Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

Botany

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - Microbiology and Phycology
	Core II- Analytical Techniques in Plant Sciences
II	Core III- Cell Biology
	Core IV - Mycology and Phytopathology
III	Core V- Archegoniatae
	Core VI- Anatomy of Angiosperms & Economic Botany
	Core VII- Genetics
IV	Core VIII- Basic Molecular Biology
	Core IX- Plant Ecology & Phytogeography
	Core X- Plant Systematics
V	Core XI- Reproductive Biology of Angiosperms
	Core XII- Basic Plant Physiology
	Core XIII- Basic Plant Biotechnology
VI	Core XIV- Basic Plant Metabolis
	Core XV- Natural Resource Management
VII	Core XVI- Applied Molecular Biology
	Core XVII- Applied Biochemistry
	Core XVIII- Biostatistics
	Core XIX- Applied Ecology
VIII	Core XX- Applied Plant Physiology
	Core XXI- Applied Biotechnology
	Core XXII- Applied Microbiology
	Core XXIII- Bioinformatics

Programme Outcomes

- To prepare the students for a career in Botany.
- To prepare the students for Higher Education and Research in Botany.
- To develop a conceptual understanding of the subject and to develop an inquisitiveness in the subject.
- To enable the student to acquire basic skills necessary to understand the subject and to master the skills to handle equipment's utilized to learn the subject.
- To generally promote wider reading on the subject and allied inter disciplinary subject.

Core I **Semester-I**

Microbiology and Phycology

Course Objectives:

- To introduce the diverse group of microorganisms and their habitat relationship.
- To learn the discovery, nature and multiplication of virus particles.
- To know the characteristics, growth and physiology of bacteria and their role in agriculture, health and industry.
- To learn the general characteristics and ecological distribution of bacteria, algae and cyanobacteria and their immense importance to the mankind.
- To have knowledge about the habitats, distribution and diversity of algae in the soil, freshwater and marine environments.

Course Outcomes

- The students learn about the diverse nature of microbes and their interaction with other organisms.
- The students certainly get the opportunities to learn the basics of the nature and impact of viruses.
- The students shall be able to understand the potential of various microbes and the approaches to use them for human welfare.
- The students would be able to identify the important microbes including bacteria, cyanobacteria, and algae available in local environments and understand their beneficial roles.
- The students shall learn about the immense potential the algal resources and understand the methods of cultivation and use of algae.

Unit-I:

Learning Outcome: The learners are able to identify diverse group of microorganisms, general features of viruses and their economic importance**.**

- The microbial world, microbial nutrition, growth and metabolism.
- Viruses**:** Discovery, nature, physicochemical and biological characteristics; classification (Baltimore), general structure with special reference to viroids and prions; replication (a general account), DNA virus (T-phage), lytic and lysogenic cycle; RNA virus (TMV). Economic importance of viruses. Vaccine production, role in research, medicine and diagnostics. Viral plant diseases- symptoms, effect and control

Unit–II:

Learning Outcome: The students understand the growth, physiology and economic importance of bacteria and cyanobacteria.

- Bacteria**:** - Discovery, general characteristics, types- archaebacteria, eubacteria, mycoplasma and spheroplasts, Cell structure, inclusions, nutrition, reproduction- vegetative, asexual and recombination (conjugation, transformation and

transduction). Economic importance of bacteria with reference to their role in agriculture, medicine and industry.

- Cyanobacteria**:-** Ecology, occurrence, cell structure, heterocyst, reproduction, economic importance; role in biotechnology. Morphology and life-cycle of *Nostoc*. General characteristics of prochlorophyceae, Evolutionary significance of Prochloron.

Unit–III:

Learning Outcome: The students able to grasp the general characteristics, ecological distribution and economic importance of algae and Chlorophyta.

- **Algae:-** General characteristics; Ecology and distribution; range of thallus organization; Cell structure and components; cell wall, pigments, reserve food (of only groups represented in the syllabus), flagella; methods of reproduction. Classification; criteria, system of Fritsch, and evolutionary classification of Lee (only upto groups); Role of algae in the environment, agriculture, biotechnology and industry.
- **Chlorophyta:-** General characteristics, occurrence, range of thallus organization, cell structure and reproduction. Morphology and life-cycles of *Chlamydomonas*, *Volvox*, *Oedogonium* and *Coleochaete*.

Unit-IV:

Learning Outcome: The students will able to understand the general characteristics, ecological distribution and economic importance of algae and cyanobacteria.

- **Charophyta:-** General characteristics; occurrence, morphology, cell structure and life-cycle of *Chara*; evolutionary significance.
- **Xanthophyta:-** General characteristics; Occurrence, morphology and life- cycle of *Vaucheria*.
- **Phaeophyta:-**Characteristics, occurrence, cell structure and reproduction. Morphology and life-cycles of *Ectocarpus* and *Fucus*.
- **Rhodophyta:-**General characteristics, occurrence, cell structure and reproduction. Morphology and life-cycle of *Polysiphonia*.

Practicals:

1. Electron micrographs/Models of viruses –T-Phage and TMV, Line drawings/ Photographs of Lytic and Lysogenic Cycle.
2. Types of Bacteria to be observed from temporary/permanent slides/photographs.
3. Examination of bacteria from bacterial culture by Gram's staining method.
4. Electron micrographs of bacteria, binary fission, endospore, conjugation, root Nodule (live materials and photographs).
5. Bacterial growth measurement by turbidometry
6. Hemocytometry

7. Colony counting using colony counter
8. Phycology: - Study of vegetative and reproductive structures of *Nostoc*, *Chlamydomonas* (electron micrographs), Volvox, *Oedogonium*, *Coleochaete*, *Chara*, *Vaucheria*, *Ectocarpus*, *Fucus* and *Polysiphonia*, *Procholoron*, Diatoms through, temporary preparations and permanent slides

Text Books:

- ✓ *Singh, V., Pandey, P.C., and Jain, D.K. (2017). Microbiology and Phycology, Rastogi Publication, Meerut.*
- ✓ *Pandey BP (2022). Botany for B.Sc. Students (Archigoniates & Plant Architecture), S. Chand publication, New Delhi*
- ✓ *Dubey RC & Maheshwari DK (2021) A text book of Microbiology, S. Chand publication, New Delhi*
- ✓ *Pandey BP (2023). Botany for B.Sc. Students Semester I, NEP 2020; S. Chand publication, New Delhi*

Reference Books:

- ✓ *Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.*
- ✓ *Prescott, L.M., Harley J.P., Klein D. A. (2010). Microbiology, McGraw-Hill, India. 8th edition.*
- ✓ *Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.*
- ✓ *Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.*
- ✓ *Pelczar, M.J., Chan, E.C.S., Krieg, N.R. (2011) Microbiology, 8th edition, Tata McGraw-Hill Co, New Delhi.*
- ✓ *Willey, Sherwood and Christopher. Laboratory exercises in Microbiology. McGraw- Hill, India. 9th edition.*
- ✓ *Vasistha B.R. (2017) Botany for Degree student, Algae, S. Chand Publication, New Delhi.*
- ✓ *Mishra B. K. (2018) Microbiology and Phycology, Kalyani Publishers, New Delhi.*

Core II Analytical Techniques in Plant Sciences

Course Objective

- To learn the principles and operations of microscopes of various complexity and their application in biological studies.
- To learn the techniques of centrifugation for separation of biological samples.
- To learn the methods of radioisotopes measurement in and their importance in study of biological materials and processes.
- To understand and the principles and applications of spectrophotometry and to understand the basic structural design of a standard instrument.
- To learn about various chromatographic techniques in separation of plant extracts.
- To acquaint the students with the advanced methods for characterization of biomolecules

Course Outcomes:

- Proper understanding of the microscopy and knowledge to analyze plant samples using electron microscopy and flow Cytometer.
- Separation of biomolecules and cell organelle and appropriate application of the knowledge of centrifugation for the same.
- Basic knowledge on the use of radioisotopes for analysis of biological samples.
- Extraction and qualitative and quantitative analysis of extracts as well as the assay mixtures using spectrophotometer.
- Skilful application of chromatographic techniques for separation of amino acids, pigments and biomolecules.
- Proper method for characterizing protein and nucleic acids and skill on handling electrophoresis equipment for preparation of gels.

Unit-I:

Learning Outcomes: Students will able to acquires knowledge about principles of microscopy and their types.

Imaging and related techniques: Principles of microscopy; Light microscopy; Fluorescence microscopy; Flow cytometry (FACS); Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching.

Unit-II:

Learning Outcomes: Students will learn about the principles of centrifugation in biomolecule separation and importance of radiography in biological research

Cell fractionation: Centrifugation: Differential and density gradient centrifugation, Sucrose density gradient, $CsCl_2$ gradient, analytical centrifugation, ultracentrifugation. Radioisotopes: Use in biological research, auto-radiography, pulse chase experiment.

Unit-III:

Learning Outcomes: Students will learn about the components and working principle of different types of Spectrophotometer

Spectroscopy: Principles, Components and working mechanism of UV-Visible and Infra-Red spectroscopy, Fluorescence spectroscopy, Chlorophyll *a* fluorescence, Flame photometer, Bomb Calorimeter and Atomic Absorption Spectrophotometer.

Unit-IV:

Learning Outcomes: Students will learn about the separation methods for biomolecules using chromatography and electrophoresis instruments.

- **Chromatography:** Principle of chromatography, paper chromatography, column chromatography, TLC, HPLC, Ion-exchange chromatography, Molecular sieve chromatography, Affinity chromatography.
- **Characterization of proteins and nucleic acids:** Electrophoresis: AGE, PAGE, SDS-PAGE. Mass spectrometry; X-ray diffraction, X-ray crystallography.

Practicals:

1. Study of different microscopic techniques observation through simple and compound microscope
2. Study of PCR using demonstration.
3. To separate pigments by paper chromatography.
4. To separate phytochemicals by thin layer chromatography.
5. Qualitative analysis of total Carbohydrates, Proteins & Lipids.
6. Demonstration of SEM/ Electrophoresis/ Chromatography.
7. Measuring OD using spectroscopy.
8. Beer Lombard's law and its validation

Text Books:

- ✓ *Patil, C. S. (2017). Advanced Analytical Techniques, ABE Books, New Delhi.*
- ✓ *Pandey BP (2023). Botany for B.Sc. Students Semester I, NEP 2020; S. Chand publication, New Delhi*

Reference Books:

- ✓ *Aneja, K. R. (2014). Laboratory manual of microbiology and biotechnology, Medtech, New Delhi*
- ✓ *Ausubel, F., Brent, R., Kingston, R. E., Moore, D.D., Seidman, J.G., Smith, J.A., Struhl, K. (1995). Short Protocols in Molecular Biology. John Wiley & Sons. 3rd edition.*
- ✓ *Plummer, D.T. (1996). An Introduction to Practical Biochemistry. Tata McGraw-Hill Publishing Co. Ltd. New Delhi. 3rd edition.*
- ✓ *Ruzin, S.E. (1999). Plant Micro technique and Microscopy, Oxford University Press, New York. U.S.A.*

Pandey, B.P. (2023). Botany for B.Sc. Students Semester I: NEP 2020, S. Chand Publishing.

Core III **Semester II**

Cell Biology

Course Objectives:

- To understand the basic components of prokaryotic and eukaryotic cells and the role of various macromolecules in the cells.
- Understand how the formation of cytoskeleton
- To have an understanding on nucleic acids as the genetic material;
- To learn the basic mechanism of replication of nucleic acids
- Understand how cells undergo mitosis & meiosis

Course Outcomes

- Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles.
- Students will understand the components of cell wall & cytoskeleton
- Students will understand how these cellular components are used to generate and utilize energy in cells.
- Students will apply their knowledge of cell biology to selected examples of changes or losses in cell function. These can include responses to environmental or physiological changes.
- Students will understand the cellular components underlying mitotic and meiotic cell division.

Unit-I:

Learning Outcomes: Students will understand the orgin, growth and basic components of cell, cell wall & cytoskeleton.

- The Cell: Cell as a unit of structure and function; Characteristics of prokaryotic and eukaryotic cells; Origin of eukaryotic cell (Endosymbiotic theory). Unique features of plant cells
- Plasmodesmata: Structure, role in movement of molecules & macromolecules, comparison with gap junctions.
- Plant Cell wall: Chemistry, structure and function.
- Cytoskeleton: The concept, structure and roles of microtubules, microfilaments and intermediary filament.

Unit–II:

Learning Outcomes: Students will recognize composition of Plasma Membrane and origin, structure, function of cell organelles

- Plasma Membrane: Overview of membrane structure and function; fluid mosaic model; Chemical composition of membranes; Membrane transport – Passive, active and facilitated transport, endocytosis and exocytosis.
- Cell organelles: Endoplasmic Reticulum, Golgi apparatus, Lysosomes & plant Vacuole.

Unit-III:

Learning Outcomes: Students will realize the importance of photosynthesis and cellular respiration

- Cell organelles: Chloroplast, Mitochondria and Peroxisomes: Structural organization & Function.
- Biogenesis & semiautonomous nature of mitochondria and chloroplast.
- Nucleus: Structure-nuclear envelope, nuclear pore complex, nuclear lamina & Function

Unit-IV:

Learning Outcomes: Students will understand the cellular units (DNA& RNA) underlying mitotic and meiotic cell division

- Nucleolus: Structure and function of nucleolus, Chromatin organization, its packaging role of nuclear matrix in chromosome organization and function, matrix binding proteins.
- Nucleic acids: Structure of nitrogenous bases; Structure and function of nucleotides; Types of nucleic acids; Structure of A, B, Z types of DNA; Types of RNA
- Cell division: Eukaryotic cell cycle, different stages of mitosis and meiosis. Cell cycle, Regulation of cell cycle.

Practical:

1. Study of plant cell structure with the help of epidermal peel mount of Onion/Rhoeo
2. Demonstration of the phenomenon of protoplasmic streaming in Hydrilla leaf.
3. Counting the cells per unit volume with the help of hemocytometer. (Yeast/pollen grains).
4. Study the phenomenon of plasmolysis and deplasmolysis.
5. Study of different stages of mitosis and meiosis using acetocarmine and acetoorcine method from Onion root tip and bud respectively.
6. To find out the mitotic index

Text Books:

- ✓ *Rastogi, V. B. (2016). Introductory Cytology, Kedar Nath & Ram Nath, Meerut*
- ✓ *Verma PS & Agarwal VK (2022) Cell Biology (Cytology, Biomoleculus and Molecular Biology) S Chand Publication ,New Delhi.*
- ✓ *Gupta, P. K. (2017). Biomolecules and Cell Biology, Rastogi Publication, Meerut.*
- ✓ *Kumar S. (2023). Cell biology, Pragati prakashan, Meerut*

Reference Books:

- ✓ *Sahoo, K. (2017) Biomolecules and Cell Biology, Kalyani Publishers, New Delhi.*
- ✓ *Tymoczko, J.L., Berg, J.M. and Stryer, L. (2012) Biochemistry: A short course, 2nd ed., W.H. Freeman*
- ✓ *Nelson, D.L. and Cox, M.M. (2008) Lehninger Principles of Biochemistry, 5th Edition, W.H. Freeman and Company.*
- ✓ *Cooper, G.M. and Hausman, R.E. 2009 The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.*
- ✓ *Kumar HD , Molecular Biology 2ed Vikas Publication*
- ✓ *Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009 The World* of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco

Core IV **Mycology and Phytopathology**

Course Objectives

- To learn classification and diversity of fungi and their nutritional requirements.
- To learn the life cycle and ecology of some important genera of fungi and their pathogenicity.
- To understand the beneficial fungal interactions.
- To learn about edible fungi and their role in human nutrition.
- To learn the beneficial application of fungi in agriculture and medicine.
- To know the phyto-pathological processes and the method of their prevention and control.

Course Outcomes

- Have an idea on the vast fungal diversity in nature and method of their identification and culture.
- Know the life cycle of commonly occurring fungal genera and the disease caused by them.
- Have knowledge on the types of fungal associations and their importance.
- Have knowledge and skill on the application of fungi and fungal biomolecules in human welfare.
- Have skill to understand the host - parasite relationship and its role in establishment of viral, fungal and bacterial diseases in plants.
- Understand the causes and conditions for commonly occurring plant diseases and the methods of their control.

Unit-I:

Learning Outcomes: To introduce the students with the classification and diversity of fungi and their nutritional requirements**.**

- Introduction to true fungi: Definition, General characteristics; Affinities with plants and animals; Thallus organization; Cell wall composition; Nutrition; Classification; spore of fungi
- Zygomycota: General characteristics; Ecology; Thallus organization; Life cycle with reference to *Rhizopus*.
- Ascomycota: General characteristics (asexual and sexual fruiting bodies); Ecology; Life cycle, Heterokaryosis and parasexuality; life cycle and classification with reference to *Saccharomyces*, *Aspergillus*, *Penicillium*, and *Neurospora*.
- Basidiomycota: General characteristics; Ecology and Classification; Life cycle of *Puccinia* and *Agaricus*.

Unit-II:

Learning Outcomes: To introduce the students with the general characteristics, classification of allied fungi and the beneficial symbiotic asociations.

- **Allied Fungi:** General characteristics; Status of Slime molds, Classification; Occurrence; Types of plasmodia; Types of fruiting bodies.

- **Oomycota:** General characteristic; Ecology; Life cycle and classification with reference to *Phytophthora*, and *Albugo*.
- **Symbiotic associations**: Lichen – Occurrence; General characteristics; Growth forms and range of thallus organization; Nature of associations of algal and fungal partners; Reproduction. Economic importance of Lichens, Mycorrhiza-Ectomycorrhiza, Endomycorrhiza and their significance.

Unit-III:

Learning Outcomes: To introduce the students with the role of fungi in food industries, agriculture and medicine.

Applied Mycology: Role of fungi in biotechnology & research, Mushroom cultivation, Application of fungi in food industry (Flavor & texture, Fermentation, Baking,Organic acids, Enzymes, Mycoproteins); Secondary metabolites (Pharmaceutical preparations); Agriculture (Biofertilizers); Mycotoxins; Biological control (Mycofungicides, Mycoherbicides, Mycoinsecticides, Myconematicides); Medical mycology.

Unit-IV:

Learning Outcomes: To introduce the students with the phytopathological processes and method for prevention and control of plant diseases.

- **Phytopathology:** Terms and concepts; General symptoms; Geographical distribution of diseases; etiology; symptomology; Host- Pathogen relationships; disease cycle and environmental relation; prevention and control of plant diseases, and role of quarantine. **Bacterial diseases** – Citrus canker and angular leaf spot disease of Cotton. Viral diseases – Tobacco Mosaic, Vein Clearing. Fungal diseases – Early blight of potato, Loose and covered smut.

Practical:

1. Introduction to the world of fungi (Unicellular, coenocytic/ septate mycelium, ascocarps & basidiocarps).
2. *Rhizopus*: study of asexual stage from temporary mounts and sexual structures through permanent slides.
3. *Aspergillus, Penicillium and Saccharomyces*: study of asexual stage from temporary mounts. Study of Sexual stage from permanent slides/photographs.
4. *Puccnia* : Study of different stages from temporary mounts and permanent slides.
5. *Agaricus*: Specimens of button stage and full-grown mushroom; sectioning of gills of Agaricus, and fairy rings are to be shown.
6. *Albugo*: Study of symptoms of plants infected with *Albugo*; asexual phase study through section/ temporary mounts and sexual structures through permanent slides.
7. Phytopathology: Herbarium specimens of bacterial diseases; Citrus Canker; Viral diseases: Mosaic disease of ladies' finger, papaya, cucurbits, moong, black gram, Fungal diseases: Blast of rice, Tikka disease of ground nut, powdery mildew of locally available plants and White rust of crucifers.

Text Books:

- ✓ *Mishra, B. K. (2017), Mycology and Phytopathology, Kalynai Publishers, New Delhi.*
- ✓ *Pandey BP (2022).Plant Pathology, S. Chand publication, New Delhi*

Reference Books:

- ✓ *Sharma, P. D. (2017). Mycology and Phytopathology Rastogi Publication, Meerut.*
- ✓ *Agrios, G.N. (1997) Plant Pathology, 4th edition, Academic Press, U.K.*
- ✓ *Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley &Sons (Asia) Singapore. 4th edition.*
- ✓ *Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.*
- ✓ *Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.*
- ✓ *Mehrotra, R. S. (2011). Plant Pathology. Tata Mc Graw-Hill Publishing Company Limited, New Delhi*
- ✓ *Vashishta B.R, Sinha A.K & Kumar. A Botany For Degree Students : FUNGI (S chand Publica) New Delhi*
- ✓ *Dubey RC & Maheshwari DK (2021) A text book of Microbiology, S. Chand publication, New Delhi*

Core V **Semester III**

Archegoniatae

Course Objectives

- To know the principles, hypotheses and process of adaptation of plants to land habitat.
- To learn about the origin classification, and characteristics of bryophytes through some representative genera.
- To learn about the origin and distribution of vascular plants and stages of evolution of conducting tissues.
- To study the morphology, and characteristics of pteridophytes through some representative genera.
- To learn the characteristics, classification and importance of the gymnosperms.
- To have a general knowledge on the fossils and fossilization processes.

Course Outcomes:

- Able to understand the mechanism of the evolution of the higher plants and their adaptation to land habit.
- Knowledge on the diversity of archegoniates and their and their pattern of habitat specific distribution.
- Knowledge on the characteristics of bryophytes and skill to differentiate the genera on the basis of their morphology and anatomy.
- Ability to identify the members of pteridophytes and knowledge on their characteristic features.
- Understand the unique features and distribution of gymnosperms.
- Capacity to analyze various types of fossils on the basis of their characters.

Unit-I:

Leaning Outcomes: The students will gain knowledge on the basic characteristics of Archegoniates.

- Introduction: Unifying features of archegoniates; Transition to land habit; Alternation of generations. General characteristics; Origin of land plants and Adaptations to land habit;
- Bryophytes: Origin and Classification; Range of thallus organization. Classification (up to family). Structure, Reproduction and evolutionary trends in *Riccia*, *Marchantia*, *Anthoceros* and *Funaria* (developmental stages not included).
  Ecological and economic importance of bryophytes.

Unit-II:

Leaning Outcomes: The learners shall acquire an understanding on the origin, evolution and structural uniqueness of pteridophytes.

Pteridophytes: General characteristics, classification. Classification (up to family), morphology, anatomy and reproduction of *Psilotum*, *Selaginella*, *Equisetum*, *Pteris* and

Marsilea. Apogamy, and apospory, heterospory and seed habit, telome theory, stellar evolution and economic importance.

Unit-III:

Leaning Outcomes: The learners shall have the skill to identify and evaluate the importance of gymnosperms in a habitat

Gymnosperms: General characteristics, classification (up to family), morphology, anatomy and reproduction of *Cycas, Pinus, Ginkgo* and *Gnetum*. (Developmental details not to be included). Ecological and economic importance.

Unit-IV:

Leaning Outcomes: The student will have knowledge to identify and analyze a fossil specimen.

Palaeobotany: Geological time scale, fossils and fossilization process. Morphology, anatomy and affinities of *Rhynia, Calamites, Lepidodendron, Lyginopteris, Cycadeoidea and Williamsonnia*.

Practical:

1. Morphology, anatomy and reproductive structures of *Riccia, Marchantia, Anthoceros, Funaria.*
2. *Psilotum*- Study of specimen, transverse section of synangium (permanent slide).
3. *Selaginella*- Morphology, whole mount of leaf with ligule, transverse section of stem, whole mount of strobilus, whole mount of microsporophyll and megasporophyll (temporary slides), longitudinal section of strobilus (permanent slide).
4. *Equisetum*- Morphology, transverse section of internode, longitudinal section of strobilus, transverse section of strobilus, whole mount of sporangiophore, whole mount of spores (wet and dry) (temporary slide), transverse section of rhizome (permanent slide).
5. Study of temporary preparations and permanent slides of *Marsilea*.
6. *Pteris*- Morphology, transverse section of rachis, vertical section of sporophyll, whole mount of sporangium, whole mount of spores (temporary slides), transverse section of rhizome, whole mount of prothallus with sex organs and young sporophyte (permanent slide).
7. *Cycas*- Morphology (coralloid roots, bulbil, leaf), whole mount of microsporophyll and megaspore, T.S root, leaflet, rachis
8. *Pinus*- Morphology (long and dwarf shoots, whole mount of dwarf shoot, male and female cones), T.S. Needle, stem, L.S. male cone, whole mount of microsporophyll, whole mount of Microspores (temporary slides), L.S. of female cone.
9. *Gnetum*- Morphology (stem, male & female cones), transverse section of stem, vertical section of ovule (permanent slide).

10. Study of some fossil slides / photographs as per theory.

Text Books:

- ✓ *Vasistha, B. R. (2017) Botany for Degree student, Bryophyta, S. Chand Publication, New Delhi.*
- ✓ *Singh, V., Pandey, P.C. and Jain, D.K. (2017). Archegoniate, Rastogi Publication, Meerut.*
- ✓ *Pandey B.P (2020) Botany For Degree Students NEP S Chand Publication New Delhi.*

Reference Books:

- ✓ *Acharya, B. S. (2017), Archegoniate, Kalyani Publishers, New Delhi.*
- ✓ *Vashistha, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S. Chand. New Delhi, India.*
- ✓ *Bhatnagar, S.P. & Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India.*
- ✓ *Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill, Delhi.*
- ✓ *Rashid. A. An Introduction To Archegoniate Plants (Vikas Publication) New Delhi*.

Core VI **Anatomy of Angiosperms & Economic Botany**

Course Objectives

- To explain the tissues and tissue systems in plants.
- To explain the organization of shoot and root apices.
- To educate the students on the activity of meristems for primary and secondary growth of plants
- To explain about various types of woods in plants and their developmental pattern.
- To give a comprehensive idea about economic botany and its importance in human welfare.
- To provide knowledge on general account, cultivation, propagation and uses of common crops.

Course Outcomes:

- The ability to examine the internal anatomy of plant systems and organs.
- Develop a critical understanding of the evolution of the concept of organization of shoot and root apex.
- Evaluate the adaptive and protective morphological systems of plants.
- Be able to know the origin and evolution of crops and the importance of wild relatives in crop improvement.
- Develop a basic knowledge on germplasm and the basics for their conservation.
- Have an understanding of plants as a source of food, beverages, spices, and materials and its application in human welfare.

Unit-I:

Learning Outcomes: Students will learn about the plant tissues and their anatomical structures. They will also learn about adaptive modifications in plants to adjust at different environments**.**

- Introduction and scope of Plant Anatomy: Applications in systematics, forensics and pharmacognosy.
- Tissues: Classification of tissues; Simple and complex tissues (no phylogeny); cyto-differentiation of tracheary elements and sieve elements; Pits and plasmodesmata; Cell wall ingrowths and transfer cells, adcrustation and incrustation, Ergastic substances.
- Adaptive and Protective Systems: Epidermal tissue system, cuticle, epicuticular waxes, trichomes (uni-and multicellular, glandular and non-glandular: two examples of each), stomata (classification); Anatomical adaptations of xerophytes and hydrophytes.

Unit-II:

Learning Outcomes: Students will learn about the leaf anatomical components. They will also learn about the organization of root and shoot system in plant.

- **Leaf:** Anatomy of dicot and monocot leaf, Kranz anatomy.
- **Stem:** Organization of shoot apex (Apical cell theory, Histogen theory, Tunica Corpustheory, continuing meristematic residue, cyto-histological zonation); Types of vascular bundles; Anatomy of dicot and monocot stem. Vascular Cambium: Structure, function and seasonal activity of cambium; secondary growth in stem (normal and anomalous). Root Stem transition.
- **Root:** Organization of root apex (Apical cell theory, Histogen theory, Korper-Kappe theory); Quiescent center; Root cap; Anatomy of dicot and monocot root; Endodermis, exodermis and origin of lateral root. Secondary growth in roots

Unit-III:

Learning Outcomes: Students will learn about the plant domestication and cultivation of important crop pla**nts.**

- **Origin of Cultivated Plants**: Concept of Centers of Origin, their importance with reference to Vavilov's work. Examples of major plant introductions; Crop domestication and loss of genetic diversity; evolution of new crops/varieties, importance of germplasm diversity.
- **Cereals:** Cultivation and brief account of Wheat, Rice and millets.
- **Legumes:** General account, importance to man and ecosystem.
- **Sugars & Starches**: Morphology, cultivation and processing of sugarcane, products and by-products of sugarcane industry. Potato – morphology, cultivation, propagation & uses.

Unit –IV:

Learning Outcomes: Students will learn about the important timber, spice, oils and fats and drug yielding plants.

- **Timber plants**: General account with special reference to teak and pine. Fibers: Classification based on the origin of fibers, Cotton and Jute (morphology, extraction and uses).
- **Spices:** Listing of important spices, their family and part used, economic importance with special reference to fennel, saffron, clove and black pepper Beverages: Tea, Coffee (morphology, processing & uses).
- **Oils & Fats**: General description, classification, extraction, their uses and health implications groundnut, coconut, linseed and *Brassica* (Botanical name, family & uses)
- **Drug-yielding plants**: Therapeutic and habit-forming drugs with special reference to Cinchona, Digitalis, Papaver and Cannabis

Practical:

1. Epidermal system: cell types, stomata types; trichomes: non-glandular and glandular.
2. Root: monocot, dicot, secondary growth.
3. Stem: monocot, dicot - primary and secondary growth (normal and anomalous); periderm; lenticels.
4. Leaf: isobilateral, dorsiventral, C4 leaves (Kranz anatomy).
5. Ecological anatomy.
6. Cereals: Rice (habit sketch, study of paddy and grain, starch grains).
7. Legumes: Soya bean/moong bean/black gram, Groundnut, (habit, fruit, seed structure, micro-chemical tests).
8. Spice and Beverages: clove, black pepper, Tea (plant specimen, tea leaves), Coffee (plant specimen, beans).
9. Fiber-yielding plants: Cotton (specimen, whole mount of seed to show lint and fuzz; whole mount of fiber and test for cellulose), Jute (specimen, transverse section of stem, test for lignin on transverse section of stem and fiber).

Text Books:

- ✓ *Singh, V., Pandey, P.C. and Jain, D.K. (2017). Anatomy of Angiosperms, Rastogi Publication, Meerut.*
- ✓ *Pandey, B. P. (2017) Plant Anatomy, S. Chand Publication, New Delhi.*
- ✓ *Pandey, B. P. (2017) Economic Botany , S. Chand Publication, New Delhi.*

Reference Books:

- ✓ *Eames, A.J. and Mc Daniels, L.H., (1953). An introduction to plant anatomy, Tata Mc Grow Hills, New Delhi*
- ✓ *Esau, K. (1977). Anatomy of Seed Plants. John Wiley & Sons, Inc., Delhi.*
- ✓ *Tayal, M. S. (2012) Plant Anatomy Rajpal and Sons, New Delhi*
- ✓ *Mishra, B. K. (2017). Anatomy of Angiosperms, Kalyani Publishers, New Delhi.*
- ✓ *Pandey, B. P. (2017) Plant Anatomy, S. Chand Publication, New Delhi.*
- ✓ *Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.*
- ✓ *Samba Murty, A.V.S.S. and Subrahmanyam, N.S. (2011). Text Book of Modern Economic Botany, CBS Publishers and Distributors, New Delhi.*
- ✓ *Hill, Albert F. Economic Botany, Tata Mc Grow Hill Publishing Company, Ltd. New Delhi.*
- ✓ *Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.*
- ✓ *Singh, V., Pandey, P.C. and Jain, D.K. (2017). Economic Botany, Rastogi Publication, Meerut.*
- ✓ *Baruah, B. (2017). Economic Botany, Kalyani Publishers, New Delhi.*

Core VII **Genetics**

Course Objective

- To know general organization, possible function, and frequency of genes and non-gene DNA sequences in a typical eukaryotic genome.
- Practical methodology for applying Mendelian laws (heavily reliant on problem solving).
- Extensions of Mendelian genetics, including different forms of allelic relationships.
- To know different types of mutations, affect genes and the corresponding mRNAs and proteins.
- Inheritance of linked genes, including recombination mapping, and the physical basis of these rules (chromosomal behaviour during meiosis)

Course Outcomes:

- Learn the basic principles of inheritance at the molecular, cellular and organismal levels.
- Understand the mechanism of inheritance and its relationship with the expression of morphological traits.
- Understand the relationships between molecule/cell level phenomena ("modern" genetics) and organism-level patterns of heredity ("classical" genetics)
- Know about the variations by polyploidy, chromosomal aberration and gene mutations.
- Test and deepen their mastery of genetics by applying this knowledge in a variety of problem-solving situations

Unit-I:

Learning Outcomes: To acquire the basic principles of inheritance at the molecular, cellular and organismal levels

- Mendelian genetics and its extension Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Interaction of genes, Pleiotropy, Recessive and Dominant traits, Polygenic inheritance.
- Extrachromosomal Inheritance: Chloroplast mutation: Variegation in Four o'clock plant; Mitochondrial mutations in yeast; cytoplasmic male sterility; Maternal effects-shell coiling in snail; Infective heredity- Kappa particles in Paramecium.

Unit-II:

Learning Outcomes: Relationships between modern genetics and classical genetics

Linkage, crossing over and chromosome mapping: Linkage and crossing over- Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Numerical based on gene mapping; Sex Linkage.

Unit-III:

Learning Outcomes: To develop mutants using different mutagens

- Variation in chromosome number and structure: Deletion, Duplication, Inversion, Translocation, Position effect, Euploidy and Aneuploidy
- Gene mutations: Types of mutations; Molecular basis of Mutations; Mutagens - physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: CIB method. Role of Transposons in mutation. DNA repair mechanisms.

Unit-IV:

Learning Outcomes: : Applying this knowledge in a variety of problem-solving situations of genetics

- The structure of gene: Classical vs. molecular concepts of gene; Cis-Trans complementation test for functional allelism; Structure of Phage T4, rII Locus.
- Population and Evolutionary Genetics: Gene pool, Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection, mutation, genetic drift. Genetic variation and Speciation

Practical:

1. Analysis of allelic and genotypic frequencies.
2. Mendel's laws through seed ratios. Laboratory exercises in probability and chi-square analysis.
3. Chromosome mapping using test cross data.
4. Pedigree analysis for dominant and recessive autosomal and sex-linked traits.
5. Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1, 9:3:4).
6. Blood Typing: ABO groups & Rh factor.
7. Chromosome anomaly: Translocation Ring, Laggards and Inversion Bridge, break etc. (through photographs).

Text Books:

- ✓ *Singh B. D. (2017). Fundamental of Genetics, Kalyani Publishers, New Delhi.*
- ✓ *Gupta P. K. (2017). Genetics, Rastogi Publication, Meerut.*
- ✓ *Verma P. S (2022) Genetics Revised Ed. Schand Publication. New Delhi*

Reference Books:

- ✓ *Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & Sons, India. 8th edition.*
- ✓ *Sinnot, E.W., Dunn, L.C. and Dobzhansky, T. (1985) Principles of Genetics, Tata Mc Grow Hill, New Delhi*
- ✓ *Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. Benjamin Cummings, U.S.A. 10th edition.*
- ✓ *Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W.H. Freeman and Co., U.S.A. 10th edition.*
- ✓ *Strickberger, M.W. Genetics, Pearson Publishers, 3rd Edition*
- ✓ *Rastogi V. B. (2017). Genetics, Kedar Nath & Ram Nath, Meerut*

Core VIII **Semester IV**

Basic Molecular Biology

Course Objectives

- To understand the Historical perspective of DNA and DNA as the carrier of genetic information.
- To learn the Organization and structure of DNA and RNA in pro-and eukaryotes.
- To understand the structure and function organellar and nuclear genomes.
- To understand the General principles of replication and the relationship with genetic code.
- To study about Processing and modification of RNA in prokaryotes and eukaryotes for translation.

Course Outcomes:

On completion of the course the students shall

- Be able to describe Organization and structure and replication of DNA and RNA.
- Have theoretical and practical knowledge the prokaryotic and eukaryotic nucleic acids.
- Have a clear understanding on the structure and function of organellar genome.
- Understand the processes of bidirectional, semi-conservative and semi discontinuous mode of replication and the importance of the genetic code.
- Have ability to understand the mechanism of translation in prokaryotes and eukaryotes.

Unit- I:

Learning Outcomes: Students will gain knowledge about historical perspective and experimental proof of nucleic acids as genetic material.

Nucleic acids: Carriers of genetic information: Historical perspective; DNA as the carrier of genetic information (Griffith's, Hershey & Chase, Avery, McLeod; McCarty), Types of genetic material, denaturation and renaturation, cot curves. Organization of DNA and structure of RNA- Prokaryotes, Viruses, Eukaryotes, Fraenkel-Conrat's experiment. Organelle DNA - mitochondria and chloroplast DNA. The Nucleosome – Chromatin structure - Euchromatin, Heterochromatin- Constitutive and Facultative heterochromatin.

Unit-II:

Learning Outcomes: This is to gain knowledge about general principles and mechanism of replication of DNA and RNA processing

The replication of DNA: Chemistry of DNA synthesis (Kornberg's discovery); General principles–bidirectional, semi-conservative and semi-discontinuous replication, RNA priming; Various models of DNA replication, including rolling circle, θ (theta) mode of replication, replication of linear ds-DNA, replication of the 5′ end of linear chromosome; Enzymes involved in DNA replication. Central dogma and genetic code: Key experiments establishing-The Central Dogma (Adaptor hypothesis and discovery of mRNA template), Genetic code (deciphering & salient features).

Unit-III:

Learning Outcomes: This is to learn the Mechanism of Transcription and transcriptional regulation in Prokaryotes and Eukaryotes

- Mechanism of Transcription: Transcription in prokaryotes and eukaryotes;
- Regulation of transcription in prokaryotes and eukaryotes: Principles of transcriptional
- Regulation; Prokaryotes: Operon concept- Regulation of lactose metabolism and tryptophan synthesis in E. coli. Eukaryotes: transcription factors, heat shock proteins, steroids and peptide hormones; Gene silencing
- Processing and modification of RNA: Split genes-concept of introns and exons, removal of introns, spliceosome machinery, splicing pathways, group I & group II intron splicing, alternative splicing eukaryotic mRNA processing (5′ cap, 3′ polyA tail); Ribozymes, exon shuffling; RNA editing and mRNA transport.

Unit-IV:

Learning Outcomes: Students will gain knowledge on Mechanism of Translation and Translation regulation in Prokaryotes and Eukaryotes**.**

Translation (Prokaryotes and eukaryotes): Ribosome structure and assembly; Charging of tRNA, aminoacyl tRNA synthetases; Various steps in protein synthesis, proteins involved in initiation, elongation and termination of polypeptides; Fidelity of translation; Inhibitors of protein synthesis; post-translational modifications of proteins.

Practical:

1. Preparation of LB medium and raising E. coli.
2. Isolation of genomic DNA from suitable plant material.
3. RNA estimation by orcinol method.
4. DNA estimation by diphenylamine reagent/UV Spectrophotometry.
5. Photographs establishing nucleic acid as genetic material (Messelson and Stahl's, Avery et al, Griffith's, Hershey & Chase's and Fraenkel & Conrat's experiments)
6. Study of Barr body from buccal smear preparation.

Text Books:

- ✓ *Gupta P. K. (2017). Molecular Biology, Rastogi Publication, Meerut.*
- ✓ *Verma P. S & Agarwal V. K (2022) Molecular Biology Revised Ed. S. chand Publication. New Delhi*

Reference Books:

- ✓ *Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M., Losick, R. (2007).*
- ✓ *Molecular Biology of the Gene, Pearson Benjamin Cummings, CSHL Press, New York, U.S.A. 6th edition.*
- ✓ *Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons Inc., U.S.A. 5th edition.*
- ✓ *Klug, W.S., Cummings, M.R., Spencer, C.A. (2009). Concepts of Genetics. Benjamin. Cummings. U.S.A. 9th edition.*
- ✓ *Sheeler, P. and Bianchi, D.E. (2009) Molecular Biology of the Cell, Willey Publisher, New Delhi*
- ✓ *Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W.H. Freeman and Co., U.S.A. 10th edition.*
- ✓ *Alberts, B. et al. 2014. Molecular Biology of the cell Garland Science. 6 th Edition*
- ✓ *Power, C. B. (2017) Cell Biology, Himalaya Publishing House, New Delhi*
- ✓ *Sahu, A.C. (2017). Essentials of Molecular Biology, Kalynai Publishers, New Delhi.*
- ✓ *Kumar H. D Molecular Biology 2nd Ed.Vikas Publication New Delhi.*

Core IX **Plant Ecology & Phytogeography**

Course objectives

- To learn the interaction of biotic components with non-living components of an ecosystem.
- To introduce to various natural ecosystems and how the interaction among different biotic and abiotic factors influencing the stability and diversity of an ecosystem.

- To study the physical, biological and chemical characteristics of factors influencing population.
- To know the experimental approach to determine the physical, chemical and organic matters of soil.
- To introduce the students to the characteristics and dynamism of population ecology.

Course Outcomes:

- Have ability to understand the ecological functioning of ecosystems and would certainly help students to maintain the local ecosystems.
- Have information on species' geographical range and how the size and life history influenced by the various components of ecosystems.
- An understanding of the factors that influence patterns of abundance and distribution in populations.
- Have knowledge on the process of soil formation and approaches to study the nature of soils.
- Have skill to evaluate the dynamics of change of population characteristics.

Unit-I:

Learning Outcomes: The students learn the concept of ecology and inter-relationships between the living world and its environment.

- Introduction and Concept of ecology, Autoecology, Synecology, System ecology: Levels of organization. Inter-relationships between the living world and the environment, the components of environment, concept of hydrosphere and lithosphere and dynamism, homeostasis.
- Light, temperature, wind and fire.Variations; adaptations of plants to their variation.

Unit-II:

Learning Outcomes: The students get idea on the formation, composition and profile of soil and state of water in environment.

Soil: Formation; Composition; Physical; Chemical and Biological components; Soil profile; Role of climate in soil development.

Water: Importance: States of water in the environment; Atmospheric moisture; Precipitation types (rain, fog, snow, hail, dew); Hydrological Cycle

Unit-III:

Learning Outcomes: The students grasp about the dynamics of population ecology and plant communities.

- Biotic interactions and Population ecology: Characteristics and Dynamics.
- Plant communities: Concept of ecological amplitude; Habitat and niche; Characters: analytical and synthetic; Ecotone and edge effect; Dynamics: succession – processes, types;

climax concepts.

Unit-IV:

Learning Outcome : The students know about the ecosystem process and phytogeography of India.

- Ecosystems: Structure; Processes; Trophic organization; Food chains and Food webs; Ecological pyramids.
- Functional aspects of ecosystem: Principles and models of energy flow; Production and productivity; Ecological efficiencies; Biogeochemical cycles; Cycling of Carbon, Nitrogen and Phosphorus.
- Phytogeography: Principles; Continental drift; Theory of tolerance; Endemism; Phytogeographical division of India; Vegetation of Odisha.

Practical:

1. Determination of pH of various soil and water samples (pH meter, universal indicator/Lovibond comparator and pH paper)
2. Analysis for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency from two soil samples by rapid field tests.
3. Determination of dissolved oxygen of water samples from polluted and unpolluted sources.
4. Study of morphological adaptations of hydrophytes, xerophytes, halophiles (two each).
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus, by species area curve method (species to be listed).
6. Quantitative analysis of herbaceous vegetation for frequency, density and abundance in the college campus.
7. Field visit to familiarize students with ecology of different sites.

Text Books:

- ✓ *Sharma, P.D. (2017). Fundamentals of Ecology. Rastogi Publications, Meerut, India.*
- ✓ *Shukla R.S. and Chandel P.S. (2016). A Text Book of Plant Ecology. S Chand Publication, New Delhi.*

Reference Books:

- ✓ *Odum, E.P. (2005). Fundamentals of ecology. Cengage Learning India Pvt. Ltd., New Delhi. 5thedition.*
- ✓ *Singh, J.S., Singh, S.P., Gupta, S. (2006). Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi, India.*

- ✓ *Wilkinson, D.M. (2007). Fundamental Processes in Ecology: An Earth Systems Approach. Oxford University Press. U.S.A.*
- ✓ *Kormondy, E.J. (1996). Concepts of ecology. PHI Learning Pvt. Ltd., Delhi, India. 4th edition.*
- ✓ *Santra, S. C. (2015) Environmental Science. New Central Book Agency (P) Ltd. Kolkata.*
- ✓ *Das M. C. and Das S. P. (2009). Fundamental of Ecology. Tata MGrow Hill, New Delhi.*
- ✓ *Shukla R.S. and Chandel P.S. (2016). A Text Book of Plant Ecology. S Chand Publication, New Delhi.*
- ✓ *Kumar H D by Modern Concept of Ecology Revised Ed. Vikas Publication.*

Core X

Plant Systematics

Course Objectives

- A comprehensive presentation of the rules, regulations and codes of governing principles of the International Code of Nomenclature of Algae, Fungi and Plants (ICN)

- To provide knowledge on basic concepts of plant nomenclature and the tools used for naming the taxa.
- To impart knowledge on the traditional and advanced systems of classification of lower and higher plants.
- To acquaint the students with the modern approaches for developing systematic relationships in the plant kingdom.
- To enlighten the students about the phylogeny and the methods for building phylogeny among taxa of various angiosperms.
- To educate the students on the specific taxonomic characteristics of some angiosperm families and the method to make morphological studies of plant materials.

Course Outcomes:

- Knowledge on various levels of taxonomic hierarchy and the relationships among various hierarchical levels with respect to their similarities and variations of characters.
- The skill to use various taxonomic literature, Flora and herbaria, keys of both physical and digital types for plant identification and floristic studies.
- Critical thinking on the ancient, traditional and modern classification systems and evaluation of their applicability in taxonomic placement of taxa.
- Knowledge on the evolution of the concepts in classifying plants and weighing the potential of various tools.
- Ability to build the phylogeny among various taxa of different levels of hierarchy and identifying the apomorphy and plesiomorphy.
- Critical observations of the morphology of plant materials for taxonomic description and identification to the family, genus and species level.

Unit I:

Learning Outcome: The students shall gain knowledge on the importance of specimens, herbaria and flora for study of plant taxonomy**.**

Plant identification, Classification, Nomenclature; Biosystematics. Identification: Field inventory; Functions of Herbarium; Important herbaria and botanical gardens of the world and India; Virtual herbarium; E-flora; Documentation: Flora, Monographs, Journals; Keys: Single access and Multi-access

Unit-II:

Learning Outcome: The learners shall have basic understanding on the application of rules of ICN for plant identification and nomenclature.

- Taxonomic hierarchy: Concept of taxa (family, genus, species); Categories and

taxonomic hierarchy; Species concept (taxonomic, biological, evolutionary).

- Botanical nomenclature: Principles and rules (ICN); Ranks and names; Typification, author citation, valid publication, rejection of names, principle of priority and its limitations; Names of hybrids.

Unit-III:

Learning Outcome: The students shall be able to classify a plant as per the correct taxonomic hierarchy.

- Systematics- an interdisciplinary science: Evidence from palynology, cytology, phytochemistry and molecular data.
- Systems of classification: Major contributions of Theophrastus, Bauhin, Tournefort, Linnaeus, Adanson, de Candolle, Bessey, Hutchinson, Takhtajan and Cronquist; Classification systems of Bentham and Hooker (up to series) and Hutchinson (up to series); Brief reference of Angiosperm Phylogeny Group (APG III) classification.

Unit-IV:

Learning Outcome: The student shall have the skill to apply modern taxonomic tools in plant taxonomy.

- Phylogeny of Angiosperms: Terms and concepts (primitive and advanced, homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly and clades). Origin& evolution of angiosperms; co- evolution of angiosperms and animals; methods of illustrating evolutionary relationship (phylogenetic tree, cladogram).
- Families of Angiosperms: Descriptive studies of *Magnoliaceae, Rosaceae, Rubiacae, Poaceae, Orchidaceae, Musaceae, Acanthaceae, Apocynaceae, Asclepiadaceae, Lamiaceae.*

Practical:

1. Study of vegetative and floral characters of available materials of the families included in theory syllabus (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification).

2. Field visit, plant collection and herbarium preparation and submission. Mounting of properly dried and pressed specimen of at least fifteen wild plants with herbarium label (to be submitted in the record book)

Text Books:

- ✓ *harma O. P. (2009) Plant Taxonomy, Tata Mc Grow Hill, New Delhi*
- ✓ *Sharma A. K, Sharma R, Taxonomy of Angiosperms and Utilisation of plants, Pragati Prakasan, Meerut*

Reference Books:

- ✓ *Singh, G. (2012). Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., New Delhi.3rdedition.*
- ✓ *Jeffrey, C. (1982). An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge.*
- ✓ *Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. (2002). Plant Systematics-A Phylogenetic Approach. Sinauer Associates Inc., U.S.A. 2nd edition.*
- ✓ *Saxena, H. O. and Brahman, M. The Flora of Orissa, CSIR Publication.*
- ✓ *Bose T. K. (2009). Trees of the World, Regional Plant Resource Centre, Bhubaneswar, Odisha, India*
- ✓ *Radford, A.E. (1986). Fundamentals of Plant Systematics. Harper and Row, New York.*
- ✓ *Hanes, H. H. (2009). Botany of Bihar and Orissa,*
- ✓ *Mohanty, C. R. (2017). Text Book of Plant Systematics, Kalynai Publisher, New Delhi.*
- ✓ *Subrahmainayam, M. S. (2011) Modern Plant Taxonomy, Vikash Publishing House, New Delhi*

Core XI **Semester V**

Reproductive Biology of Angiosperms

Course Objectives

- To give a comprehensive idea about economic botany and its importance in human welfare.

- To know the origin, introduction, domestication and evolution of new crops / varieties of crop plants.
- To create awareness about importance of germplasm diversity.
- To provide knowledge on general account, cultivation, propagation and uses of common crops and processing of the materials.
- To know the extraction and uses of different oils as well as essential oils.

Course Outcomes:

- Have an understanding on the fundamental concepts of Economic Botany.
- Develop a basic knowledge on the evolution of crops/varieties.
- be aware about the importance of germplasm diversity and learn the methods for their conservation.
- Increase appreciation of diversity of plants and plant products used in everyday life of human and the methods for their enhanced production.
- Have an understanding of plants as a source of food, beverages, spices, and materials.

Unit-I:

Learning Outcome: Learn about structure and function of anther and pollen as well as their abnormalities

- Introduction: History and scope.
- Anther: Anther wall: Structure and functions, micro-sporogenesis, callose deposition and its significance.
- Pollen biology: Micro-gametogenesis; Pollen wall structure, MGU (male germ unit) structure, NPC system; Palynology and scope (a brief account); Pollen wall proteins; Pollen viability, storage and germination; Abnormal features: Pseudomonads, polyads, massulae, pollinia.

Unit-II:

Learning Outcome: Learn about the structure and function of ovule and embryo sac.

Ovule: Structure; Types; Special structures–endothelium, obturator, aril, caruncle and hypostase; Female gametophyte– mega-sporogenesis and mega-gametogenesis; Types and ultrastructure of different mature embryo sacs (Details of *Polygonum* type), Developmental pattern of mono-, bi- and tetrasporic embryo sacs.

Unit-III:

Learning Outcome: Develop knowledge about process of pollination, fertilization and self-incompatibility.

- **Pollination and fertilization**: Pollination types and significance; adaptations; structure of stigma and style; path of pollen tube in pistil; double fertilization.
- **Self-incompatibility**: Basic concepts; Methods to overcome self- incompatibility: mixed pollination, bud pollination, stub pollination; Intraovarian and *in vitro* pollination; Modification of stigma surface.

Unit-IV:

Learning Outcome: Students will be aware of the details of endosperm, embryo, seed, polyembryony and apomixes**.**

- **Endosperm:** development, structure and functions
- **Embryo:** Types of embryogeny; General pattern of development of dicot and monocot embryo; Suspensor: structure and functions; Embryo- endosperm relationship; Nutrition of embryo; Embryo development in *Paeonia*.
- **Seed:** Structure, importance and dispersal mechanisms
  Polyembryony and apomixes: Introduction; Classification; Causes and applications

Practical:

1. Anther: Wall and its ontogeny; Tapetum (amoeboid and glandular); MMC, spore tetrads, uninucleate, bicelled and dehisced anther stages through slides/micrographs, male germ unit (MGU) through photographs and schematic representation.

2. Pollen grains: Fresh and acetolyzed showing ornamentation and aperture, psuedomonads, polyads, pollinia (slides/photographs, fresh material), ultrastructure of pollen wall (micrograph); Pollen viability: Tetrazolium test, Germination: Calculation of percentage germination in different media using hanging drop method.

3. Ovule: Types-anatropous, orthotropous, amphitropous/ campylotropous, circinotropous, unitegmic, bitegmic; Tenuinucellate and crassinucellate; Special structures: Endothelium, obturator, hypostase, caruncle and aril (permanent slides/specimens/photographs). Female gametophyte through permanent slides/ photographs: Types, ultrastructure of mature egg apparatus.

4. Embryogenesis: Study of development of dicot embryo through permanent slides/photographs; dissection of developing seeds for embryos at various developmental stages; Study of suspensor through electron micrographs.

5. Tracing the path of pollen tube.

6. Study of haustorial endosperm

Text Books:

- ✓ *Singh, V., Pandey, P.C, and Jain, D.K. (2017). Reproductive Biology of Angiosperms, Rastogi Publications, Meerut*
- ✓ *Bhojwani SS /S P Bhatnagar and Dantu PK (2015) - The Embryology of Angiosperms 6th ed Vikas Publication*.

Reference Books:

- ✓ Maheswari, P. (2009). Embryology of Angiosperms.
- ✓ *Shivanna, K.R. (2003). Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.*
- ✓ *Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands.*
- ✓ *Johri, B.M. l (1984). Embryology of Angiosperms, Springer-Verlag, Netherlands.*
- ✓ *Mishra, B. K. (2017). Reproductive Biology of Angiosperms, Kalyani Publishers, New Delhi.*
- ✓ *Pandey, B. P., (2017). Taxonomy of Angiosperm. S. Chand Publication New Delhi*

Core XII **Basic Plant Physiology**

Course Objectives

- About the mechanism and physiological activities in plants.

- On nutrient uptake and translocation to different plant parts.
- On the nature and physiological roles of various plant hormones on plant growth and development.
- On the physiological requirements for plant morphogenesis and flowering
- On the role of light responsive pigments in plant morphogenesis.

Course Outcomes

- The governing principles behind various physiological processes in plants.
- About various uptake and transport mechanisms (water and solutes) in plants and the factors governing these processes.
- The role of various plant hormones, signaling compounds, and stress responses.
- The skills to manipulate the plant hormones in plants for desired morphological and physiological responses.
- The climatic and physiological requirements for molecular signaling of plants for growth, differentiation, maturity.

Unit -I:

Learning Outcome: The learners shall have the knowledge on importance of water for basic physiological processes of plants.

- Structure and properties of water; pH and buffers; cellular buffering systems; Cell water Potential and its components, plasmolysis and imbibition, soil water potential.
- Water absorption by roots, aquaporins, pathway of water movement, symplast, apoplast, trans-membrane pathways.
- Ascent of sap–cohesion-tension theory. root pressure; water movement to leaves.
- Transpiration: Processes; mechanism of stomatal movement; factors affecting transpiration; guttation.
- Translocation in the phloem: experimental evidence in support of phloem as the site of sugar translocation. pressure–flow model; phloem loading and unloading; source–sink relationship.

Unit-II:

Learning Outcome: The students shall know about the nutrient uptakes and hormonal regulation of plant growth and metabolism**.**

- Mineral nutrition: essential and beneficial elements, macro and micronutrients, mineral deficiency symptoms, chelating agents.
- Nutrient Uptake: Transport of ions across cell membrane, passive absorption, electrochemical gradient, facilitated diffusion, active absorption, role of ATP, carrier

systems, proton ATPase pump and ion flux, uniport, co-transport, Symport and antiport.

- Plant growth regulators: Auxin: Biosynthesis, transport, distribution and function
- Gibberellins: Biosynthesis, transport, distribution and function
- Cytokinin: Biosynthesis, transport, distribution and function
- Abscisic acid: Biosynthesis, transport, distribution and function
- Ethylene: Biosynthesis, transport, distribution and function

Unit-III:

Learning Outcome: The students shall know about photosynthesis and storage of metabolites by plants.

- Photosynthesis: general concept; photosynthetic apparatus; photosynthetic pigments and photosystems; Red drop and Emerson's enhancement effect.
- Primary photochemical reactions: photon, exciton and electron transfer.
- Non-cyclic electron flow: role of tyrosine and phaeophytin, quinine cycle, oxygen evolving complex and water splitting. Cyclic electron flow: process and function; role of ferredoxin-quinone reductase
- C3, C4 and CAM pathways of carbon fixation.
- Photorespiration
- Synthesis and Catabolism of Sucrose and Starch.

Unit-IV:

Learning Outcome: The learners shall have the skill to understand the photomorphogenesis.

- Physiology of flowering: Photoperiodism, flowering stimulus, floral meristems, external and internal factors of flower evocation; florigen concept; ABC model of floral organ identity; chemical signals for floral evocation.
- Seed dormancy: causes, effects, breaking of seed dormancy.
- Senescence: Types and causes, biochemical basis
- Phytochrome: Discovery, chemical nature, role of phytochrome in photo-morphogenesis, low energy responses (LER) and high irradiance responses (HIR), mode of action.

Practical:

1. Determination of osmotic potential of plant cell sap by plasmolytic method.
2. Determination of water potential of given tissue (potato tuber) by weight method.

3. Study of the effect of wind velocity and light on the rate of transpiration in excised twig/leaf.
4. Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of a mesophyte and xerophyte.
5. To calculate the area of an open stoma and percentage of leaf area open through stomata in a mesophyte and xerophyte (both surfaces).
6. To study the phenomenon of seed germination (effect of light).
7. To study the induction of amylase activity in germinating barley grains
8. To demonstrate suction due to transpiration.
9. Measurement of relation between transpiration and transpiring surface
10. Measurement of cuticular resistance to transpiration.
11. Measurement of primary photochemical reactions by fluorescence.
12. Jain V K Fundamental of Plant physiology,20th ed. S chand publication ,New Delhi

Text Books:

- ✓ *Pandey and Sinha (2011). Plant Physiology, Vikash Publishing House, New Delhi*

Reference Books:

- ✓ *Sinha, R. K. (2015). Modern Plant Physiology, Narosa Publishing House, New Delhi.*
- ✓ *Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons. U.S.A. 4th edition.*
- ✓ *Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.*
- ✓ *Bajracharya D. (1999). Experiments in Plant Physiology-A Laboratory Manual. Narosa Publishing House, New Delhi.*
- ✓ *Salisbury, F. B. and Ross, C. W. Plant Physiology Wadsworth Publishing Company, California*
- ✓ *Sahoo, A. C. (2018). Outlines of Plant Physiology Kalyani Publishers, New Delhi.*
- ✓ *Srivastava, N. K. (2017). Plant Physiology, Rastogi Publications, Meerut.*

Core XIII **Basic Plant Biotechnology**

Course Objectives:

- To have a basic idea on principles and methods of Plant Tissue culture and in vitro

tissue differentiation.

- To study about Somatic embryogenesis; Embryo culture and embryo rescue
- To have theoretical and practical knowledge on Protoplast isolation, fusion, culture and Selection of hybrid cells for regeneration of hybrid plants.
- To study about Recombinant DNA technology and its application.
- To study various techniques of gene transfer and its application in plant improvement.

Course Outcomes

- Have knowledge the about methods of Plant Tissue culture and its application.
- Be able to describe the Somatic embryogenesis; Embryo culture and embryo rescue
- Have skill to isolate plant Protoplast and differentiate the normal and hybrid protoplasts
- Have knowledge the Gene Construct; construction of genomic and cDNA libraries, screening DNA libraries
- Gain knowledge on methods for developing transgenic plants and application of transgenics for human welfare.

Unit -I:

Learning Outcome: Understanding of the various process of tissue culture mediated plant regeneration protocols.

Plant Tissue Culture: Historical perspective; Aseptic tissue culture techniques; Composition of media; Nutrient and hormone requirements (role of vitamins and hormones). Totipotency; Micropropagation (using nodal explant); Organogenesis (Callus mediated and direct adventitious); Somatic Embryogenesis; Protoplast isolation, culture and fusion, plant acclimatization

Unit-II:

Learning Outcome: Gain knowledge about the fundamental aspects of recombinant DNA technology.

Recombinant DNA technology-I: Restriction Endonucleases (History, Types I-IV, biological role and application); Restriction Mapping (Linear and Circular); Cloning Vectors: Prokaryotic (pUC 18 and pUC19, pBR322, Ti plasmid, BAC); Lambda phage, M13 phagemid, Cosmid, Shuttle vector; Eukaryotic Vectors (YAC and briefly PAC, MAC, HAC). Gene Cloning (Recombinant DNA, Bacterial transformation and selection of Recombinant clones, PCR mediated gene cloning).

Unit-III:

Learning Outcome: Gain knowledge about the recombinant DNA technology, gene transfer technology and production of transgenic plants**.**

Recombinant DNA technology-II: Gene Construct; construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by genetic selection; complementation, colony hybridization; Probes-oligonucleotide, heterologous, Methods of gene transfer- *Agrobacterium*-mediated, Direct gene transfer by Polyethylene Glycol (PEG) Electroporation, Microinjection, Microprojectile bombardment; Selection of transgenics– selectable marker and reporter genes (Kanamycin, Luciferase, GUS, GFP).

Unit-IV:

Learning Outcome: Have knowledge on chloroplast transformation and biosafety concerns of GM crops.

Chloroplast Engineering: Chloroplast genome, chloroplast transformation: rationale, methods used for generation of transplastomic plants, vectors for chloroplast transformation, transplastomics without antibiotic resistant gene, applications of chloroplast transformation. Biosafety concerns of genetically modified (GM) crops.

Practical:

1. Tissue Culture: laboratory setup (drawing component wise)
2. Demonstration of instruments for Plant tissue culture like Autoclave, Laminar air flow cabinet, and Hot air oven.
3. Demonstration of sterilization techniques for glassware
4. Preparation of tissue culture (MS) medium.
5. Demonstration of surface sterilization techniques.
6. Demonstration of aseptic inoculation of nodal or leaf explants of any available plant species.
7. Isolation of plasmid DNA.
8. Gel electrophoresis and visualization (demonstration/photography)

Text Books:

- ✓ *Chawla, H. S. (2010). Introduction to Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.*
- ✓ *Ramawat K G & Goyal S Comprehensive Biotechonology 4th ed S chand Publication New Delhi.*

Reference Books:

- ✓ *Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.*

- ✓ *Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.*
- ✓ *Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.*
- ✓ *Singh, B. D. (2018). Plant Biotechnology Kalynai Publishers, New Delhi.*
- ✓ *Gupta, P. K. (2017). Plant Biotechnology, Rastogi Publication, Meerut.*
- ✓ *Dubey, R. C. (2017). Advanced Biotechnology, S, Chand Publication, New Delhi*

Core XIV **Semester VI**

Basic Plant Metabolis

Course Objectives:

- To learn the anabolic and catabolic cellular processes and their regulations.
- To understand the mechanism of signal transduction in plants and the major signaling pathways.
- To learn the photochemical and biochemical mechanisms for photosynthetic carbon fixation.
- To learn the mechanism of carbon oxidation and ATP synthesis.
- To understand the pathways of synthesis and oxidation and of lipids and fatty acids.
- To understand the role of enzymes and enzyme action.

Course Outcomes:

- The students shall be able to explain the importance of biochemical pathways and regulatory pathways.
- The students can explain the role of enzymes in metabolic activities.
- The students shall have ability to differentiate various carbon metabolic pathways.
- The students shall have proper level of knowledge on carbon oxidation and energysyn thesis.
- The students can explain the processes of lipid metabolism and its importance in theg erminating seeds.
- The students shall be able to understand and explain the amino acid metabolic pathways.

Unit–I:

Learning Outcomes: Students will learn about the cellular metabolism and understand metabolic pathways and regulation of glycolysis, TCA cycle, ATP synthesis

- Concept of metabolism: Introduction, anabolic and catabolic pathways
- Glycolysis and its regulation, Fate of pyruvate, oxidative pentose phosphate pathway, oxidative decarboxylation of pyruvate; regulation of PDH, NADH shuttle.
- TCA cycle, amphibolic role, anaplerotic reactions, regulation of the TCA cycle,
- Mechanism of ATP synthesis, substrate level phosphorylation, chemiosmotic mechanism (oxidative and photo-phosphorylation), ATP synthase enzyme
- Boyers conformational model, Racker's experiment, Jaggendorf's experiment
- Role of uncouplers in ATP synthesis and their application.

Unit-II:

Learning Outcomes: Students will learn about fatty acid synthesis, breakdown and their regulation in plants**.**

- Fatty acid biosynthesis: Synthesis, and breakdown of triglycerides and their

importance.

- Fatty acid Breakdown: β-oxidation, α oxidation, glyoxylate cycle
- Regulation of fatty acid metabolism. Gluconeogenesis and its role in mobilization of lipids during seed germination

Unit-III:

Learning Outcomes: The learner will understand the aminoacid biosynthesis, degradation along with their regulation in plants.

- Amino acid biosynthesis and degradation in plants and its importance (proteasomal pathway) Synthesis of amino acid of alpha-ketoglutarate family, 3-phosphoglycerate precursor family, oxalo-acetate and pyruvate family, PEP erythrose-4-phosphate precursor family, Ribose-5-phosphate precursor family.
- Feedback control of amino acid biosynthesis: sequential, concerted and cumulative feedback control

Unit- IV:

Learning Outcomes: Students will learn about the enzymes and their classification, kinetics, inhibition and regulation.

- Enzymes: General properties, nomenclature and classification,
- Energetics of enzyme reactions, free energy change, forward and reverse reactions.
- Michaelis-Menten kinetics of enzyme reactions and its significance, Reciprocal plot, Brigg's-Halden modification, determination of V_{max} and K_m
- Enzyme inhibition: competitive, non-competitive inhibition, determination of K_i,
- Role of regulatory enzymes: allosteric, covalent modulation

Practical:

1. Detection of organic acids: citric, tartaric, oxalic and malic from laboratory samples.
2. Detection and quantification of protein from plant samples samples following Bradford method using spectrophotometer/colorimeter.
3. Detection/Estimation of the nature of carbohydrate – glucose, fructose, sucrose and starch from laboratory samples.
4. Detection of Ca, Mg, Fe, S from plant ash sample
5. Estimation of amino-nitrogen by formol titration method (glycine)
6. Estimation of titratable acidity from lemon.

Text Books:

- ✓ *Gupta, S, K. (2017). Plant Metabolism, Rastogi Publication, Meerut.*
- ✓ *Pandey B P (2019) Botany For Degree Student S Chand Publication. New Delhi*

Reference Books:

- ✓ *Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Develo pment.Sinauer Associates Inc. UA. 6th edition.*
- ✓ *Heldt, Hans-Walter. Plant Bio-Chemistry (3rd ed.), 2005. Elsevier Academic Press.*

Core XV **Natural Resource Management**

Course Objectives:

- To introduce the types of natural resources and the concept of sustainable development.

- To understand the status of biological diversity and their management.
- To know the contemporary tools such as EIA and GIS for assessment and conservation of natural resources.
- To know about the non-conventional energy resources and their application.
- To learn the concept of resource accounting for better natural resource management

Course Outcomes:

- Be able to understand importance of each component of natural resources and try to use the available resources judiciously.
- Know about different biological conventions and treaties emphasizing the conservation of biological diversities.
- Clearly understand the importance of sustainable use of natural resources and procedures for their assessment.
- Have skill to use renewable energy sources for the betterment of the human civilization and actively participate in popularization of the methods of energy and resource conservation.
- Know the national and international efforts for management and accounting of natural resources.

Unit-I:

Learning Outcome: The learners shall gain knowledge about the importance of natural resources.

- **Natural resources:** Definition and types.
- **Sustainable utilization**: Concept, approaches (economic, ecological and socio-cultural).
- **Land:** Utilization (agricultural, horticultural, silvicultural); Soil degradation and management.
- **Water:** Fresh water (rivers, lakes, groundwater, water harvesting technology, rainwater storage and utilization.

Unit-II:

Learning Outcome: The students shall be able to know the processes for maintaining sustainability.

- Biological Resources: Biodiversity-definition and types; Significance; Threats; Management strategies; Bioprospecting; IPR; CBD; National Biodiversity Action Plan).
- Forests: Definition, Cover and its significance (with special reference to India); Major andminor forest products; Depletion; Management.

Unit-III:

Learning Outcome: The students shall have skills to use modern tools for effective resource assessment and utilization.

- Energy: Renewable and non-renewable sources of energy-solar, wind, tidal, geothermal and bioenergy resources.
- Contemporary practices in resource management: EIA, GIS, Participatory Resource Appraisal, Ecological Footprint with emphasis on carbon footprint

Unit-IV:

Learning Outcome: The learners shall gain accounting skills for management and conservation of natural resources.

Resource Accounting; Waste management. National and international efforts in resource management and conservation

Practicals

1. Estimation of solid waste generated by a domestic system (biodegradable and non-biodegradable) and its impact on land degradation.
2. Collections of data on forest cover of specific area.
3. Measurement of dominance of woody species by DBH (diameter at breast height) method.
4. Calculation and analysis of ecological footprint.
5. Ecological modeling.
6. Estimation of soil moisture content and soil texture.
7. Estimation of soil porosity
8. Estimation of soil water-holding capacity.
9. Estimation of soil organic matter and soil carbon

Text Books:

- ✓ *Pandey, B. W. 2005. Natural Resource Management. Mittal Publication, New Delhi*
- ✓ *Singh J S & Singh S P (2017) Ecology, Environmental science, Conservation. (Revised Ed) S Chand Publication New Delhi*

Reference Books:

- ✓ *Vasudevan, N. (2006). Essentials of Environmental Science. Narosa Publishing House, New Delhi.*
- ✓ *Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi*.
- ✓ *Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.*

Core XVI **Semester VII**

Applied Molecular Biology

Course Objectives:

- To understand the methods of recombinant DNA Technology.
- To learn the isolation, purification and estimation of Plasmid DNA.
- To understand methods of expression of a recombinant Protein in E. coli.
- To learn about the methods to study DNA replication recombination and repair.
- To learn the methods for confirmation of gene cloning and gene expression.
- To understand the application DNA molecular markers: RFLP, RAPD and AFLP techniques

Course Outcomes:

- Be able to describe methods of recombinant DNA Technology.
- Have theoretical and practical knowledge of the isolation, purification and estimation of Plasmid DNA.
- Have a clear understanding on the methods of expression of a recombinant Protein in E.coli.
- Understand the processes of the DNA replication recombination and repair.
- Have ability to understand the mechanism the methods for confirmation of gene cloning and gene expression.
- Be able to describe the application DNA molecular markers: RFLP, RAPD and AFLP techniques

Unit- I:

Learning Outcome: Students will gain knowledge on recombinant DNA Technology, and Expression and purification of a recombinant Protein in *E.coli*

- Plasmid DNA preparation, Agarose gel electrophoresis of DNA and identification of various structural forms of plasmid, Estimation of the purity of the isolated Plasmid DNA spectrophotometrically, Digestion of DNA by restriction enzyme; Purification of DNA from gel. Preparation of competent cells by $CaCl_2$ mediated method. Ligation and transformation of ligated DNA to *E.coli* of competent cells, measurement of Transformation efficiency.
- Expression of a recombinant Protein in *E.coli* and one step purification of the protein by Affinity column Chromatography. Estimation of the purity of the isolated protein by SDS-PAGE.

Unit- II:

Learning Outcome: Students will understand the methods for genetic transformation and detection transformed clones.

Methods for genetic transfers: transformation, conjugation, transduction and sex-duction, mapping genes by interrupted mating. Methods to study DNA replication recombination and repair (Radioactive and nonradioactive Tracers, Autoradiography, Southern Blots, DNA

Fingerprinting and DNA Typing, *In Situ* Hybridization, DNA Sequencing and Physical Mapping of chromosomes).

Unit- III:

Learning Outcome: Students will gain knowledge on Genomic DNA isolation, purification, and characterization of Genomic DNA and applications of DNA molecular markers.

- Genomic DNA isolation, purification, and characterization from seedlings by Edwards method and visualization by agarose gel electrophoresis, checking the quality of extracted DNA by spectrophotometry.
- Applications of DNA molecular markers: Methods of PCR analysis, different types of PCR technique, RAPD, SSR markers. Restriction digestion of genomic DNA ; RFLP, and AFLP techniques/markers.

Unit- IV:

Learning Outcome: Students will understand the Gene expression at RNA and protein level using various molecular tools and techniques.

Gene expression at RNA and protein level, large scale expression, such as microarray based techniques: Reverse transcription PCR, qRT-PCR, Mapping and Quantifying Transcripts (Northern Blots, Primer Extension, Run-Off Transcription, Cassette Transcription), Measuring Transcription Rates *in vivo* (Nuclear Run-On, Reporter Gene Transcription, Measuring Protein Accumulation *in vivo*), Assaying DNA–Protein Interactions (Filter Binding, Gel Mobility Shift, DNase Footprinting, Chromatin Immunoprecipitation), Assaying Protein–Protein Interactions.

Practicals

1. Plasmid DNA preparation and visualization on Agarose gel electrophoresis
2. Isolation of total plant protein, Protein profiling using SDS-PAGE.
3. Genomic DNA isolation, purification, and visualization by agarose gel electrophoresis,
4. Checking the quality of extracted DNA by spectrophotometry
5. Demonstration of Methods for genetic transformation through Kit
6. DNA Fingerprinting data scoring of RAPD photographs and phylogeny construction applying bioinformatic tools.
7. Southern Blots, Western blots, Chromosome banding by photographs.
8. PCR analysis and its application using RAPD primers.
9. RT-PCR demonstration/ Exposure visit to Molecular laboratory in different institute.

Text Books:

- ✓ *Dubey R C & Maheshwari D K (2004) A Text Book of Microbiology Revised Ed. Schand Publication. New Delhi.*

Recommended Books:

- ✓ *Krebs, J. E., Goldstein, E. S. and Kilpatrick, S. T. (2018) Lewin's GENES XII. Jones and Bartlett Learning.*
- ✓ *Watson, J. D. et al. (2017) Molecular Biology of Gene. 7th edition. Pearson.*
- ✓ *Weaver, R. (2011) Molecular Biology. 5th edition. McGraw-Hill Education.*
- ✓ *Smith, R. H. (2013) Plant Tissue Culture: Techniques and Experiments. 3rd Edition. Academic Press.*
- ✓ *Green, M. R. and Sambrook, J. (2012) Molecular Cloning: A Laboratory Manual. 4th edition. CSHL Press.*
- ✓ *Introduction To Plant Biotechnology, 3rd Edition (2020) by H. S. Chawla. ISBN: 1439894140, 9781439894149. CRC Press.*

Core XVII **Applied Biochemistry**

Course Objectives:

- To learn the use of anabolic and catabolic cellular processes in commercial sectors.
- To understand the mechanism of production of plant based products from biomolecules.
- To learn the need of industries use of biological materials
- To learn the method to discover bioactive components from plant sources
- To understand the pathways of enzyme kinetics.

Course Outcomes:

- The students shall be able to explain the importance of carbohydrates from plant sources and their different uses.
- The students shall be able to explain the importance of lipids from plant sources and their different uses.
- The students shall be able to explain the importance of nucleic acid from plant sources and their different uses.
- The students shall be able to explain the importance of proteins/enzymes from plant sources and understand the underlaying mechanisms.
- The students can explain the processes of lipid metabolism and its importance in the germinating seeds.
- The students shall be able to understand and explain the importance of enzyme kinetics and industrial use.

Unit–I:

Learning Outcome: Students will learn about the industrial use of plant sugars and lipids.

- Role of plant sugars and polysaccharides for biorefining, biofuels, animal feed, food and other industrial uses.
- Methods and understanding of source-sink dynamics for crop yield and productivity; Industrial application of cellulose, starch, fructans, amylose
- Role of plant lipids and fatty acids in biofuels, essential oil, and other industrial uses.
- Industrial application of palm oil, ground nut oil and lemon grass oil.

Unit-II:

Learning Outcome: Students will learn about the nucleic acid synthesis and degradation methods and understand how they can play important role in chemotherapy and developmental process

- Nucleotide biosynthesis: De-novo synthesis of purine and pyrimidine, Salvage pathway, Synthesis of deoxy-nucleotides. Synthesis of nucleotide triphosphates.
- Degradation of nucleotides: catabolism of purines and pyrimidines. Regulation of nucleotide biosynthesis and chemotherapeutic targeting.
- Plant Transcriptional factors (functional domains and regulation) and their importance in plant development process.

Unit-III:

Learning Outcome: Students will learn about importance of plant proteins and their role from infection to storage**.**

- Plant protein synthesis: Organellar compartmentalization, post translational modifications and degradation,
- Mechanism of plant-viral translation
- Proteomics and plant food sources: food security, crop improvement and GMOs
- Plant Storage Proteins: vicilins, legumins, prolamins, 2S Albumins, Ricin
- Seed protein: synthesis, mobilization and degradation

Unit-IV:

Learning Outcome: Students will learn about applied role of enzyme kinetics, mode of action and inhibitors in detail

- Enzyme Kinetics: Bi-substrate kinetics, Sequential and Random ordered kinetics.
- Mechanism of enzyme action: general acid-base catalysis, covalent catalysis, metal catalysis Mechanism of action of RNAse, Lysozyme and Chymotrypsin; Isozymes
- Enzyme Inhibitors: Rational Design of Enzyme Inhibitors, transition-state analogues, mechanism-based inhibitors, affinity labels.
- Application of enzymes in food, agriculture, medicine, disease diagnosis, bioremediation.

Practical:

1. Estimation of enzyme activity in plant samples and effect of substrate, enzyme concentration and pH on enzyme activity and determination of Km value. (Catalase, Peroxidase, Acid phosphatase)
2. Estimation of urease activity in plant samples.
3. Colorimetric estimation of protein by Folin phenol reagent.
4. Preparation of standard curves for quantification of protein, carbohydrate and reducing sugar.
5. Quantification of soluble and total protein and total carbohydrate contents of plant samples.
6. Isolation of Chloroplast and study of protein profile of RUBISCO by SDS-PAGE.

Text Books:

- ✓ *Gupta, S, K. (2017). Plant Metabolism, Rastogi Publication, Meerut.*
- ✓ *Sahoo, A. C. (2018). Outlines of Plant Metabolism, Kalyani Publishers, New Delhi.*
- ✓ *Jain J L, Jain S & Jain Nitin (2020) Fundamental of Biochemistry S Chand Publication. New Delhi*
- ✓ *B P Pandey B P (2019) Plant Metabolism S Chand Publication*

Reference Books:

- ✓ *Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons. U.S.A. 4th edition.*
- ✓ *Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Develo pment.Sinauer Associates Inc. UA. 6th edition.*
- ✓ *Harborne, J.B. (1973). Phytochemical Methods. John Wiley & Sons. New York.*
- ✓ *Jain, V.K. Fundamental of Plant Physiology (7th ed.) 2004. S. Chand and Company.*
- ✓ *Salisbury, F.B. & Ross, C.W. Plant Physiology (4th ed.), 19992, Wadsoworth Publishing Company.*
- ✓ *Panday, S.N. & Sinha, B.K. Plant Physiology (4th ed.), 2006, Vikas Publishing House Pvt. Ltd.*
- ✓ *Wilkins, M.B. Advances Plant Physiology. 1984, ELBS Longman.*
- ✓ *Heldt, Hans-Walter. Plant Bio-Chemistry (3rd ed.), 2005. Elsevier Academic Press.*
- ✓ *Buchanan, Gruissen and Jones. Plant Physiology & Biochemistry: Biochemistry and Molecular Biology of plants, 2000, I.K. International.*

Core XVIII **Biostatistics**

Course Objectives

- On the importance of collection and analysis of data for inference
- On Procedures for collection, processing and analysis of data
- To identify correct test for analysis and comparison of data
- For understanding the principles of data trend and pattern
- For making the fitting prediction of data

Course Outcomes:

- The methods for primary and secondary data collection.
- Process the data and simulate the data to field conditions.
- How to select correct statistical method for analysis of a set of data
- The skill to build conclusion by outcome of the data analysis
- The skill to analysis complex data sets by multivariate analysis.

Unit -I:

Learning Outcome: The students shall have the skill to collect and statistically process the date of biological samples**.**

- **Statistical methods** - basic principles. Population; Sample from population, sample size and frequency.
- **Sampling**: sampling procedure-completely randomized design, complex block design, lattice design, group balanced block design, strip plot design and split-plot design.
- **Data collection**: primary and secondary data, frequency and frequency class.
- **Measures of central tendency**: Mean, median, mode of small and large samples.
- **Measures of dispersion**: variance, standard deviation, mean deviation, standard error, Co- efficient of variations and confidence interval.

Unit-II:

Learning Outcome: The learners shall have the skill to test the hypothesis using proper statistical procedure statistical procedure.

- Data distribution: probalility of distribution; normal, binomial and poisson distribution; test of hypothesis-Chi square test; Symmetry and kurtosis
- Hypothesis – setting of hypothesis- probability considerations; error of acceptance and rejection, type I and type II errors.
- Two sample comparison: paired student 't' test and unpaired ‘t’ test.
- Multiple comparison: The Turkey’s test

Unit-III:

Learning Outcome: The learners shall be able to analyze the trend among data and determine the rates of change.

- Types and methods of correlation and regression, computational requirements, derivation of simple linear regression equations, slopes and intercepts, fitting prediction, similarities and dissimilarities of correlation and regression.
- Data transformation: logarithmic, exponential and reciprocal transformations; non-linear regressions of data.

Unit -IV:

Learning Outcome: The students shall be able to make the intra-group and inter-group comparison of data.

- Multiple regression equations; comparison of slopes and intercepts; analysis of variance of multiple datasets; analysis of variance, one factor and two factor ANOVA.
- Group comparison test.
- Least significant difference (LSD) test, ranking of means with LSD.
- Duncan's multiple range (DMRT) test; ranking of means with DMRT

Practical:

1. Calculation of central tendency and dispersion of data
2. Chi-square test of field samples to test distribution pattern (binomial and poisson distribution)
3. Dependent 't' comparison of data
4. Independent 't' comparison of data
5. Calculation of 'F' value and finding out the probability value for the F value.
6. Two factor ANOVA and test of hypothesis
7. Test for LSD of data
8. Test for DMRT of data
9. Regression and correlation of linearly distributed data
10. Regression and correlation of transformed distributed data (logarithmic and exponential)

Text Book:

- ✓ *Banerjee K. Pranab (Revised Ed) Introduction to Biostatistics S Chand Publication New Delhi*

Reference book:

- ✓ *Biostatistical Analysis, Jar, J.H., 2006, 4th Ed, Pearson Education Inc.*
- ✓ *Stastical Procedure for Agricultural Research, Gomez, K.A., and Gomez, A. A., 1984, Wiley.*
- ✓ *Statistical Analysis of epidemiological data, Selvin, S., 1991. New York University Press.*
- ✓ *Statistics for Biology, Boston, Bishop, O.N. Houghton, Mifflin.*
- ✓ *The Principles of scientific research, Freedman, P. New York, Pergamon Press.*
- ✓ *Statistics for Biologists, Campbell, R.C., 1998.Cambridge University Press.*
- ✓ *Biostatistic, Danniel, W.W., 1987.New York, John Wiley Sons.*
- ✓ *An introduction to Biostatistics, 3rd edition, Sundarrao, P.S.S and Richards, J. Christian Medical College, Vellor*

Core XIX **Applied Ecology**

Course Objectives:

- On the methods for analyzing a community and a population
- On the solid wastes management, disposal and reuse.
- Regarding the process of wastewater treatment and recycling.
- About energy environment and the potential of non-conventional energy.
- On the methods for modeling of ecosystems and function prediction.

Course Outcomes:

- Have skill to analyse a plant community and determine its importance in the habitat
- Develop a proper understanding of the potential of solid wastes and the processes used to reuse.
- Clearly understand the importance of protection of surface waters and maximize the water reuse and recycling.
- Know importance of bio-energy and skill to plan the harvesting and use of alternate energy.
- Understand the mathematical models for ecosystem analysis and skill to develop the predictive models.

Unit-I:

Learning Outcome: The learners shall understand the structure, function and ecology of a population.

- Phytosociological analysis of vegetation: density, diversity and distribution; keystone species; importance value index; species richness; ecological indices; community homeostasis.
- Population growth patterns; density-dependent and independent population growth,
- Population interactions: types and ecological importance
- Population restoration, bio-security and conservation.
- Meta-population: characteristics, structure, ecological importance.

Unit-II:

Learning Outcome: The students shall gain the knowledge on treatment and use of wastes of various types.

- Solid waste processing technology: Components of solid waste management, leachate control and treatment, Vermicomposting; treatment of hazardous wastes, biomedical waste management.
- Wastewater treatment and disposal: eutrophication-causes, effects and control
- Waste water treatment processes; secondary treatment systems; conventional and high

rate biofilters, rotating biological contactors; activated sludge; nutrient removal through biomass production.

Unit-III:

Learning Outcome: The students shall gain the knowledge on alternate and sustainable energy resources and on efficient energy management.

- Energy management: Biomass, bioenergy and biofuels, biofuel-opportunities and challenges, levels of biofuel technology;
- Feedstocks and production- starch, cellulosic and algal biofuel feedstocks.
- Biomass production-single and multiple species approach,
- Dedicated energy crops, alternate habitats for biomass production
- Biodiesel, bioethanol, biogas and biohydrogen production.

Unit-IV:

Learning Outcome: The learners shall understand the toxicity of xenobiotics and have knowledge on their effective degradation**.**

- **Aquatic toxicity assessment**: concept of toxicity; mechanism of toxicants' action.
- Selection of test batteries; First, second and higher tiers of toxicity testing.
- **Bioaccumulation**: Concept and measurement, food chain and lipophilicity approach, quantitative structure activity relationship, kinetics of uptake and retention, factors affecting bioaccumulation.
- Microbial transformation of metals; biosorption, phytofiltration, phytochelation and phytoextraction; role of metalphores.
- Biodegradation of organic pollutants: measurement of biodegradability; aerobic and anaerobic aliphatic hydrocarbons, and aromatic hydrocarbons and pesticides

Practical:

1. Phytosociological analysis of vegetation.
2. Succession study in grassland ecosystem.
3. Determination of COD, BOD of different samples- surface water, ground water, drinking water and waste water.
4. Measurement of nitrate, sulphate and phosphates of waste water.
5. Organic carbon content of domestic solid waste.
6. Aerobic composting and degradation analysis.
7. Vermicomposting and degradation analysis.
8. Algal culture in waste water.
9. Measurement of BOD of water under different6 aeration regime.
10. Nutrient analysis of water, growth with macrophytes.

Text Books:

- ✓ S*harma, P.D. (2017). Fundamentals of Ecology. Rastogi Publications, Meerut, India.*

Reference Book:

- ✓ Odum, E.P. (2005). Fundamentals of ecology. Cengage Learning India Pvt. Ltd., New Delhi. 5th edition.
- ✓ Kormondy, E.J. (1996). Concepts of ecology. PHI Learning Pvt. Ltd., Delhi, India. 4th edition.
- ✓ Santra, S. C. (2015) Environmental Science. New Central Book Agency (P) Ltd. Kolkata.
- ✓ Mohapatra P.K. (2006) Environmental Biotechnology, IK Publ., New Delhi, India.
- ✓ Smith, T.M., Smith, R.L. (2012). Elements of Ecology, 8 th Ed., Pearson Edn. USA
- ✓ Begon, M., Townsend, S.R., Harper, J.L. (2006). Ecology: from individuals to ecosystem, 4 thEd., Blackwell Publ.
- ✓ Singh, J.S., Singh, S.P., Gupta, S. (2006). Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi, India.
- ✓ Wilkinson, D.M. (2007). Fundamental Processes in Ecology: An Earth Systems Approach.Oxford University Press. U.S.A.
- ✓ Das M. C. and Das S. P. (2009). Fundamental of Ecology. Tata MGrow Hill, New Delhi.
- ✓ Shukla R.S. and Chandel P.S. (2016). A Text Book of Plant Ecology. S Chand Publication, New Delhi
- ✓ Singh J S & Singh S P (2017) Ecology, Environmental science, Conservation. (Revised Ed) S Chand Publication New Delhi.

Core XX **Semester VIII**

Applied Plant Physiology

Course Objectives:

- About the mechanism and of uptake of nutrients by plants.
- On various secondary metabolites and their role in plant growth, development and defense.
- About the plant reactions to stress and stress adaptations and resistance.
- On the practical application of plant growth promoters and hormones
- On the progresses for augmenting crop production.

Course Outcomes:

- The pathways of nutrient uptake and the physiological principles regulating the uptake.
- The skill to identify the secondary metabolites for plant defense and apply the same for plant defense induction.
- About the biotic and abiotic components to induce disease resistance in plants.
- The skills to manipulate the plant hormones in plants for desired morphological and physiological responses.
- The progress in augmenting plant production

Unit-I:

Learning Outcome: The learners shall able to understand mechanism of mineral assimilation

- Energetics of nutrient assimilation.
- Nitrate assimilation by roots and shoots; role of nitrate reductase. Ammonium assimilation.
- Symbiotic nitrogen fixation: exchange of signals; role of NOD factors; hormonal regulation; nitrogenase activity.
- Sulphur assimilation: enzymatic and non-enzymatic reactions; role of cysteine in sulphur assimilation.
- Assimilation of phosphate and cations (K^+, Mg^{2+}, Ca^{2+}); Oxygen assimilation.

Unit-II:

Learning Outcome: The learners able to comprehend the plant metabolites and their significance.

- **Secondary metabolites**: Terpenes: structure, biosynthesis and function in growth, development and defense of plants; Phenolic compounds: structure and biosynthesis; Flavonoids, lignins and tannins; role in plant growth and pathogen defense.
- **Nitrogen containing compounds**: alkaloids, glycosides, and non-protein amino acids.
- **Antimicrobial compounds**: phytoalexins

- Biotic and abiotic stress factors, Stress signaling; signaling pathways: Calcium modulation, Phospholipid signaling. Pathogen induced Signal Transduction Cascade
- Systemic acquired resistance; Induced systemic resistance; modoration of insect and disease resistance by biological and chemical inductions; Hypersensitive reaction; Pathogenesis–related (PR) proteins; bacterial and fungal inducers of resistance; Role of jasmonates, riboflavin, salicylic acid, and silicon.

Unit-III:

Learning Outcome: The learners will be able to know the use of plant hormones and their significance.

- **Phytochrome:** regulation for plant development; cellular and molecular mechanism of function; phytochrome mediated gene expression and modulation of other photoreceptors.
- **Blue light receptors**: role in plant growth and development.
- **Vernalization**: mechanism and application.
- **Auxins:** signal transduction pathways; auxins application for stress adaptation and plant growth.
- **Gibberellins:** signal transduction pathways; application of GA for modulation of plant growth.
- **Cytokinine:** cellular and molecular functions; role in plant development.
- **Ethylene:** cellular and molecular functions; role in plant defense.
- **Abscisic** acid: cellular and molecular functions; role in plant development and flowering.

Unit-IV:

Learning Outcome: The learners shall grasp about the photosynthesis and building resilient plant species

- Regulation of photosynthesis; regulation of Rubisco-oxygenase activity; designing of photosystems and antenna complex; role of bicarbonate on PS II; action of PS I and PS II herbicides; artificial photosynthesis; Biohydrogen function.
- Photorespiration: role in nitrogen and sulphur assimilation.
- Pleurality of carbon pathways for improved photosynthesis-C_2, C_2+C_4 and C_3+C_4 pathways.
- C_4 rice initiatives: single enzyme expression; gene pyramiding and multienzyme expression; C_3 gene editing; achievements and limitations.

Practical:

1. Quantitative estimation of peroxidase activity in the seedlings in the absence and presence of salt stress.

2. Superoxide activity in seedlings in the absence and presence of salt stress.
3. Plant response measurement under light and salt stress
4. Zymographic analysis of superoxide dismutase activity.
5. Quantitative estimation of catalase.
6. Quantitative estimation of glutathione reductase.
7. Estimation of superoxide anions.
8. Measurement of photosynthesis with light, salt and herbicide stress.
9. Measurement of the effect of PS II herbicides
10. Measurement of the effect of PS II herbicides

Text book:

- ✓ *Jain V K By Fundamental of Plant physiology,20th ed. S Chand publication, New Delhi*

Reference Book:

- ✓ *Govindjee (ed) Advances in photosynthesis and Respiration, Book series, Springer.*
- ✓ *Voet D. and Voet J.G. (2021). Biochemistry, 6th Edn, Wiley.*
- ✓ *Sinha, R. K. (2015). Modern Plant Physiology, Narosa Publishing House, New Delhi.*
- ✓ *Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons. U.S.A. 4th edition.*
- ✓ *Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.*
- ✓ *Bajracharya D. (1999). Experiments in Plant Physiology-A Laboratory Manual. Narosa Publishing House, New Delhi.*
- ✓ *Salisbury, F. B. and Ross, C. W. Plant Physiology Wadsworth Publishing Company, California*
- ✓ *Sahoo, A. C. (2018). Outlines of Plant Physiology Kalyani Publishers, New Delhi.*
- ✓ *Srivastava, N. K. (2017). Plant Physiology, Rastogi Publications, Meerut.*
- ✓ *Pandey and Sinha (2011). Plant Physiology, Vikash Publishing House, New Delhi*

Core XXI **Applied Biotechnology**

Course Objectives:

- To study about the basic process and requirements of Plant Tissue culture.
- To learn about the culture of different types of tissues and cells and their application
- To learn about Agrobacterium mediated, direct and indirect gene transfer in plants
- To learn the techniques for developing transgenic plants and their application in crop improvement
- To study about Metabolic engineering for metabolites and industrial products

Course Outcomes:

- Have knowledge about methods of plant tissue culture, organogenesis and somatic embryogenesis and their application in crop improvement.
- Be able to understand the process of protoplast isolation, fusion and culture, selection of hybrid cells and regeneration of hybrid plants
- Learn the method of gene transfer for developing transgenic plants
- Gain knowledge on transgenics for herbicide resistance, resistance to biotic stress abiotic stress and other quality improvement
- Gain knowledge on metabolic engineering for augmentation of secondary metabolite biosynthesis and their industrial potential.

UNIT –I:
Learning Outcome: Learn the in vitro propagation, somatic embryogenesis and crop improvement using plant tissue culture

Tissue culture applications: Micropropagation, virus elimination; embryo culture and embryo rescue, anther and microspore culture, production of triploid, hybrid, somaclonal variants, cell suspension culture and hairy root culture for secondary metabolite production, synthetic seed and cryopreservation for germplasm conservation.

UNIT –II:
Learning Outcome: To use plant tissue culture as back bone of plant biotechnology

Applications of Biotechnology: Pest resistant (Bt-cotton); herbicide resistant plants (Round Up Ready soybean); Transgenic crops with improved quality traits (Flavr Savr tomato, Golden rice); Improved horticultural varieties (Moondust carnations); Role of transgenics in bioremediation (Superbug); edible vaccines; Industrial enzymes (Protease, Lipase); Genetically Engineered Products-Human Growth Hormone; Humulin.

UNIT –III:
Learning Outcome: Learn the method of gene transfer for developing transgenic plants

Gene Silencing: Regulatory RNA (micro RNA), Antisense RNA, construction of antisense vectors, analysis of antisense clones, applications of antisense technology. Gene silencing: causes (DNA methylation, homology-dependent suppression by antisense gene), CRISPAR-Cas9, strategies for avoiding gene silencing and its application.

UNIT –IV:

Learning Outcome: Knowledge on metabolic engineering for augmentation of secondary metabolite biosynthesis and their industrial potential

Intellectual Property Rights (IPRs) and Patents: IPRs, classification, rationale for protection of IPRs, patents-concept and patenting of biological material, Farmer's rights and breeders right's, plant varietal protection and farmer's right act.

Practicals

1. Preparation of different stock solution; preparation of tissue culture media.
2. Preparation of synthetic seeds by alginate encapsulation method.
3. Study of Anther culture and microspore culture through photograph.
4. Study of Bt Cotton through photographs.
5. Cytological examination of regenerated plants.
6. *Agrobacterium*- mediated transformation protocol (using photographs/ video).
7. RAPD / any PCR based marker analysis and data scoring.
8. Exposure visit to commercial Tissue culture Laboratory in different institute

Text book:

- ✓ *Introduction to Plant Biotechnology. Chawla H.S. Oxford & mH Publishing Co. Pvt. Ltd*.

Suggested readings:

- ✓ *Plant Biotechnology, the genetic manipulation of plants. Adrian Slater, Nigel Scott and Mark Fowler. Oxford University Press.*
- ✓ *Plant Cell, Tissue and Organ Culture, Fundamental Methods. Gamborg O.L. and Phillips G.e. (Editors). Narosa Publishing House.*
- ✓ *From Genes to Genomes, Concepts and Applications of DNA technology. Dale IW. And Von Schantz M. John Wiley and Sons Ltd.*
- ✓ *Plant Tissue Culture: Theory and Practice. Bhojwani S.S and Razdan M.K., Elsevier*
- ✓ *Dubey R C (Revised Ed.) Advanced Biotechnology S Chand Publication. New Delhi*
- ✓ *Ashish s Verma Laboratory Manual for Biotechnology S Chand Publication. New Delhi*

Core XXII **Applied Microbiology**

Course Objective:

- To explain fermentation processes and its bi-product, their industrial uses and recent advances.
- To explain the basic idea on designing of bioreactors for production of microbial products.
- To make the students understanding the role of disinfectants and sterilization
- To give an introduction to the various aspects of environmental biotechnology

Course Outcomes:

- The students would be able to understand the roles of microbes and production of microbial products
- The students certainly get the opportunities to learn the basics of idea on bioreactors and utility
- The students shall be able to understand the application of various disinfectants and instruments used for sterilization.
- The students would be able to identify the important microbes for bioremediation of pollutants

UNIT I:

Learning Outcome: The students will learn about fermentation process and its application.

Microbial production of industrial products, Brief history and developments in Fermentation Technology & Industrial Microbiology, Primary and secondary screening, strain development, preservation and maintenance of industrial strains, Typical composition & characteristics of industrial fermentation media, Crude and synthetic media; molasses, corn-steep liquor; microbial production of ethanol, penicillin, amylase and lipase

UNIT II:

Learning Outcome: The learners will learn about the biofermentors and their working**.**

Fermentation processes & Instrumentation, Solid-state and liquid-state (stationary and submerged) fermentations; Batch, fed-batchand continuous fermentations, Components of a typical bioreactor, types of bioreactors-Laboratory, pilot- scale, and production fermenters; stirred tank fermenter, fixed bed and fluidized bed bioreactors and air-lift fermenter.

UNIT III:

Learning Outcome: The students will learn about microbes in pharmaceutical industry and sterilisation process**.**

Pharmaceutical Microbiology: Disinfection: Classification, mode of action, factors influencing disinfectants, uses, evaluation and effectiveness. Sterilization: Introduction, significance, sensitivity of microorganisms, detailed methods for sterilization processes. Sterilization control and sterility assurance. Sterility testing of pharmaceutical products as per pharmaceutical standards. Microbiological assays of antibiotics.

UNIT IV:

Learning Outcome: The learners will understand about bioremediation process of wastelands.

Bioremediation:Bioremediation of inorganic pollutants, Biodegradation of hydrocarbons, pesticides, herbicides and other important compounds. Bioremediation of contaminated soil and waste lands. Genetically engineered microbes in biodegradation, Sewage/ waste water treatment

Practical:

1. Types of Bacteria to be observed from temporary/permanent slides/photographs.
2. Study of instruments used for microbiology research and sterilization techniques
3. Preparation of nutrient media
4. Preparation of pure culture
5. Examination of bacteria from bacterial culture by Gram's staining method.
6. Isolation of amylase and lipase producing bacteria
7. Production of amylase and lipase

Text Books:

- ✓ *R C Dubey & Maheshwari D K (2020) A Text Book Of Microbiology Schand Publication New Delhi.*

References books

- ✓ *Pelzer. Chan, B.C.s and Krej, N.R. 1993. Microbiology. MC Graw Hill-Inc. New Delhi.*
- ✓ *Prescott,L.M, Harley, J.P and Klein, D.A 1998. Microbiology W M C Brown Publishers. New Delhi.*
- ✓ *Rangaswami, G and Bagyaraj,D.J.(1996). Agricultural Microbiology 2nd edn. Prentice Hall of India New*
- ✓ *Glazer, A.N and Nikaido. H. (1995). Microbial Biotechnology. W.H.Freeman And co. New York.*
- ✓ *Kumar H.D. Environmental Technology & Biosphere Management. Oxford & IBH Publishing Co. Pvt. Ltd R.K. Sinha and R. Sinha, 2008, Environmental Biotechnology. Aavishkar Publisher Distributors.Delhi.*
- ✓ *Evans G.G., Furlong J. (2011). Environmental Biotechnology: Theory and Application, John Wiley & Sons, 290 pp.*
- ✓ *Brock Biology of Microorganisms, 14th Edition. Clinical Microbiology Made Ridiculously Simple, 6th Edition.*
- ✓ *Microbiology: An Introduction (12th Edition) Jawetz Melnick &Adelbergs Medical Microbiology.*
- ✓ *Raskin, I (1999). Phytoremediation of Toxic Metals: Using Plants to Clean Up the Environment. Wiley-Interscience, New York.*
- ✓ *Willey, Sherwood and Chritopher, Laboratory Excercises in Microbiology. McGrow-*

Hill, India. 9 th Edition

- ✓ *Kaushik Purshotam (Revised Ed) Microbiology (Question & Answer) Schand Publication.*

Core XXIII **Bioinformatics**

Course Objectives:

- To know the principles, hypotheses, and process in the field of bioinformatics
- To prepare the expert manpower in the bioinformatics industry, academia, and society
- To learn and promote research in the field of bioinformatics.
- To aware students on using computer for analyzing and solving biological data
- To learn computer aided drug discovery
- To create awareness and research facility in bioinformatics and molecular modeling

Couse Outcomes:

- The students shall have ability to correlate with evolutionary development.
- The students shall be able to compare the diversity of different aspects in analyzing the genetic and proteomic data.
- The students shall have skill to differentiate the primitive and modern traits of species.
- The students shall be able to use computer and different biological softwares and tools for solving biological problems.
- The students can categorize and apply computational approaches in understanding biological data.
- The students can analyze aspects in drug discovery.

Unit-I:

Learning Outcome: Students will learn about bioinformatics and understand the different biological databases**.**

- Bioinformatics: Introduction, History, Scope, and Application of bioinformatics. Concept of omics – genomics, transcriptomics proteomics, and metabolomics
- Biological databases, Types of sequence databases-primary, secondary, and composite.
- Nucleotides sequence repositories: NCBI (GenBank), DDBJ and EMBL-EBI (ENA); Protein sequence repositories: Uniport, Interpro, CATH, SCOP
- Other biological databases: Structural databases (pdb), Pathway database (KEGG, Reactome), Disease database (OMIM), Plant database (PlantGDB) and interaction database (BioGRID)

Unit-II:

Learning Outcome: Students will learn about biological sequence and methods for their alignment.

- Concept of program and algorithm. Basic concepts of sequence similarity, identity,

annotation; Definitions of homologues, orthologues, paralogues, concepts behind scoring matrices.

- Alignment of pairs of sequence, Global & Local Alignment, Basic Local Alignment Search tool (BLAST), PSI-BLAST and other variations. Application of BLAST tools.
- Multiple sequence alignment and its applications.

Unit-III:

Learning Outcome: Students will learn about methods of phylogenetics and phylogenetic tree construction. They will also have understanding on phylogenetic analysis tool.

- Concept of phylogenetics: Definition and description of phylogenetic tree and phylogenetic tree construction.
- Evolution, elements of phylogeny, methods of phylogenetic analysis, Phylogenetic tree of life, comparison of genetic sequence of organisms, 16SrRNA data analysis, general understanding of phylogenetic analysis tools-Phylip, ClustalW, MEGA
- Biodiversity informatics: current challenges and future prospects.

Unit-IV:

Learning Outcome: Students will learn about application of bioinformatics in the field of drug development and discovery.

- Natural products and Drugs; Principles of drug development. Bioinformatics in drug development, Chemoinformatics and Pharmacoinformatics.
- Applications of Drug Discovery and *In-Silico* Drug Designing, Drug discovery in the field of Molecular Biology, pharmaco-genomics and pharmaco-proteomics.
- Structure-based drug designing approaches:- Target Identification and Validation, homology modeling and protein folding, receptor mapping, active site analysis.

Practical:

1. To retrieve nucleotide, protein sequence and protein structure from a biological database.
2. To perform multiple sequence alignment for any number of sequences
3. To predict the secondary structure of protein using suitable proteomics tool
4. To retrieve biological data from various database (SwissProt, PDB, OMIM, KEGG)
5. To find the similar sequence to a given protein sequence using BLAST.
6. To perform homology modelling using Swiss PDB viewer
7. To perform structure visualization using suitable visualization tool.

Text Books:

- ✓ *P. E. Bourne and J. GU; Structural bioinformatics; 2nd edition. John Wiley and Sons. 2009.*
- ✓ *A. Leach; Molecular modelling – principles and applications; Pearson Education Ltd, 2001.*
- ✓ *Pandey B P (2020) NEP Botany For Bsc Students (molecular Biology And Bioinformatics) S chand Publication. New Delhi*

Reference Books:

- ✓ *N. C Jones and A. Pavel; Introduction to Bioinformatics Algorithms; the MIT Press, 2004.*
- ✓ *P. G. Higgs and T. K Attwood; Bioinformatics and Molecular Evolution; Blackwell Publishing, 2005.*
- ✓ *Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata Mc Graw Hill, Delhi.*

Singh Ruchi Bioinformatics: Genomics And Proteomics Vikas Publication New Delhi

Model Curriculum for Three/Four Year Degree Course (With Multiple Entry /Exit Option)

Based on NEP-2020

Chemistry

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - Atomic Structure, Periodicity of Elements and Chemical Bonding
	Core II- Fundamental Organic Chemistry
II	Core III- States of matter, and Ionic equilibrium
	Core IV - Chemical thermodynamics, equilibrium, and Colligative property
III	Core V- Acids and Bases, Metallurgy, Chemistry of main group elements
	Core VI- Chemistry of halogen, oxygen and sulphur containing organic compounds
	Core VII- Phase equilibrium, Chemical dynamics, catalysis and surface chemistry
IV	Core VIII- Coordination Chemistry, Chemistry of d- and f-block elements, Inorganic Reaction Mechanism and electron transfer reactions
	Core IX- Natural Products, Heterocyclic Compounds, Nitrogen containing compounds and Polynuclear Hydrocarbons
	Core X- Conductance, electrochemistry, electrical properties of atoms and molecules
V	Core XI- Organic Spectroscopy
	Core XII- Basic quantum chemistry, Molecular & electronic spectroscopy, and photochemistry
	Core XIII- Chemistry of Organometallic Compounds
VI	Core XIV- Analytical Methods of Chemistry
	Core XV- Solid and porous materials, and magneto chemistry and power cells
VII	Core XVI- Chemistry of Biomolecules
	Core XVII- Polymer Chemistry
	Core XVIII- Green Chemistry
	Core XIX- Oxidation, Reduction, Reagents, Rearrangements and Name Reactions
VIII	Core XX- Quantum chemistry & Statistical Thermodynamics
	Core XXI- Chemical group theory, electronic spectra of metal complexes, and nuclear chemistry
	Core XXII- Pericyclic reactions, Photochemistry and Retrosynthesis
	Core XXIII- Research Methodology for Chemistry

Programme Outcomes

- To prepare the students for a career in Chemistry.
- To prepare the students for Higher Education and Research in Chemistry.
- To develop a conceptual understanding of the subject and to develop an inquisitiveness in the subject.
- To enable the student to acquire basic skills necessary to understand the subject and to master the skills to handle equipment's utilized to learn the subject.
- To generally promote wider reading on the subject and allied inter disciplinary subject.

Core I **Semester -I**

Atomic Structure, Periodicity of Elements and Chemical Bonding

Course Outcomes:

- Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom.
- Learn the various atomic properties of atoms and their variations in the periodic table.
- Gain the idea of different types of bonding and their associated properties.
- Understand the theory and applications of various acid-base titrations.

Unit – I: Atomic structure

Rutherford's nuclear model of atom, Bohr's theory and the origin of hydrogen spectrum, Sommerfeld's extension of Bohr's theory, de-Broglie equation, Heisenberg's Uncertainty Principle and its significance. Postulates of wave mechanics, Derivation of Schrödinger's wave equation for hydrogen atom, significance of ψ and ψ^2. Radial and angular wave functions, Radial function plots, radial probability distribution plots, angular distribution curves. Shapes of s-, p-, d- and f-orbitals, Relative energies of orbitals. Slater's rule and its limitations, Quantum numbers and their significance. Pauli's Exclusion Principle, Hund's rule of maximum spin multiplicity and Aufbau principle.

Unit – II: Periodicity of elements:

Introduction to long form periodic table, Cause of periodicity, Division of elements into s-, p-, d- and f-blocks. Atomic radius, ionic radius, covalent radius and Van der Walls radius. Periodic trends in ionic and covalent radii. Ionization energy, electron affinity, electronegativity, and their variations in the periodic table. Applications of electronegativities. Pauling's/Mulliken's scale of electronegativity, Sanderson's electron density ratio.

Unit – III: Chemical bonding

Ionic bond-General characteristics, types of ions, size effects, radius ratio rule and its limitations. Packing of ions in crystals. Lattice energy, Born-Haber cycle and its application, Born-Lande equation, Madelung constant, importance of Kapustinskii equation for lattice energy. Solvation energy, Covalent character in ionic compounds, polarizing power and polarizability. Fajan's rules and consequences of polarization.

Unit – IV: Chemical bonding

Covalent bond-Valence shell electron pair repulsion (VSEPR) theory, shapes of the following simple molecules and ions containing lone pairs and bond pairs of electrons: CH_4, H_2O, NH_3, PCl_3, PCl_5, SF_6, ClF_3, I_3^-, BrF_2^+, PCl_6^- , ICl_2^-, ICl_4^- , NH_4^+, $PO_4^{3-}$and SO_4^{2-}. Valence Bond

theory (Heitler-London approach). Hybridization, equivalent and non-equivalent hybrid orbitals. Ionic character in covalent compounds: Dipole moment. Percentage ionic character from dipole moment and electronegativity difference, Mo l e c u l a r orbital diagrams of homo- & hetero-diatomic molecules (N_2, O_2, C_2, B_2, F_2, CO, NO) and their ions. Calculation of bond order. Concept of bent rule.

Metallic bond:

Concept of metallic bond, The free electron model, The valence bond model, The band model (molecular orbital approach), semiconductor and insulators.

Hydrogen bond:

Concept of hydrogen bond, nature of hydrogen bonding, consequences of hydrogen bonding and its importance.

List of experiments

1. Calibration and use of apparatus
2. Preparation of solutions of different Molarity/Normality.
3. Estimation of oxalic acid using standard NaOH solution
4. Estimation of sodium carbonate using standard HCl.
5. Estimation of carbonate and hydroxide present together in a mixture.
6. Estimation of carbonate and bicarbonate present together in a mixture.

Text Books:

- ✓ *B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing Co., 33rd Ed., 2017.*
- ✓ *A. J. Elias, The Chemistry of the p-Block Elements-Syntheses, Reactions and Applications, University Press (India) Pvt Ltd., 2009.*
- ✓ *G. H. Jeffery, J. Bassett, J. Mendham, R. C. Denney, Vogel's Textbook of Quantitative Chemical Analysis, John Wiley and Sons, 1989.*

Reference Books:

- ✓ *J. D. Lee, Concise Inorganic Chemistry, Wiley India, 2010.*
- ✓ *B. E. Douglas, D. H. McDaniel, J. J. Alexander, Concepts and Models of InorganicChemistry, John Wiley & Sons, 1994.*
- ✓ *P. W. Atkins, T. L. Overton, J. P. Rourke, M. T. Weller, F. A. Armstrong, Shriver and Atkins Inorganic Chemistry, 5th Edition, Oxford University Press, 2010.*
- ✓ *P. Chndra, C. Gupta, Chemical Dynamics and Coordination chemistry, 1st Ed., 2022.*
- ✓ *A. K. Das, M. Das, Fundamental Concepts of Inorganic Chemistry, 1st Edition,Volume CBS Publishers & Distributors Pvt. Ltd., 2014.*
- ✓ *J. E. Huheey, E. A. Keiter, R. L. Keiter, O. K. Medhi, Inorganic Chemistry-Principles of Structure and Reactivity, Pearson Education, 2009.*
- ✓ *D. C. Harris, C. A. Lucy, Quantitative Chemical Analysis, 9th Ed, Freeman and Company,2016.*

Core II **Fundamental Organic Chemistry**

Course Objectives:

To provide the fundamental knowledge on organic chemistry in order to comprehend other organic chemistry courses in coming semesters with greater depth. The purpose of this core paper is to review the basic concepts of electron displacement and the chemistry of aliphatic and aromatic hydrocarbons. Stereochemistry is also introduced to help to student to visualize the organic molecules and their spatial arrangement in three dimensional spaces and hands on experience on detection of organic molecules.

Course Outcomes :

1. Understanding the basic concepts of electronic displacement phenomena in organic molecules, various bond breaking processes and types of organic reactions.
2. Fundamental knowledge on symmetry and asymmetry aspect of organic molecules and their spatial arrangements in two-dimension and three-dimension with their stereochemistry.
3. Learning the synthesis, structure and stability of unsaturated hydrocarbons, understanding the concept of aromaticity and chemical reactions of unsaturated hydrocarbons and aromatic hydrocarbons.
4. Knowledge on selection of suitable solvent for purification and separation of organic compounds and detection of various elements present in it.

Unit–I: Basics of Organic Chemistry

Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications in dipole moment; organic acids and bases; their relative strength. Homolytic and heterolytic fission with suitable examples. Curly arrow rules; Electrophiles and Nucleophiles; Nucleophilicity and basicity; Types, shape and relative stability of carbocations, carbanions, free radicals and carbenes.
Introduction to types of organic reactions with suitable examples: Addition, Elimination, Substitution, Rearrangement and Pericyclic reactions.
Carbon-carbon sigma bonds, chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Corey-House Reactions, Free radical substitutions: Halogenation –relative reactivity and selectivity.

Unit–II: Stereochemistry

Concept of Chirality/Asymmetry, Geometrical isomerism and Optical Isomerism: Optical Activity, Specific Rotation. Determination of Relative and absolute configuration in chiral molecules using D/L, R/S, cis/trans, Syn/Anti and E/Z descriptors using C.I.P rules. Representation by Fischer Projection, Newmann and Sawhorse Projection formulae in molecules containing one and two chiral-centres. Enantiomers, Distereoisomers, meso-structures, Racemic mixture and their resolution.
Stability and Conformational analysis: types of cycloalkanes and their relative stability, Baeyer strain theory, Conformational analysis of alkanes (ethane and n-butane): Relative stability with energy diagrams. Energy diagrams of cyclohexane: Chair, Half chair, boat and twist boat forms.

Unit–III: **Chemistry of Unsaturated Hydrocarbons**

Carbon-Carbon Pi Bonds: Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.
Reactions of alkenes: Electrophilic additions their mechanisms (Markownikoff/AntiMarkownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, syn and anti-hydroxylation (oxidation).1,2- and 1,4-addition reactions in conjugated dienes and Diels-Alder reaction; Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

Unit–IV: Chemistry of Aromatic Hydrocarbons

Aromaticity: Hückel's rule, aromaticity in benzenoid and non-benzenoid compounds, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples.
Electrophilic aromatic substitution with mechanism: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directing effects of the functional groups.

List of Experiments

1. Detection of extra elements (N, Cl, Br, I and S) in organic compounds by Lassaigne's test.
2. Functional group tests for alcohols, phenols, carbonyl and carboxylic acid groups in known organic compounds.
3. Separation and purification of any one component of following binary solid mixture (Benzoic acid/*p*-Toluidine; *p*-Nitrobenzoic acid/*p*-Aminobenzoic acid; *p*-Nitrotolune/*p*- Anisidine) based on the solubility in common laboratory reagents/solvents like water (cold, hot), ethanol (cold, hot), dil. HCl, dil. NaOH, dil.$NaHCO_3$ etc.
4. Determination of melting point and boiling point of different organic compounds

Text Books:

- ✓ *R. T. Morrison, R. N. Boyd, S. K. Bhattacharjee, Organic Chemistry, 7th Ed., Pearson Education India, 2010.*
- ✓ *A. Bahl, B. S. Bahl, Advanced Organic Chemistry, 5th Ed., S. Chand, 2012.*
- ✓ *B. S. Furniss, A. J. Hannaford, P. W. G. Smith, A. R. Tatchell, Vogel's Textbook of Practical Organic Chemistry, 5th Ed., Pearson Education India, 2003.*

Reference Books:

- ✓ *T. W. Graham Solomons, C. G. Fryhle, S. A. Snyder, Solomons' Organic Chemistry, Global Ed., Wiley, 2024.*
- ✓ *J. Clayden, N. Greeves, S. Warren, Organic Chemistry, 2nd Ed., Oxford Publisher, 2012.*
- ✓ *R. K. Bansal, Organic Reaction Mechanism, 3rd Ed., Tata McGraw-Hill Publications, 1998.*
- ✓ *D. Nasipuri, Stereochemistry of Organic compounds, 4th Ed., New Age International Publisher, 2020.*
- ✓ *P. Sykes, A Guidebook to Mechanism in Organic Chemistry, 6th Ed., Pearson Education, 2003.*
- ✓ *F. A. Carey, R. J. Sundberg, Advanced Organic Chemistry, Part-A and Part-B, 5th Ed., Springer 2007.*
- ✓ *N. K. Vishnoi, Advanced Practical Organic Chemistry, 3rd Ed., Vikas Publishing House, 2009.*
- ✓ *O. P. Agarwal, Advanced Practical Organic Chemistry, Krishna Prakashan, 2014.*
- ✓ *V. K. Ahluwalia, R. Aggarwal, Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, Universities Press, 2004.*
- ✓ *H. T. Clarke, A Handbook of Organic Analysis: Qualitative and Quantitative, 4th Ed., CBS Publishers, 2021.*

Core III **Semester II**

States of matter, and Ionic equilibrium

Course Objectives:

The objective of this course is to develop basic and advance concepts regarding gases and liquids. It aims to study the similarity and differences between the two states of matter and reasons responsible for these. The objective of the practical is to develop skills for working in physical chemistry laboratory. The student will perform experiments based on the concepts learnt in Physical chemistry-I course.

Course Outcomes:

1. Derive mathematical expressions for different properties of gas and liquid and understand their physical significance.
2. Apply the concepts of gas equations and liquids while studying other chemistry courses and understand the importance of pH in every-day life.
3. Understand different lattice systems and apply working principles of XRD for understanding crystal structure by powder and single crystal method.
4. Handle stalagmometer and Ostwald viscometer properly and determine the density of aqueous solutions. Data reduction, interpretation using numerical and graphical methods.

Unit-I: Gaseous state

Kinetic molecular model of a gas, Collision frequency, Collision diameter, Collision cross section, Mean free path and viscosity of gases, including their temperature and pressure dependence, Relation between mean free path and coefficient of viscosity, Maxwell distribution of molecular velocities (no derivation); average, root mean square and most probable velocities and average kinetic energy, Law of equipartition of energy, Behaviour of real gases: Deviations from ideal gas behavior, Causes of deviation from ideal behavior, Vander Wall equation and its application, Compressibility factor Z, and its variation with pressure for different gases, Critical Phenomenon and critical constant derivation.

Unit-II: **Liquid state**

Qualitative treatment of the structure of the liquid state; physical properties of liquids; vapour pressure, surface tension and coefficient of viscosity, and their determination. Effect of addition of various solutes on surface tension and viscosity. Capillary action in relation to cohesive and adhesive forces, Explanation of cleansing action of detergents. Temperature variation of viscosity of liquids and comparison with that of gases. Qualitative discussion of structure of water.

Unit- III: Solid state

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powderpattern method. Analyses of powder diffraction patterns of NaCl, CsCl and KCl. Defects in crystals (stoichiometric and non- stoichiometric).

Unit-IV: Ionic equilibria

Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono- and diprotic acids. calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts and its application.

List of experiments:

1. Determine the surface tension by (i) drop number (ii) drop weight method.
2. Study the variation of surface tension of detergent solutions with concentration and determination of CMC
3. Determination of viscosity of aqueous solutions of (i) polymer (ii) ethanol and (iii) sugar at room temperature.

4. Study the variation of viscosity of sucrose solution with the concentration of solute.
5. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.
6. Preparation of buffer solutions of different pH (i) Sodium acetate-acetic acid (ii)
7. Ammonium chloride-ammonium hydroxide
8. Determination of dissociation constant of a weak acid.
9. Determination of solubility product of PbI_2 by titrimetric method.

Text Books:

- ✓ *P. W. Atkins, J. de Paula, Elements of Physical Chemistry, Oxford University Press, 6th Ed., 2006.*
- ✓ *G. W. Castellan Physical Chemistry 4thEdn. Narosa 2004.*
- ✓ *Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co., New Delhi 2011.*

Reference books:

- ✓ *Puri, Sharma & Pathania, Principles of Physical Chemistry, Vishal Publishing Co, 47th Edn., 2017.*
- ✓ *R. G., Mortimer Physical Chemistry, Elsevier (Academic Press), 3rd Ed,2008.*
- ✓ *T. Engel & P. Reid Physical Chemistry, 3rd Ed. Pearson 2013*
- ✓ *Kapoor K. L., Text Book of Physical Chemistry, McGraw Hill, 3rd Edn. 2017*
- ✓ *Hrishikesh Chatterjee, Understanding PHYSICAL CHEMISTRY Through Theories and Problems, Nonlinear insights (opc) pvt. ltd. Publication division, 1st Ed., 2023.*

Core IV

Chemical thermodynamics, equilibrium, and Colligative property

Course Objectives:

The learners should be able to apply principles and laws of thermodynamics to reversible and irreversible systems. In addition, they should be able to use spectroscopic data to calculate thermodynamic properties of ideal & real mixtures. In addition, understand the change in thermodynamic properties, equilibrium constants, partial molar quantities, chemical potential. Also able to identify factors affecting equilibrium constant using the principles and techniques of statistical thermodynamics.

Course Outcomes:

By the end of the course, the students will be able to:

- Discuss the laws of thermodynamics and applications to natural phenomena.
- Acquire a strong foundation of partial molar properties, its variation with temp and pressure for different systems and able to apply on the thermodynamics of simple mixtures.
- Inculcate firm foundations in the fundamentals and application of chemical equilibrium, and ΔG derive the relationship between different equilibrium constants.
- Understand the basic concept of Solutions of non-volatile solutes, colligative properties. Calculate various thermodynamic properties (ΔHneutralization, ΔHhydration & Cv) for chemical reactions using calorimeter.

Unit-I: Chemical thermodynamics

Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics. First law: Concept of heat, q, work, w, internal energy, U, and statement of **first law**; enthalpy, H, relation between heat capacities, calculations of q, w, U and H for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions. Thermochemistry: Heats of reactions: standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions.

Unit-II

Carnot cycle, efficiency of heat engine, Carnot theorem; **Second Law:** Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; molecular and statistical interpretation of entropy. Calculation of entropy change for reversible and irreversible processes. **Third Law:** Statement of third law, concept of residual entropy, calculation of absolute entropy of molecules. Free Energy Functions: Gibbs and Helmholtz energy; variation of S, G, A with T, V, P; Free energy change and spontaneity. Relation between Joule-Thomson coefficient and other thermodynamic parameters, inversion temperature, Gibbs- Helmholtz equation, Maxwell relations, thermodynamic equation of state.

Unit-III: Systems of variable composition

Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions in mixing of ideal gases. **Chemical equilibrium**: Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases, concept of fugacity. Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient (vant Hoff's reaction). Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Free energy of mixing and spontaneity; thermodynamic derivation of relations between the various equilibrium constants K_p, K_C and K_X. Le Chatelier principle (quantitative treatment) and its applications.

Unit-IV: Solutions and Colligative Properties

Dilute solutions; lowering of vapour pressure, Raoult's and Henry's Laws and their applications. Thermodynamic derivation using chemical potential to derive relations between the four colligative properties: (i) relative lowering of vapour pressure, (ii) elevation of boiling point, (iii) Depression of freezing point, (iv) osmotic pressure and amount of solute. Applications in calculating molar masses of normal, dissociated and associated solutes in solution.

List of experiments

1. Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
2. Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
3. Calculation of the enthalpy of ionization of ethanoic acid.
4. Determination of heat capacity of the calorimeter and integral enthalpy (endothermic and exothermic) solution of salts.
5. Determination of basicity/proticity of a polyprotic acid by the thermochemical method in terms of the changes of temperatures observed in the graph of temperature versus time for different additions of a base. Also calculate the enthalpy of neutralization of the first step.
6. Determination of enthalpy of hydration of copper sulphate.
7. Determination of heat of solution (ΔH) of oxalic acid/benzoic acid from solubility measurement.

Text Books:

- ✓ *P. W. Atkins& J. de Paula, Elements of Physical Chemistry, Oxford University Press, 6th Ed., 2006.*
- ✓ *D. A. McQuarrie, & J. D Simon. Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi 2004.*
- ✓ *K. L. Kapoor, Text Book of Physical Chemistry, Mac Grow Hill, 3rdEdn. 2017*
- ✓ *B. D. Khosla, V. C. Garg, & A. Gulati, Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi 2011.*

Reference Books:

- ✓ *T. Engel & P. Reid, Physical Chemistry 3rd Ed. Pearson 2013.*
- ✓ *S.C. Kheterpal Pradeep's Physical Chemistry, Vol. I & II, Pradeep Publications 2011.*
- ✓ *Puri, Sharma &Pathania, Principles of Physical Chemistry, Vishal Publishing Co, 47th Edn., 2017.*

Core V **Semester III**

Acids and Bases, Metallurgy, Chemistry of main group elements

Course Objectives:

To provide the basic knowledge on general principles of acids and bases, principle of metallurgy and chemistry of s- and p-block elements. Students can learn about chronological developments of the concepts of acids and bases. It will help students to get aware of the pH scale and classify a substance as acidic, basic, or neutral based on their pH or hydrogen ion concentration. Students can achieve the knowledge regarding volumetric analysis and preparation of metal complex.

Course Outcomes:

1. Know how the various theories of acid and base, and understand the occurrence and purification of metals
2. Learn the different properties of s- and p-block elements
3. Understand the preparation and properties of inorganic polymers.
4. Achieve knowledge on how to standardize, estimate and prepare inorganic compounds/metal ions.

Unit – I: Acids and Bases

Different concepts of acids and bases: Arrhenius theory, Bronsted-Lowry theory, Lewis theory, The Lux-Flood definition, The Usanovich definition, acids and bases in proton solvents, Concept of conjugate acid and conjugate base, Concept of pH, Pearson's classification of Lewis acid and Lewis bases into Hard and Soft Acids and Bases (HSAB), HSAB principle, application of HSAB principle.

Principle of metallurgy

Chief modes of occurrence of metals, Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agent, electrolytic reduction, hydrometallurgy. Methods of purification of metals: electrolytic process, parting process, Van Arkel-de Boer process, Mond's process and Zone refining.

Unit – II: Chemistry of *s*-Block Elements

General characteristics: melting point, flame colour, reducing nature, diagonal relationships and anomalous behavior of first member of each group. Reactions of alkali and alkaline earth metals with oxygen, hydrogen, nitrogen and water. Common features such as ease of formation, thermal stability and solubility of the following alkali and alkaline earth metal compounds: hydrides, oxides, peroxides, superoxides, carbonates, nitrates, and sulphates. Complex formation tendency of s-block elements; structure of the following complexes: crown ethers and cryptates of Group I; Hydride and their classifications: ionic, covalent and interstitial, EDTA complexes of calcium and magnesium. Solutions of alkali metals in liquid ammonia and their properties.

Unit – III: Chemistry of *p*-Block Elements

Electronic configuration, atomic and ionic size, metallic/non-metallic character, melting point, ionization enthalpy, electron gain enthalpy, electronegativity, catenation, allotropy of C, P, S; inert pair effect, diagonal relationship between B and Si and anomalous behavior of first member of each group. interhalogen and pseudo halogen compounds, Structure, bonding and properties (acidic/basic nature, stability, ionic/covalent nature, oxidation/reduction, hydrolysis, action of heat) of the following:

- **Hydrides:** hydrides of Group 13 (only diborane), Group 14, Group 15, Group 16 and Group 17.
- **Oxides**: oxides of phosphorus, sulphur and chlorine
- **Oxoacids:** oxoacids of phosphorus and chlorine; per oxoacids of sulphur
- **Halides:** halides of silicon and phosphorus

Unit – IV: Noble gases

Occurrence and uses, rationalization of inertness of noble gases, clathrates; preparation and properties of XeF_2, XeF_4 and XeF_6. Molecular shapes of noble gas compounds (VSEPR theory).

Inorganic polymer

Preparation, properties, structure and uses of the following compounds: Borazine, Silicates, silicones, phosphonitrilic halides $\{(PNCl_2)_n$ where n = 3 and 4$\}$, and concept of carbophosphazene.

List of experiments

1. Standardization of sodium thiosulphate solution by standard $K_2Cr_2O_7$ solution.
2. Estimation of copper using standard sodium thiosulphate solution (Iodometrically).
3. Estimation of available chlorine in bleaching powder iodometrically.
4. Preparation of Cuprous chloride (Cu_2Cl_2)
5. Preparation of Manganese (III) phosphate ($MnPO_4.H_2O$)
6. Preparation of Lead chromate ($PbCrO_4$)

Text Books:

- ✓ *A. J. Elias, The Chemistry of the p-Block Elements-Syntheses, Reactions and Applications, University Press (India) Pvt Ltd., 2009.*
- ✓ *J. D. Lee, Concise Inorganic Chemistry Wiley India, 5th Edn., 2008.*
- ✓ *J. E. Huheey, E. A. Keiter, R. L. Keiter, Inorganic Chemistry – Principles of structure and reactivity, Pearson Education, 4th Ed. 2002.*

Reference Books:

- ✓ *A. K. Das, Fundamentals of Inorganic Chemistry, Vol. I, CBS Publications, 2nd Ed., 2010.*
- ✓ *S. Prakash, G. D. Tuli, S. K. Basu, R. D. Madan, Advanced Inorganic Chemistry, Vol. I, 7th Ed., S. Chand & Company Pvt. Ltd., 2021.*
- ✓ *Puri, Sharma, Kalia, Principles of Inorganic Chemistry, Vishal Publication Co., 33rd Ed., 2017.*
- ✓ *D. E. Shriver, P.W.Atkins, Inorganic Chemistry, Oxford University Press, 5th Ed., 2010.*
- ✓ *G. L. Miessler, P. J. Fischer, D. A. Tarr, Inorganic Chemistry, 5th Ed., Pearson, 2014.*
- ✓ *J. Mendham, Vogel's Quantitative Chemical Analysis, 6th Ed., Pearson, 2009.*
- ✓ *V. K. Ahluwalia, S. Dhingra, A. Gulati, College Practical Chemistry, University Press, 2005.*

Core VI

Chemistry of halogen, oxygen and sulphur containing organic compounds

Course Objectives:

To provide the knowledge on organic compounds containing halogen, alcohol, phenol, thiol, ether, thioether, aldehydes, ketones, carboxylic acids and its derivatives as functional groups. Further to know their preparation, properties and reactivity for developing the skills required for synthesizing a target molecule from a given molecule.

Course Outcomes:

1. Understanding on preparation, properties and reactions of haloalkanes, haloarenes, and organic compounds containing C, H, O and S functional groups.
2. Basic knowledge on various name reactions and their mechanisms involving substitution, addition, elimination and condensation.
3. Knowledge on functional group interconversion and synthetic applications of different organic compounds.
4. Knowledge on various functional group detection in organic compounds and preparation of derivatives of functional groups.

Unit-I: Chemistry of Halogenated Hydrocarbons

Alkyl halides: Methods of preparation, nucleophilic substitution reactions – S_N1, S_N2 and S_Ni mechanisms with stereochemical aspects and effect of solvent and nucleophiles. substitution vs. elimination.
Aryl halides: Preparation, including preparation from diazonium salts, nucleophilic aromatic substitution; SNAr, Benzyne mechanism.
Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

Unit-II: Alcohols, Phenols, Ethers and Epoxides

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt-Blanc Reduction; Preparation and properties of glycols: Oxidation by periodic acid and lead tetraacetate, Pinacol-Pinacolone rearrangement;
Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer–Tiemann and Kolbe's–Schmidt Reactions, Fries and Claisen rearrangements with mechanism;
Ethers and Epoxides: Preparation and reactions with acids. Reactions of epoxides with alcohols, Ammonia derivatives and $LiAlH_4$.
Sulphur containing compounds: Preparation and reactions of thiols and thioethers

Unit-III: Carbonyl Compounds

Structure, reactivity and preparation. Nucleophilic additions, Nucleophilic addition-elimination reactions with ammonia derivatives with mechanism; Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Perkin, Cannizzaro and Wittig reaction, Beckmann rearrangements, α halo-form reaction and Baeyer-Villiger oxidation, - substitution reactions, oxidations and reductions (Clemmensen, Wolff-Kishner, $LiAlH_4$, $NaBH_4$, MPVO.; Addition reactions of unsaturated carbonyl compounds: Michael addition.
Active methylene compounds: Keto-enol tautomerism. Preparation and synthetic applications of diethyl malonate and ethylaceto acetate.

Unit-IV: Carboxylic Acids and Derivatives

Preparation, physical properties and reactions of monocarboxylic acids: Typical reactions of dicarboxylic acids, hydroxy acids and unsaturated acids: succinic, lactic, malic, tartaric, citric, maleic and fumaric acids; Preparation and reactions of acid chlorides, anhydrides, esters and amides; Comparative study of nucleophilic substitution at acyl group -Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Dieckmann and Reformatsky reactions, Hofmann-bromamide degradation and Curtius rearrangement.

List of Experiments

1. Functional group tests for amines (*p*-, *sec*- *tert*-), nitro, amide and imide groups in known organic compounds.
2. Benzolyation of one of the following amines (aniline, o-, m-, p- toluidines and o-, m-, p- anisidine) and one of the following phenols (β-naphthol, resorcinol, p-cresol) by Schotten-Baumann reaction.
3. Bromination of any one of the following:
   a) Acetanilide by conventional methods
   b) Acetanilide using green approach (Bromate-bromide method)
4. Nitration of any one of the following:
   a) Acetanilide/nitrobenzene by conventional method
   b) Salicylic acid by green approach (using ceric ammonium nitrate).
5. Identification of unknown organic compounds containing one functional group in CHO or CHN systems and their derivative preparation.

Text Books:

- ✓ *R. T. Morrison, R. N. Boyd, S. K. Bhattacharjee, Organic Chemistry, 7th Ed., Pearson Education India, 2010.*
- ✓ *A. Bahl, B. S. Bahl, Advanced Organic Chemistry, 5th Ed., S. Chand, 2012.*
- ✓ *N. K. Vishnoi, Advanced Practical Organic Chemistry, 3rd Ed., Vikas Publishing House, 2009.*

- *Reference Books:*

- ✓ *T. W. Graham Solomons, C. G. Fryhle, S. A. Snyder, Solomons' Organic Chemistry, Global Ed., Wiley, 2024.*
- ✓ *J. Clayden, N. Greeves, S. Warren, Organic Chemistry, 2nd Ed., Oxford Publisher, 2012.*
- ✓ *R. K. Bansal, Organic Reaction Mechanism, 3rd Ed., Tata McGraw-Hill Publications, 1998.*
- ✓ *P. Sykes, A Guidebook to Mechanism in Organic Chemistry, 6th Ed., Pearson Education, 2003.*
- ✓ *F. A. Carey, R. J. Sundberg, Advanced Organic Chemistry, Part-A and Part-B, 5th Ed., Springer 2007.*
- ✓ *B. S. Furniss, A. J. Hannaford, P. W. G. Smith, A. R. Tatchell, Vogel's Textbook of Practical Organic Chemistry, 5th Ed., Pearson Education India, 2003.*
- ✓ *O. P. Agarwal, Advanced Practical Organic Chemistry, Krishna Prakashan, 2014.*
- ✓ *V. K. Ahluwalia, R. Aggarwal, Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, Universities Press, 2004.*
- ✓ *H. T. Clarke, A Handbook of Organic Analysis: Qualitative and Quantitative, 4th Ed., CBS Publishers, 2021.*

Core VII

Phase equilibrium, Chemical dynamics, catalysis and surface chemistry

Course Objectives:

This course is offered by School of Chemistry as a core subject for the B.Sc. programme, with an emphasis on fundamental understanding phase equilibrium and chemical kinetics. The objective of this course is to develop basic and advance concepts regarding of Surface chemistry and catalysis. It aims to study the similarity and differences between adsorption isotherms and reasons responsible for these. The objective of the practical is to develop skills for working in physical chemistry laboratory pertaining to kinetics & adsorption isotherms. The student will perform experiments based on the concepts learnt in Physical chemistry-III course.

Course Outcomes:

By the end of the course, the students will be able to:

- Establish the phase rule for one, two component systems, eutectics; and its thermodynamic derivation; fundamentals of physical transformation of pure materials.
- Interpret chemical kinetics of chemical reactions and its impact on reaction mechanism.
- Differentiate between homogenous and heterogenous catalysis & Acid Base Catalysis, differentiate between Physical adsorption, chemisorption and various adsorption isotherms.
- Determine distribution coefficients of solution mixtures, Interpret and use data generated from kinetic studies by graphical and experimental methods.

Unit-I: Phase Equilibria-I

Concept of phases, components and degrees of freedom, derivation of Gibbs Phase Rule for nonreactive and reactive systems; Clausius-Clapeyron equation and its applications to solid- liquid, liquid-vapour and solid-vapour equilibria, phase diagram for one component systems, with applications (H_2O and sulphur system). Phase diagrams for systems of solid-liquid equilibria involving eutectic (Pb-Ag system, desilverisation of lead), congruent (ferric chloride-water) and incongruent (sodium sulphate- water) melting points.

Unit-II: Phase Equilibria-II

Three component systems, water-chloroform-acetic acid system, triangular plots.
Binary solutions: Gibbs-Duhem-Margules equation, its derivation and applications to fractional distillation of binary miscible liquids (ideal and non-ideal), azeotropes, partial miscibility of liquids, CST, miscible pairs, steam distillation. Nernst distribution law: its derivation and applications.

Unit-III: Chemical Kinetics

Order and molecularity of a reaction, derivation of rate laws (Zero, first, and second order) and its differential and integrated form of rate expressions up to second order reactions, experimental methods of the determination of orders. Kinetics of complex reactions (integrated rate expressions up to first order only): (i) Opposing reactions (ii) parallel reactions (iii) consecutive reactions and their differential rate equations (steady-state approximation in reaction mechanisms) (iv) chain reactions (HBr chain reaction).
Temperature dependence of reaction rates; Arrhenius equation; activation energy. Collision theory of reaction rates, qualitative treatment of the theory of absolute reaction rates.

Unit-IV: Catalysis

Types of catalyst, specificity and selectivity, mechanisms of catalyzed reactions at solid surfaces; effect of particle size and efficiency of nanoparticles as catalysts. Enzyme catalysis, Michaelis- Menten mechanism, acid-base catalysis. Surface chemistry: Physical adsorption, chemisorption, adsorption isotherms (Langmuir, Freundlich and Gibb's isotherms), nature of adsorbed state.

List of experiments

1. Determination of distribution coefficients of:
   (a) Iodine between water and carbon tetrachloride.
   (b) Acetic/ benzoic acid between water and cyclohexane.
2. Study the equilibrium of at least one of the following reactions by the distribution method:

- $I_2\ (aq) + I^- \rightarrow I_3^-(aq)$
- $Cu^{2+}(aq) + nNH_3 \rightarrow Cu\ (NH_3)_n$

3. Study the kinetics of the following reactions.
   (i) Integrated rate method:
   a) Acid hydrolysis of methyl acetate with hydrochloric acid.
   b) Saponification of ethyl acetate.
   (ii) Compare the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methyl acetate.
4. Verify the Freundlich and Langmuir isotherms for adsorption of acetic acid on activated charcoal.

Text Books:

- ✓ *P. W. Atkins, J. de Paula, Elements of Physical Chemistry, Oxford University Press, 6th Ed., 2006.*
- ✓ *K. J. Laidler, Chemical kinetics, New York: Harper & Row 1916*
- ✓ *J. Rajaram, J. C. Kuriacose Kinetics and Mechanisms of Chemical Transformations, Penguin Books Ltd, 2000.*

Reference Books:

- ✓ *T. Engel, P. Reid, Physical Chemistry 3rd Ed. Pearson 2013.*
- ✓ *D. A. McQuarrie, J. D. Simon, Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi 2004.*
- ✓ *K. L. Kapoor, Text Book of Physical Chemistry, Mac Grow Hill, 3rdEdn. 2017*

Core VIII **Semester IV**

Coordination Chemistry, Chemistry of d- and f-block elements, Inorganic Reaction Mechanism and electron transfer reactions

Course Objectives:

To provide the knowledge on the coordination compounds which find manifold applications in the diverse fields such as industrial catalysis, metallurgy, pharmaceutical industry, paints and pigments. Students will achieve the knowledge about the diverse kinetic aspects of the coordination compounds. They will also be familiarized with the chemistry of d- and f-block elements and get an idea about horizontal similarity in a periodin addition to vertical similarity in a group. Besides, the idea of inorganic reaction mechanism and the importance of electron transfer reactions have been reviewed. Synthesis and estimation of inorganic compoundshave been included to enhance the practical skill of students in this regard.

Course Outcomes:

1. Understand the chemistry of coordination compounds, and d- and f-Block elements.
2. Explain magnetic properties and colour of complexes on the basis of Crystal Field Theory.
3. Understanding the fundamental importance of inorganic reaction mechanism and electron transfer reaction
4. Achieved the knowledge of the preparation of inorganic complex, estimation by EDTA method and gravimetric method.

Unit – I: Coordination Chemistry

Werner's Coordination theory, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds with coordination numbers 4 and 6. A brief idea about chelate effect, and labile and inert complexes. Valence bond theory and its application to complexes of coordination numbers 4 and 6. Examples of inner and outer orbital complexes. Crystal field theory and its application, measurement of Δ_o. Calculation of CFSE in weak and strong fields, concept of pairing energies, factors affecting the magnitude of Δ_o. Octahedral *vs.* tetrahedral coordination, tetragonal distortions from octahedral geometry, Jahn-Teller theorem, square planar geometry. Qualitative aspect of Ligand field theory, and MO Theory (bonding and antibonding interactions, idea about σ, σ^*, π, π^*, n –MO).

Unit – II: Chemistry of d- and f-Block Elements

Chemistry of transition metals: General group trends with special reference to electronic configuration, colour, variable valency, magnetic properties (no temperature dependence), catalytic properties, and ability to form complexes. Distinction among the first, second and third transition series. Chemistry of Ti, V, Cr, Mn, Fe and Co in various oxidation states (excluding their metallurgy). Some importantcompounds of Cr, Mn, Fe and Co and their roles as laboratory reagents; Potassium dichromate, potassiumpermanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside and sodium cobaltinitrite. Chemistry of Lanthanides and Actinides: electronic configuration, oxidation states, colour, spectral and magnetic properties. Lanthanide contraction (causes and effects), separation of lanthanides by ion exchange method. General features of actinides, separation of Np, Pm, Am from U.

Unit – III: Inorganic Reaction Mechanism

Thermodynamic and kinetic stability, Stepwise and overall formation constants and their relationship, factors affecting stability, Substitution reactions in square planar complexes, trans-effect, theories of trans- effect (electrostatic polarization and π-bonding theory), Substitution reactions in octahedral complexes, acid hydrolysis of octahedral Co(III) complexes with reference to effect of charge, chelation, steric crowding & effects of leaving group, base hydrolysis of octahedral Co(III) complexes: Conjugate base mechanism, test of conjugate base mechanism, anation reaction.

Unit– IV: Electron transfer reaction

Redox reactions: electron tunneling hypothesis, concept of Marcus-Hush theory, atom transfer reactions, one and two electron transfer, complementary and non-complementary reactions, inner sphere and outer sphere reactions, electron transfer through extended bridges, concept of hydrated electron.

List of experiments

1. Synthesis of hexamine nickel (II) complex, $[Ni(NH_3)_6]Cl_2$
2. Synthesis of tetraamminecopper (II) sulphate, $[Cu(NH_3)_4]SO_4.H_2O$
3. Estimation of Ca and Mg from cement by EDTA method
4. Estimation of nickel (II) using dimethylglyoxime (DMG)

Text Books:

- ✓ *J. D. Lee, Concise Inorganic Chemistry, Wiley India, 5th Edn., 2008.*
- ✓ *J. E. Huheey, E. A. Keiter, R. L. Keiter, Inorganic Chemistry– Principles of structure and reactivity, Pearson Education, 4th Ed. 2002.*
- ✓ *F. A. Cotton, G. Wilkinson, Advanced Inorganic Chemistry Wiley-VCH., 1999.*

Reference books:

- ✓ *A. K. Das, Fundamentals of Inorganic Chemistry, Vol. II, CBS Publications, 2nd Ed. 2010.*
- ✓ *G. H. Jeffery, J. Bassett, J. Mendham, R. C. Denney, Vogel's Textbook of Quantitative Chemical Analysis, John Wiley and Sons, 1989.*
- ✓ *Puri, Sharma, Kalia, Principles of Inorganic Chemistry, Vishal Pub. Co., 33rd ed., 2017.*
- ✓ *D. E. Shriver, P. W. Atkins, Inorganic Chemistry, Oxford University Press, 5th Edn.*
- ✓ *V. K. Ahluwalia, S. Dhingra, A. Gulati, College Practical Chemistry, University Press (2005).*
- ✓ *S. Gulati, J. L. Sharma, S. Manocha, Practical Inorganic Chemistry, 1st Edn., CBS Publishers & Distributors Pvt Ltd., (2017).*

Core-IX

Natural Products, Heterocyclic Compounds, Nitrogen containing compounds and Polynuclear Hydrocarbons

Course Objectives:

Imparting information on natural products, nitrogen based organic compounds, heterocyclic compounds and polynuclear hydrocarbons with their chemical properties and structural elucidation. Imparting hands on training in estimation and analysis of organic compounds.

Course Outcomes:

1. Gaining knowledge on preparation, properties and synthetic application of nitrogen containing compounds including diazonium salts.
2. Understanding on isolation and structural elucidation of natural products and heterocyclic compounds and their chemical reactions.
3. Knowledge on structure and properties of fused aromatic compounds.
4. Learning on various procedures of estimation of organic compounds.

Unit-I: Nitrogen Containing Functional Groups

Amines*:* Effect of substituent and solvent on basicity; Preparation from nitro and nitriles and properties: Gabriel phthalimide synthesis, Carbylamine reaction, Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction; Distinction between 1°, 2° and 3° amines with Hinsberg reagent and nitrous acid.

*Diazonium Salt*s**:** Preparation and their synthetic applications.

Unit-II: Dyes and Polynuclear hydrocarbon derivatives

Classification, colour and constitution; Mordant and Vat dyes; Chemistry of dyeing. Synthesis and applications of: *Azo dyes* – Methyl orange and Congo red (mechanism of Diazo coupling); *Triphenylmethane dyes*- Malachite Green, and crystal violet; *Phthalein dyes*– Phenolphthalein and Fluorescein. Edible dyes with example.

Preparation of Polynuclear Hydrocarbons: Reactions of naphthalene, anthracene, phenanthrene, acenaphthene, pyrene. Preparation and their structure elucidation (naphthalene) and important derivatives of naphthalene and anthracene.

Unit-III: Heterocyclic Compounds

Classification and nomenclature, Structure, aromaticity in 5-numbered and 6-membered rings containing one heteroatom, Reaction and mechanism of substitution reactions of: Furan, Pyrrole, Thiophene and Pyridine. Synthesis of Pyrrole (Paal-Knorr synthesis, Knorr pyrrole synthesis), Furan (Paal Knorr synthesis, Fiest-Benary Synthesis), Derivatives of Furan: Furfural and Furoic acid (preparation only) Pyridine (Hantzsch synthesis). Pyrimidine (synthesis from β-keto acid), Bicyclic Heterocyclic compound: Indole (Fischer indole synthesis and Madelung synthesis) Quinoline (Skraup synthesis, Friedlander Synthesis).

Unit-IV: Natural Products (11 hrs)

Alkaloids

Natural occurrence, General structural features, Isolation and their physiological action. Hoffmann's exhaustive methylation, Emde's modification, Structure elucidation, synthesis and medicinal importance of Hygrine, Nicotine, Quinine and Morphine

Terpenes

Occurrence, classification, isoprene rule; Elucidation of structure and synthesis of Citral, and α- terpineol.

List of Experiments

1) Qualitative analysis of unknown organic compounds containing bifunctional groups
2) Estimation of Phenol/ Aniline
3) Estimation of Methyl Ketone
4) Determination of percentage purity of carbonyl compound.

Text Books:

- ✓ *R. T. Morrison, R. N. Boyd, S. K. Bhattacharjee, Organic Chemistry, 7th Ed., Pearson Education India, 2010.*
- ✓ *I. L. Finar, Organic Chemistry, Vol-2, 5th Ed., Pearson Publisher, 2002.*
- ✓ *N. K. Vishnoi, Advanced Practical Organic Chemistry, 3rd Ed., Vikas Publishing House, 2009.*

Reference Books:

- ✓ *T. W. Graham Solomons, C. G. Fryhle, S. A. Snyder, Solomons' Organic Chemistry, Global Ed., Wiley, 2024.*
- ✓ *J. Clayden, N. Greeves, S. Warren, Organic Chemistry, 2nd Ed., Oxford Publisher, 2012.*
- ✓ *J. A. Joule, K. Mills, Heterocyclic Chemistry, 5th Ed., Wiley Blackwell, 2010.*
- ✓ *R. K. Bansal, Heterocyclic Chemistry, 5th Ed., New Age International, 2017.*
- ✓ *O. P. Agarwal, Organic Chemistry: Natural Products, Vol. I, Krishna Prakashan Media, 2015.*
- ✓ *H. T. Clarke, A Handbook of Organic Analysis: Qualitative and Quantitative, 4th Ed., CBS Publishers, 2021.*

Core X

Conductance, electrochemistry, electrical properties of atoms and molecules

Course Objectives:

This course offers in introductory knowledge of electrolytic conductance depth knowledge of electrochemical cells. Students are expected to have background knowledge in physical chemistry and mathematics up to the +2 level for this course. The objective of the practical is to develop skills for working in physical chemistry laboratory. The student will perform experiments based on the concepts learnt in Physical chemistry-IV course.

Course Outcomes:

By the end of the course, the students will be able to:

1. The text provides an in-depth analysis of the conductance nature of electrolytic solutions, their thermodynamics, Debye-Huckel theory, ionic strength, mean ionic activity coefficient, and the Debye-Huckel limiting law.
2. Explain dynamic electrochemical processes and skill development to analyse it.
3. Understand the dynamic electrochemical processes and skill development to analyse it.
4. Develop skill to solve problems on Electrochemical Cells, electrode potentials, emf & solubility product measurements, potentiometric titrations, pK and pH measurements.

Unit-I: Conductance-I

Arrhenius theory of electrolytic dissociation. Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Molar conductivity at infinite dilution. Kohlrausch law of independent migration of ions. Debye-Hückel-Onsager equation, Wien effect, Debye-Falkenhagen effect, Walden's rules.

Unit-II: Conductance-II

Ionic velocities, mobilities and their determinations, transference numbers and their relation to ionic mobilities, determination of transference numbers using Hittorf and Moving Boundary methods. Applications of conductance measurement: (i) degree of dissociation of weak electrolytes, (ii) ionic product of water (iii) solubility and solubility product of sparingly soluble salts, (iv) conductometric titrations, and (v) hydrolysis constants of salts.

Unit-III: Electrochemistry-I

Quantitative aspects of Faraday's laws of electrolysis, rules of oxidation/reduction of ions based on half-cell potentials, applications of electrolysis in metallurgy and industry.
Chemical cells, reversible and irreversible cells with examples. Electromotive force of a cell and its measurement, Nernst equation; Standard electrode (reduction) potential and its application to different kinds of half-cells. Application of EMF measurements in determining free energy, enthalpy and entropy of a cell reaction, (ii) equilibrium constants, and (iii) pH values, using hydrogen, quinone-hydroquinone, glass electrodes.

Unit-IV: Electrochemistry-II

Concentration cells with and without transference, liquid junction potential; determination of activity coefficients and transference numbers. Qualitative discussion of potentiometric titrations (acid-base, redox, precipitation). **Electrical properties of atoms and molecules**: Basic ideas of electrostatics, Electrostatics of dielectric media. Clausius-Mosotti equation and Lorenz-Laurentz equation (no derivation), Dipole moment and molecular polarizabilities and their measurements.

List of experiments

I. Determination of cell constant.

II. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid.

III. Perform the following conductometric titrations:

i. Strong acid vs. strong base

ii. Weak acid vs. strong base

iii. Strong acid vs. weak base

I Perform the following potentiometric titrations:

i. Strong acid vs. strong base

ii. Weak acid vs. strong base

iii. Dibasic acid vs. strong base

Text Books:

- ✓ *P. W Atkins. & J. de Paula, Elements of Physical Chemistry, Oxford University Press, 6th Ed., 2006.*
- ✓ *J. O. Bockris & A. Reddy. Modern Electrochemistry, Kluwer Academic, 2002.*
- ✓ *S. Glasstone, An Introduction to Electrochemistry: Affiliated East West Press Private, Limited. 1960*

Reference Books:

- ✓ *T. Engel & P. Reid, Physical Chemistry 3rd Ed. Pearson 2013.*
- ✓ *McQuarrie, D. A. & Simon, J. D. Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi 2004.*
- ✓ *Kheterpal S.C., Pradeep's Physical Chemistry, Vol. I & II, Pradeep Publications. 2002.*

Core XI **Semester V**

Organic Spectroscopy

Course Objectives:

To provide knowledge on the principles of different advanced spectroscopic methods such as UV-Visible, FTIR, NMR and Mass-spectrometry and to develop analytical aptitude for interpretation of structure of the organic compounds by applying these spectroscopic methods. Imparting practical knowledge on UV-visible spectroscopy and colour of compounds.

Course Outcomes:

- Gaining knowledge on principle of UV-visible and Infrared Spectroscopic techniques.
- Gaining knowledge on principle of NMR Spectroscopic techniques.
- Gaining knowledge on principle of Mass Spectrometry techniques.
- Understanding and interpretation of different spectra of organic molecules.

Unit-I: UV-Visible Spectroscopy

Types of electronic transitions, λ_{max}, Lambert-Beer's law and its limitations, Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts, Intensity of absorption; Instrumentation (brief idea only), Application of Woodward rules for calculation of λ_{max} for the following systems: α, β- unsaturated carbonyl compounds, acids and esters; Conjugated dienes, distinction between cis and trans isomers.

Unit-II: FTIR Spectroscopy

Fundamental and non-fundamental molecular vibrations; IR absorption positions of O and N containing functional groups; Effect of H-bonding, conjugation, resonance and ring size on IR absorptions; Fingerprint region and its significance; application in simple functional group analysis

Unit-III: NMR Spectroscopy

NMR Spectroscopy: Basic principles of Proton Magnetic Resonance, chemical shift and factors influencing it; Equivalent and non-equivalent protons, Spin-spin coupling and coupling constant; Anisotropic effects in alkene, alkyne, aldehydes and aromatics; Interpretation of NMR spectra of simple organic compounds. ^{13}C NMR spectroscopy, chemical shift values and interpretation of NMR spectra. preliminary idea on NMR of ^{15}N, ^{19}F, ^{31}P nuclei.

Unit-IV: Mass Spectrometry

Introduction, Basic principle, Fragmentation pattern, instrumentation, Determination of molecular formulae, molecular ions, Parent peak, Base peak, isotopic peak and metastable ion peak. Use of molecular fragmentation, McLafferty rearrangement, Mass spectra of some classes of compounds (hydrocarbons, alcohols, phenols, ketones, aldehydes, acids and esters)

Problems involving identification of organic compounds using UV, IR, NMR and Mass spectroscopy.

List of Experiments

1) Using an UV-visible spectrophotometer, obtain the uv-visible spectrum, determine the λ_{max} value and, after comparing the spectra of the following molecules, predict the effect of auxochrome and conjugation on absorption maxima.

   (a) Take and analyze the spectra of benzene, aniline, and 4-methoxyaniline using a suitable solvent. Then, compare the results after adding dil hydrochloric acid to it.

   (b) Take and analyze the spectra of salicylic acid, benzoic acid and *p*-amino benzoic acid, cinnamic acid in neutral and then compare the result after adding dil NaOH to it.

   (c) Take and analyze the spectra of o-nitrophenol, p-nitrophenols and nitrobenzene in neutral and then compare the result after adding dil NaOH to it.

2) Identification of labelled peaks in the ^{1}H NMR spectra of the known organic compounds and to explain their δ-values and splitting pattern on a supplied NMR spectra.

2) Identification of labelled peaks in the IR spectrum of a compound and to explain the relative frequencies of the absorptions (C-H, O-H, N-H, C-O, C-N, C-X, C=C, C=O, N=O, C≡C, C≡N) of a supplied spectrum.

Text Books:

- ✓ *W. Kemp, Organic Spectroscopy, 2nd Ed., Macmillan, 2019.*
- ✓ *P. S. Kalsi, Spectroscopy of Organic Compounds, 9th Ed., New Age International Publishers, 2022.*
- ✓ *D. L. Pavia, G. M. Lampman, G. S. Kriz, J. R. Vyvyan, Introduction to Spectroscopy, 5th Ed., Cengage India Private Limited, 2015.*

Reference Books:

- ✓ Y. R. Sharma, Elementary Organic Spectroscopy, 5th Ed., S. Chand, 2013.
- ✓ Jag Mohan, Organic Spectroscopy: Principles and Applications, 2nd Ed., Narosa Publishers, 2009.
- ✓ J. Singh, J Singh, Organic Spectroscopy: Principles, Problems and their Solutions, Pragati Prakashan, 2019.
- ✓ R. M. Silverstein, F. X. Webster, D. J. Kiemle, D. L. Bryce, Spectrometric Identification of Organic Compounds, 8th Ed., Wiley, 2022.

Core XII

Basic quantum chemistry, Molecular & electronic spectroscopy, and photochemistry

Course Objectives:

This course is offered by School of Chemistry as a core subject for the B.Sc. programme, with an emphasis on fundamental understanding of Quantum chemistry, molecular spectroscopy, and photochemistry. Students are expected to have background knowledge in mathematics up to the +2 level for this course. The objective of the practical is to develop skills for working in physical chemistry laboratory. The student will perform experiments based on the concepts learnt in Physical chemistry-V course.

Course outcomes:

By the end of the course, the students will be able to:

- Understand the postulates of quantum mechanics. Construct the Schrödinger wave equations for 1-D box, 3-D box, Rigid rotor, and SHO and able to interpret the solution of Schrödinger equation.
- Understand LCAO-MO compare with VBT of H2 molecule. Apply the fundamentals of Quantum mechanics to interpret molecular spectroscopy.
- Calculate quantum yield of photochemical reactions.
- Interpret the data obtained from graphical methods of Lambert-Beer's law experiments and corelate with UV-Vis spectroscopy.

Unit-I: Quantum Chemistry-I

Quantum mechanical operators, Postulates of quantum mechanics, Schrödinger equation and its application to particle in one-dimensional box (complete solution) - quantization of energy levels, zero-point energy, normalization of wave functions, probability distribution functions, nodal properties. Extension to three-dimensional boxes.

Qualitative treatment of simple harmonic oscillator model of vibrational motion: Setting up of Schrödinger equation and discussion of solution and wave functions. Vibrational energy of diatomic molecules and zero-point energy.

Rigid rotator model of rotation of diatomic molecule: Schrödinger equation, transformation to spherical polar coordinates. Derivation of rotational energy expression of diatomic molecule.

UNIT-II Chemical Bonding

Chemical bonding: Covalent bonding, valence bond and molecular orbital approaches, LCAO- MO treatment of H_2^+. Bonding and antibonding orbitals. Qualitative extension to H_2. Comparison of LCAO-MO and VB

treatments of H_2 (only wave functions, detailed solution not required) and their limitations. Localized and non- localized molecular orbitals treatment of triatomic (BeH_2, H_2O) molecules.

Unit-III: Molecular Spectroscopy

Interaction of electromagnetic radiation with molecules and various types of spectra; Born- Oppenheimer approximation.

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic molecules, isotopic substitution.

Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration. Vibration-rotation spectroscopy: diatomic vibrating rotator, P, Q, R branches.

UNIT-IV: Molecular Spectroscopy-II

Raman spectroscopy: Qualitative treatment of Rotational Raman effect; Effect of nuclear spin, Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion. ***Electronic spectroscopy:*** Franck-Condon principle, electronic transitions, singlet and triplet states, fluorescence and phosphorescence, dissociation and predissociation.

Photochemistry Laws of photochemistry, quantum yield, actinometry, examples of low and high quantum yields, photochemical equilibrium and the differential rate of photochemical reactions, photosensitised reactions, quenching, chemiluminescence.

List of experiments

1. Study of absorption spectra (visible range) of $KMnO_4$ and determine the λ_{max} value. Calculate the energies of the transitions in kJ mol^{-1}, cm^{-1}, and eV.
2. Verify Lambert-Beer's law and determine the concentration of $CuSO_4$/$KMnO_4$/$K_2Cr_2O_7$ in a solution of unknown concentration.
3. Determine the dissociation constant of an indicator (phenolphthalein).
4. Determine the concentration of HCl against 0.1 N Na OH spectrophotometrically.
5. To find the strength of given ferric ammonium sulfate solution of (0.05 M) by using EDTA spectrophotometrically.
6. To find out the strength of $CuSO_4$ solution by titrating with EDTA spectrophotometrically.
7. To determine the concentration of Cu (II) and Fe (III) solution photometrically by titrating with EDTA.

Text Books:

- ✓ *D. A. McQuarrie, Quantum Chemistry, Viva Books, Indian Student Edition, Reprint, 2011*
- ✓ *R.K. Prasad, Quantum Chemistry, New Age International, 2006*
- ✓ *I. Levine, Quantum Chemistry, 7th Edition, Pearson, 2000*

Reference Books:

- ✓ T. Engel & P. Reid, Physical Chemistry 3rd Ed. Pearson 2013.
- ✓ D. A. McQuarrie, & J. D. Simon, Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi 2004.
- ✓ S.C. Kheterpal Pradeep's Physical Chemistry, Vol. I & II, Pradeep Publications. 2011.

Core XIII

Chemistry of Organometallic Compounds

Course Objectives

To provide the basic knowledge and cutting-edge developments in the field of organometallic chemistry. This includes the classification of organometallic compounds, the concept of hapticity and the 18-electron rule governing the stability of a wide variety of organometallic species. Specific organometallic compounds are studied in detail to understand the basic concepts. It familiarizes the versatility of phosphine/NHC ligands as well as metathesis reactions. It provides much fundamentals about the qualitative inorganic analysis having multiple radical mixtures.

Course Outcomes:

1. Understand the basic concepts of organometallic compounds pertaining to their synthesis, structure and bonding
2. Understand the mechanistic phenomena of organometallic based catalytic reactions
3. Get knowledge on the versatility of phosphine/NHC ligands, and industrially important metathesis reactions.
4. Understand and explain the basic principles of qualitative inorganic analysis

Unit – I: Organometallic Compounds-I

Definition of organometallic compound, classifications, nature of metal-carbon bond, nomenclature, the 18-electron rule, Concept of hapticity of organic ligands. Metal carbonyls: electron counting of metal carbonyls of 3d series. General methods of preparation (direct combination, reductive carbonylation, thermal and photochemical decomposition) of mono and binuclear metal carbonyls of 3d series. Structures of mononuclear and binuclear carbonyls of Cr, Mn, Fe, Co and Ni using VBT. π-acceptor behaviour of CO (MO diagram of CO to be discussed), synergic effect and use of IR data to explain extent of back bonding. Zeise's salt: preparation and structure, evidence of synergic effect and comparison of synergic effect with that in carbonyls.

Unit – II: Organometallic Compounds-II

Metal Alkyls: Important structural features of methyl lithium (tetramer) and trialkyl aluminium (dimer), concept of multicentre bonding in these compounds. Role of triethyl aluminium in the polymerisation of ethene and propylene (Ziegler – Natta Catalyst). Ferrocene: preparation and reactions (acetylation, alkylation, metallation, Mannich condensation, nitration, halogenation, silylation, borylation,sulphonation), structure and aromaticity, comparison of aromaticity and reactivity with that of benzene. Fluxional molecules. Concept of coordinative unsaturation, oxidative addition, reductive elimination, insertion reaction, migratory insertion, intramolecular hydrogen transfer reaction, agostic interaction.

Unit – III: Organometallic Catalysis

General idea of catalysis, turnover number (TON), turnover frequency (TOF), hydrogenation of alkenes using Wilkinson's catalyst, Tolman catalytic loop, hydroformylation of alkenes (using cobalt catalyst), enantioselective hydrofomylation, wacker process, mosanto acetic acid synthesis, cativa process, hydrosilylation reactions, reduction of carbon monoxide by hydrogen (Fischer-Tropsch reaction). Concept of Pd-catalyzed cross-coupling reactions.

Unit – IV: Neutral Spectator Ligands and Metathesis Reactions

Steric and electronic structure of phosphine ligands, basicity of phosphine, monodentate and multidentate phosphines, cone angle, bite angle, N-heterocyclic carbenes (NHC), synthesis of NHC, alkene metathesis, mechanism of alkene metathesis, classification of metathesis reactions, significance of metathesis reactions.

Lists of Experiment

1. Qualitative analysis of mixtures containing 4 radicals (2 anions and 2 cations). Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

   CO_3^{2-}, NO_2^-, S^{2-}, SO_3^{2-}, F^-, Cl^-, Br^-, I^-, NO_3^-, PO_4^{3-}, NH_4^+, K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}.

   Mixtures may contain one insoluble component ($BaSO_4$, $SrSO_4$, $PbSO_4$, CaF_2 or Al_2O_3) or combination of interfering anions e.g., CO_3^{2-} and SO_3^{2-}; NO_2^- and NO_3^-; Cl^-, Br^-, I^-; $Br^-$and I^-; NO_3^-, Br^-, I^-.

Text Books:

- ✓ *B. D. Gupta, A. J. Elias, Basic Organometallic Chemistry, 2nd Edn., University Press (2013).*
- ✓ *R. C. Mehrotra, A. Singh, Organometallic Chemistry, New Age International Publishers, 2nd Edn, 2000.*
- ✓ *Vogel's Qualitative Inorganic Analysis, 7th Ed, Revised by G. Svehela, 4th Ed., Person, 2007.*

Reference Books:

- ✓ *A. K. Das, Fundamentals of Inorganic Chemistry, Vol. II, CBS Publications, 2nd Ed. 2010.*
- ✓ *D. E. Shriver, P. W. Atkins Inorganic Chemistry, Oxford University Press, 5th Edn.*
- ✓ *J. E. Huheey, E. A. Keiter, R. L. Keiter, Inorganic Chemistry – Principles of structure and reactivity,Pearson Education, 4th Ed. 2002.*
- ✓ *B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing Co., 33rd Ed., 2017.*
- ✓ *J. F. Hartwig, Organotransition Metal Chemistry: From Bonding to Catalysis, University ScienceBooks, 2010.*

Core XIV **Semester VI**

Analytical Methods of Chemistry

Course Objectives:

This course is offered by School of Chemistry as a core subject for both 4-year B.Sc. with and without research Programs, with an emphasis on analytical methods of chemistry. This course aims to impart skills, promotes employability, and entrepreneurships in broad domains such as Thermal industry, pharma, dyes & paints, coating, metal & metallurgical PSUs, research, and academic institutes. Instrumentation proficiency: Students should gain hands-on experience with analytical instrumentation commonly used in chemical analysis, such as spectrophotometers, chromatographs, and mass spectrometers. The aims are to provide a sound physical understanding of the principles of analytical chemistry and to show how these principles are applied in chemistry and related disciplines— especially in life sciences and environmental science.

Course Outcomes:

1. Perform calibration and standardization procedures to ensure the accuracy and precision of analytical measurements, adhering to established protocols and standards.
2. Apply a variety of analytical techniques, such as spectroscopy, chromatography, electrochemistry, and titrimetry, to quantitatively and qualitatively analyze chemical substances.
3. Collect, analyze, and interpret experimental data accurately using appropriate statistical methods and error analysis techniques.
4. Develop critical thinking and problem-solving skills and Implement quality control and assurance practices, including the use of control charts and validation of analytical methods, to ensure the reliability and reproducibility of analytical results.

Unit I – Tools and Data Handling

Calibration of tools, sampling. Errors and Statistics: significant figures, rounding off, accuracy and precision, determinate and indeterminate errors, standard deviation, propagation of errors, confidence limit, test of data; F, Q and t test, rejection of data, and confidence intervals.

Unit II – Separation Techniques

Solvent Extraction: distribution Coefficient, distribution ratio, solvent extraction of metals, multiple batch extraction, counter-current distribution. - Chromatographic Techniques: classification, theory of chromatographic separation, distribution coefficient, retention, sorption, efficiency and resolution. -Column, ion exchange, paper, TLC & amp; HPTLC: techniques and application. - Gas Chromatography: retention time or volume, capacity ratio, partition coefficient, theoretical plate and number, separation efficiency and resolution, instrumentation and application.

Unit III – Spectroscopic Techniques

Electromagnetic radiation, absorption, and emission of radiation – instrumentation: sources, monochromators, detectors. - Flame spectrometry: flame emission, AAS, ICP, instrumentation and application. - Absorption spectrometry: UV-VIS, IR, instrumentation, techniques and applications.

Unit IV – Thermal and Electroanalytical Techniques

Thermogravimetry: instrumentation and techniques, TGA curves, DTA and DSC, applications. Electrogravimetry, coulometry, voltammetry, polarography, conductometry, instrumentation, techniques and application.

Textbooks:

- ✓ *D. C. Harris, Quantitative Chemical Analysis, 4th Edn., W. H. Freeman, 1995.*
- ✓ *G. D. Christian & J. E. O'Reily, Instrumental Analysis, 2nd Edn., Allyn & Balon, 1986.*
- ✓ *Skoog, Holler and Crouch, Principles of Instrumental Analysis, Cengage Learning, 6th Indian Reprint 2017.*

Reference books

- ✓ *W. H. Hobert: Instrumental Methods of Analysis, 7th Ed., Wardsworth Publishing Company, Belmont, California, USA, 1988.*
- ✓ *O. Mikes, & R.A. Chalmes, Laboratory Hand Book of Chromatographic & Allied Methods, Elles Harwood Ltd. London. 2001*
- ✓ *Pavia, Lamman, Kriz and Vyvyan, Introduction to Spectroscopy, Cengage Learning, 3rd Indian Reprint 2017.*

Core XV

Solid and porous materials, and magneto chemistry and power cells

Course Objectives:

To provide the basic understanding about the solid and porous materials with their diverse applications. Students will learn fundamentals of magnetochemistry and molecular magnetism which will be helpful for their competitive examinations. Course is designed to develop a comprehensive technological understanding in different power cells.

Course Outcomes:

- Learn about the different materials, including theory and methods for the development of new materials with desired properties.
- Know how pores can influence the properties of materials
- Demonstrate an increased knowledge and understanding of magnetochemistry with critical thought and achieve the ability to analyze magnetochemical studies and data
- Explain the principles that underlie the ability of various power cells and develop new idea of constructing power cell

Unit I

Inorganic Solid Materials

Silicate industry:

Glass: Glassy state and its properties, classification (silicate and nonsilicate glasses), Manufacture and processing of glass, composite armoured properties of the following types of glasses: soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, colored glass, photosensitive glass.

Ceramics: Manufacture and types of ceramics, high technology ceramics and their applications, superconducting and semiconducting oxides, fullerenes, carbon nanotubes and carbon fibers.

Cement: Classification of cement, ingredients and their role, manufacture of the cement, and their setting process and quick setting cements.

Unit – II : Crystal Engineering and Principle of Designing Porous Materials

Inorganic crystal engineering and design principle of metal-organic frameworks and organic-inorganic hybrids. Principles of ICE in the design of porous materials, their understanding and characterizations using X-ray diffraction and thermal methods. Surface characterization and surface behavior of such porous materials with special reference to the gas/solvent vapors sorption. Some special applications of such materials like gas storage, gas/solvent separation, etc. Understanding of the structure-property relationship for the design of functional molecular material or molecular devices- philosophy and the terminologies**.**

Unit – III : Magnetochemistry

Magnetic Substances: Terminology related with magnetic properties, Classification, Cooperative Magnetism, Ferromagnetic substances and related aspects, Application of hard and soft ferromagnetic substances. Para-, ferro- and antiferro-magnetism: Temperature dependence of magnetic susceptibility, Curie ‘s Law and Curie-Weiss Law, Pathways of ferro- and antiferromagnetism, magnetic properties of an electron, paramagnetism and thermal energy, Spin-orbit Coupling, Magnetic properties of compounds of d- and f-block elements: concentrated and dilute systems, magnetically frustrated systems, single molecule magnet (SMM), single ion magnet (SIM), single chain magnet (SCM).

Unit – IV: Power Cells

Primary and secondary batteries, Battery components and their role, characteristics of battery, working principles of following batteries: Pb-battery, Li-battery, solid state electrolyte battery, fuel cell, solar cell, polymer cell.

Text Books:

- ✓ *F. Gomez-Granados, J. C. Moreno-Pirajan, L. Giraldo-Gutierrez, Porous Materials: Theory and Its Application for Environmental Remediation (Engineering Materials), Springer Nature Switzerland AG; 1st Ed. 2021.*
- ✓ *R. L. Dutta, A. Syamal, Elements of magnetochemistry, 2nd Ed, Affiliated East-West Press Pvt. Ltd, 2010.*
- ✓ *J. N. Lalena, D. A. Cleary, O. B. M. H. Duparc, Principles of Inorganic Materials Design, 3rd Ed, Wiley, 2020.*

Reference Books:

- ✓ *C. N. R. Rao, K. Biswas, Essentials of Inorganic Materials Synthesis, John Wiley & Sons, Inc., 2015.*
- ✓ *C. Julien, A. Mauger, A. Vijh, K. Zaghib, Lithium Batteries: Science and Technology, Springer, 2015.*
- ✓ *C. S. Solanki, Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Prentice Hall India Learning Pvt. Ltd., 2013.*
- ✓ *D. Pavlov, Lead-Acid Batteries: Science and Technology, Elsevier Science, 2015.*
- ✓ *S. P. Jiang, Q. Li, Introduction to Fuel Cells: Electrochemistry and Materials, Springer, 2022.*
- ✓ *A. Ramanan, G. R. Desiraju, J. J. Vittal, Crystal Engineering: A Textbook, World Scientific Publishing Co. Pte. Ltd., 2011.*
- ✓ *A. Earnshaw, Introduction to Magnetochemistry, Academic Press, 2013.*

Core XVI **Semester VII**

Chemistry of Biomolecules

Course Objectives:

The objective of this course is to familiarize the student with biomolecules such as carbohydrates, amino acids, proteins, peptides, lipids and enzymes. The student will comprehend the structure, nomenclature, and properties of various biomolecules and their functions in biological systems. It will also help the learners to build the concept of metabolism by studying the chemistry and energetics of biomolecules in biochemical reactions.

Course Outcomes

- Imparting knowledge on various biomolecules with their detailed classification, structure, nomenclature and functions.
- Understanding the chemistry and energetics of food to energy conversion in biological systems.
- Gaining knowledge on type of enzymes and their roles in metabolism of biomolecules in various biochemical reactions.
- Practically determine saponification value and iodine number of fat and oil and determine the reducing andnon-reducing sugars by Benedict's reagent.

Unit-I: Carbohydrate

Occurrence, classification (mono-, di- and poly- saccharides), chemical structure, constitution and absolute configuration of glucose and fructose, epimers and anomers relationships, mutarotation, determination of ring size of glucose and fructose, Haworth projections and Fischer projection conformational structures, interconversions of aldoses and ketoses. Chemical properties of monosaccharides and Killiani-Fischer synthesis and Ruff degradation; Synthesis of Disaccharides – (Sucrose, Lactose and maltose) by condensation reactions.

Unit-II: Amino Acids, Peptides, Proteins and Nucleic acids

Amino acids: Classification, Synthesis, ionic properties and reactions. Zwitterions, pKa values, isoelectric point and electrophoresis.

Peptides: Classification, Determination of their primary structures-end group analysis, methods of peptide synthesis. Synthesis of peptides using N-protecting, C-protecting and C-activating groups- Solid-phase synthesis.

Proteins: Structure of proteins, protein denaturation and renaturation.

Nucleic Acids: Components of nucleic acids, Nucleosides and nucleotides; Structure, synthesis and reactions of: Adenine, Guanine, Cytosine, Uracil and Thymine; Structure of polynucleotides.

Unit-III: Lipids

Introduction to oils and fats, common fatty acids present in oils and fats, role of lipids in our body, structure and classification, importance of omega-3 and omega-6 fatty acids and their sources. Physical and chemical properties of oils and fats, acid value, saponification value, iodine value, smoke point, flash point, fire point, and specific gravity. Chemical reactions of oil and fat, rancidity, conversion of oil to fat through hydrogenation, Baudouin test, Halphens test, Hexabromide test.

Unit-IV: Enzymes

Introduction to enzyme nomenclature, classification and characteristics. Salient features of active site of enzymes. Enzyme-substrate formation theory. Mechanism of enzyme action, factors affecting enzyme action, coenzymes and cofactors and their role in biological reactions, specificity of enzyme action, enzyme inhibitors and their importance, phenomenon of inhibition (competitive, uncompetitive and non-competitive including allosteric inhibition).

List of Experiments

(1) Determination of Saponification value of supplied oil.
(2) Determination of Iodine value of supplied oil.
(3) Qualitative analysis of carbohydrate: aldoses and ketoses, reducing and non-reducing sugars.
(4) Quantitative estimation of sugars:
    a) Estimation glucose by titration with Fehling's solution.
    b) Estimation glucose and sucrose in a given mixture.
(5) Estimation of glycine by Sorenson's formalin method.
(6) Study of the titration curve of glycine
(7) Separation and identification of amino acids by paper chromatography
(8) Separation of blue and orange dyes from methyl orange by paper chromatography
(9) Separation and identification of food dyes by paper chromatography
(10) Separation of two immiscible liquids by paper chromatography
(11) Separation of blue and yellow dyes using isopropanol by paper chromatography

Textbooks

- ✓ *D. L. Nelson, M. M. Cox, Lehninger Principles of Biochemistry, 7th Ed., W. H. Freeman Co., 2017.*
- ✓ *J. L. Jain, S. Jain, N. Jain, Fundamentals of Biochemistry, S. Chand, 2016.*
- ✓ *E. J. Wood, Wilson and Walker Principle and Techniques of Practical Biochemistry, Cambridge University Press, 2009.*

Reference Books:

- ✓ *D. Das, Biochemistry, 14th Ed., Academic Publishers, 2015.*
- ✓ *A. V. S. S. Rao, A Textbook of Biochemistry, 9th Ed., UBS, 2002.*
- ✓ *R. T. Morrison, R. N. Boyd, S. K. Bhattacharjee, Organic Chemistry, 7th Ed., Pearson Education India,2010.*
- ✓ *G. P. Talwar, L. M. Srivastava, Textbook of Biochemistry and Human Biology,3rd Ed., Prentice HallIndia, 2002.*
- ✓ *J. M. Berg, J. L. Tymoczko, L. Stryer, Biochemistry, 6th Ed., W. H. Freeman, 2006.*
- ✓ *P. J. Kennelly, K. M. Botham, O. Mcguinness, V. W. Rodwell, P. A. Weil, Harper's IllustratedBiochemistry, 32nd Ed., Lange-McGraw-Hill, 2022.*
- ✓ *T. W. Graham Solomons, C. G. Fryhle, S. A. Snyder, Solomons' Organic Chemistry, Global Ed., Wiley,2024.*

Core XVII

Polymer Chemistry

Course Objectives:

This course is offered by School of Chemistry as a core subject for the 4-year B.Sc. Programme, with an emphasis on fundamental understanding of the type of bond in a polymer and rationally design the monomers for a given polymer. To describe various methods used for synthesizing polymers. To use analytical methods to characterize a polymer. To study the properties of polymers.

Course outcomes:

5. The learners will be able to classify the polymers based on nature, occurance, mode of synthesis, thermal properties etc.
6. To differentiate between methods and mechanism of polymerization process.
7. Calculate molecular weights of polymers and study the applications & properties.
8. The learners will be able to design the monomers for the preparation of polymers of interest, characterize and understand the properties polymers.

Unit-I: Introduction and history of polymeric materials:

Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers, Texture of Polymers.

Functionality and its importance: Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization. Bi- functional systems, Poly-functional systems.

Unit-II: Mechanism & Kinetics of Polymerization

Polymerization reactions – addition and condensation, mechanism and kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic) and coordination polymerizations, Mechanism and kinetics of copolymerization, polymerization techniques. **Crystallization and crystallinity:** Determination of crystalline melting point and degree of crystallinity, Morphology of crystalline polymers, Factors affecting crystalline melting point.

Unit-III: Molecular weight of polymers and their determination

(M_n, Mw, M_v, M_z) by end group analysis, viscometry and osmotic pressure methods. Molecular weight distribution and its significance. Polydispersity index. Glass transition temperature (Tg) and its determination: WLFequation, outlines of factors affecting glass transition temperature (Tg).

Unit-IV: Properties of polymers

(physical, thermal and mechanical properties). Preparation, structure, properties and applications of the following polymers: polyolefins (polyethylene, polypropylene), polystyrene, polyvinyl chloride, polyvinyl acetate, polyacrylamide, fluoro polymers (Teflon), polyamides (nylon-6 and nylon 6,6). Thermosetting polymers - phenol formaldehyde resins (Bakelite, Novalac), polyurethanes, conducting polymers (polyacetylene, polyaniline). Brief outline of biodegradable polymers.

List of experiments

1. Preparation of nylon-6,6 / Polyaniline
2. Preparations of phenol-formaldehyde resin-novalac / phenol-formaldehyde resin resold.
3. Preparation of urea-formaldehyde resin
4. Redox polymerization of acrylamide
5. Precipitation polymerization of acrylonitrile
6. Determination of molecular weight by viscometry:
   a. Polyacrylamide / Polystyrene
   b. (Polyvinyl pyrolidine (PVP)
7. Determination of acid value/saponification value of a resin.
8. Determination of hydroxyl number of a polymer using colorimetric method.
9. Estimation of the amount of HCHO in the given solution by sodium sulphite method
10. Analysis of some IR spectra of polymers – Identification of labelled peaks in IR spectra of known polymer.

Text Books:

- ✓ *V. R. Gowarikar, Jayadev Sreedhar, N. V. Viswanathan, Polymer Science 1st Edition, New Age International Publishers, 1986.*
- ✓ *Premamoy Ghosh, Polymer Science and Technology: Plastics, Rubber, Blends and Composites, 3rdEdition, McGraw Hill Education, 2010.*
- ✓ *P. Bahadur & N.V.Sastry, Principles of polymer science, Narosa Publishing house, New Delhi2002.*

Reference books

- ✓ *L. H. Sperling, Introduction to Physical Polymer Science, 4th ed. John Wiley & Sons (2005)*
- ✓ *Malcolm P. Stevens, Polymer Chemistry: An Introduction, 3rd ed. Oxford University Press (2005)*
- ✓ *Seymour/Carraher's Polymer Chemistry, 9th ed. by Charles E. Carraher, Jr. (2013).*
- ✓ *Nayak P.L., Polymer Chemistry, Kalyani Publisher (2017).*
- ✓ *Hundiwale G.D., Athawale V.D., Kapadi U.R. and Gite V. V., Experiments in Polymer Science, New Age Publications (2009).*

Core XVIII

Green Chemistry

Course Objectives:

Basic introduction and explaining goals of Green Chemistry. Limitations/Obstacles in the pursuit of the goals of Green Chemistry, Principles of Green Chemistry with their explanations and examples and special emphasis on Designing a Green Synthesis using these principles.

Course outcomes:

- Discuss about the role of principles of green chemistry.
- Explain the importance of green synthesis.
- Interpret the knowledge of prevention of hazardous chemicals in reactions.
- Evaluate the efficiency of green catalysts & interpret the use of biocatalysts.

Unit-I: Introduction to Green Chemistry

What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry.

Principles of Green Chemistry and Designing a Chemical synthesis-I

Twelve principles of Green Chemistry. Explanations of principle with special emphasis on - Designing green synthesis processes: Prevention of Waste/ by-products; maximize the incorporation of the materials used in the process into the final products (Atom Economy) with reference to rearrangement, addition, substitution and elimination reactions; Prevention/ minimization of hazardous/ toxic products; Designing safer chemicals; Use of safer solvents and auxiliaries (e.g. separating agent) - green solvents (supercritical CO_2, water, ionic liquids), solventless processes, immobilized solvents.

Unit-II: Principles of Green Chemistry and Designing a Chemical synthesis-II

Explanation of green chemistry principles with special emphasis on: Energy efficient processes for synthesis - use of microwaves and ultrasonic energy. Selection of starting materials (use of renewable feedstock); avoidance of unnecessary derivatization (e.g. blocking group, protection groups, deprotection); Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; designing of biodegradable products use of chemically safer substances for prevention of chemical accidents, inherent safer design greener - alternative to Bhopal Gas Tragedy (safer route to carcarbaryl) and Flixiborough accident (safer route to cyclohexanol); real-time, in-process monitoring and control to prevent the formation of hazardous substances; development of green analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes.

Unit-III: Examples of Green Synthesis/ Reactions and some real-world cases-I

Green Synthesis of the following compounds: adipic acid, catechol, methyl methacrylate, urethane, disodium iminodiacetate (alternative to Strecker synthesis), paracetamol, furfural.

Microwave assisted reactions: Applications to reactions (i) in water: Hofmann Elimination, hydrolysis (of benzyl chloride, methyl benzoate to benzoic acid), Oxidation (of toluene, alcohols); (ii) reactions in organic solvents: Diels-Alder reaction and Decarboxylation reaction.

Ultrasound assisted reactions: Applications to esterification, saponification, Simmons-Smith Reaction (Ultrasonic alternative to Iodine).

Unit-IV: Examples of Green Synthesis/ Reactions and some real-world cases-II

Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO_2 for precision cleaning and dry cleaning of garments; Designing of Environmentally safe marine antifoulant; Rightfit pigment: synthetic azopigments to replace toxic organic and
inorganic pigments; Synthesis of a compostable and widely applicable plastic (poly lactic acid) from corn; Development of Fully Recyclable Carpet: Cradle to Cradle Carpeting

Future Trends in Green Chemistry

Oxidizing and reducing reagents and catalysts; multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; Green chemistry in sustainable development. (Bio-diesel, bio-ethanol and biogas).

List of experiments

1. Acetylation of primary amine (Aniline to N-phenylacetamide) using Zn dust.
2. Nitration of salicylic acid by green method (Using calcium nitrate and acetic acid).
3. Bromination of acetanilide using ceric ammonium nitrate/KBr.
4. Microwave assisted nitration of Phenols using $Cu(NO_3)_2$.
5. Detection of elements in organic compounds by green method (Sodium carbonate fusion)
6. Base catalyzed Aldol condensation (Synthesis of dibenzalpropanone)
7. Vitamin C clock reaction using vitamin C tablets, tincture of iodine, hydrogen peroxide and liquid laundry starch. Effect of concentration on clock reaction.
8. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.
9. Diels Alder reaction in water: Reaction between furan and maleic acid in water and at room temperature rather than in benzene and reflux.
10. Preparation and characterization of nanoparticles (Cu,Ag) using plant extract.

Text Books:

- ✓ *P.T. Anastas & J.K. Warner, Green Chemistry- Theory and Practical, Oxford University Press 2000.*
- ✓ *V.K. Ahluwalia & M. Kidwai.: New Trends in Green Chemistry, Anamalaya Publishers, New Delhi 2004.*
- ✓ *V. Kumar An Introduction to Green Chemistry, Vishal Publishing Co., 2015.*

Reference Books:

- ✓ *A.S. Matlack. Introduction to Green Chemistry, Marcel Dekker 2001.*
- ✓ *A K. Das and M. Das, Environment Chemistry with Green Chemistry, Books and Allied (P) Ltd. 2010.*
- ✓ *R.K. Sharma, I.T. Sidhwani &, M.K Chaudhari. I.K. Green Chemistry Experiment:A monograph International Publishing House Pvt Ltd. New Delhi. Bangalore CISBN978-93-81141-55-7, 2013.*

- ✓ ***E-Contents:*** *The supporting materials can be found on the* ***website of the Berkeley Center for Green Chemistry (http://bcgc.berkeley.edu/)****.*
- ✓ ***Case Study:*** *https://shorturl.at/cjuHI*

Core XIX

Oxidation, Reduction, Reagents, Rearrangements and Name Reactions

Unit-I: Oxidation Reactions

Oxidation of (a) alcohols to carbonyls by chromium, manganese, aluminium, silver, ruthenium, DMSO, hypervalent iodine and TEMPO based reagents, (b) alkenes to epoxides by peroxides/per acids, Sharpless asymmetric epoxidation, Jacobsen epoxidation, Shi epoxidation (c) alkenes to carbonyls with bond cleavage by Manganese, Osmium, Ruthenium and lead based oxidants and ozonolysis (d) alkenes to alcohols/carbonyls without bond cleavage, Wacker oxidation, selenium, chromium based allylic oxidation process.

Unit-II: Reduction Reactions

Reduction reactions (a) in heterogeneous medium by Palladium/Platinum/Rhodium/Nickel (Resenmund reduction) and in homogeneous medium (Wilkinson reaction). Noyori asymmetric hydrogenation. (b) Metal based reductions using Li/Na in liquid ammonia (Birch reduction), Sodium, Magnesium, Zinc, Titanium and Samarium. (c) Reduction by hydride transfer reagents: Aluminium alkoxide, Sodium borohydride ($NaBH_4$), di-isobutylaluminium hydride (DIBAL-H), Sodium cyanoborodydride, Lithium trialkylborohydride, reduction with hydrazine (Wolff-Kischner reduction), reduction with trialkyltinhydride.

Unit-III: Reagents in Organic Synthesis

Functionalized Grignard reagents, organozinc, organo-lithium, organocopper, organopalladium, lithium diisopropylamide (LDA), Dicyclohexylcarbodiimide (DCC), organosilicon, organoborane, organotin, crown ethers, Dichlorodicyano benzoquinone (DDQ), Osmium tetroxide, 1,3-Dithiane, Trimethyl silyl iodide, Tri-n-butyl tin hydride.

Unit-IV: Rearrangement and Name Reactions

Nature of migration and migratory aptitude of groups in rearrangements reaction, Wagner-Meerwein, Favorskii, Fries, Benzil-Benzilic acid, Arndt-Eistert synthesis, Neber, Beckmann, Hofmann, Schmidt, Lossen, Shapiro reaction, Von-Richter, Sommelet-Hauser rearrangement, Wolff, Stevens reaction.

Recommended Textbooks:

- ✓ S. N. Sanyal, Reactions, Rearrangements and Reagents, 4th Ed., Bharati Bhawan Publishers & Distributors, 2019.
- ✓ R. K. Bansal, Organic Reaction Mechanism, 3rd Ed., Tata McGraw-Hill Publications, 1998.
- ✓ R. K. Bansal, Synthetic Approaches in Organic Chemistry, Narosa Publishing House, India, 1996.

Reference Books:

- ✓ W. Carruthares, I. Coldham, Modern Methods of Organic Synthesis, 4th Ed., Cambridge University Press, 2015.
- ✓ F. A. Carey, R. J. Sundberg, Advanced Organic Chemistry, Part-A and Part-B, 5th Ed., Springer 2007.
- ✓ J. March, M. B. Smith, March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, 6th Ed., Wiley, 2013.
- ✓ I. L. Finar, Organic Chemistry, Vol-2, 5th Ed., Pearson Publisher, 2002.
- ✓ R. O. C. Norman, J. M. Coxon, Principle of Organic Synthesis, 3rd Ed., CRC Press, 2017.

Core XX **Semester VIII**

Quantum chemistry & Statistical Thermodynamics

Course Objectives:

This course is offered by School of Chemistry as a core subject for the B.Sc. programme, with an emphasis on fundamental understanding of Quantum chemistry, molecular spectroscopy, and photochemistry. Students are expected to have background knowledge in mathematics up to the +2 level for this course. The objective of the practical is to develop skills for working in physical chemistry laboratory. The student will perform experiments based on the concepts learnt in Physical chemistry-V course.

Course Outcomes:

By the end of the course, the students will be able to:

- Understand the approximation method encompassing Linear variation principle, perturbation theory.
- Apply HMO to different conjugated systems.
- Acquire a firm knowledge of statistical methods, Ensambles, and apply the concept of molecular partition functions to macroscopic systems.
- Compare the thermodynamic properties of different statistics.

Unit-I:

Approximation Methods: The variation theorem, linear variation principle, Perturbation theory (first order and non-degenerate). Applications of variation method and perturbation theory to the Helium atom.

Unit-II:

Huckell theory of conjugated systems, Calculation of π-bond energy, delocalization energy, electronic & charge density calculation, and bond order. Applications to ethylene, butadiene, cyclopropanol radical, and cyclobutadiene.

Unit-III:

Fundamentals of Statistical methods, Starling's approximation, Statistical Thermodynamics: mathematical & thermodynamic probability. Maxwell Boltzman distribution between partition function. Types of Partition functions: translational, rotational, vibrational and electronic partition functions.

Unit-IV:

Types of Statistics- Bose-Einstein statistics, Maxwell-Boltzman, Fermi-Dirac statistics. Calculation of results of three types of statistics.

Text Books:

- ✓ *D. A. McQuarrie, Quantum Chemistry, Viva Books, Reprint, 2011, Indian Student Edition*
- ✓ *Statistical Thermodynamics: M. C. Gupta, New Age Pvt Publication*
- ✓ *Statistical Mechanics and Thermodynamics, C. Garrod, Oxford Univ. Press, New York.*

Reference Book:

- ✓ *Atkin's Physical Chemistry: P. W. Atkins, J. D. Paula, Oxford University Press*
- ✓ *Statistical Mechanics, D. A. McQuarrie, University Science Books, California.*
- ✓ *Statistical Mechanics - A Concise Introduction for Chemists B. Widom, Cambridge University Press*

Core XXI

Chemical group theory, electronic spectra of metal complexes, and nuclear chemistry

Course Objectives:

To provide basic knowledge on symmetry of molecules applied through mathematical group theory. Gives idea about the electronic transitions between d-orbitals, L-S coupling, qualitative Orgel diagrams for different d^n systems, selection rules for electronic spectral transitions, charge transfer phenomena, Nuclear chemistry has been introduced to inculcate students about the chemistry of inner core of atoms. Lab work has been designed for preparing key inorganic compounds and estimating important ingredients of day-to-day use in a product in order to make students competent in this regard.

Course Outcomes:

- Learn a significant knowledge on formal group theory for understanding molecular spectroscopy.
- Explore the fundamentals of electronic spectra of coordination complexes.
- Understand the stability of nucleus and its reactions, and the applications of radioisotopes in different fields.
- Achieve the knowledge on quantitative estimation of important ingredients in various commonly used products, and also get the synthetic skills of preparing key inorganic compounds

Unit – I: Fundamentals of group theory

Symmetry operation, symmetry element, classification of symmetry elements, definition of group, subgroup, cyclic groups, molecular point groups, group multiplication table, group generators, symmetry of platonic solids, conjugacy relation and classes, matrix representation of symmetry elements.

Unit – II: Character table and normal modes

Character of a representation, reducible and irreducible representation, Great orthogonality theorem (qualitative description only), properties of irreducible representation. Character table (explanation and significance), construction of character tables for C_{2v} and C_{3v} point groups, direct product, standard reduction formula, Normal modes for C_{2v} and C_{3v} molecules.

Unit – III: Electronic spectra of metal complexes

Electronic transitions between d-orbitals, L-S coupling, Orgel diagrams for $3d^1$ to $3d^9$ ions. Selection rules for electronic spectral transitions, relaxation in selection rules. spectrochemical series of ligands, nephelauxetic series, Evaluation of Dq, B and beta (β) parameters for the complex, charge transfer spectra (elementary idea). Significance of Tanabe-Sugano diagram.

Unit – IV: Nuclear Chemistry

Nuclear stability, magic numbers, radioactivity, general characteristics of radioactive decay particles, decay kinetics, nuclear reaction, Bethe's notation, types of nuclear reaction, nuclear cross section, compound nuclear theory, nuclear fission, liquid drop model, shell model, hard core preformation theory, fission fragments and their mass distribution, charge distribution, ionic charge of fission fragments, working principle of nuclear reactor, concept of boron-neutron capture therapy, concept of nuclear fusion.

List of experiments:

1. Estimation of iodine in iodized common salt iodometrically
2. Estimation of phosphoric acid in cola drinks by molybdenum blue method
3. Preparation of potash alum from scrap aluminum
4. Preparation of potassium of trioxalatoferrate (III) trihydrate, $K_3[Fe(C_2O_4)_3].3H_2O$
5. Determination of alkali content in antacid tablet using HCl
6. Determination of acetic acid in commercial vinegar

Text Books:

- ✓ *K. V. Ready, Symmetry and Spectroscopy of Molecules, New Age Int. Publishers, 2nd Ed, 2009.*
- ✓ *H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Pvt. Ltd., 4th Ed. 2011.*
- ✓ *A. Sakthivel , D. T. Masram, M. Sathiyendiran, S. Kaur-Ghumaan, Electronic and Magnetic Properties of Transition and Inner Transition Elements and Their Complexes, Publish with Nova Science Publishers, 2017.*

Reference Books:

- ✓ *F. A. Cotton, Chemical Applications of Group Theory, Wiley India (P) Ltd., 3rd Ed, 2009.*
- ✓ *G. L. Miessler, P. J. Fischer, D. A. Tarr, Inorganic chemistry, 5th Ed., 2014.*
- ✓ *D. E. Shriver, P. W. Atkins, Inorganic Chemistry, Oxford University Press, 5th Edn.*
- ✓ *D. Gabel, R. Moss, Boron Neutron Capture Therapy: Toward Clinical Trials of Glioma Treatment, Springer-Verlag New York Inc., 1st Ed, 2012.*
- ✓ *A. J. Elias, General Chemistry Experiments, University Press, 2007.*
- ✓ *Y. R. Sharma, Modern Approach to Practical Chemistry, Kalyani Publishers, 2008.*
- ✓ *Vogel's Qualitative Inorganic Analysis, 7th Ed, Revised by G. Svehela, 4th Ed., Person, 2007.*

Core XXII

Pericyclic reactions, Photochemistry and Retrosynthesis

Course Objective

Imparting knowledge in the theory and applications of various aspects of pericyclic reactions and photochemistry and synthetic aptitutde of organic molecules. It will also help to understand the synthesis and mechanisms of various reactions.

Course Outcome

- Understand the concepts related to organic synthesis, mechanisms.
- Apply their understanding about the photochemical reactions of industrial significance.
- Evaluate the photochemical reactions based on the influence of the substituents on substrate
- molecules.
- Design new photochemical reactions in order to achieve the required product(s).

nit-I: Pericyclic Reaction-I:

Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3-butadiene, 1,3,5-hexatriene and allyl system. Classification of pericyclic reactions. Woodward-Hoffmann rules, Correlation diagrams, FMO and PMO approaches. Electrocyclic reactions - Conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems.

Unit-II: Pericyclic Reaction-II:

Cycloaddition reactions - suprafacial and antarafacial additions, 4n and 4n+2 systems, Correlation diagrams and FMO method, Allowed and forbidden reactions. Diels-Alder reactions: retro Diels-Alder reaction- FMO mechanism for endo- and exo-selectivity, stereochemistry, inter- and intramolecular reactions.

Sigmatropic rearrangements: [i,j] H-shifts and C-shifts, supra and antarafacial migrations, retention and inversion of configurations, Sommelet-Hauser, Claisen, thio-Claisen, Cope, Oxa and aza-Cope rearrangements, Ene reaction.

Unit-III: Photochemistry:

First order Photochemical processes Light absorption, Fluorescence and Phosphorescence. Photochemistry of Alkene: Isomerization, Intramolecular reactions of the olefinic bond,di-π-methane, oxa di-π- and aza di-π-methane rearrangements, Photochemistry of vision. Photochemistry of Carbonyl compounds: Norrish type I and II reaction, Paterno-Buchi reaction, Photoreduction. Photochemistry of Arenes: Photochemical aromatic substitution, addition and isomerisation reaction. Photo-Fries reactions of anilides, Barton reaction, the mechanisms of reactions involving free

radicals- Sandmayer, Gomberg- Bachmann, Pschorr, Ulmann and Hunsdiecker reactions. Singlet molecular oxygen reactions.

Unit-IV: Retro synthesis:

An introduction to synthons and synthetic equivalents, disconnection approach, functional group interconversions, the importance of the order of events in organic synthesis. one group C-X and two group C-X disconnections, chemo selectivity, reversal of polarity, cyclisation reactions. One Group C-C disconnection: Alcohols and carbonyl compounds, regioselectivity, Alkene synthesis, use of acetylenes and aliphatic nitro compounds in organic synthesis. Two group C-C Disconnections: Diels-Alder reaction, 1,3-difunctionalised compounds, α, β- unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds. Michael addition and Robinson annulation. Protecting Groups, Principle of protection of alcohol, amine, carbonyl and carboxyl groups.

List of Experiments

(1) Photoreduction of benzophenone to benzopinacol in the presence of sunlight.
(2) Diels Alder reaction in water: Reaction between furan and maleic acid in water at room temperature rather than in benzene under reflux condition.
(3) Preparations of the following compounds: Aspirin/Paracetamol/Barbituric acid/
(4) Synthesis of methyl orange.
(5) Synthesis of amide derivative from carboxylic acid and amine or from esters
(6) Synthesis of esters by refluxing glacial acetic acid and ethanol in presence of sulphuric acid.
(7) Retrosynthetic analysis of biomolecules.

Textbooks

- ✓ *S. Warren, P. Wyatt, Organic synthesis, the disconnection approach, 2nd Ed., Wiley, 2012.*
- ✓ *J. Singh, J Singh, Photochemistry and Pericyclic Reactions, New Age Science, 2009.*
- ✓ *B. S. Furniss, A. J. Hannaford, P. W. G. Smith, A. R. Tatchell, Vogel's Textbook of Practical Organic Chemistry, 5th Ed., Pearson Education India, 2003.*

Reference Books:

- ✓ *S. Kumar, V. Kumar, S. P. Singh, Pericyclic Reactions: A Mechanistic and Problem-SolvingApproach, Academic Press, 2015.*
- ✓ *W. Carruthares, I. Coldham, Modern Methods of Organic Synthesis, 4th Ed., Cambridge University Press, 2015.*
- ✓ *J. March, M. B. Smith, March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, 6th Ed., Wiley, 2013.*
- ✓ *R. K. Bansal, Organic Reaction Mechanism, 3rd Ed., Tata McGraw-Hill Publications, 1998.*
- ✓ *R. K. Bansal, Synthetic Approaches in Organic Chemistry, Narosa Publishing House, India, 1996.*

- ✓ *J. Clayden, N. Greeves, S. Warren, Organic Chemistry, 2nd Ed., Oxford Publisher, 2012.*
- ✓ *T. L. Gilchrist, R. C. Storr, Organic Reactions and Orbital Symmetry, 2nd Ed., Cambridge University Press, 1979.*
- ✓ *F. A. Carey, R. J. Sundberg, Advanced Organic Chemistry, Part-A and Part-B, 5th Ed., Springer 2007.*
- ✓ *I. L. Finar, Organic Chemistry Vol. I & Vol. II, Longman, Cambridge, 2011.*

Core XXIII

Research Methodology for Chemistry

Course Objectives:

- To make the students aware of fundamental but mandatory ethical practices in chemistry. chemistry.
- To introduce the concept of data analysis.
- To learn to perform literature survey in different modes.
- To make the students aware of safety handling and safe storage of chemicals.
- To make students aware about plagiarism and how to avoid it. To teach the use of different e-resources.

Course Outcomes:

By the end of the course, the students will be able to:

- Follow ethical practices in chemistry
- Do Data analysis
- Literature survey in different modes
- Use e-resources.
- Avoid plagiarism, understand the consequences and how to avoid

Unit-I: Scope of Research, Research Databases and Metrics

Define research problem, review literature, formulate hypothesis, design research/experiment, collect and analyse data, interpret and report, importance and future scope. **Print Database (traditional)**: Sources of information: Primary, secondary, tertiary sources; **Digital: Databases (modern source):** Google Scholar, Web of science, Scopus, UGC INFONET, SciFinder, PubMed, ResearchGate, E-consortium, e-books; **EBSCO:** e-Resources Gateway for Universities of Odisha (odisha university | OSHEC | e-Resources for Universities and Colleges of Odisha); **Research metrics**: Impact factor of Journal, h-index, i10 index, Altmetrics, Citation index; **Author identifiers/ profiles:** ORCID, Publons, Google Scholar, ResearchGate, VIDWAN.

Unit-II: Statistical tools and validation for chemists

Types of data, data collection-Methods and tools, data processing, hypothesis testing, Normal and Binomial distribution, tests of significance: t-test, F-test, chi- square test, ANOVA, multiple range test, regression and correlation. Features of data analysis with computers and softwares -Microsoft Excel, Origin, SPSS.

Unit-III: Research and Publication ethics:

Ethics with respect to science and research, Scientific Misconducts: falsification, fabrication and plagiarism, similarity index, software tools for finding plagiarism (Turnitin, Drillbit/Urkund etc), redundant publications; **Publication Ethics:** Introduction, COPE (Committee on Publication Ethics) guidelines; conflicts of interest, **publication misconduct:** problems that lead to unethical behaviour and vice versa, types, violation of publication ethics, authorship and contributorship, predatory publishers and journals; **IPR** - Intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS)

Unit-IV: Science Communications:

Types of scientific documents: Full length research paper, book chapters, reviews, short communication, project proposal, Letters to editor, and thesis; Thesis writing – Windows and/or linux operating system, programming fundamentals, basics of high level programming language-C: editing, compilation and running a programme, storing data, elementary numerical methods, different steps and software tools (Word processing, LaTeX, Chemdraw, Chemsketch etc) in the design and preparation of thesis, layout, structure (chapter plan) and language of typical reports, Illustrations and tables, bibliography, referencing: Styles (APA, Oxford etc), annotated bibliography, Citation management tools: Mendeley, Zotero and Endnote; footnotes; Oral presentation/posters – planning, software tools, creating and making effective presentation, use of visual aids, importance of effective communication, electronic manuscript submission, effective oral scientific communication and presentation skills.

Text Books:

- ✓ *Dean, J. R., Jones, A. M., Holmes, D., Reed, R., Weyers, J. & Jones, A. (2011) Practical skills in chemistry. 2nd Ed. Prentice-Hall, Harlow.*
- ✓ *Hibbert, D. B. & Gooding, J. J. (2006) Data analysis for chemistry. Oxford University Press.*
- ✓ *Topping, J. (1984) Errors of observation and their treatment. Fourth Ed., Chapman Hall, London.*

Reference Book:

- ✓ *Harris, D. C. Quantitative chemical analysis. 6th Ed., Freeman (2007) Chapters 3-5.*
- ✓ *Levie, R. de, how to use Excel in analytical chemistry and in general scientific data analysis. Cambridge Univ. Press (2001) 487 pages.*
- ✓ *Chemical safety matters – IUPAC – IPCS, Cambridge University Press, 1992. OSU safety manual 1.01*

E-Contents:

1. Google Scholar
2. Scopus preview - Scopus - Welcome to Scopus
3. Web of Science
4. CAS Insights | CAS
5. Reveal online attention to research - Altmetric
6. odisha university | OSHEC | e-Resources for Universities and Colleges of Odisha

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

Commerce

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - Financial Accounting
	Core II- Cost Accounting
II	Core III- Corporate Accounting and Reporting
	Core IV - Income Tax Law & Practice
III	Core V- Financial Markets and Institutions
	Core VI- GST and other Indirect Taxes (Customs)
	Core VII- Management Accounting
IV	Core VIII- Financial Management & Risk Management
	Core IX- Auditing and Corporate Governance
	Core X- Corporate Legal Framework
V	Core XI- Financial Statement Analysis
	Core XII- Business Data Analytics
	Core XIII- Fundamentals of IND-AS & IFRS
VI	Core XIV- Fundamentals of Financial Modelling
	Core XV- Business Application Software
VII	Core XVI- Research Methodology & Research Ethics
	Core XVII- Fundamentals of Securities Analysis and Portfolio Management
	Core XVIII- Fundamentals of Operation Research and Quantitative Technique
	Core XIX- Corporate Restructuring & Business Valuation
VIII	Core XX- International Business Environment
	Core XXI- Sustainable Development and Corporate Social Responsibility
	Core XXII- Fundamentals of Commodity Markets
	Core XXIII- Social Entrepreneurship and Incubation

Commerce Core II (Minor)

Semester	Subjects
I	**Business Organization Management**
II	
III	**(A) Financial Literacy or** **(B) Fundamentals of Investment and Planning**
IV	
V	**(A) Digital Marketing or** **(B) Insurance Theory and Practices**
VI	
VII	**(A) Marketing and Supply Chain Management or** **(B) Treasury & Forex Management**
VIII	**(A) Banking Theory and Practices or** **(B) Securities Market Operations**

Commerce Core III (Minor)

Semester	Subjects
I	
II	**Business Statistics and Data Interpretation**
III	
IV	**Business Regulatory Framework**
V	
VI	**Human Resource Management**
VII	
VIII	

Programme Outcomes

- To prepare the students for a career in Commerce.
- To prepare the students for Higher Education and Research in Commerce.
- To develop a conceptual understanding of the subject and to develop an inquisitiveness in the subject.
- To enable the student to acquire basic skills necessary to understand the subject and to master the skills to handle equipment's utilized to learn the subject.
- To generally promote wider reading on the subject and allied inter disciplinary subject.

Core I **Semester I**

Financial Accounting

Course Objectives

The course aims to help learners to acquire conceptual knowledge on financial accounting, to impart skills for recording various kinds of business transactions and to prepare financial statements.

Course Outcomes

At the end of this course the learner will be able to;

- Apply the generally accepted accounting principles while recording transactions and preparing financial statements of sole-traders;
- Compute depreciation and inventories to be recorded in financial statements
- Demonstrate accounting process under computerized accounting
- System;
- Create financial statements of sole proprietor and partnership firms;
- Prepare accounts for inland branches and not-for-profit organizations.

Unit I: Introduction

- Accounting principles: Concepts and Conventions. Introduction to Accounting Standards and Indian Accounting Standards (AS &Ind-AS), Accounting Cycle: Journal, Ledger, Trial Balance, Financial Statements (IND AS-1). Capital & Revenue Recognition (IND AS 18), Accounting for Inventory (IND AS-2)
- **Depreciation (IND AS-16):** Nature of depreciation causes of depreciation, Factors, Methods of computing depreciation; Disposal of depreciable assets- change of method, Relevant Accounting Standard. **Final Accounts**: Preparation of Financial Statements of a Sole Trader including adjustments. Errors & their rectification.

Unit II:

- **Accounting for partnership Firms:** Partner's Capital Accounts; profit and Loss Appropriation Account, Accounts Prepared on admission, Death and Retirement of Partners; Accounts on Dissolution of partnership Firm.
- **Accounting for Hire purchase and Installment Purchase;** Lease accounting (IND AS 116)/ Royalty accounting

Unit III: Accounting for Branch and Not-for Profit organizations

- **Accounting for Branch:**

  Concept of Dependent branches; Branch Accounting debtors system, stock and debtors' system, branch final account system and wholesale basis system. Independent branches: concept, accounting treatment with necessary adjustment entries; Incorporation of Branch Trial Balance in Head Office Books for home branches.

- **Accounting for Not-for-Profit Organizations**

  Meaning of Not-for-Profit Organization; Significance of Receipt and Payment Account, Income and Expenditure Account and Balance Sheet; Difference between Profit and Loss Account and Income and Expenditure Account; Preparation of Receipt and Payment Account, Income and Expenditure Account and Balance Sheet.

Unit IV: Computerized Accounting Systems

Computerized Accounting Systems: Computerized Accounts by using any popular accounting software Creating a Company; Configure and Features settings; Creating Accounting Ledgers and Groups; Creating Stock Items and Groups; Vouchers Entry; Generating Reports - Cash Book, Ledger Accounts, Trial Balance, Profit and Loss Account, Balance Sheet, and Cash Flow Statement. Selecting and shutting a Company; Backup, and Restore data of a Company.

Suggested Readings

- ✓ *Goyal, Bhusan Kumar- Fundamentals of Financial Accounting Taxmann's.*
- ✓ *S.P. Jain and K.L. Narang- Financial Accounting– Kalyani Publisher*
- ✓ *Gupta R.L. Radhaswamy. M-Financial Accounting, Sultan Chandand Sons*
- ✓ *R.K. Mittal / M.R.Bansal/Sahadev Swain, Financial Accounting, VK Global Publication*
- ✓ *Tulsian P.C., Financial Accounting, Pearson Education*
- ✓ *S.N. Maheshwari, and. S. K. Maheshwari. Financial Accounting. VikasPublishingHouse.*
- ✓ *JawaharLal& S. Srivastava, B. Com- Financial Accounting, Himalaya Publishing House.*

Core II

Cost Accounting

Course Objectives

- To develop understanding among learners about contemporary cost concepts and rational approach towards cost systems and cost ascertainment.
- To provide knowledge about various methods of cost determination under specific situations.
- To acquire the ability to use information determined through cost accounting for decision making purposes.

Course Outcomes

After completion of the course, learners will be able to:

- Understand and analyse the different cost concepts.
- Analyse various components of cost of production.
- Compute unit cost and total cost by preparing a cost statement.
- Compute employee cost, employee productivity and employee turnover.
- Determine cost for different industries using job costing, process costing, contract costing and service costing.

Unit 1: Introduction

Meaning, scope, objectives and advantages of cost accounting; Difference between financial and cost accounting. Cost concepts and classifications, Cost centre, profit centre and responsibility centre, Overview of elements of cost and preparation of Cost Sheet for manufacturing sector. Role of a cost accountant in an organisation. Cost Accounting Standards (CAS – 4 on Cost of Production / Acquisition / Supply of Goods / Provision of Services) and (CAS – 22 on Manufacturing Cost) as amended from time to time.

Unit 2: Elements of Cost: Material and Employee Cost

- Materials: Accounting and control of purchases, storage and issue of materials. Techniques of inventory control, Periodic and perpetual systems of maintaining inventory records, an overview of methods of pricing of materials issues — FIFO and Weighted Average price method, Valuation of materials as per CAS – 6 on Material Cost, Accounting treatment of losses— Wastage, scrap, spoilage and defectives
- Employee (Labour) Cost: Accounting and Control of employee cost. Time-keeping and time-booking. Employee turnover: meaning, methods of measurement and accounting treatment. Concept and treatment of idle time and overtime. Methods of wage payment and Incentive schemes- Halsey, Rowan, Taylor's differential piece wage.

Unit 3: Elements of Cost: Overheads

Classification, allocation, apportionment and absorption of overheads, Under and over-absorption of overheads; Capacity Levels and Costs; Treatments of certain items in costing

like interest and financing charges, packing expenses, bad debts, research and development costs.

Unit 4: Methods of Costing

Job costing, Contract costing, Process costing/ Operation Costing (including process losses, valuation of work- in-progress), Service costing/ Operating costing and Activity Based Costing.

Suggested Readings

- ✓ *Tulsian, P.C. (2020).Cost Accounting. Delhi, India: S.Chand.*
  "Advanced Cost Accounting" by Saxena and Vashist - published by Kalyani Publishers, Cuttack, Odisha.
  Arora, M.N. (2021). Cost Accounting-principles and practice. Delhi, India: Vikas Publishing House.
- ✓ *Goel, R. K., &Goel, I. (2019).Concept Building Approach to Cost Accounting for B.Com (Hons.)/B.Com.. Delhi, India: Cengage Publications.*
- ✓ *Gupta, S., Reeta, &Prabhakar, R. R. (2021).Cost Accounting for B.Com. Delhi, India: Sultan Chand.*
- ✓ *Maheshwari, S. N., & Mittal, S. N. (2020).Cost Accounting. Theory and Problems. Delhi, India: ShriMahaveer Book Depot.*
- ✓ *Maheshwari, S. N., Mittal S. K. & Mittal, S.N. (2021). Cost Accounting: Principles & Practice, Delhi, India: Shree Mahaveer Book.*
- ✓ *Mitra, J. K. (2021).Cost and Management Accounting. Delhi, India: Oxford University Press.*
- ✓ *Nigam, B. M. L. & Jain, I. C. (2023). Cost Accounting: Principles and Practice. Delhi, India: PHI Learning.*
- ✓ *Singh, S. (2019). Fundamentals of Cost Accounting. Allahabad, India: KitabMahal.*

Core III **Semester II**

Corporate Accounting and Reporting

Course Objectives

The course aims to:

- Understand the principles of corporate accounting and financial reporting.
- Apply accounting standards and regulations to prepare and analyze financial statements.
- Interpret financial information to assess the financial performance and position of a company.
- Develop skills in financial reporting and disclosure requirements for different stakeholders.
- Analyze contemporary issues and challenges in corporate accounting and reporting.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Corporate Accounting Principles.
- Preparation and Analysis of Financial Statements.
- Interpretation of Financial Information.
- Financial Reporting Skills.
- Analysis of Contemporary Issues.

Unit I: Accounting for Share Capital and Debentures

Types of shares; Issue and Pro-rata allotment of shares; concept & process of book building; forfeiture and reissue of forfeited shares; Issue of rights and bonus shares; ESOPs and Buy Back of shares. Issue and redemption of preference shares; Issue and redemption of debentures;

Unit II: Final Account of Companies including one Person Company (IND-AS.1)

Preparation of financial statements of corporate entities including one Person company (excluding calculation of managerial remuneration) as per Division I and II of Schedule III of the Companies Act 2013; Preparation of Financial Statements.

Unit III: Corporate Reconstruction and Profit or Loss Prior to Incorporation

- **Internal Reconstruction:** Different forms of Internal Reconstruction; Accounting treatment for alteration of share capital and reduction of the share capital; Preparation of balance sheet after Internal Reconstruction.
- **External Reconstruction:** accounting for amalgamation in the nature of merger and in the nature of acquisition (IND-As.103)
- **Profit or loss Prior to Incorporation:** Meaning of profit or loss prior to incorporation; accounting treatment of profit or loss prior to incorporation.

Unit IV: Consolidated Financial statement and Reporting

- Consolidation process and elimination entries, Intercompany transactions, Revaluation of assets and liabilities, Non-controlling interests (NCI), equity method

investments (IND-As.110), issue of bonus shares and distribution of dividend from pre and post-acquisition period. Preparation of consolidated financial statements.

- Reporting: Financial reporting (As per IND-As.1), Non-financial reporting: Business Responsibility and Sustainability Reporting (As per LORD, SEBI), Environmental Social and Governance Reporting, Sustainability Reporting (As per GRI).

  Integrated Reporting (As per IIRC)

Suggested Readings

- ✓ *Goyal, B. K., Corporate Accounting. New Delhi: Taxmann Publication.*
- ✓ *Jain, S. P., &Narang, K. L. Corporate Accounting. New Delhi: Kalyani Publishers.*
- ✓ *Maheshwari, S. N., Maheshwari, S. K., &Maheshwari, S. K.Corporate Accounting. New Delhi: Vikas Publishing House.*
- ✓ *Mukherjee, A., &Hanif, M. Corporate Accounting. New Delhi: TataMcGraw Hill Education.*
- ✓ *Shukla, M. C., Grewal, T. S., & Gupta, S. C. Advanced Accounts. Vol.-II. New Delhi: S. Chand Publishing.*
- ✓ *Sehgal, A. Fundamentals* of Corporate Accounting. New Delhi: Taxmann Publication.
- ✓ *Dam, B. B. &Gautam, H. C. Corporate Accounting. Guwahati: Gayatri Publications.*
- ✓ *Goyal, V. K., &Goyal, R. Corporate Accounting. New Delhi: PHI Learning.*
- ✓ *Monga, J. R. Fundamentals of Corporate Accounting. New Delhi: Mayur Paperbacks.*

Core IV **Income Tax Law & Practice**

Course Objectives

- The course aims to provide knowledge of the various provisions of income- tax law in India and enable the learners to apply such provisions to compute total income and tax liability of individuals.
- It also aims to enable learners to understand the provisions relating to filing of return of income.

Course Outcomes

After completion of the course, learners will be able to:

- Comprehend the concepts of taxation, including assessment year, previous year, assesses, person, income, total income, agricultural income and determine the residential status of persons;
- Compute income under different heads, applying the charging provisions, deeming provisions, exemptions and deductions;
- Apply the clubbing provisions and provisions relating to set-off and carry forward of losses to determine the gross total income;
- Calculate the tax liability of an individual as well as deductions from gross total income and determine the total income of an individual;
- Comprehend the provisions relating to filing of return of income;

Unit I: Introduction

- **Basic concepts:** Income, agricultural income, person, assesse, assessment year, previous year, gross total income, total income, maximum marginal rate of tax; Permanent Account Number (PAN)
- **Residential status**–Meaning, Determination of Residential Status, Scope of total income on the basis of residential status, Exempted income.

Unit II: Computation of Income under different Heads

Income from Salaries, Income from house property, Profits and gains of business or profession, Capital gains & Income from other sources.

Unit III: Computation of Total Income and Tax Liability

Aggregation of income and set-off and carry forward of losses, Deductions from Gross Total Income, Exemptions, Rebates and reliefs, Computation of total income of individuals; Tax liability of an individual.

Unit IV: Preparation of Return of Income

Filing of returns: Manually, Assessment Procedures, Filing of Returns, Return Forms, Provision & Procedures of Compulsory On-Line filing of returns for specified assesses.

Suggested Readings

- ✓ *Singhania, V. K., &Singhania, M. Student's Guide to Income Tax including GST-Problems & Solutions. New Delhi: Taxmann Publications Pvt. Ltd.*
  Gaur, V. P., Narang, D. B., & Gaur, P. (2018). Income Tax Law and Practice. New Delhi: Kalyani Publishers.
  Singhania, V. K., &Singhania, K. (2020). Direct Taxes: Law & Practice. New Delhi: Taxmann Publication.
- ✓ *Ahuja, G., & Gupta, R. Simplified Approach to Income Tax. New Delhi: Flair Publications Pvt.Ltd.*
- ✓ *Study material of ICAI Intermediate Paper 4A: Income-tax Law.*

Core V **Semester III**

Financial Markets and Institutions

Course Objectives

- Understand the structure and organization of financial markets.
- Analyze the functions and operations of various financial institutions.
- Explore the role of financial intermediaries in the economy.
- Examine the regulatory frameworks governing financial markets and institutions.
- Assess the impact of financial market developments on economic activity.
- Develop critical thinking and analytical skills in evaluating financial market trends and dynamics

Course Outcomes

After completion of the course, learners will be able to:

- Students are able to know the features of different financial markets and their role in economic development.
- Students are able to know the functions of financial markets and capital markets.
- Students are able to know about the commercial Banks and their role in project financing and working capital finance and also about the massive growth of NPAs.
- Students are able to know about the role of insurance companies, NBFCs and Mutual Funds.
- Understand the basics of financial services and its various dimensions.

Unit I: An Introduction to Financial System and its Components

Financial markets and institutions. Financial intermediation, Functions and components of Financial System Financial system and economic development .An overview of the Indian financial system.

Unit II: Financial Market

Money market-functions, organization and instruments. Role of Central Bank in money market; Indian money market-An overview. Capital Markets- functions, organization and instruments. Indian debt market; Indian equity market-primary and secondary markets; Role of stock exchanges in India.

Unit III: Financial Institution

Commercial banking-introduction, its role in project finance and working capital finance. Development Financial Institutions (DFIs).problems of NPA, Financial Inclusion. Life and non-life insurance companies in India; Non-banking financial companies (NBFCs); Mutual Funds; Types and role in Capital Market, Regulation of Mutual Funds.

Unit IV: Financial Services

Meaning, types, Leasing and hire-purchase, Consumer and housing finance; Venture capital finance; Factoring services, Bank Guarantees and Bank Undertakings, Letter of Credit; Credit Rating Agencies.

Suggested Readings

- ✓ *Gupta S. K. Financial Market, Institution and Services, kalyani publishing house.*
- ✓ *Bhole,L.M.,FinancialMarketsandInstitutions.TataMcGrawHillPublishing Company*
- ✓ *Khan,M.Y.,IndianFinancialSystemTheoryandPractice.NewDelhi:VikasPublishingHouse*
- ✓ *Financial Services and Markets, PandianPunithavathy Vikas Publishing*
- ✓ *Sharma,G.L.,andY.P.Singh.ContemporaryIssuesinFinanceandTaxation.AcademicFoundation,Delhi*
- ✓ *Khanand Jain, Financial Services,TataMcGrawHill*
- ✓ *Singh, J.K., Venture Capital Financing in India. DhanpatRai and Company, New Delhi.*
- ✓ *Annual Reports of Major Financial Institutions in India.*

Core VI GST and other Indirect Taxes (Customs)

Course Objectives

The course aims to provide understanding about salient features of GST law and implications of its various provisions for different classes of suppliers, to be applied in real life business scenario.

Course Outcomes

After completion of the course, learners will be able to:

- Explain the concept, need, and utility of indirect taxes;
- Implement the provisions relating to supply under GST in real life scenario;
- Apply the provisions of levy of GST and identify various returns under GST and payment of taxes;
- Evaluate the concepts of Customs Act, various custom duties and computation of the assessable value for charging customs duty

Unit I: Basic Concepts

Concept and features of Indirect Taxes, Difference between Direct and Indirect Taxes, Concept of GST, Relevant Definitions under GST law, Constitutional aspects of GST. GST Council: Constitution, Structure and functioning.

Unit II: Concept of supply and Levy of GST

Concept of supply including composite and mixed supply, Place, Time and Value of taxable supply, Significance of consideration. Basis of Charge of GST, Inter-State Supply, Intra-state supply, GST rates notified for supply of various goods and services, Reverse charge mechanism, Composition levy, Exemptions from GST, Power to grant exemptions, Exempted goods under exemption notifications, Exempted services under exemption notifications, Input tax credit.

Unit III: Procedures under GST

Registration under GST law, Tax invoice credit and debit notes, Different GST returns, Electronic liability Ledger, Electronic credit Ledger, Electronic cash ledger, Different assessment under GST, Interest applicable under GST (Period), Penalty under GST, Various provisions regarding e-way bill in GST, Mechanism of Tax Deducted at Source (TDS) and tax collected at source (TCS), Audit under GST.

Unit IV: E-filling of GST returns and Customs Law

Understanding the GST return preparation process, Data entry and validation of GST return details, Uploading GST returns using offline/online tools, Filing GSTR-1 (Outward Supplies), Filing GSTR-3B (Monthly Summary Return), Filing GSTR-9 (Annual Return). Compliance and Error Handling; Overview of GST compliance requirements, Identifying common errors and discrepancies in GST returns, Strategies for error correction and reconciliation. Basic concepts, Territorial waters and High seas; Types of custom duties; Valuation.

Suggested Readings

- ✓ *Rout P.K. & Others GST and Indirect Taxes, kalyani publishing house.*
- ✓ *Haldia, Arpit&Mohd, Taxmann's GST Law & Practice*
- ✓ *Bangar, Vandana&Bangar,Yogendra, Comprehensive Guide to Indirect Tax Laws–GST & Customs*

Latest revisions and notifications relating to GST & Customs

Core VII **Management Accounting**

Course Objectives

The course aims to enable students to acquire knowledge of concepts, methods and techniques of management accounting for the purpose of managerial planning, control and decision making.

Course Outcomes

After completion of the course, learners will be able to:

- Examine the conceptual framework of Management Accounting and identify the differences between various forms of accounting.
- Analyse budgetary control system as a tool of managerial planning and control.
- Evaluate the standard costing system as a tool of managerial control.
- Recognise the concept of marginal costing and cost-volume-profit analysis.
- Analyse techniques of decision making.
- Discuss the concept of responsibility accounting and performance measurement.

Unit 1: Introduction to Management Accounting

Meaning, objectives, nature and scope of management accounting, Difference between different forms of accounting- Cost, Financial and Management accounting, Cost control and Cost reduction.

Unit 2: Budgetary Control and Standard Costing Systems

- Budgeting and Budgetary Control: Concept of budget, budgeting and budgetary control; objectives, merits and limitations; Functional Budgets; Fixed and Flexible budgeting; An overview of different approaches to budgeting (Zero base budgeting, Performance budgeting and Programme budgeting)

- Standard Costing and Variance Analysis: Meaning of standard cost and standard costing; advantages, limitations and applications; Variance Analysis – material, labour, overheads and sales variances. Control ratios.

Unit 3: Marginal Costing

Concept of marginal cost and marginal costing; Absorption versus Variable Costing: Distinctive features and income determination; Cost-volume-profit analysis; Break-even Analysis-Statements, mathematical and graphical approaches; Profit-volume ratio, angle of incidence, margin of safety, key factor, determination of cost indifference point.

Unit 4: Decision Making

Steps in Decision making process. Concept of relevant costs. solving various short -term decision making problems using marginal costing and differential costing techniques – Profitable product mix, Acceptance or rejection of special/ export offers, Make or buy, Addition or elimination of a product line, sell or process further, operate or shut down and Pricing decisions.

Suggested Readings

- ✓ *Sharma / Gupta Management accounting, kalyani publishing house.*

- ✓ *ManagementAccounting, 4th Edition Pillai R.S.N. &Bagavathi S. Chand Publishing*
- ✓ *Arora, M. N. (2019).Management Accounting. Delhi, India: Himalaya Publishing House.*
- ✓ *Management Accounting: Principles & Practice, 3rd Edition Sahaf M.A. Vikas Publishing*
- ✓ *COST AND MANAGEMENT ACCOUNTING RAVI M KISHORE, taxman publishing house.*
- ✓ *Goel, R. K., &Goel, I. (2019). Concept Building Approach to Management Accounting for B.Com(Hons.), Delhi, India: Cengage.*
- ✓ *Maheshwari, S. N., & Mittal, S. N. (2019).Management Accounting. Delhi, India: ShriMahaveer Book Depot.*
- ✓ *Maheshwari, S. N., Maheshwari, S. K., &Maheshwari, S. K. (2021).Principles of Management Accounting. Delhi, India: Sultan Chand & Sons.*
- ✓ *Maheshwari, S. N. (2015).Management Accounting and Financial Control. Delhi, India: Sultan Chand & Sons.*
- ✓ *Shah, P. (2015).Management Accounting. Delhi, India: Oxford University Press.*
- ✓ *Singh, S. (2023). Management Accounting. Delhi, India: PHI Learning Pvt. Limited.*
- ✓ *Singh, S. K., & Gupta, L. (2021). Management Accounting: Theory and Practice. Delhi, India: A. K. Publications.*
- ✓ *Tulsian, P. C., &Tulsian, B. (2023).Advanced Management Accounting.*
- ✓ *Drury, C. (2020).Management and Cost Accounting. China: Cengage.*
- ✓ *Horngren, C. T., Foster, G., &Dattar, S. M. (2002). Cost Accounting: A Managerial Emphasis. Delhi, India: Prentice Hall of India Ltd.*
- ✓ *Khan, M. Y., & Jain, P. K. (2021).Management Accounting. Delhi, India: Tata McGraw Hill Publishig Co.*
- ✓ *Usry, M. E., & Lawrence, H. H. (2010). Cost Accounting: Planning and Control. Delhi, India: S. Chand.*

Core VIII **Semester IV**

Financial Management & Risk Management

Course Objectives

The course aims to familiarize the learners with the principles and practices of financial management.

Course Outcomes

After completion of the course, learners will be able to:

- Explain the nature and scope of financial management and assess the impact of time value of money in different business decisions;
- Analyze capital budgeting process and apply capital budgeting techniques for business decisions;
- Discuss the various sources of finance in today's competitive industry and explain various theories and factors affecting capital structure decisions;
- Critically examine various theories of dividend, identify and analyze factors affecting dividend policy;
- Design a model of risk assessment and control.

Unit I: Introduction

Nature, scope, and objectives of financial management- profit maximization Vs wealth maximization; Value maximization-concept and implications, Economic Value Added (EVA), Market Value Added (MVA). Functions and Responsibilities of a Finance Manager. Time value of money, Risk and Return Analysis; emerging dimensions in finance area- Crypto currencies, block chain, behavioral finance, sustainable finance.

Unit II: Financing Decision

Sources of long-term financing, Components of cost of capital, Method for calculating Cost of Equity, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average Cost of Capital (WACC) and Marginal Cost of Capital. Capital Structure-Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating Leverage, Financial Leverage and Combined Leverage. EBIT-EPS Analysis. Determinants of Optimum Capital Structure.

Unit III: Investment Decision and Dividend Decision

- **Long-term investment decision:** Capital Budgeting Process, Capital Budgeting Techniques; Payback Period Method, Discounted Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index.
- **Short-term investment decision:** Concept of Working Capital, working capital cycle, Risk-return Trade off, working capital estimation, cash management, receivables management, inventory management, payables management.
- **Dividend Decision**: Theories for relevance and irrelevance of dividend decision for corporate valuation-Walter's Model, Gordon's Model, MM Approach, Forms of dividend payment, types of dividend policies and Determinants of Dividend policy.

Unit IV: Risk Management

Introduction, meaning, definition and types of risk; operational and financial risks. Risk management process; identification, assessment, risk treatment; risk transfer, risk avoidance, risk retention and risk control, review and evaluation of plan. Risk management approach and methods; avoidance, loss prevention, loss reduction separation, duplication, diversification; risk reporting process; internal reporting and external reporting, risk organisation and risk management organization structure; traditional and modern structure

Suggested Readings

- ✓ *Sharma R. K. &Gupta S. K. Financial Management, kalyani publishing house.*
- ✓ *Fundamentals of Financial Management AmitSinghal Vikas Publishing*
- ✓ *Khan, M.Y., &Jain, P.K. Financial Management: Text and Problem. New Delhi: Tata McGraw Hill Education India.*
- ✓ *Kothari,R.FinancialManagement:AContemporaryApproach.NewDelhi:SagePublicationsIndiaPvt.Ltd.*
- ✓ *Pandey,I.M.FinancialManagement. NewDelhi:VikasPublications.*
- ✓ *Rustagi,R.P.FundamentalsofFinancialManagement.NewDelhi:TaxmannPublication.*
- ✓ *Ross, S. A., Westerfield, R. W., Jaffe, J., &Kakani, R. K. CorporateFinance.New York: McGraw Hill Education.*
- ✓ *Chandra, P. (2007). Financial Management-Theory and Practice. New Delhi: Tata McGraw Hill Education.*
- ✓ *Horne. J. C., &Wachowicz, J. M. (2008). Fundamentals of Financial Management. New Jersey: Prentice Hall.*
- ✓ *Khan, M. Y., & Jain, P. K. (2018). Financial Management: Text and Problem. New Delhi: Tata McGraw HillEducation India.*
- ✓ *Kothari, R. (2016). Financial Management: A Contemporary Approach. New Delhi: Sage Publications India Pvt.Ltd.*
- ✓ *Pandey, I. M. (2015). Financial Management. New Delhi: Vikas Publications.*
- ✓ *Rustagi, R. P. (2015). Fundamentals of Financial Management. New Delhi: Taxmann Publication.*
- ✓ *Ross, S. A., Westerfield, R. W., Jaffe, J., &Kakani, R. K. (2014). Corporate Finance. New York: McGraw HillEducation.*
- ✓ *Sharma, S. K., &Zareen, R. (2018). Fundamentals of Financial Management. New Delhi: S. Chand Publishing.*
- ✓ *Singh, P. (2010). Financial Management. New Delhi: Ane Books Pvt. Ltd.*
- ✓ *Singh, J. K. (2016). Financial Management-Theory and Practice. Delhi: Galgotia Publishing House.*

Core IX Auditing and Corporate Governance

Course Objectives

The course aims to provide knowledge of auditing concepts, principles, procedures, and techniques in accordance with current legal requirements.

Course Outcomes

After completion of the course, learners will be able to:

- Summarise the basic concepts of auditing and acquaint with latest developments in the area of auditing.
- Describe the need of auditing and the role of auditors.
- Demonstrate the principles, procedures and techniques of auditing.
- Interpret the contents of audit reports.
- Analyse the provisions of Companies Act, 2013 relating to auditor and auditing.

Unit I: Introduction to Auditing

- Introduction – Meaning - Definition – Objectives – Differences between Accountancy and Auditing – Types of Audit - Advantages of Auditing – Preparation before commencement of new Audit – Audit Notebook – Audit Working Papers – Audit Program, Recent Trends In auditing: Nature & Significance of Tax Audit – Cost Audit - Management audit.
- Internal Control: meaning and objectives. Internal Check: meaning, objectives. Internal Check as regards: Wage Payments, Cash Sales, Cash Purchases. Internal Audit: Meaning - Advantages and Disadvantages of Internal Audit – Differences between Internal Check and Internal Audit.

Unit II: Vouching And Verification And Valuation Of Assets And Liabilities

- Meaning - Definition – Importance – Routine Checking and Vouching – Voucher - Types of Vouchers – Vouching of Receipts: Cash Sales, Receipts from debtors, Proceeds of the sale of Investments. Vouching of Payments: Cash Purchases, Payment to Creditors, Deferred Revenue Expenditure
- Meaning and Objectives of verification and valuation – Position of an Auditor as regards the Valuation of Assets – Verification and Valuation of different Items: Assets: Land & Building, Plant & Machinery, Goodwill – Investments - Stock in Trade. Liabilities: Bills Payable - Sundry Creditors – Contingent Liabilities.

Unit III: Audit of Limited Companies and Audit Report

- Company Auditor – Appointment – Qualification - Powers - Duties and Liabilities – Professional Ethics of an Auditor, Audit of Educational Institutions – Audit of Insurance Companies- Audit of Co-operative societies.
- **Audit Report and Special Audit** Contents and types of audit report, Qualified and Unqualified report; National Financial Reporting Authority. Special Audit: Banking and Insurance company; Forensic Audit.

Unit IV: Corporate Governance

Conceptual framework of Corporate Governance, Corporate Governance Reforms. Major Corporate Scandals in India and Abroad: Common Governance Problems Noticed in various Corporate Failures. Codes & Standards on Corporate Governance.

Suggested Readings

- ✓ *Das / Das Auditing and Corporate Governance, kalyani publisher.*
- ✓ *P N Reddy &Appannaiah, Auditing, HPH*
- ✓ *BN Tandon, Practical Auditing, Sultan Chand*
- ✓ *Dr.NanjeGowda, Principles of Auditing, VBH*
- ✓ *Dr. Alice Mani: Principles & Practices of Auditing, SBH.*
- ✓ *K. Venkataramana, Principles And Practice Of Auditing, SHBP.*
- ✓ *MS Ramaswamy, Principles and Practice of Auditing.*
- ✓ *DinakarPagare, Practice of Auditing, Sultan Chand*
- ✓ *Kamal Gupta, Practical Auditing, TMH*
- ✓ *R.G Sexena - Principles and Practice of Auditing, HPH*

Core X **Corporate Legal Framework**

Course Objectives

The course aims to impart the learner's working knowledge of the provisions of the Companies Act, 2013.

Course Outcomes

After completion of the course, learners will be able to:

- Explain relevant definitions and provisions relating to issue of prospectus and allotment of shares;
- Synthesize company processes, meetings, and decisions;
- Describe the framework of dividend distribution, Accounts of the company and Audit and Auditors of company;
- Determine the role of Board of directors and their legal position;
- State regulatory aspects involved in Oppression, Mismanagement, corporate restructuring and Winding Up and to study the composition of Adjudicating Authority i.e. NCLT and NCLAT and its powers.

Unit I: Introduction to Companies Act, 2013

Important definitions: Prospectus and Share Capital, Allotment of securities, Private Placement, share capital, basic requirements, alteration of share capital, Sweat Equity, Bonus issue, issue of shares at premium and discount, Further issue of shares, buy-back of shares.

Unit II: Management and Administration

Board Meetings, Annual General Meeting, Extraordinary General Meeting, Requisites of a valid meeting, Convening of Meetings, Minutes and Resolutions; Postal ballot; voting through electronic matters.

Unit III: Directors and their Powers

Board of directors, cclassification of directors, women directors, independent director; appointment and qualifications of directors; Director Identification Number (DIN); Disqualifications, Removal of directors; Legal positions, Powers, Duties and responsibilities; Additional Director, Alternate Director, Nominee Director, Director appointed by casual Vacancy, Key Managerial Personnel, Managing Director, Manager and Whole Time Director.

Unit IV: Oppression, Mismanagement, Corporate Restructuring and Winding-Up

Oppression, Mismanagement, Rights to apply, Powers of Tribunal, Provisions related to Compromises, Arrangement and Amalgamations, Concept and Modes of Winding Up; Provisions of winding up under Insolvency and Bankruptcy Code, 2016. National Company Law Tribunal and Appellate Tribunal-Definitions; Constitution of National Company Law Tribunal; Constitution of Appellate Tribunal; Appeal from orders of Tribunal; Power to punish for contempt.

Suggested Readings

- ✓ *Garg /Gupta/Dhingra Corporate Law, kalyani publisher.*
- ✓ *CORPORATE LAWS, Vandana Bansal, Anjali Arora & Jyoti Prakash Rath Vikas Publishing.*
- ✓ *Business and Corporate Laws Tulsian P.C. S. Chand Publishing.*
- ✓ *Kumar, A. Corporate Laws. New Delhi: Taxmann Publication.*
- ✓ *Sharma, J. P. An Easy Approach to Corporate Laws. New Delhi: Ane Books Pvt. Ltd.*
- ✓ *Chadha R., & Chadha, S. (2018). Company Laws. Delhi: Scholar Tech Press.*
- ✓ *Hicks, A., & Goo, S. H. (2017). Cases and Material on Company Law. Oxford: Oxford University Press.*
- ✓ *Kuchhal, M. C., & Kuchhal, A. (2020). Corporate Laws. New Delhi: Shree Mahavir Book Depot.*
- ✓ *Kumar, A. (2019). Corporate Laws. New Delhi: Taxmann Publication.*
- ✓ *Sharma, J. P. (2018). An Easy Approach to Corporate Laws. New Delhi: Ane Books Pvt. Ltd.*

Core XI **Semester V**

Financial Statement Analysis

Course Objectives

The course provides a user perspective on the role of accounting and financial reporting in capturing and conveying economic information about an organization and aims at helping students acquire confidence in using the concepts and vocabulary of accounting to analyse and communicate about business performance and resource allocation

Course Outcomes

After completion of the course, learners will be able to:

- Learn about the basics of analytics, the types and their application;
- Learn the technique of projecting growth, income and cash from accounting data for the future through time-series models;
- Learn accounting ratios and forecasting through the SLR model;
- Learn data visualization through graph, SLR & the method of Least Squares for estimation of parameters;
- Learn the use of R-Programming for analysing accounting data.

Unit I: Introduction to Analytics

Introduction to Analytics, Analysis& Business Analytics; Overview of Machine Learning and Artificial Intelligence; Types of Analytics (Descriptive, Predictive & Prescriptive); Application of Analytics in Business Functions.

Unit II: Financial Statements Analysis (Using Descriptive & Predictive Models)

Financial statement analysis-Techniques of financial statement analysis- Descriptive analysis of Comparative Statements, Common-size Statements, Trend percentages, Cash Flow Statement (Overview only). Future Cash/ Cash Flow, Growth & Incomeprojectionofabusinessfromaccountingdataavailablefromfinancialstatementsthroughtime series model.

Unit III: Accounting Ratios and Forecasting

Classification of ratios–Ratio formation (Overview only)–Ratio interpretation (Practical Problem); Time Series (intra firm) Analysis, Cross Sectional (inter firm)Analysis, Residual Analysis and Multivariate Analysis; Projection of future at ios through Simple linear Regression model.

Unit IV: Data Visualization and Decision making

- Histogram, Bar Chart, Pie Chart, Scatter Plot, Box Plot, Line Charts. Simple Regression Analysis (SLR) (Overview only): Introduction, SLR Model Building, Estimation of parameters using Ordinary Least Squares.
- **Accounting Data Analytics Tools:** Spread sheets, Data Science Languages, Data Manipulation in Spread sheet, Spread sheet Functions-Advanced functions

Suggested Readings

- ✓ *Sharma, R. K., & Gupta, S. K. (2016). Management Accounting. Cuttack, Odisha: Kalyani Publishers.*
- ✓ *Ahuja, N. L., &Dawar, V. (2015). Financial Accounting and Analysis. New Delhi: Taxmann Publications.*
- ✓ *Bernstein, L. A. (1974). Understanding Corporate Reports: A guide to Financial Statements. Homewood,California: Dow Jones-lrwin.*
- ✓ *Bhattacharjee, Ashish Kumar; Financial Accounting for Business Managers, Prentice Hall of India,*
- ✓ *Friedson, M. S., & Alvarez, F. (2011). Financial Statement Analysis: A practioners' Guide. New Jersey: Wiley.*
- ✓ *Foster, G. (1986). Financial Statement Analysis. London: Pearson Education.*
- ✓ *Gopalkrishnan, A. A. (2001). Understanding Financial Statements - Interpretation and Analysis. New Delhi:Label Book Publisher.*
- ✓ *Gupta, A. (2018). Financial Accounting for Managers: An Analytical Perspective. Delhi: Pearson Education.*
- ✓ *Helfert, E. A. (1996). Techniques of Financial Analysis: A Practical Guide to Measuring Business Performance.New York: McGraw Hill Education.*
- ✓ *Khan, M. Y., & Jain, P. K. (2017). Management Accounting: Text, Problems and Cases. New Delhi: TataMcGraw Hill Education.*
- ✓ *Lal, Jawahar&Sucheta, Gauba, Financial Reporting and Analysis. Himalaya Publishing House, Mumbai*
- ✓ *Narasimhan, M. S. (2016). Financial Statement and Analysis. Noida, Uttar Pradesh: Cengage Learning India.*
- ✓ *Soffer, L. C., &Soffer, R. J. (2002). Financial Statement Analysis: A Valuation Approach. London: PearsonEducation.*

Core XII **Business Data Analytics**

Course Objectives

- Understand the fundamentals of data analytics: Students should be able to grasp the basic concepts and principles of data analytics, including data types, data sources, and data processing techniques.
- Develop proficiency in data manipulation and exploration: Students should gain hands-on experience in manipulating and exploring data using tools such as spread sheets, databases, and data visualization software.
- Learn statistical methods and techniques for data analysis: Students should acquire knowledge of statistical methods commonly used in business data analysis, including descriptive statistics, hypothesis testing, regression analysis, and time series analysis.
- Apply data analytics techniques to real-world business problems: Students should be able to identify business problems that can be addressed through data analysis, formulate appropriate analytical approaches, and interpret the results to make informed business decisions.
- Gain proficiency in data visualization: Students should develop skills in visualizing data effectively using graphs, charts, and dashboards to communicate insights and findings to stakeholders.
- Understand the ethical and legal considerations in data analytics: Students should be aware of ethical issues related to data privacy, confidentiality, and bias, and understand the legal frameworks governing the collection, storage, and use of data.
- Explore emerging trends and technologies in business data analytics: Students should stay updated on the latest trends, tools, and technologies in the field of data analytics, including machine learning, artificial intelligence, and big data platforms.

Course Outcomes

After completion of the course, learners will be able to:

- Learn about the basics of analytics, the types and their application;
- Learn the technique of projecting growth, income and cash from accounting data for the future through time-series models;
- Learn accounting ratios and forecasting through the SLR model;
- Learn data visualization through graph, SLR & the method of Least Squares for estimation of parameters;
- Learn the use of R-Programming for analysing accounting data.

Unit 1: Introduction to Business Data Analytics

Understanding Data Analytics in Business, Definition and Importance of Business Data Analytics, Overview of Data Analytics Lifecycle: Collection, Cleaning, Analysis, Interpretation, and Visualization, Role of Data Analytics in Decision-Making and Business Strategy, Data Collection and Preprocessing. Sources of Business Data: Internal and External, Data Collection Methods: Surveys, Interviews, Observations, etc. Data Cleaning and Preprocessing Techniques: Handling Missing Values, Outliers, and Data Transformation, Exploratory Data Analysis (EDA). Descriptive Statistics: Measures of Central Tendency, Dispersion, and Distribution, Data Visualization Techniques: Histograms, Box Plots, Pie-charts, Doughnut, Scatter Plots etc. Identifying Patterns and

Trends in Data using EDA

Unit 2: Business Analytics Tools in Excel

Introduction to Excel for Data Analytics, Advanced Data Analysis in Excel, PivotTables and Pivot Charts for Data Summarization and Visualization. Data Analysis Tools: Goal Seek, Solver, Scenario Manager, Slicer etc., Practical Applications in Excel, Case Studies and Business Scenarios, Hands-on Exercises and Projects to Apply Excel Skills in Real-World Analytics Tasks, Integration with External Data Sources and Automation Techniques

Unit 3: Data Visualization with Power BI

Introduction to Power BI, Overview of Power BI: Features, Components, and Benefits, Connecting to Data Sources: Excel, Databases, Online Services, etc. Creating Interactive Dashboards and Reports, Data Transformation and Modeling in Power BI, Creating Advanced Data Visualizations: Charts, Maps, and Gauges, Advanced Analytics and Insights in Power BI, Analyzing Data with Power BI, Sharing and Collaborating on Power BI Dashboards and Reports

Unit 4: Data Visualization with Tableau

Introduction to Tableau, Overview of Tableau Desktop and Tableau Server, Connecting to Data Sources: Excel, Databases, Cloud Services, etc. Building Interactive Dashboards and Visualizations, Data Preparation and Analysis in Tableau, Data Cleaning and Transformation using Tableau Prep Builder, Exploratory Data Analysis with Tableau Desktop: Drag-and-Drop Analytics, Creating Calculated Fields and Parameters, Advanced Visualization Techniques in Tableau, Implementing Advanced Chart Types: Tree Maps, Heat Maps, and Dual Axis Charts, Dashboard Design Best Practices and Interactivity Features

Project Work and Assessment: Application of Business Data Analytics Techniques and Tools in Real-World Business Scenarios, Project Planning, Execution, and Presentation, Integration of Skills Learned Throughout the Course

Suggested Readings

- ✓ *Alexander, M., Decker, J., &Wehbe, B. (2014).Microsoft Business Intelligence Tools for Excel Analysis. New Jersey: Wiley.*
- ✓ *Kumar, D. U. (2017). Business Analytics: The Science of Data Driven Decision Making. New Jersey: Wiley.*
- ✓ *Motwani, B. (2019).Data Analytics with R. New Jersey: Wiley.*
- ✓ *North, M. (2012). Data Mining for the masses. Athens, Georgia: Global Text Project.*
- ✓ *Paul, T. (2011).R Cook book. New York: O Reilly Media'*
- ✓ *Provost, F., & Fawcett, T. (2013).Data Science for Business. New York: O'Reilly Media.*

Core XIII **Fundamentals of IND-AS & IFRS**

Course Objectives

The objective of this paper is to let the students know the fundamentals of Accounting standards and corporate reporting practices. This paper will help the students to gain the knowledge on selective accounting standard.

Course Outcomes

After completion of the course, learners will be able to:

- Understand the concepts of Indian Accounting Standards along with the difference between Ind AS and IFRS.
- Know the contents of Annual Report and concept of triple bottom line.
- Prepare statement of Cash flow statement and to have broad idea about PPP and inventory valuation.
- Know basic ideas about fair value of items of financial statement and the history of adoption of Indian Accounting Standards.
- Understand concepts of corporate reporting practices.

Unit I: Introduction

Accounting Standards: Meaning of Accounting Standards - Need for Accounting Standards - Significance or advantages of Accounting Standards – Limitations of Accounting Standards. Orientation to International Accounting Standards, International Financial Reporting Standards and Convergence to IFRS. Accounting Standards in Indian Context – Introduction to Indian Accounting Standards (Ind AS).Accounting Bodies. Procedure for issuing Accounting Standards by the Accounting Standards Board.

Unit II: Regulatory Framework

Preparation of Financial Statements as per Ind As: Framework for preparation of financial statements. Presentation of Financial Statements as per Ind AS 1: Statement of Profit and Loss, Balance Sheet, Statement of Changes in Equity, Statement of Cash Flows and Notes to Accounts. Problems on preparation of Statement of Profit & Loss and Balance Sheet.

Unit III:

Provisions Under Accounting Standards for items Appearing in Financial Statements: Revenue Recognition (Ind AS 18); Valuation of Inventory (Ind AS 2); Property, Plant and Equipment, including Depreciation (Ind AS 16); Borrowing Cost (Ind AS 23), Intangible Assets (Ind AS 38), Provisions (IndAS 37), Earnings per Share (Ind AS 33), Separate financial statements (IndAS-27), Annual Report, Triple Bottom Line, Statement of Cash Flows (Ind AS-7), Income Tax (Ind AS -12).

Unit IV:

Provisions under Accounting Standards for items that Do Not Appear In Financial Statements: Segment Reporting (Ind AS 108), Related Party Disclosures (Ind AS 24), Events occurring after Balance Sheet Date (Ind AS 10), Interim Financial Reporting (Ind AS 34), Impairment of Assets (Ind AS-36), Fair value measurement (Ind AS-113), Leases (Ind AS-116)

Suggested Readings

- ✓ *Chatterjee, B. D. &ain Jinender, Illustrated Guide to Indian Accounting Standards (Ind AS), Taxmann, New Delhi.*
- ✓ *Maller, S., Accounting under Ind AS, Bloomsbury, New Delhi.*
- ✓ *Rawat, D. S. & Jain Jinender, Students" Guide ToInd ASs (Converged IFRSs), Taxmann, New Delhi.*
- ✓ *Uma Devi. R., Reporting Practices-Financial and Non-Financial, CSMFL, Inda.*
- ✓ *Anil Kumar, Rajesh Kumar and Mariyappa, Indian Accounting Standards, HPH*

Core XIV **Semester VI**

Fundamentals of Financial Modelling

Course Objectives

- Understand the principles and importance of financial modeling in decision-making.
- Develop proficiency in constructing financial models using Excel.
- Apply financial modeling techniques to analyze investment decisions, forecast financial performance, and assess risk.
- Interpret and communicate the results of financial models effectively.
- Gain practical skills relevant to careers in finance, accounting, and business analysis.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding Financial Modeling Principles.
- Proficiency in Excel-Based Modeling.
- Application of Financial Modeling Techniques.
- Interpretation and Communication of Results.
- Practical Skills for Finance and Business Analysis.
- Problem-Solving and Critical Thinking.
- Collaboration and Teamwork.

Unit-1: Introduction to Financial Modeling

Definition and importance of financial modelling, Types of financial models, Overview of Excel for financial modelling. Financial Statement Modeling, Building historical and forecasted financial statements, Linking income statement, balance sheet, and cash flow statement, Sensitivity analysis and scenario planning

Unit-2: Valuation Modeling

Discounted Cash Flow (DCF) analysis, Comparable company analysis (CCA), Precedent transactions analysis (PTA). Budgeting and Forecasting; Sales forecasting techniques, Expense forecasting and budgeting, Rolling forecasts and variance analysis

Unit-3: Capital Budgeting and Investment Analysis

Net Present Value (NPV) analysis, Internal Rate of Return (IRR) analysis, Payback period and profitability index, Risk Analysis and Monte Carlo Simulation, Introduction to risk analysis in financial modelling, Monte Carlo simulation methodology, Incorporating risk factors into financial models

Unit-4: Advanced Excel Techniques for Financial Modeling

Advanced functions and formulas, Data manipulation and analysis tools, Macros and VBA for automation. Case Studies and Practical Applications; Real-world case studies applying financial modeling techniques, Industry-specific applications of financial modelling, Presentation and communication of financial model results

Core XV **Business Application Software**

Course Objectives

- Understand Financial Modeling Concepts.
- Develop Proficiency in Excel.
- Apply Financial Modeling Techniques.
- Enhance Analytical Skills.
- Communicate Results Effectively.
- Problem-Solving and Decision Making.
- Explore Industry Applications.
- Collaborative Learning

Course Outcomes

After completion of the course, learners will be able to:

- Understanding Financial Modeling Principles.
- Proficiency in Excel-Based Modeling.
- Application of Financial Modeling Techniques.
- Effective Communication Skills.
- Critical Thinking and Analytical Skills.
- Practical Skills for Finance Careers.
- Industry-Relevant Knowledge.
- Continuous Learning and Professional Development.

Unit 1: Introduction to Business Application Software

Understanding Business Application Software, Definition and Importance of Business, Application Software, Overview of Tally and One ERP Systems, Role of Excel and PowerPoint in Business Operations, Introduction to Tally ERP 9, Installation and Setup of Tally ERP 9, Basic Navigation and Interface Overview, Creating Company Profiles and Configurations, Practical Application of Tally ERP 9, Accounting and Financial Management in Tally, Inventory Management and Stock Control, Generating Financial Reports: Balance Sheet, Profit & Loss Statement

Unit 2: Advanced Tally Features and Functions

Advanced Accounting Features in Tally ERP 9, Creation of Ledgers and Sub-ledgers, Advanced Voucher Entries: Contra, Payment, Receipt, Journal, etc., Handling Multi-Currency Transactions, Budgets and Controls in Tally, Tally Customization and Integration, Customizing Tally Reports and Invoice Formats, Integration with Excel for Data Import and Export, Integrating Tally with Other Business Applications, Introduction to One ERP, Overview of Enterprise Resource Planning (ERP), Introduction to One ERP System and Modules, Key Features and Benefits of One ERP Implementation

Unit 3: Excel for Business Analysis and Reporting

- Excel Basics and Functions, Introduction to Excel Interface and Navigation, Basic Formulas and Functions: SUM, AVERAGE, IF, VLOOKUP, etc., Data Entry and Formatting Techniques, Advanced Excel Features, Data Analysis Tools: PivotTables, PivotCharts, Data Validation, Advanced Formulas and Functions: INDEX-MATCH, SUMIFS, COUNTIFS, etc.
- Excel Macros and Automation, Excel Integration with AI, Introduction to AI Integration in Excel, Using AI-Powered Features for Data Analysis and Prediction, Leveraging AI for Enhanced Decision-Making and Business Insights

Unit 4: Effective Presentation with PowerPoint

PowerPoint Basics and Design Principles, Introduction to PowerPoint Interface and Layout, Designing Effective Slides: Layouts, Fonts, Colors, Graphics, Tips for Creating Engaging Presentations, Advanced PowerPoint Features, Animation and Transition Effects, Slide Master and Custom Templates, AI Integration in PowerPoint, Using AI-Powered Design Suggestions, Leveraging AI for Presentation Insights and Feedback

Project Work and Assessment: Practical Application Projects

Application of Tally, One ERP, Excel, and PowerPoint Skills in Real-World Business Scenarios, Project Planning, Execution, and Presentation

Core XVI **Semester VII**

Research Methodology & Research Ethics

Course Objectives

To acquaint students with the concepts of Survey and Research and provide inputs relating to research methodology, the process of research report writing.

Course Outcomes

After completion of the course, learners will be able to:

- Understand Meaning of Research and role of research in various functional areas;
- Formulate hypothesis and research design;
- Identify Methods of Data collection and pilot study;
- Develop Processing and Analysis of data;
- Apply Report writing techniques and draft research report

Unit-1: Introduction to Research Methodology

Definition of research, Importance of research in academic and professional contexts, Types of research: qualitative vs. quantitative. Research Design and Planning; Formulating research questions and objectives, Selecting appropriate research designs: experimental, observational, survey, case study Developing research hypotheses and variables

Unit-2: Data Collection Methods and Sampling Techniques

Surveys: design, administration, and analysis. Interviews: types, techniques, and ethical considerations. Observational research: participant observation, structured observation. Probability sampling methods: simple random sampling stratified sampling, cluster sampling Non-probability sampling methods: convenience sampling, purposive sampling, snowball sampling.

Unit-3: Data Analysis Techniques and Research Project Design

Qualitative data analysis methods: thematic analysis, content analysis, grounded theory, Quantitative data analysis methods: descriptive statistics, inferential statistics, and regression analysis. Developing a research proposal: objectives, literature review, methodology, timeline. Planning and executing a research project: data collection, analysis, and interpretation

Unit-4: Research Ethics

Ethical principles in research: integrity, respect, fairness, responsibility. Informed consent and confidentiality, Avoiding plagiarism and maintaining academic integrity

Suggested Readings

- ✓ *Swain A.K.P.C Business Research Method & Project Work, kalyani publisher.*
- ✓ *Research Methodology, Cauvery R./ Nayak, Sudha U.K./ Girija M. &Meenakshi R.S. Chand Publishing*
- ✓ *Research Methodology: Concepts and Cases, Chawla Deepak &Neena Sodhi Vikas Publishing*

- ✓ *Cooper, D. R. & Schindler, P. S., Business Research Methods. Boston, Mass.: McGraw-Hill/Irwin*
- ✓ *Greene, W. H., Econometric Analysis. Pearson Pvt. limited*
- ✓ *Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin (2013).Business Research Methods. Cengage Learning limited*

Core XVII Fundamentals of Securities Analysis and Portfolio Management

Course Objectives

To expose the students on the various avenues available for effective investment and possible way to avoid risk in investments through portfolio Management.

Course Outcomes

After completion of the course, learners will be able to:

- Understand the basic concepts of security and portfolio
- Analyze the individual security
- Construct and Manage a Portfolio
- Evaluate and revise the portfolios

Unit I

- Introduction to Security: Nature and Scope of Security Analysis; Savings vs. Investment, Elements of Investment, Objectives of Investment, Investment Philosophy, Types of Investor, Investor, Speculator & Gambler, Investment Avenues, Features of Investment, Process of Investment, Contemporary Issues in Investment Management.
- Measurement of Risk and Return: Measurement of Stock Return, Systematic Risk and Unsystematic Risk, Measurement of Beta. Measuring Risk and Return in Practice (Using Ms-Excel).

Unit-II

- Equity Analysis: Fundamental Analysis: Economic Analysis, Industry Analysis and Company Analysis. Technical Analysis: Various Prices and Volume Indicators, Indices: Various Types of Trends and Indices.
- Market Efficiency: Concept and Importance, Random Walk Theory, the Efficient Market Hypothesis. Forms of Market Efficiency, Testing Different Form of Market Efficiency Using MS-Excel/SPSS

Unit-III

Portfolio Management: Meaning, Importance and Objectives, Phase of Portfolio Management. Portfolio Analysis: Estimating Rate of Return and Standard Deviation of Portfolio Returns; Effects of Combining Securities; Markowitz Risk-Return Optimization.

Unit-IV

Single Index Model: Portfolio Risk: Portfolio Market Risk and Unique Risk, Sharpe's Optimization Solution. Capital Asset Pricing Model and Its Assumptions, Capital Market Line, Security Market Line; Risk Free Lending and Borrowing. Arbitrage Pricing Theory and Multifactor Asset Pricing Models

Suggested Readings

- ✓ Barua, Raghunathan and Verma: Portfolio Management, Tata McGraw Hill, Delhi.
- ✓ Bhalla V. K. - Investment Management, Portfolio Analysis - S. Chand, New Delhi.
- ✓ Clark, James Francies: Investment management. McGraw Hill, International Edition, New York.

Core XVIII Fundamentals of Operation Research and Quantitative Technique

Course Objectives

- Understand the fundamental concepts and principles of operations research and quantitative techniques.
- Learn mathematical modeling techniques for representing real-world problems in OR.
- Develop proficiency in optimization methods, including linear programming, integer programming, and nonlinear programming.
- Gain practical skills in applying quantitative techniques to analyze and solve business, engineering, and management problems.
- Learn simulation techniques for modeling stochastic systems and uncertainty in decision-making.
- Explore applications of OR and quantitative techniques in diverse fields such as supply chain management, logistics, finance, and healthcare.
- Develop critical thinking and problem-solving skills through hands-on exercises and case studies.
- Communicate quantitative analysis results effectively through written reports and presentations.

Course Outcomes

After completion of the course, learners will be able to:

- Foundational Knowledge of Operations Research.
- Proficiency in Mathematical Modeling.
- Competence in Optimization Techniques.
- Understanding of Simulation Modeling.
- Applications of OR in Diverse Fields.
- Critical Thinking and Problem-Solving Abilities.
- Effective Communication of Analysis Results.
- Practical Skills for Decision Support

Unit- 1: Introduction to Operations Research

Definition and scope of operations research, Historical development of OR and its applications, Role of quantitative techniques in decision-making. Mathematical Modeling; Formulation of mathematical models for real-world problems, Linear and nonlinear models, Objective functions, decision variables, and constraints

Unit-2: Optimization Techniques and Network Analysis

Linear programming: formulation, graphical solution, simplex method, Integer programming: branch and bound, cutting planes, Nonlinear programming: gradient-based methods, convex optimization. Network modeling techniques: critical path method (CPM), program evaluation

and review technique (PERT), Shortest path problems, minimum spanning trees, maximum flow problems

Unit-3: Simulation Modeling

Simulation methodology: discrete event simulation, Monte Carlo simulation, Random number generation, input modeling, output analysis, Applications of simulation in business and engineering. Decision Analysis; Decision trees: construction, analysis, and evaluation, Utility theory and risk analysis, Sensitivity analysis and decision-making under uncertainty

Unit-4: Applications of Operations Research

Supply chain optimization, Inventory management, Production planning and scheduling, Transportation and logistics. Case Studies and Practical Applications, Real-world case studies applying OR and quantitative techniques, Group projects analyzing and solving complex problems using quantitative methods, Presentation and communication of analysis results

Suggested Readings

- ✓ Operations Research, 4th Edition , Kalavathy S. Vikas Publishing

Core XIX Corporate Restructuring & Business Valuation

Course Objectives

- Understand the concepts and motives behind corporate restructuring.
- Learn about different forms of corporate restructuring, including mergers, acquisitions, divestitures, and reorganizations.
- Gain proficiency in financial statement analysis and interpretation.
- Develop skills in business valuation techniques and methodologies.
- Analyze the impact of corporate restructuring on shareholder value.
- Explore regulatory and legal considerations in corporate restructuring.
- Apply corporate restructuring and valuation principles to real-world business scenarios.
- Communicate valuation analyses and restructuring strategies effectively.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Corporate Restructuring
- Proficiency in Financial Statement Analysis
- Competence in Business Valuation
- Analysis of Restructuring Impact on Shareholder Value
- Understanding of Regulatory and Legal Considerations
- Application of Valuation and Restructuring Principles
- Critical Thinking and Problem-Solving Abilities
- Effective Communication of Valuation Analyses

Unit I: Introduction to Corporate Restructuring

Definition and motives behind corporate restructuring, Types of corporate restructuring: mergers, acquisitions, divestitures, spin-offs, reorganizations. Financial Statement Analysis; Overview of financial statements: balance sheet, income statement, cash flow statement, Ratio analysis: liquidity ratios, profitability ratios, leverage ratios, Common-size analysis and trend analysis

Unit II: Business Valuation Methods

Introduction to business valuation: intrinsic value vs. market value, Valuation approaches: asset-based, income-based, market-based, Discounted cash flow (DCF) analysis, comparable company analysis (CCA), precedent transactions analysis (PTA). Valuation of Mergers and Acquisitions; Methods of valuing mergers and acquisitions, Synergy analysis and valuation adjustments, Valuation considerations in merger negotiations. Valuation of Divestitures and Spin-offs; Valuation considerations in divestiture transactions, Spin-off valuation techniques and analysis, Financial modeling for spin-off transactions.

Unit III: Regulatory and Legal Aspects of Corporate Restructuring

Regulatory frameworks governing corporate restructuring, Legal considerations in mergers, acquisitions, and divestitures, Compliance with antitrust laws and securities regulations

Unit IV: Impact of Corporate Restructuring on Shareholder Value

Assessing the impact of restructuring on shareholder wealth, Market reaction to restructuring announcements, Long-term implications of corporate restructuring on firm performance, Real-world case studies of corporate restructuring transactions

Core XX **Semester VIII**

International Business Environment

Course Objectives

- Understand the concepts and theories of international business and globalization.
- Analyze the economic, political, legal, and cultural dimensions of the international business environment.
- Learn about international trade policies, trade agreements, and trade barriers.
- Explore foreign market entry strategies and modes of international expansion.
- Gain insights into managing cultural diversity and ethical challenges in international business.
- Understand the role of technology and innovation in shaping the global business landscape.
- Analyze international business risks and develop risk management strategies.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of International Business Concepts.
- Analysis of Economic Environment.
- Assessment of Political and Legal Risks.
- Management of Cultural Diversity.
- Evaluation of Trade Policies and Agreements.
- Development of Foreign Market Entry Strategies.
- Integration of Technology and Innovation.

Unit-1: Introduction to International Business

Definition and scope of international business, Theories of international trade and investment, Drivers of globalization and its impact on businesses. Economic Environment of International Business; Global economic systems: capitalism, socialism, mixed economies, Economic indicators and measures: GDP, GNP, inflation, exchange rates, International financial institutions and their role in global finance

Unit-2: Political, Legal and Cultural Environment of International Business

Political systems and ideologies: democracy, authoritarianism, communism, Legal frameworks governing international business: international law, trade regulations, intellectual property rights, Political risk assessment and management strategies, Dimensions of culture: Hofstede's cultural dimensions theory, Cultural differences and their impact on business practices, Managing cultural diversity and fostering cross-cultural communication

Unit-3: International Trade Policies and Agreements

Trade theories: comparative advantage, absolute advantage, factor endowment theory, Trade policies: tariffs, quotas, subsidies, Regional trade agreements and their impact on international business. Foreign Market Entry Strategies; Modes of international market entry: exporting, licensing, franchising, joint ventures, acquisitions, greenfield investments, Factors

influencing the choice of entry mode, Entry strategies for emerging markets vs. developed markets

Unit-4: Technology and Innovation in International Business

Role of technology in facilitating international business operations,Impact of innovation on global competitiveness, Digital transformation and its implications for international business. Managing International Business Risks; Types of international business risks: political risk, financial risk, operational risk, Risk assessment techniques and tools, Risk management strategies and contingency planning

Core XXI Sustainable Development and Corporate Social Responsibility

Course Objectives

- Understand the concepts of sustainable development, corporate social responsibility, and business ethics.
- Explore the relationship between business operations and environmental, social, and governance (ESG) issues.
- Learn about sustainability frameworks, standards, and reporting guidelines.
- Analyze the role of stakeholders in sustainability and CSR initiatives.
- Examine strategies for integrating sustainability and CSR into corporate strategies and operations.
- Assess the impact of sustainability and CSR practices on business performance and stakeholder value.
- Develop skills in sustainability reporting and communication

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Sustainable Development and CSR.
- Analysis of Environmental and Social Impacts.
- Knowledge of Sustainability Frameworks and Reporting
- Stakeholder Engagement and Governance.
- Integration of Sustainability into Business Strategy.
- Assessment of CSR Performance and Impact.
- Communication and Reporting Skills.
- Application of Sustainability Principles.

Unit-1: Introduction to Sustainable Development and CSR

Definitions and concepts of sustainable development and CSR, Historical evolution and significance of sustainability and CSR in business, **Environmental Sustainability and Business Operations;** Environmental challenges and impacts of business operations, Sustainable business practices: energy efficiency, waste reduction, resource conservation

Unit-2: Social Responsibility and Stakeholder Engagement

Social issues in business: labor practices, human rights, community development, Stakeholder theory and stakeholder engagement strategies. Governance, Ethics, and Corporate Citizenship; Corporate governance principles and practices, Business ethics and ethical decision-making, Role of corporations in global citizenship and community development.

Unit-3: Sustainability Reporting and Standards

Sustainability reporting frameworks: Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Integrated reporting and triple bottom line accounting,

Assurance and verification of sustainability reports. Sustainable Supply Chain Management; Principles of sustainable supply chain management, Supplier engagement and responsible sourcing practices, Supply chain transparency and traceability

Unit-4: CSR Strategy and Implementation

Developing a CSR strategy: goal-setting, implementation, evaluation, CSR integration into corporate culture and operations, Measuring and evaluating CSR performance and impact. Case studies of companies implementing sustainability and CSR initiatives, Best practices in sustainable development and corporate social responsibility.

Core XII

Fundamentals of Commodity Markets

Course Objectives

- Understand the Basics of Commodity Markets.
- Learn about Different Types of Commodities.
- Examine Supply and Demand Dynamics.
- Understand Price Determination Mechanisms.
- Explore Risk Management Strategies.
- Study Trading and Hedging Techniques.
- Examine Regulatory Frameworks.

After completion of the course, learners will be able to:

- Foundational Knowledge of Commodity Markets.
- Familiarity with Various Types of Commodities.
- Understanding of Supply and Demand Dynamics.
- Proficiency in Price Determination Mechanisms.
- Skills in Risk Management.
- Competence in Trading and Hedging.
- Awareness of Regulatory Requirements

Unit-1: Introduction to Commodity Markets

Definition of commodities, Historical evolution of commodity trading, Importance of commodities in the global economy. Types of Commodities; Classification of commodities (agricultural, energy, metals, etc.), Characteristics of different commodity types, Major commodity exchanges worldwide.

Unit-2: Participants in Commodity Markets

Overview of market participants (producers, consumers, traders, speculators, hedgers, etc.), Role of intermediaries (brokers, exchanges, clearinghouses, etc.), Importance of market liquidity. Supply and Demand Dynamics; Factors affecting commodity supply and demand, Seasonality and cyclical trends in commodity markets, Impact of geopolitical events and weather patterns. Commodity Pricing Mechanisms; Spot market vs. futures market, Basics of commodity futures contracts, Price discovery process.

Unit-3: Risk Management in Commodity Markets

Overview of price risk, credit risk, and operational risk, Introduction to hedging strategies, Risk management tools (futures, options, swaps, etc.). Fundamental analysis: Supply-demand fundamentals, production forecasts, consumption trends, Technical analysis: Chart patterns, trend analysis, technical indicators, Sentiment analysis: Market sentiment, news impact on prices

Unit-4: Trading Strategies and Regulatory Environment

Overview of trading strategies (trend following, mean reversion, spread trading, etc.), Back-testing and performance evaluation, Risk-reward considerations, Overview of regulatory

bodies and frameworks governing commodity markets, Compliance requirements for market participants, Market manipulation and insider trading.

Core XXIII Social Entrepreneurship and Incubation

Course Objectives

- Understand Social Entrepreneurship.
- Explore Social Innovation.
- Learn about Incubation Ecosystems.
- Develop Entrepreneurial Mindset.
- Identify Social Impact Opportunities.
- Understand Funding and Financing.
- Gain Skills in Business Planning and Management.
- Promote Ethical Leadership and Governance.

Course Outcomes

After completion of the course, learners will be able to:

- Comprehensive Understanding of Social Entrepreneurship.
- Ability to Innovate for Social Impact.
- Familiarity with Incubation Ecosystems.
- Entrepreneurial Mindset Development.
- Identification of Social Impact Opportunities.
- Knowledge of Funding and Financing Options.
- Skills in Business Planning and Management.
- Emphasis on Ethical Leadership and Governance.

Unit-1: Introduction to Social Entrepreneurship

Definition and characteristics of social entrepreneurship, Historical overview and contemporary examples of social enterprises. Social Impact Assessment**;** Methods for measuring social impact, Theory of change and logic models, Impact assessment frameworks and tools

Unit-2: Business Model Design for Social Enterprises

Adapting traditional business models for social impact, Revenue models for sustainability, Balancing financial and social objectives. Social Innovation and Ideation**;** Techniques for identifying social problems and needs, Ideation and brainstorming for innovative solutions, Human-cantered design and prototyping

Unit-3: Incubation and Acceleration of Social Ventures

The role of incubators and accelerators in supporting social entrepreneurs, Accessing resources: funding, mentorship, and networks, Developing a social enterprise toolkit: business planning, marketing, and legal considerations. Scaling Social Ventures; Strategies for scaling impact while maintaining mission integrity, Partnerships and collaborations for scale, Challenges and opportunities in scaling social enterprises

Unit-4: Ethics and Values in Social Entrepreneurship

Ethical dilemmas and decision-making in social entrepreneurship, Stakeholder engagement and community empowerment, Building a culture of transparency and accountability.

Commerce Core II (Minor)

Business Organization & Management (Semester-I)

Course Objectives

The course aims to acquaint learners with the basics of Business concepts and functions, forms of Business Organisation and functions of Management.

Course Outcomes

At the end of this course the learner will be able to;

Course Outcomes At the end of this course the learner will be able to;

- Distinguish and explain each form of business.
- Prepare draft of Article of Association & Memorandum of Association for a business;
- Explain principles and functions of management implemented in the organisation;
- Identify the managerial skills used in business;
- Analyse the concept of Delegation of Authority, coordination, and control.

Course Outlines

Unit 1: Concept and Forms of Business Organisations

Concepts of Business, Trade, Industry and Commerce- Objectives and functions of Business–Social Responsibility of a business, Ethical Conduct & Human Values. Forms of Business Organisation-Meaning, Characteristics, Advantages and Disadvantages of Sole Proprietorship – Meaning, Characteristics, Advantages and Disadvantages of Partnership - Kinds of Partners - Partnership Deed - Concept of Limited liability partnership – Meaning, Characteristics, Advantages and Disadvantages of Hindu Undivided Family – Meaning, Advantages and Disadvantages of Co-operative Organisation and Joint Stock Company.

Unit 2: Principles and Functions of Management

Management - Meaning - Characteristics - Fayol's 14 Principles of Management. Functions of Management; Planning, Organising, Staffing, Directing, Coordinating and Controlling; Levels of Management, Skills of Management, Scientific Management - meaning, objectives, relevance and criticism.

Unit 3: Leadership and Management

Distinction between leadership and management, Leadership theories (trait theory, behavioral theory, contingency theory), Management styles (autocratic, democratic, laissez-faire), Developing leadership skills competencies

Unit 4: Decision-Making Processes and Application

Types of decisions in organizations, Decision-making models (rational, bounded rationality, intuitive), Factors influencing decision-making, Ethical considerations in decision-making, Case studies and real-world examples, Application of management principles to practical scenarios.

Suggested Readings

- ✓ *Management Concepts and Organizational Behaviour" by K. Aswathappa - published by Himalaya Publishing House, Cuttack, Odisha.*
- ✓ *Business Organisation and Management" by M. C. Shukla and T. S. Grewal - published by Sultan Chand & Sons, Bhubaneswar, Odisha.*
- ✓ *Business Organization and Management" by K. C. Gupta - published by V K Publications, Bhubaneswar, Odisha.*
- ✓ *Essentials of Business Organisation and Management" by S. K. Bhatia - published by Kalyani Publishers, Cuttack, Odisha.*
- ✓ *Daft, R. L. (2015). Organization theory & design. Cengage Learning.*
- ✓ *Drucker, P. F. (2017). The effective executive: The definitive guide to getting the right things done. Harper Collins.*
- ✓ *Kotter, J. P. (2014). Leading change. Harvard Business Review Press.*
- ✓ *Mintzberg, H., Ahlstrand, B., &Lampel, J. (2019). Strategy safari: A guided tour through the wilds of strategic management. Routledge.*
- ✓ *Robbins, S. P., Coulter, M., &DeCenzo, D. A. (2017). Fundamentals of management. Pearson.*
- ✓ *Principles of Management , Neeru Vasisth, Taxman*

(A) Financial Literacy (Semester III)

Course Objectives

- Understand the importance of financial literacy and its impact on personal financial well-being.
- Develop foundational knowledge of key financial concepts and principles.
- Learn practical skills for budgeting, saving, and managing personal finances.
- Explore different investment options and strategies for building wealth.
- Understand the principles of credit management and debt repayment.
- Learn about retirement planning and long-term financial security.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Financial Concepts.
- Application of Financial Skills
- Effective Budgeting and Expense Management
- Sound Saving and Investment Strategies
- Responsible Credit Management
- Debt Management and Repayment Skills
- Retirement Planning Competence
- Awareness of Estate Planning and Insurance
- Informed Financial Decision Making
- Financial Confidence and Empowerment

Course Outlines

Unit-1: Introduction to Financial Literacy

Definition and importance of financial literacy, objectives, Impact of financial decisions on personal well-being. Financial Goal Setting; Setting SMART financial goals, Prioritizing financial goals based on needs and values, Developing a personal financial plan.

Unit-2: Budgeting and Expense Management

Basics of budgeting, Tracking income and expenses, Creating and managing a budget. Saving and Emergency Funds; Importance of saving, Strategies for building emergency funds, Savings accounts and other saving options.

Unit-3: Introduction to Investing

Basics of investing, Types of investment options (stocks, bonds, mutual funds, etc.), Risk and return. Investment Strategies; Diversification and asset allocation, Long-term vs. short-term investing, Understanding investment risk. Credit Management; Importance of good credit, Credit scores and reports, Managing credit cards and loans, Debt Management and Repayment; Understanding different types of debt, Strategies for debt repayment, Debt consolidation and refinancing options.

Unit-4: Evaluating financial products and services

Importance of insurance (life, health, property), Understanding insurance policies and coverage options. Financial Decision Making; Making informed financial decisions, Avoiding common financial pitfalls.

Suggested Readings

- ✓ *Avadhani, V. A. (2019). Investment Management. Mumbai: Himalaya Publishing House Pvt. Ltd.*
- ✓ *Hota P.K / Das S.K Financial Literacy and Banking, kalyani publishing house*
- ✓ *Chandra, P. (2012). Investment Game: How to Win. New Delhi: Tata McGraw Hill Education.*
- ✓ *Kothari, R. (2010). Financial Services in India-Concept and Application. New Delhi: Sage Publications India Pvt. Ltd.*
- ✓ *Milling, B. E. (2003). The Basics of Finance: Financial Tools for Non-Financial Managers. Indiana: universe Company.*
- ✓ *Mittra, S., Rai, S. K., Sahu, A. P., & Starn, H. J. (2015). Financial Planning. New Delhi: Sage Publications India Pvt. Ltd.*
- ✓ *Zokaityte, A. (2017). Financial Literacy Education. London: Palgrave Macmillan.*

(B) Fundamentals of Investment and Planning

Course Objectives

1. Understand the principles of investment analysis and portfolio management.
2. Learn about different investment vehicles and their characteristics.
3. Develop skills in assessing risk and return in investment decisions.
4. Understand the basics of financial planning, including retirement and estate planning.
5. Apply investment and planning techniques to real-life scenarios.
6. Develop critical thinking and analytical skills in evaluating investment opportunities and financial plans.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Investment Principles
- Knowledge of Investment Vehicles.
- Skills in Risk Assessment
- Understanding of Financial Planning
- Application of Investment Techniques
- Critical Thinking and Analytical Skills

Course Outlines

Unit-1: Introduction to Investment Planning and Avenues

Definition and scope of investment planning, Importance of investment planning, Overview of financial markets and investment instruments, Setting financial goals, Assessing financial status, Developing a financial plan, Monitoring and revising the financial plan. Investment Avenues; Stocks, Bonds, Mutual funds, Exchange-traded funds (ETFs), Real estate investment trusts (REITs)

Unit-2: Portfolio Management

Understanding risk and return trade-off, Measurement of risk: standard deviation, beta, Capital asset pricing model (CAPM), Modern portfolio theory (MPT), Asset allocation strategies, Diversification and portfolio construction, Portfolio rebalancing techniques, Performance evaluation and benchmarking

Unit-3: Alternative Investments and Retirement Planning

Commodities, Hedge funds, Private equity, Venture capital. Basics of retirement planning, Retirement savings vehicles: 401(k), IRA, Roth IRA, Estimating retirement needs, Social Security and pension plans, Beneficiary designations. Tax Planning; Basics of tax planning, Tax-efficient investment strategies, Tax implications of different investment avenues.

Unit-4: Case Studies and Practical Applications

Analysis of investment scenarios, Developing financial plans for hypothetical clients, Case studies on retirement and estate planning

Suggested Readings

- ✓ *Gupta Sashi/Joshi R. Fundamentals of Investment, kalyani publishing house.*
- ✓ *Indian Institute of Banking & Finance. (2017). Introduction to Financial Planning. New Delhi: Taxmann Publication.*

- ✓ *Pandit, A. (2014). The Only Financial Planning Book that You Will Ever Need. Mumbai: Network 18 Publications Ltd.*
- ✓ *Sinha, M. (2008). Financial Planning: A Ready Reckoner. New York: McGraw Hill Education.*
- ✓ *Halan, M. (2018). Let's Talk Money: You've Worked Hard for It, Now Make It Work for You. New York: HarperCollins Publishers.*
- ✓ *Tripathi, V. (2017). Fundamentals of Investment. New Delhi: Taxmann Publication.*

(A) Digital Marketing (Semester-V)

Course Objectives

The course aims to provide knowledge about the concepts, tools, techniques, and relevance of digital marketing in the present changing scenario. It also enables the learners to learn the application of digital marketing tools and acquaint about the ethical and legal aspects involved therein.

Course Outcomes

After completion of the course, learners will be able to:

- Identify and assess the impact of digital technology in transforming the business environment and also the customer journey;
- Explain the way marketers think, conceptualize, test continuously to optimize their product search on digital platforms;
- Illustrate the measurement of effectiveness of a digital marketing campaign;
- Demonstrate their skills in digital marketing tools such as SEO, Social media, and Blogging for engaging the digital generation;
- Explain the need for regulatory framework for digital marketing in India.

Course Outlines

Unit 1: Introduction

Concept, scope, and importance of digital marketing. Traditional marketing versus digital marketing. Challenges and opportunities for digital marketing. Digital penetration in the Indian market. Benefits to the customer; Digital marketing landscape: an overview.

Unit 2: Search Engine Optimization (SEO)

Concept of Search Engine, SEO, Organic SEO, On-Page SEO, Off-Page SEO, Keyword Search, Search Engine Marketing (SEM), Pay-Per-Click Advertising, CPM Model, Cost Per Click (CPC), AD Rank, Concept of Display , Advertising, Working with Google Ads.

Unit 3: Social Media Marketing and Online Digital Marketing

Fundamentals of Social Media Marketing, Content Strategy for Social Media Marketing, Word-of-Mouth, Working with Linked In, Twitter, You Tube, Facebook, Instagram. Mobile Marketing, Email Marketing, Content Marketing, Influencer Marketing, M-Commerce & E-Commerce, Case Study. Project- making. CRM.

Electronic Business Models, P-O-E-M Framework, Planning for Digital Marketing, SOSTAC Framework. Website Design – Website as Marketplace, Planning the Website Strategy, Social Media Tools in Digital Marketing. Case Study.

Unit 4: Ethical and Legal Issues of Digital Marketing

Analysing Digital Media Performance, New Technologies & Advancement in Digital Marketing, Legal & Ethical Issues in Digital Marketing, Privacy Digital Property and Legal Protection, Cyber Laws- Information Technology Act, 2000.Case studies.

Suggested Readings

- ✓ *Blanchard O. A. (2011). Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization. Indianapolis: Que Publishing.*
- ✓ *Charlesworth, A. (2018). Digital Marketing: A Practical Approach. Abingdon: Routledge.*
- ✓ *Frost, R. D., Fox, A., & Strauss, J. (2018). E- Marketing. Abingdon: Routledge.*
- ✓ *Gupta, S. (2018). Digital Marketing. Delhi: Tata McGraw Hill Education.*
- ✓ *Kapoor, N. (2018).Fundamentals of E-Marketing. Delhi: Pinnacle India.*
- ✓ *Kotler, P., Kartajaya, H., &Setiawan, I. (2017). Digital Marketing: 4.0 Moving from Traditional to Digital. New Jersey: John Wiley & Sons.*
- ✓ *Ryan, D., & Calvin, J. (2016).Understanding Digital Marketing: Marketing Strategies for engaging the Digital Generation. London: Kogan page. Oxford: Oxford University Press.*

(B) Insurance Theory and Practices

Course Outcomes

After completion of the course, learners will be able to:

- Understand the fundamental principles and concepts of insurance, including insurable interest, utmost good faith, and indemnity.
- Analyze the structure and dynamics of the insurance market, including regulatory frameworks and market trends.
- Evaluate different types of insurance products and services, including life insurance, property and casualty insurance, and health insurance.
- Apply underwriting principles and risk assessment techniques in the context of insurance policies.
- Demonstrate proficiency in claims handling and settlement procedures for various insurance types.
- Assess the role and significance of reinsurance in managing insurance risks.
- Integrate insurance into broader risk management strategies, including risk assessment and mitigation.
- Critically analyze insurance policies and contracts to identify coverage gaps and potential risks.
- Apply ethical considerations and professional standards in insurance practices and decision-making.
- Communicate effectively about insurance concepts, policies, and practices to diverse stakeholders.

Course Outlines

Unit-1: Introduction to Insurance

Definition and concept of insurance, Historical development of insurance, Types of insurance products and services. Principles of Insurance; Insurable interest, utmost good faith, indemnity, contribution, and subrogation Principle of proximate cause and principle of mitigation of loss, Principle of utmost good faith (Uberrimae-Fidei) and principle of indemnity. Insurance Market and Regulation; Structure of the insurance industry, Regulatory bodies and insurance laws, Market dynamics and trends.

Unit-2: Life Insurance and Health Insurance

Basic concepts and types of life insurance policies, Underwriting process and risk assessment, Claims management in life insurance, Overview of health insurance systems and models, Types of health insurance products, Regulatory aspects and healthcare reform

Unit-3: Property and Casualty Insurance and Reinsurance

Types of property and casualty insurance, Underwriting considerations for property and casualty risks, Claims handling and settlement procedures. Role and importance of reinsurance in the insurance industry, Types of reinsurance arrangements and structures, Reinsurance underwriting and claims handling

Unit-4: Risk Management and Insurance

Integration of insurance into risk management strategies, Risk assessment and mitigation techniques, Insurance as a tool for financial planning and protection

Suggested Readings

- ✓ *Mishra M Singh Jagroop, Indian Banking and Insurance System, kalyani publisher.*
- ✓ *Banking,RiskandInsuranceManagement Mohan Prakash, N.R. Vikas Publishing*
- ✓ *InsurancePrinciplesandPractice,22ndEdition Mishra M.N. & Mishra S.B. S. Chand Publishing*
- ✓ *Blanchard O. A. (2011). Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization. Indianapolis: Que Publishing.*
- ✓ *Charlesworth, A. (2018). Digital Marketing: A Practical Approach. Abingdon: Routledge.*
- ✓ *Frost, R. D., Fox, A., & Strauss, J. (2018). E- Marketing. Abingdon: Routledge.*
- ✓ *Gupta, S. (2018). Digital Marketing. Delhi: Tata McGraw Hill Education.*
- ✓ *Kapoor, N. (2018).Fundamentals of E-Marketing. Delhi: Pinnacle India.*
- ✓ *Kotler, P., Kartajaya, H., &Setiawan, I. (2017). Digital Marketing: 4.0 Moving from Traditional to Digital. New Jersey: John Wiley & Sons.*
- ✓ *Ryan, D., & Calvin, J. (2016).Understanding Digital Marketing: Marketing Strategies for engaging the Digital Generation. London: Kogan page. Oxford: Oxford University Press.*

(A) Marketing and Supply Chain Management (Semester-VII)

Course Objectives

The course aims to equip the learners with the basic knowledge of concepts, principles, tools, and techniques of marketing and to provide knowledge about various developments in marketing.

Course Outcomes

After completion of the course, learners will be able to:

- Understand the basic concepts of marketing, marketing philosophies and environmental conditions affecting marketing decisions of a firm;
- Explain the dynamics of consumer behaviour and process of market selection through STP stages;
- Analyze the process of value creation through marketing decisions involving product development;
- Elaborate the process of marketing decision making involving product pricing and its distribution;
- Develop product promotion process in marketing decisions of a firm and understand latest developments in marketing.

Course Outlines

Unit-1: Introduction

Marketing - Meaning, Nature, Scope and Importance; Core concepts of marketing; Service marketing; Marketing Philosophies; Marketing Environment; Marketing Mix. Micro environmental and Macro environmental factors.

Unit-2: Understanding Consumer Behaviour and Market Selection

Consumer Behaviour: Types; Stages in Consumer buying decision process; Factors influencing consumer buying decisions; STP. Market Segmentation-Levels and bases of segmenting consumer markets. Market Targeting-concept and criteria. Product Positioning – concept and bases; Product differentiation- concept and bases.

Unit-3: Marketing Mix Decision-Product

Product Decisions: Concept and classification; Levels of Product. Product-mix dimensions, strategies and types; Branding; Packaging and Labeling; New Product Development: Product life cycle – concept and marketing strategies.

Unit-4: Marketing Mix Decisions-Pricing and Distribution

Pricing Decisions: Objectives; Factors affecting the price of a product; Pricing methods; Pricing strategies; Ethical issues in pricing decisions. Distribution Decisions: Channels of distribution; Distribution strategies; Wholesaling and retailing; Emerging distribution trends.

Promotion Decisions and Developments in Marketing

Promotion Decisions: Communication process; Developments in Marketing: Relationship Marketing, Sustainable Marketing, Rural marketing, Social marketing and Digital marketing.

Suggested Readings

- ✓ *Bajaj K./ Kaur K. Principles of Marketing, kalyani publisher.*
- ✓ *Marketing Management, Pillai R.S.N. & Bagavathi S. Chand Publishing*
- ✓ *MarketingManagement,3rdEdition*
  Kumar Arun & Meenakshi N. Vikas Publishing
- ✓ *Armstrong, G., &Kotler, P. (2021). Marketing: An Introduction.PearsonEducation Limited.*
- ✓ *Kotler, P., Kartajaya, H., &Setiawan, I. (2021). Marketing 5.0:Technologyfor Humanity. JohnWiley & Sons.*
- ✓ *Peter,J.P.,&Donnelly,J.H.Jr.(2021).MarketingManagement:KnowledgeandSkills.McGraw-HillEducation.*
- ✓ *Schmitt, B. H. (2021). The Changing Face of Marketing: FromPandemictoPossibility.Routledge.*
- ✓ *Vargo, S. L., &Lusch, R. F. (2017). Service-Dominant Logic:Premises,Perspectives,Possibilities.CambridgeUniversityPress.*

(B)Treasury & Forex Management

Course Objectives

- Understand the role and functions of treasury management in organizations.
- Learn techniques for cash flow forecasting, cash management, and liquidity management.
- Gain proficiency in managing foreign exchange risk and exposure.
- Understand the structure and operation of international financial markets.
- Learn about financial derivatives and their use in managing foreign exchange risk.
- Develop skills in forex trading, hedging strategies, and speculation.
- Explore regulatory frameworks and compliance requirements in treasury and forex management.
- Apply treasury and forex management principles to real-world business scenarios.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Treasury Management Principles.
- Proficiency in Cash and Liquidity Management.
- Competence in Foreign Exchange Risk Management.
- Knowledge of International Financial Markets.
- Skills in Forex Trading and Hedging Strategies.
- Awareness of Regulatory Framework and Compliance.
- Application of Treasury and Forex Management Principles.
- Critical Thinking and Problem-Solving Abilities.

Course Outlines

Unit- 1: Introduction to Treasury Management

Role and functions of treasury management, Objectives and importance of treasury management in organizations, Structure and organization of treasury departments. Cash Management and Liquidity Management; Cash flow forecasting techniques, Cash pooling and cash concentration, Short-term investment strategies for liquidity management

Unit-2: Foreign Exchange Markets and Risk Management

Structure and operation of foreign exchange markets, Exchange rate determination: factors influencing exchange rates, Participants in the foreign exchange market. Foreign Exchange Risk Management; Types of foreign exchange exposure: transaction exposure, translation exposure, economic exposure, Techniques for managing foreign exchange risk: hedging, forward contracts, options, swaps

Unit-3: International Financial Markets

Overview of international financial markets: money market, capital market, forex market, Instruments traded in international financial markets: bonds, equities, currencies, commodities

Regulatory Framework and Compliance

Regulatory requirements for treasury and forex management, Compliance with international accounting standards (IAS) and regulatory guidelines, Corporate governance and risk management practices in treasury operations

Unit-4 Financial Derivatives in Forex Management and Hedging Strategies

Introduction to financial derivatives: futures, options, swaps, Use of derivatives in managing foreign exchange risk, Pricing and valuation of currency derivatives. Forex trading strategies: carry trade, arbitrage, speculation, Hedging strategies for managing currency risk: money market hedging, options hedging, cross-currency swaps

(A) Banking Theory and Practices (Semester- VIII)

Course Objectives

- Understand the role and functions of banks in the financial system.
- Learn about the structure and organization of the banking industry.
- Explore banking operations, including deposit-taking, lending, and investment activities.
- Understand banking regulations and compliance requirements.
- Gain knowledge of financial products and services offered by banks.
- Develop skills in risk management and credit assessment in banking.
- Analyze the impact of monetary policy and central banking on the banking sector.
- Explore emerging trends and challenges in banking, including digital banking and fin-tech innovations.

Course Outcomes

After completion of the course, learners will be able to:

- Understanding of Banking Functions.
- Knowledge of Banking Structure and Regulations.
- Proficiency in Banking Operations.
- Comprehension of Financial Products and Services.
- Skills in Risk Management.
- Understanding of Central Banking and Monetary Policy.
- Awareness of Emerging Trends in Banking.
- Critical Thinking and Research Skills.

Course Outlines

Unit-1: Introduction to Banking

Definition and functions of banks, Evolution of banking systems, Role of banks in the economy. Structure of the Banking Industry; Types of banks: commercial banks, central banks, investment banks, Banking regulations and regulatory agencies, Banking industry trends and challenges. Banking Operations; Deposit-taking: types of deposits, deposit products, Lending activities: types of loans, credit analysis, loan origination process, Investment activities: securities trading, asset management

Unit-2: Banking Regulations and Compliance

Regulatory framework for banks: Basel Accords, Dodd-Frank Act, Sarbanes-Oxley Act, Compliance requirements: anti-money laundering (AML), know your customer (KYC), Basel III regulations. Financial Products and Services; Retail banking products: savings accounts, checking accounts, mortgages, consumer loans, Corporate banking products: commercial loans, trade finance, cash management, Investment banking services: underwriting, mergers and acquisitions, advisory services

Unit-3: Risk Management in Banking

Types of risks in banking: credit risk, market risk, operational risk, Risk management

techniques: risk assessment, risk mitigation strategies, stress testing. Central Banking and Monetary Policy; Role of central banks in the banking system, Monetary policy tools and objectives, Impact of monetary policy on banks and financial markets.

Unit-4: Emerging Trends in Banking

Digital banking and online banking services, Fin-tech innovations and their impact on traditional banking, Regulatory challenges and opportunities in the digital era.

Suggested Readings

- ✓ *Rath J.P./Rout P.K. Indian Banking & Insurance System, kalyani publisher.*
- ✓ *Banking, Risk and Insurance Management Mohan Prakash, N.R. Vikas Publishing*
- ✓ *Banking Law and Practice Mishra Sukhvinder S. Chand Publishing*
- ✓ *Indian Institute of Banking & Finance. (2017). Introduction to Financial Planning. New Delhi: Taxmann Publication.*
- ✓ *Pandit, A. (2014). The Only Financial Planning Book that You Will Ever Need. Mumbai: Network 18 Publications Ltd.*
- ✓ *Sinha, M. (2008). Financial Planning: A Ready Reckoner. New York: McGraw Hill Education.*
- ✓ *Halan, M. (2018). Let's Talk Money: You've Worked Hard for It, Now Make It Work for You. New York: Harper Collins Publishers.*
- ✓ *Tripathi, V. (2017). Fundamentals of Investment. New Delhi: Taxmann Publication*

(B) Securities Market Operations

Course Objectives
The course aims to equip learners with the basic skills required to operate in the stock market. They can learn the trading mechanism of the stock exchanges.

Course Outcomes

After completion of the course, learners will be able to:

- Explain the basics of investing in the stock market, the investment environment as well as risk & return
- Analyze Indian securities market including the derivatives market;
- Examine EIC framework and conduct fundamental analysis;
- Perform technical analysis;
- Invest in the mutual funds market.

Course Outlines

Unit 1: Basics of Investing
Basics of Investment & Investment Environment. Risk and Return, Avenues of Investment - Equity shares, Preference shares, Bonds & Debentures, Insurance Schemes, Mutual Funds, Index Funds. Indian Security Markets - Primary Market, Secondary Market and Derivative Market. Responsible Investment.

Unit 2: Fundamental Analysis
Top down and bottom up approaches, Analysis of international & domestic economic scenario, Industry analysis, Company analysis (Quality of management, financial analysis: Both Annual and Quarterly, Income statement analysis, position statement analysis including key financial ratios, Cash flow statement analysis, Industry market ratios: PE, PEG, Price over sales, Price over book value, EVA), Understanding Shareholding pattern of the company.

Unit 3: Technical Analysis
Trading rules (credit balance theory, confidence index, filter rules, market breadth, advances vs declines and charting (use of historic prices, simple moving average and MACD) basic and advanced interactive charts. Do's &Don't s of investing in markets.

Unit 4: Indian Stock Market
Market Participants: Stock Broker, Investor, Depositories, Clearing House, Stock Exchanges. Role of stock exchange, Stock exchanges in India- BSE, NSE and MCX. Security Market Indices: Nifty, Sensex and Sectoral indices, Sources of financial information. Trading in securities: Demat trading, types of orders, using brokerage and analyst recommendations.

Mutual Funds
Concept and background on Mutual Funds: Advantages, Disadvantages of investing in Mutual Funds, Types of Mutual funds- Open ended, close ended, equity, debt, hybrid, index funds and money market funds. Factors affecting choice of mutual funds. CRISIL mutual fund ranking and its usage, calculation and use of Net Asset Value.

Suggested Readings

- ✓ *Chandra,P. Investment Analysis and Portfolio Management. New Delhi: Tata McGraw Hill Education.*
- ✓ *Kevin, S. Security Analysis and Portfolio Management. Delhi: PHI Learning.*
- ✓ *Ranganatham, M., &Madhumathi, R. Security Analysis and Portfolio Management. Pearson (India) Education.*
- ✓ *Pandian, P. Security Analysis and Portfolio Management. New Delhi: Vikas Publishing House.*

Commerce Core III (Minor)

Business Statistics and Data Interpretation (Semester-II)

Course Objectives
The course aims to develop amongst the learners the ability to summarise, analyse and interpret quantitative information for business decision making

Course Outcomes
After completion of the course, learners will be able to:

- ✓ Examine and understand the various descriptive properties of statistical data;
- ✓ Evaluate probability rules and concepts relating to discrete and continuous random variables to answer questions within a business context;
- ✓ Analyse the underlying relationships between the variables to use simple regression models;
- ✓ Analyse the trends and tendencies over a period of time through time series analysis;
- ✓ Examine and apply index numbers to real life situations.

Course Outlines
Unit 1: Descriptive Statistics
Measures of Central Tendency: Concept and properties of averages including Arithmetic mean, Median and Mode. Measures of Dispersion: An overview of Range, Quartile Deviation and Mean Deviation; Standard deviation; Variance and Coefficient of variation. Moments: Computation and significance; Skewness; Kurtosis.
Use Microsoft Excel for data analysis and interpretation

Unit 2: Probability and Probability Distributions
Theory and approaches to probability; Probability Theorems: Addition and Multiplication; Conditional probability and Bayes' Theorem. Expectation and variance of a random variable. Discrete Probability distributions: Binomial and Poisson (Properties and Applications). Normal distribution: Properties of Normal curve; Computation of Probabilities and Applications.
Use Microsoft Excel for data analysis and interpretation

Unit 3: Simple Correlation and Regression Analysis
Correlation Analysis: Meaning and types of Correlation; Correlation Vs Causation; Pearson's coefficient of correlation (computation and properties); Probable and standard errors; Rank correlation.
Regression Analysis: Principle of least squares and regression lines; Regression equations and estimation; Properties of regression coefficients; Relationship between Correlation and Regression coefficients; Standard Error of Estimate.
Use Microsoft Excel for data analysis and interpretation

Unit 4: Time Series Analysis and Index Numbers
Time Series Data; Components of time series; Additive and Multiplicative models. Trend analysis; Fitting of trend using principle of least squares – linear and second-degree parabola. Shifting of Origin and Conversion of annual linear trend equation to quarterly/monthly basis and vice-versa.
Meaning and uses of index numbers. Construction of Index numbers: Methods of Laspeyres,

Paasche and Fisher's Ideal index.

Use Microsoft Excel for data analysis and interpretation

Suggested Readings

- ✓ *Anderson, D. R. (2019).Statistics for learners of Economics and Business. Boston, United States: Cengage Learning.*
- ✓ *"Statistics for Management" by Richard I. Levin and David S. Rubin - published by Kalyani Publishers, Cuttack, Odisha.*
- ✓ *Douglas A. Lind, Robert D. Mason, William G. Marchal. (2022).*
- ✓ *Basic Statistics for Business and Economics. New York, United States: Mc-Graw-Hill International editions.*
- ✓ *Gupta, S. C., & Gupta, I. (2018).Business Statistics. Mumbai, India: Himalaya Publishing House.*
- ✓ *Gupta, S. P., & Gupta, A. (2018). Business Statistics: Statistical Methods.*

Business Regulatory Framework (Semester IV)

Course Objectives

- Inculcate among the students the basic principles of law connected with business transactions.
- To enable students to apply the law while entering into contracts
- To provide a basic idea of the law relating to partnership and sale of goods
- To provide an outline of the fundamentals of Company Law
- To convey the core ideas of Intellectual Property Rights

Course Outcomes

After completion of the course, learners will be able to:

- CO1: Know the basics of the laws related to contracts
- CO2: Demonstrate an understanding of the legal environment of business
- CO3: Apply basic knowledge to business transactions and formation of contracts
- CO4: Understand and evaluate the law applicable to companies
- CO5: Understand and apply the basic principles of IPR

Course Outlines

UNIT I: Indian Contract ACT,1872

Nature of contract and its essentials, Void, valid and voidable contracts, Consent, consideration and its' impact on contract, Agreements in restraint of trade, Performance, breach, revocation and termination of contract, Agency and bailment contracts, Contract of Indemnity, Contract of Guarantee and Pledge.

UNIT II: Sale of Goods Act,1930

Nature of sale, conditions and warranties, Performance of contract of sale and right of unpaid seller. Bailment and Pledge.

UNIT III: Competition Act, 2002 and Consumer Protection Act, 2019 Competition Act,2002: Objectives and basic concepts, Consumer, goods, service, Prohibition of anti-competitive agreements, Prohibition of Abuse of Dominant Position; Consumer Protection Act, 2019: Important definitions, Consumer Disputes Redressal Commission, Measures to Prevent Unfair Trade Practices, Offences and Penalties

UNIT IV: The Limited Liability Partnership Act, 2008 &Intellectual Property Rights

Limited liability partnership, need, scope and advantages; Incorporation of LLP, Partners and their relations, financial disclosures, conversions, winding up and dissolution, difference between Limited Liability Partnership and other forms of organization. IPR ecosystem, Institutional Support System, Regulatory aspects of innovation, IPR and Start-ups. The concept of Intellectual Property Law, Patent, Copyright, Trademarks etc.

Suggested Readings

- ✓ *Garg K.C. / Business Law (Hons.), kalyani publisher.*
- ✓ *Bose, D. C. (2008). Business Law. New Delhi: PHI Limited.*
- ✓ *Business Laws: Semester I: (NEP 2020 for the University of Delhi) Kuchhal M.C. & Kuchhal Vivek Vikas Publishing*
- ✓ *Business Laws for B.Com. (Hons.) Tulsian P.C. & Tulsian Bharat S. Chand Publishing*
- ✓ *Chopra, R. K. (2015). Business Laws. New Delhi: Himalaya Publishing House.*
- ✓ *Kuchhal, M. C., &Kuchhal, V. (2018). Business Laws. New Delhi: Vikas Publishing.*
- ✓ *Singh, A. (2009). Business Law. Delhi: Eastern Book Company*
- ✓ *Chadha R., &Chadha, S. (2018). Company Laws. Delhi: Scholar Tech Press.*
- ✓ *Hicks, A., & Goo, S. H. (2017). Cases and Material on Company Law. Oxford: Oxford University Press. Kuchhal, M. C., &Kuchhal, A. (2020).Corporate Laws. New Delhi: Shree Mahavir Book Depot.*
- ✓ *Intellectual Property Rights –Law & Practice, ICSI Materials*

Human Resource Management (Semester VI)

Course Objectives
To acquaint the learners with the techniques and principles to manage human resources of an organisation.

Course Outcomes
After completion of the course, learners will be able to:

- Develop necessary skills to prepare an HR policy to enable the employees attain work life balance;
- Prepare a Human Resource Plan in an organisation, a report on job analysis; and Organize an induction programme in an organisation;
- Develop an understanding and use of different kinds of training and development strategies in real life scenarios; and Organize counselling sessions for employees in an organisation;
- Design incentive schemes for different job roles in an organisation;
- Create HR policies related to grievance redressal, employee health, safety, welfare, and their social security in an organisation.

Unit 1: Introduction to Human Resource

Management Concept and functions; Role, status and competencies of HR manager; HR policies; Evolution of HRM; Emerging challenges of human resource management - Workforce diversity, empowerment, downsizing, VRS, work life balance.

Unit 2: Recruitment and Selection

Human resource planning- Quantitative and qualitative dimensions; Job analysis – Job description and job specification; Recruitment – concept and sources; Selection – concept and process; Test and interview; Placement, induction and socialization; Retention.

Unit 3: HR Development- Training and Development

Concept and importance; Training and development methods – Apprenticeship, understudy, job rotation, vestibule training, case study, role playing, sensitivity training, In-basket, management games, conferences and seminars, coaching and mentoring, management development programmes; Training process outsourcing.

Unit 4: Performance Appraisal and Compensation Management
Performance appraisal, Methods of performance appraisal; Potential appraisal; Employee counselling; Job changes - Transfers and promotions. Compensation - Concept and policies, Base and supplementary compensation; Individual, group and organisation incentive plans; Fringe benefits; Pay band compensation system; Job evaluation. Emerging Horizons of HRM Collective Bargaining - Workers Participation in Management, Employee welfare; Employee code of conduct. Grievance handling and redressal; Industrial disputes: Causes and settlement machinery; e-HRM; Human Resource Information System (HRIS).

Suggested Readings

- ✓ *Sharma / Gupta Human Resource Management, kalyani publisher.*
- ✓ *Human Resource Management, 2e, Khanka S.S. S. Chand Publishing*
- ✓ *Human Resource Management, 2nd Edition , Seema Sanghi Vikas Publishing*
- ✓ *Satrapi, K. (2007). Human Resource Management. New Delhi: Tata McGraw-Hill.*
- ✓ *Gupta, C. B. (2018). Human Resource Management. Delhi: Sultan Chand & Sons.*
- ✓ *Decenzo, D. A., & Robbins, S. P. (2009). Fundamentals of Human Resource Management. New Jersey: Wiley.*
- ✓ *Dessler, G., &Varkkey, B. (2011). Human Resource Management. New Delhi: Pearson Education.*
- ✓ *Mondy, A. W., & Noe, R. M. (1999). Human Resource Management. London: Pearson.*
- ✓ *French, W. L. (1994). Human Resource Management. Boston: Houghton Mifflin.*
- ✓ *Rao, V. S. P. (2002). Human Resource Management: Text and Cases. Delhi: Excel Books.*

Model Curriculum for Three/Four Year Degree Course (With Multiple Entry /Exit Option)

Based on NEP-2020

Economics

Odisha State Higher Education Council, Bhubaneswar
Government of Odisha

Semester	Name of the Papers
I	1. Basic Economics I
	2. Indian Economy I
II	3. Basic Economics II
	4. Indian Economy II
III	5. Microeconomics I
	6. Macroeconomics I
	7. Mathematical Methods for Economics I
IV	8. Microeconomics II
	9. Macroeconomics II
	10. Statistical Methods for Economics
V	11. Development Economics I
	12. Mathematical Methods for Economics II
	13. History of Economic Thought Or Money and Banking Or Economy of Odisha
VI	14. Introductory Econometrics Or Public Economics I Or Development Economics II
	15. Computational Methods in Economics Or Environmental Economics Or International Economics
VII (With Research)	16. Quantitative Methods
	17. Research Methodology
	18. Basic Econometrics
(Without Research)	16. Quantitative Methods
	17. Research Methodology
	18. Basic Econometrics
	19.Economics of Growth and Development
VIII (With Research)	20.Microeconomics III
	21.Macroeconomics III
	Dissertation
VIII (Without Research)	20.Microeconomics III
	21.Macroeconomics III
	22.Public Economics II
	23.Economics of Social Sector

BA Economics Programme Outcomes

On successful completion of the programme, a student will

- Gain an ability to understand economic theories and the functioning of basic microeconomic and macroeconomic systems.
- Be able to apply knowledge and skill in the field of Economics, research, statistics, and mathematics and will be able to have employability in these areas.
- Be ready for work in the Economic world like banking, industries, education, etc.
- Be poised to go for higher studies and engage in research in the field.

Core-I

1.

SEMESTER I
Basic Economics I

Course Description

This course is designed to expose the students to the basic principles of how the economy works at the microeconomic level with some basic concepts like markets, and consumer choice. in macroeconomics. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations. This course also discusses the preliminary macroeconomic concepts associated with the determination and measurement of aggregate macroeconomic variables like savings, investment, and GDP.

Course Outcomes (COs)

1. To expose the students to the introductory micro and macro-economic concepts.
2. To explain how to think like an economist and illustrate how microeconomic concepts can be applied to analyses of real-life situations.
3. To introduce preliminary macroeconomic concepts associated with the determination and measurement of aggregate macroeconomic variables like savings, investment, and GDP.
4. To examine the circular flow of income and expenditure in a 2, 3, and 4-sector economy.

Unit I: Exploring the Subject Matter of Economics, Markets and Welfare

The Ten Principles of Economics: How people make decisions; Working of the economy as a whole; Thinking Like an Economist: The Economist as Scientist – The scientific method: Observation, Theory and more observation; Role of Assumptions; Economic Models; Why economists disagree; Graphs in Economics; The Market Forces; Markets and Competition; The Demand and Supply curves – Market vs Individual curves, Shifts in Demand and Supply Curves; Market Equilibrium and changes therein; Price Elasticity of Demand – determinants and computation; Income and Cross Elasticity of Demand; The Price Elasticity of Supply – determinants and computation; Consumer and Producer Surplus.

LO: Upon completion of this module, students will get a basic idea about the basic underlying principles followed in economics and get a formative perspective to concepts of elasticity of demand and supply.

Unit II: Theory of Consumer Choice

The Budget Constraint; Preferences – representing preferences with indifference curves; Properties of Indifference Curves; Two extreme examples of indifference curves; Optimization – Equilibrium; Change in equilibrium due to changes in income, changes in price; Income and Substitution Effect; Derivation of Demand Curve; Three applications – Demand for Giffen goods, Wages and Labour Supply, Interest rate and Household saving.

LO: Upon completion of this module, the students can understand the problem of choice and decision-making by consumers and have a vivid understanding of optimization and equilibrium.

Unit III: Basic Concepts in Macroeconomics

Macro vs. Micro Economics; Limitations of Macroeconomics; Stock and Flow variables, Equilibrium and Disequilibrium, Partial, and General Equilibrium Statics – Comparative Statics and Dynamics; National Income Concepts – GDP, GNP, NDP, and NNP at market price, factor cost, real and nominal; Disposable Personal Income.

LO: Upon completion of this module, the students will be introduced to concepts of macroeconomic variables and the basic concept of National Income Accounting.

Unit IV: Measurement of Macroeconomic Variables

Output, Income and Expenditure Approaches; Difficulties of Estimating National Income; National Income Identities in a simple 2-sector economy and with government and foreign trade sectors; Circular Flows of Income in 2, 3 and 4-sector economies; National Income and Economic Welfare; Green Accounting.

LO: Upon completion of this module, the students will be familiarized with the estimation of National Income and understand the circular flow of income and expenditures in a closed and open economy.

Text Book:

- ✓ *Gregory N Mankiw: Principles of Economics, 6th Edition, Cengage Learning India Private Limited, New Delhi*
- ✓ *Gregory N. Mankiw (2010): Macroeconomics, 7th edition, Cengage Learning India Private Limited, New Delhi*
- ✓ *Government of India (2012): National Accounts Statistics Sources and Methods, CSO, MOSPI*

Reference Book:

- ✓ *Karl E. Case and Ray C. Fair (2007): Principles of Economics, 8th Edition, Pearson Education Inc.*
- ✓ *Richard T. Froyen (2005): Macroeconomics, 2nd Edition, Pearson Education Asia, New Delhi.*

Core I 2. Indian Economy I

Course Description

Using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in India in the post-independence period, with particular emphasis on paradigm shifts and turning points. Given the rapid changes taking place in India, the reading list should be updated annually.

Course Outcomes

1. To have an understanding of the evolution of the Indian economy from pre-colonial to modern times, and its current state as a developing economy.
2. To be able to explain the relationship between population growth, human development, and economic development in India.
3. To be able to assess the national income trends in India, including sectoral composition, regional disparities, and challenges like poverty, inequality, and unemployment.
4. To gain the ability to critically analyze the role of economic planning in India's development, including the evolution from Five-Year Plans to NITI Aayog.

Unit I: Basic Characteristics of Indian Economy as a Developing Economy

Indian Economy in the Pre-British Period; The Structure and Organization of Villages and Towns; Industries and Handicrafts in Pre-British India; Colonialism; Economic Consequences of British Rule; Decline of Handicrafts and Progressive Ruralization; The Land System and Commercialization of Agriculture; Industrial Transition; Colonial Exploitation and Impacts – Underdevelopment; Colonization and Modernization; State Policies and Economic Underdevelopment; The Current State of Indian Economy

LO: This module shall enable the students to gain an in-depth understanding of the pre-British Indian economy, including its structure, industries, colonial impacts, and modernization, and evaluate state policies and current economic conditions.

Unit II: Population and Human Development

Population Growth and Economic Development – size, growth and Future of Population; Causes of rapid Population Growth; Population and Economic Development; Population Policy; Demographic Issues– Sex and Age Composition of Population; Demographic Dividend; Urbanization and Migration; Human Resource Development – Indicators and importance of Human Resource Development; Education policy; Health and nutrition.

LO: Upon completion of this module, students will analyze the population trends and policies in India, understand their impact on economic development, and evaluate the importance of human development (education, health) for India's future.

Unit III: National Income in India: The Growth Story and Current Challenges

Trends in national and per capita income; Changes in sectoral composition of national income; Regional disparities in Growth and Income; Savings and Investment and Economic Growth – The Linkage; Poverty – Estimation and Trends, Poverty Alleviation Programs– MGNREGA, NRLM, SJSRY; Inequality –Measures and trends in India; Unemployment– Nature, Estimates, Trends, Causes and Employment Policy.

LO: Upon completion of this module, students will have an understanding of national income trends, sectoral contributions, regional inequalities, and challenges that India faces like poverty, inequality, and unemployment.

Unit IV: Economic Planning in India

Rationale, Features, Objectives, Strategies, Achievements and Assessment of Planning in India; Eleventh Five Year Plan– Objectives, Targets and Achievements; Twelfth Five Year Plan – Visionand Strategy; From Planning to NITI– Transforming India's Development Agenda.

LO: Upon completion of this module, students will be able to appreciate the rationale and features of economic planning in India, its objectives and strategies, evaluate its achievements, and describe the transition to NITI Aayog.

Text Book:

- ✓ *Misra, S. K. and Puri V. K. Indian Economy — Its Development Experience. HimalayaPublishing House, Mumbai*

Reference Books:

- ✓ *Dutt R. and Sundharam K. P. M: Indian Economy. S. Chand & Company Ltd., New Delhi.*
- ✓ *Datt and Sundharam, Gaurav Datt and Ashwani Mahajan, S Chand: Indian Economy, Publications, 7th Revised Edition*
- ✓ *Indian Economy Since Independence, ed by Uma Kapila, Academic Foundation, Revised Nineteenth Edition 2008-09*
- ✓ *Government of India (Current Year): Economic Survey, Ministry of Finance, New Delhi*
- ✓ *Basu, K. (2008): Oxford Companion to Economics in India, Oxford University Press*

SEMESTER II

Core I **3. Basic Economics II**

Course Description

This course is designed to expose the students to the basic principles of how the economy works at the microeconomic level with some basic concepts like production, firms and input markets. This course also aims to introduce the students to the basic macroeconomic concepts of money, inflation, and the theories of determination of income and employment in the aggregate economy.

Course Outcomes

- ✓ *To have a clear idea about the principles that govern the economy's running at the micro and macro levels.*
- ✓ *To understand about the working of the input market.*
- ✓ *To gain clarity about dynamic concepts of Inflation, Employment, money, and income.*
- ✓ *To understand of the theories of determination of income and employment in the aggregate economy.*

Unit I: The Firm and Market Structures

Cost concepts; Production and Costs; The various measures of cost – Fixed and Variable cost, Average and Marginal cost; Cost curves and their shapes; Costs in the short run and the long run; Economies and diseconomies of scale. Firms in Competitive Markets – What is a competitive market; Profit maximization and the competitive firm‘s supply curve; The marginal cost curve and the firm‘s supply decision; Firm‘s short-run decision to shut down; Firm‘s long-run decision to exit or enter a market; The supply curve in a competitive market – short run and long run

LO: Upon completion of this module, the students will have a clear understanding of the traditional theory of cost and different cost concepts, and be able to distinguish between short-run and long-run costs, and relate them to a firm's decision-making under competitive markets.

Unit II: The Input Markets

The Demand for Labour – The production function and the marginal product of labour; Value of the marginal product of labour and demand for labour; Shifts in labour demand curve; The supply of labour – the trade-off between work and leisure; Shifts in the labour supply curve; Equilibrium in the Labour Market; Other factors of production: Land and Capital; Linkages among factors of production

LO: Upon completion of this module, the students will get an insight into the analysis of demand and supply of inputs and the linkages among the factors of production.

Unit III: Money and Changes in its Value

Evolution and Functions of Money, Quantity Theory of Money – Cash Transactions, Cash Balances and Keynesian Approaches, Value of Money and Index Number of Prices

Inflation – Meaning, Causes, and Anti-Inflationary Measures; Classical, Keynesian, Monetarist and Modern Theories of Inflation, Inflationary Gap, Deflation- Meaning, Causes, and Anti-Deflationary Measurers, Depression and Stagflation; Inflation vs. Deflation

LO: Upon completion of this module, the students shall understand the evolution of money and the classical theories of money supply and be able to explain the causes of inflation and deflation in an economy and the impact and solution thereto.

Unit IV: Determination of National Income

The Classical Approach - Say's Law, Theory of Determination of Income and Employment with and without saving and Investment; Basics of Aggregate Demand and Aggregate Supply and Consumption- Saving – Investment Functions, The Keynesian Approach – Basics of Aggregate Demand and Aggregate Supply and Consumption, Saving, Investment Functions; The Principle of Effective Demand; Income Determination in a Simple 2-Sector Model; Changes in Aggregate Demand and Income- The Simple Investment Multiplier

LO: Upon completion of this module, the students shall get to know the classical and Keynesian theories of income and employment determination.

Text Book:

- ✓ Gregory N Mankiw: *Principles of Economics*, 6th Edition, Cengage Learning India Private Limited, New Delhi
- ✓ Gregory N. Mankiw (2010): *Macroeconomics*, 7th edition, Cengage Learning India Private Limited, New Delhi
- ✓ Government of India (2012): *National Accounts Statistics Sources and Methods*, CSO, MOSPI

Reference Book:

- ✓ *Karl E. Case and Ray C. Fair (2007): Principles of Economics, 8th Edition, Pearson Education Inc.*
- ✓ *Richard T. Froyen (2005): Macroeconomics, 2nd Edition, Pearson Education Asia, New Delhi.*

Core I **4. Indian Economy II**

Course Description

This course examines sector-specific policies and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence. Given the rapid changes taking place in the country, the reading list should be updated annually.

Course Outcomes

- To analyze the current state of Indian agriculture, including production trends, factors influencing production, and policy initiatives like land reforms and the green revolution.
- To evaluate the development of Indian industries, including historical industrial policies, challenges faced by small-scale industries, and the role of labor.
- To assess the contribution of the tertiary sector to the Indian economy, and understand the concept of Human Resource Development (HRD) and its role in India's development.
- To explain India's foreign trade scenario, including trade composition, export promotion strategies, and the role of foreign capital.
- To analyze the environmental policies implemented in India and the global response to climate change, considering India's specific situation.

Unit I: Agricultural Development in India

Indian Agriculture: nature, importance, trends in agricultural production and productivity, factors determining production, land reforms, new agricultural strategies and green revolution, rural credit; Agricultural marketing and warehousing.

LO: Students will be able to analyze the structure, challenges, and advancements in Indian agriculture, including policies, credit, and marketing.

Unit II: Industrial Development in India

Trends in industrial output and productivity; Industrial Policies of 1948, 1956, 1977, and 1991; Industrial Licensing Policies – MRTP Act, FERA, and FEMA; Growth and problems of SSIs, Industrial sickness; Industrial finance; Industrial labor.

LO: Students will know about industrial output and productivity trends, industrial policies, the impact of licensing policies, small-scale industries' growth, industrial finance, and labor issues in India.

Unit III: Tertiary Sector, HRD, and the External Sector

Tertiary Sector: growth and contribution of the service sector to GDP of India, share of services in employment; Human development – concept, evolution, measurement; HRD: indication, importance, education in India, Indian educational policy; Health and Nutrition. Foreign Trade: role, composition, and direction of India‘s foreign trade, trends of export and import in India, export promotion versus import substitution; Balance of Payments of India; India‘s Trade Policies; Foreign Capital – FDI, Aid and MNCs.

LO: Students will have an understanding of the growth of India's service sector, human development strategies (education & health), and international trade dynamics (exports, imports, foreign investment)

Unit IV: Indian Economy and Environment

Environmental Policies in India: The Environment (Protection) Act 1986, The Environment (Protection) Rules 1986, The National Forest Policy 1988, Policy statement for Abatement of

Pollution 1992, National Conservation Strategy and Policy Statement on Environment and Development 1992, The National Environment Appellate Authority Act 1997, National Environmental Policy 2006; Global deal with Climate Change: Introduction, Intergovernmental Panel for Climate Change (IPCC), Impact of Climate Change on India, Global Response on Climate Change, Possible Role of India.

LO: Students will be able to analyze key environmental policies in India, the global deal on climate change, IPCC's role, climate change impacts, and global responses to India's role.

Text Book:

- ✓ *Mishra, S. K. and Puri V. K. Indian Economy — Its Development Experience. HimalayaPublishing House, Mumbai*

Reference Books:

- ✓ *Dutt R. and Sundharam K. P. M.: Indian Economy. S. Chand & Company Ltd., New Delhi.*
- ✓ *Datt and Sundharam, Gaurav Datt and Ashwani Mahajann: Indian Economy, S Chand Publications, 7th Revised Edition*
- ✓ *Indian Economy Since Independence, ed by Uma Kapila, Academic Foundation, RevisedNineteenth Edition 2008-09*
- ✓ *Government of India (Current Year): Economic Survey, Ministry of Finance, New Delhi*

SEMESTER III

Core I **5. Microeconomics I**

Course Description

The course is designed to provide sound training in microeconomic theory to formally analyze the behavior of individual agents. Since students are already familiar with the quantitative techniques in the previous semesters, mathematical tools are used to facilitate understanding of the basic concepts; this course looks at the behavior of the consumer and the producer and also covers the behavior of a competitive firm.

Course Outcomes:

- To develop an understanding of preferences and consumer choice and formally analyze the behavior of individual agents
- To be able to use mathematical tools to facilitate understanding of the basic concepts of Economics.
- To understand the behavior of the consumer and the producer.
- To understand the behavior of a competitive firm.

Unit I: Consumer Theory I

Preferences and Utility, Axioms of Rational Choice, Utility, Trades and Substitutions, Indifference curves; Mathematics of Indifference curves, Utility functions for specific preferences, the many good cases; Utility Maximization and choice: the 2-good case (graphical analysis), the n-good case, Indirect utility function, the Lump sum principle, Expenditure minimization, properties of the expenditure function

LO: This module will enable the students to understand the basic concepts in consumer behavior like utility, choice, optimization, and Indifference curves using mathematical tools; and differentiate between direct and indirect utility, and explain expenditure function and its properties.

Unit II: Consumer Theory II

The Income and Substitution Effects: Demand function, changes in income, changes in goods price- Direct and Indirect Approaches (Slutsky), the Individual‘s Demand Curve, Compensated (Hicksian) demand curves and functions, demand elasticity, Consumer Surplus, Demand relationships among goods, the 2-good case, substitutes and complements, Net (Hicksian) substitutes, and Complements, Substitutability with many goods

LO: This module will enable the students to analyze the effects of changes in income and prices on demand; differentiate between Ordinary and compensated demand; explain the concepts of price and income elasticities, and substitutability between goods; and understand the concept of Consumer Surplus

Unit III: Production Theory and Costs

Production Functions: Marginal productivity, Production with One Variable Input (labour) and with Two-Variable Inputs, Isoquant Maps and the Rate of Technical Substitution, Returns to Scale, Elasticity of Substitution, Some Simple Production Functions: Linear, Fixed Proportions; Technical Progress. Definition of Cost and its properties, Cost minimizing input choices (Optimization principles, Expansion Path), Cost Functions and Shift in Cost Curves, Long-Run versus Short-Run Cost Curves

LO: This module will enable the students to understand concepts like production function in the short run and the long run, isoquants, and substitution between inputs; and explain concepts of cost, and optimization in the short run and long run

Unit IV: Profit Maximization

The Nature and Behaviour of Firms, Marginal Revenue – Relationship between Average and marginal revenue, Short-Run Supply by a Price-Taking Firm, Profit Functions and its Properties, Profit maximization – General conditions, Input demands

LO: This module will enable the students to understand the behavior of the competitive firm and concepts like average and marginal revenue; and learn the conditions for profit maximization, properties of profit function

Text Book:

- ✓ *C. Snyder and W. Nicholson (2012): Microeconomic Theory: Basic Principles and Extensions, 11th Edition, Cengage Learning, Delhi, India*

Reference Books:

- ✓ *H. R. Varian (2010): Intermediate Microeconomics: A Modern Approach, 8th Edition,W.W. Norton and Company/Affiliated East-West Press (India). The workbook by Varian and Bergstrom may be used for problems*

Core I **6. Macroeconomics I**

Course Description
This course introduces the students to formal modelling of a macro-economy in terms of analytical tools. It discusses various alternative theories of output and employment determination in a closed economy in the short run as well as long run, and the role of policies in this context.

Course Outcomes:

- To understand the basics of consumption function and its relation with income, and factors influencing consumption function.
- To get a knowledge about various types of investment spending and evaluate the impact of investment through multiplier and accelerator in economies.
- Discuss the various approaches to demand and supply of money.
- Analyse and interpret the IS-LM model as a step toward understanding economic fluctuations.

Unit I: Consumption
Consumption – Income Relationship, Propensities to Consume and the Fundamental Psychological Law of Consumption; Implications of Keynesian Consumption Function; Factors Influencing Consumption Function; Measures to Raise Consumption Function; Absolute, Relative, Permanent, and Life-cycle hypothesis

LO: This module shall enable the students to find out how consumption is affected by income and other factors.

Unit II: Investment
Autonomous and Induced Investment, Residential and Inventory Investment, Determinants of Business Fixed Investment, Decision to Invest and MEC, Accelerator and MEI, Theories of Investment: The Accelerator and Tobin‘s theory

LO: Students will gain an understanding of different forms of investment spending and theories of investment

Unit III: Demand for and Supply of Money
Demand for Money – Classical, Neoclassical, and Keynesian Approaches, The Keynesian Liquidity Trap and its Implications, Supply of Money – Classical and Keynesian Approaches, The Theory of Money Supply Determination and Money Multiplier, Measures of Money Supply in India, RBI approach to money supply, Determination and Money multiplier. High-powered money and money multiplier

LO: Students will be able to understand the workings of money in an economy.

Unit IV: Aggregate Demand and Aggregate Supply
Derivation of Aggregate Demand and Aggregate Supply Curves in the IS-LM Framework; Nature and Shape of IS and LM curves; Interaction of IS and LM curves and Determination of Employment, Output, Prices and Investment; Changes in IS and LM curves and their Implications for Equilibrium

LO: This module shall help to gain knowledge about the way the goods market and money market serve as a basis for the determination of employment, output, price, and investment.

Text Readings:

- ✓ *N. Gregory Mankiw (2010): Macroeconomics, 7th edition, Cengage Learning India Private Limited, New Delhi.*
- ✓ *Richard T. Froyen (2005): Macroeconomics, 2nd Edition, Pearson Education Asia, New Delhi.*

Reference Book:

- ✓ *Snowdon, B. and Vane H. R. (2005). Modern macroeconomics –its Origins, Development and Current State. Edward Elgar Publishing Limited, Cheltenham, UK.*
- ✓ *Ahuja H. L. (2019). Macroeconomics- Theory and Policy. 20th Edition, S Chand publication.*
- ✓ *Dwivedi, D. N. (2018): Macroeconomics -Theory and Policy. 5th Edition, Tata McGraw Hill.*

Core I **7. Mathematical Methods for Economics I**

Course Description

This is the first of a compulsory two-course sequence. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends,but the means for illustrating the method of applying mathematical techniques to economic theoryin general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Outcomes:

- To use mathematical techniques in analyzing economic problems
- To get a fair idea about the number system, set theory, and different types of functions.
- Evaluate and use the concept of derivative of functions involving single variables to link the total and marginal concepts in Economics.
- Understand major concepts of Linear Algebra

Unit I: **Preliminaries and Functions of One Real Variable**

Sets and set operations; Cartesian product; relations; functions and their properties; Number systems. Types of Functions: constant, polynomial, rational, exponential, logarithmic; Graphs and graphs offunctions; Limit and Continuity of functions; Limit theorems.

LO: This module will enable the students to know the theory of sets, ordered pairs, and Cartesian products; and learn the concepts of relation and function and limit and continuity of functions.

Unit II: Derivative of a Function

Rate of change and derivative; Derivative and slope of a curve; Continuity and differentiability of a function; Rules of differentiation for a function of one variable; Application- Relationship between total, average and marginal functions.

LO: This module will enable the students to know the concept of the derivative and the rules for derivatives; and about the economic applications of differentiation in establishing the relationship between total, marginal, and average functions in Economics.

Unit III: Functions of two or more Independent Variables

Partial differentiation techniques; Geometric interpretation of partial derivatives; Partial derivatives in Economics; Elasticity of a function – demand and cost elasticity, cross and partial elasticity.

LO: This module will enable the students to find out partial derivatives of multivariate functions; and calculate elasticities of multivariate functions.

Unit- IV: **Matrices and Determinants**

Matrices: concept, types, matrix algebra, transpose, inverse, rank; Determinants: concept, properties, solving problems using properties of determinants, solution to a system of equations - Crammer‘s rule and matrix inversion method.

LO: This module will enable the students to understand different types of matrices and determinants; and learn about the matrix operations and solve systems of linear equations using matrices.

Text Book:

- ✓ C. Chiang and K. Wainwright (2005): *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition

Reference Book:

- ✓ *K. Sydsaeter and P. J. Hammond (2002): Mathematics for Economic Analysis. PearsonEducational Asia*
- ✓ *Edward T Dowling (2004): Introduction to Mathematical economics, Tata McGeaw-Hill, Third Edition.*
- ✓ *Taro Yamane (1995): Mathematics foe Economists: An elementary survey. New Delhi Prentice Hall. Second Editio*

Semester IV

Core I **8.Microeconomics II**

Course Description

This course is a sequel to Microeconomics I. The emphasis will be on giving conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It covers the Market, general equilibrium and welfare, imperfect markets, and topics under information economics.

Course Outcomes:

- To understand short-run and long-run supply decisions of a competitive firm & industry equilibrium
- To have a basic understanding of concepts of Pareto efficiency in consumption & production; general equilibrium, and welfare theorems
- To develop an understanding of imperfect markets such as Oligopoly
- To understand basic concepts of game theory.

Unit I: Firm Supply and Equilibrium

Supply decision of a competitive firm and Exceptions; Inverse Supply Function; Profits and Producer‘s Surplus; Long Run Supply Curve of a Firm; Long Run Average Costs; Short Run and Long Run Industry Supply; Industry Equilibrium in Short and Long Run; Meaning of Zero Profits; Economic Rent

LO: Upon completion of this module, students will understand the short-run and long-run supply decisions of a competitive firm and the concept of industry equilibrium; and gain an idea about long-run average costs, zero profit, and economic rent

Unit II: General Equilibrium, Efficiency and Welfare

The Edgeworth Box; Trade; Pareto Efficient Allocations; Existence, Stability and Uniqueness of equilibrium; Walras Law; The Welfare Theorems and their implications; The Firm; Production and the Welfare Theorems; Production possibilities, comparative advantage and Pareto efficiency

LO: This module shall help to understand concepts like Pareto efficiency, and general equilibrium in consumption and learn welfare theorems, comparative advantage, production possibilities, and general equilibrium in production

Unit III: Market Imperfections: Monopoly and Monopolistic Competition

Barriers to Entry, Profit Maximization and Output Choice, Monopoly and resource Allocation, Price Discrimination, Degrees of Price Discrimination, Regulation of Monopoly, Dynamic Views of Monopoly. Monopolistic competition – product differentiation, Selling costs and excess capacity

LO: This module shall aid in understanding the nature of monopoly markets and the role of barriers to entry and explain price discrimination; and to explain features of monopolistic competition and the question of economic inefficiency in equilibrium

Unit IV: Oligopoly and Game Theory

Non-collusive oligopoly models: Cournot, Bertrand, Stackelberg, Sweezy, Chamberlin, Collusive oligopoly models: Cartels, Price leadership. The Payoff Matrix of a Game; Nash Equilibrium, Pure and Mixed Strategies, The Prisoner‘s Dilemma, Repeated Games, Tit-for tat strategy, Enforcing a cartel, Sequential Games, A Game of entry deterrence

LO: Upon completion of this module, students will be able to understand and explain the features of oligopoly and learn different models thereof; and the meaning and use of game theory in oligopoly; understand concepts like Nash equilibrium and different types of games, especially Prisoner's dilemma.

Text Book:

- ✓ *H. R. Varian (2010): Intermediate Microeconomics: A Modern Approach, 8th Edition,*
- ✓ *W.W. Norton and Company/Affiliated East-West Press (India). The workbook by Varian and Bergstrom may be used for problems.*
- ✓ *Koutsoyiannis, A (1979): Modern Microeconomics,2nd Ed, ELBS/Macmillan*

Reference Book:

- ✓ *C. Snyder and W. Nicholson (2012): Microeconomic Theory: Basic Principles and Extensions, 11th Edition, Cengage Learning, Delhi, India.*
- ✓ *Robert S. Pindyck and Daniel Rubinfeld: Microeconomics, 8th Edition, Pearson*
- ✓ *H. L. Ahuja (2018): Advanced Economic Theory. Twenty-First Edition, Sultan Chand Publication*

Core I **9. Macroeconomics II**

Course Description
This paper deals with growth models and the classical school of thought, and its evolution into Keynesian economics. The students are introduced to long-run dynamics in growth and technical progress. This paper also familiarizes about the open economy and its dynamics.

Course Outcomes:

- To emphasize on conceptual understanding and some applications of important growth models.
- To enable critical appreciation of the classical school of thought and the evolution of Keynesian economics.
- To understand the theoretical underpinnings of economic policy in open economies, such as monetary and fiscal policy, the basic Mundell-Fleming model, and nominal and real exchange rate determination.
- To understand the trade-off between Unemployment and Inflation; get a critical understanding of Long-run and Short-run Phillips Curve, unemployment, and Expectations.

Unit I: Economic growth model:
Accumulation of capital in the basic Solow model; supply and demand for goods, growth in the capital stock and the steady state, Golden rule level of capital, comparing steady states, transition to the golden rule steady state with too much and too little capital, population growth technological progress – Solow version

LO: The module shall enable the students to get conceptual clarity and strengthen theoretical foundations of the Solow growth model

Unit II: Classical and Keynesian Macroeconomic thought
Classical macroeconomics, Employment and output determination: Say‘s law; the quantity theory of money, Keynes General theory: Keynes main propositions, Analysis of the labour market, Keynes critique of Says law and Quantity Theory of Money, the orthodox Keynesian school, underemployment equilibrium in the Keynesian model.

LO: This module shall help students in developing a clear, comprehensive understanding of how and in what ways the Classical and Keynesian schools of economic thought differ from each other.

Unit III: Open Economy and Macroeconomic policies
Balance of payments –concepts, meaning of equilibrium and disequilibrium in Balance of payments measures to correct disequilibrium. Determination of foreign exchange rate- the balance of payments theory, fixed versus flexible exchange rate; the short run open economy model: The basic Mundell-Fleming model: Macroeconomic policies – Fiscal policy - Crowding-out and Crowding-in; Monetary policy and instruments, the Transmission Mechanism, Effectiveness of macroeconomic policies in the open and closed economies.

LO: This module will enable students to get clarity on macroeconomic theories and models in the context of open economies, the interdependent nature of key macroeconomic variables, sectors, and markets, and the dynamics of responses to exogenous domestic and international economic shocks

Unit IV: Inflation, Unemployment and Expectations

Inflation – Unemployment trade-off and the Phillips curve – short run and long run analysis, Adaptive and Rational expectation hypothesis. The policy ineffectiveness debate. Phillips curve and orthodox Keynesian school. Solow and Tobin's modified Philips curve.

LO: Upon completion of this module, students shall be able to derive the Phillips Curve from the Aggregate Supply Curve, the short-run and long-run Phillips curve, and understand the role of adaptive expectations and rationale expectations.

Text Readings:

- ✓ *Richard T. Froyen (2005): Macroeconomics, 2nd Edition, Pearson Education Asia, New Delhi.*
- ✓ *N. Gregory Mankiw (2010): Macroeconomics, 7th edition, Cengage Learning India Private Limited, New Delhi.*

Suggested References:

- ✓ *Levacic R and Rebmann A (1982): Macroeconomics –An introduction to Keynesian – neoclassical controversies*
- ✓ *Edward Shapiro (2001): Macroeconomics Analysis- Galgotia Publication Private Limited, 5th Edition, New Delhi.*
- ✓ *Dwivedi, D. N. (2018): Macroeconomics -Theory and Policy. 5th Edition, Tata McGraw Hill.*
- ✓ *Blanchard, O. (2013): Macroeconomics. 7th edition, Pearson Edn*

Core 1 **10. Statistical Methods for Economics**

Course Description:
This is a course on statistical methods for economics. It begins with some basic concepts and terminology that are fundamental to statistical analysis and inference. It is followed by a study and measure of the relationship between variables, which are the core of economic analysis. This is followed by a basic discussion on index numbers and time series. The paper finally develops the notion of probability, followed by probability distributions of discrete and continuous random variables, and introduces the most frequently used theoretical distribution, the Normal distribution.

Course Outcomes:

- To summarize data effectively using measures of central tendency, dispersion, and graphical techniques.
- To analyze relationships between variables through correlation and regression analysis.
- To understand and interpret time series data by identifying trends and seasonality.
- To apply probability theory and sampling techniques to solve statistical problems and assess data validity.

Unit I: Data Collection and Measures of Central Tendency and Dispersion
Basic concepts: population and sample, parameter and statistics; Data Collection: primary and secondary data, methods of collection of primary data; Presentation of Data: frequency distribution; cumulative frequency; graphic and diagrammatic representation of data; Measures of Central Tendency: mean, median, mode, geometric mean, harmonic mean, their relative merits and demerits; Measures of Dispersion: absolute and relative - range, mean deviation, standard deviation, coefficient of variation, quartile deviation, their merits, and demerits; Measures of skewness and kurtosis.

LO: At the end of this module, students will be able to distinguish between population and sample, collect and organize data, and calculate measures of central tendency and dispersion to understand a data set's characteristics.

Unit II: Correlation and Regression Analysis
Correlation: scatter diagram, sample correlation coefficient - Karl Pearson‘s correlation coefficient and its properties, probable error of correlation coefficient, Spearman‘s rank correlation coefficient. Two variable linear regression analysis - estimation of regression lines (Least square method) and regression coefficients - their interpretation and properties, standard error of estimate.

LO: This module shall help students master the techniques to measure the strength and direction of relationships between variables (correlation) and use linear regression analysis to model and predict those relationships.

Unit III: Time Series and Index Number
Time Series: definition and components, measurement of the trend- freehand method, methods of semi-average, moving average and method of least squares (equations of first and second degree only), measurement of the seasonal component; Index Numbers: Concept, price relative, quantity relative and value relative; Laspeyer‘s and Fisher‘s index, family budget method, problems in construction and limitations of index numbers, test for ideal index number.

LO: Upon completion of this module, students will be able to analyze time series data for trends and seasonality, and construct and interpret index numbers to measure price and quantity changes.

Unit IV: Probability Theory and Sampling

Probability: Basic concepts, addition, and multiplication rules, conditional probability; Meaning of Sampling, Types of Sampling: Probability Sampling versus Non-Probability Sampling; Simple Random Sampling and its selection, Systematic Sampling, Multi-stage Sampling, Quota Sampling; Error: Sampling and Non-sampling.

LO: Upon completion of this module, students will be able to calculate probabilities, understand different sampling methods (probability vs. non-probability), and identify potential errors associated with sampling.

Basic Readings and Textbooks:

- ✓ *S. C. Gupta (2017): Fundamentals of Statistics, Himalaya Publishing House, Delhi*

Reference Book:

- ✓ *Murray R. Speigel (2017): Theory & Problems of Statistics, Schaum's publishing Series.*
- ✓ *A L Nagar & R K Das (1983): Basic Statistics. Oxford University Press.*

SEMESTER V

Core I 11. Development Economics I

Course Description:
This is the first part of a two-part course on economic development. The course begins with a discussion of alternative conceptions of development and their justification. It then proceeds to aggregate models of growth and cross-national comparisons of the growth experience that can help evaluate these models. The axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored. The course ends by linking political institutions to growth and inequality by discussing the role of the state in economic development and the informational and incentive problems that affect state governance.

Course Outcomes:

- The course will enhance the understanding of concepts of development and the need for it.
- It helps students learn about aggregate models of growth.
- It examines the axiomatic basis for inequality measurement and explores the connections between growth and inequality.
- It familiarizes the students with the socio-economic and political institutions while showing their contribution to economic development.

Unit I: Study of Economic Development
Conceptions of Development economic growth and economic development; Alternative measures of development, documenting the international variations in these measures, comparing development trajectories across nations and within them–measures of economic development – national and per capita income, basic needs approach, capabilities approach, three core values of development, PQLI, HDI, HPI, MDPI, GDI; Happiness Index

LO: Upon completion of this module, students learn the alternative concepts associated with the development and the changes in the measurement of development over time.

Unit II: Theories of Economic Growth and Development
Classical theory, Marxian theory; Schumpeterian theory; Rostow's stages of economic growth; Harrod-Domar model, Solow model and convergence with population growth and technical progress.

LO: Upon completion of this module, students gain an elaborate knowledge about the growth theories put forth by different Schools of Economics.

Unit III: Poverty, Inequality, Agriculture, Industry and Development:
Measuring poverty: Head Count Ratio, Poverty Gap Ratio, Squared Poverty Ratio, FGT Ratio; Measuring Inequality – Lorenz curve and Kuznets' inverted U hypothesis; Growth, poverty and inequality; Policy options – some basic considerations
Agriculture, Industry and Economic Development: Interdependence between agriculture and industries – A model of complementarities between agriculture and industry; terms of trade between agriculture and industry; functioning of markets in agrarian societies; interlinked agrarian markets

LO: This module shall help the leraners to understand different measures of poverty and inequality in an economy and gain an insight into the role of agriculture and industry in economic development and the dynamic complementarity between the two sectors.

Unit IV: Institutions and Economic Development:

Role of institutions in economic development; Characteristics of good institutions and quality of institutions; The pre-requisites of a sound institutional structure; Different measures of institutions – aggregate governance index, property rights and risk of expropriation; The role of democracy in economic development; Role of markets and market failure; Institutional and cultural requirements for operation of effective private markets; Market facilitating conditions; Limitations of markets in LDCs; Corruption and economic development – tackling the problem of corruption

LO: Upon completion of this module, students get to know the importance and role of institutions in the process of economic development.

Text book:

- ✓ *Todaro, Michael P and Stephen C Smith (2006): Economic Development, 8th Edition, Pearson*

Reference Books:

- ✓ *Debraj Ray (2009): Development Economics, Oxford University Press.*
- ✓ *Thirlwall, A P (2011): Economics of Development, 9th Edition, Palgrave Macmillan*

Core I 12. Mathematical Methods for Economics II

Course Description:
This course is the second part of a compulsory two-course sequence. This part is to be taught in Semester II following the first part in Semester I. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this Syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theoryin general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

Course Outcomes:

- To use mathematical techniques to analyze economic problems.
- To have an understanding of the input-output models.
- To be able to use second and higher-order derivatives and integration to analyze the nature of functions.
- To develop the ability to optimise objective functions subject to satisfaction of constraints.

Unit I: **Linear models:**
Input-Output Model: Basic concepts and structure of Leontief's open and static Input-Output model; Solution for equilibrium output in a three-industry model; The closed model.

LO: This module will enable the students to get an idea of the static input-output model in its closed and open versions, which are of great practical importance in Economics.

Unit II: Second and Higher Order Derivatives and Integration:
Technique of higher order differentiation; Interpretation of second derivative; Second order derivative and curvature of a function; Concavity and convexity of functions; Points of inflection, Derivative of Implicit Function; Higher Order Partial Derivative. Indefinite Integrals; Rules of Integration; Techniques of Integration: Substitution Rule, Integration by parts, and Partial Fractions; Definite Integral – Area Interpretation.

LO: This module will enable the students to know the concept of higher-order derivatives and integration, definite and indefinite; and the applications of higher-order derivatives and integration in Economics.

Unit III: Single and Multivariable Optimization:
Optimum values and extreme values; Relative maximum and minimum; Necessary versus sufficient conditions - First and Second derivative tests (using Hessian Determinants); Economic applications thereof, First and second order condition for extrema of multivariable functions; Convex functions and convex sets.

LO: This module will enable the student to learn the concept of optimization of single and multi-variable functions.

Unit IV: Optimization with Equality Constraints:
Effects of a constraint; Finding stationary value – Lagrange-Multiplier method (Two variable singleconstraint case only): First and second order condition; The Bordered Hessian determinant.

LO: This module will enable the student to understand the meaning and definition of constraint optimization, and the use of the Lagrange multiplier method and the Bordered Hessian determinant to optimize an objective function with respect to a constraint.

Text Reading:

- ✓ *A. C. Chiang and K. Wainwright (2005): Fundamental Methods of Mathematical Economics, McGraw Hill International Edition.*

Reference Book:

- ✓ *K. Sydsaeter and P. J. Hammond (2002): Mathematics for Economic Analysis. PearsonEducational Asia*
- ✓ *Edward T Dowling (2004): Introduction to Mathematical economics, Tata McGeaw-Hill, Third Edition.*
- ✓ *Taro Yamane (1995): Mathematics foe Economists: An elementary survey. New Delhi Prentice Hall. Second Edition.*

Core I 13. History of Economic Thought

Course description
This course provides a perspective to our intellectual history, development of economic thought and helps relate this to the current thinking. It introduces the students to the philosophers and economists who developed economic reasoning and modeling of economic activities. It also helps create critical abilities and attitudes.

Course Outcomes:

- Understanding economic theories from Mercantilism to the Classical Economists of the eighteenth century and allowing the study of particular economic ideas and theories in considerable depth.
- To facilitate an understanding of economics effectively and comparing different theories of economists from the classical to Marxism.
- Exploring the contrasting theoretical approaches of different economists.
- Understanding the historical evolution of Indian economic thought and its comparison with Western economic thought.

Unit I: Introduction and Early Economic Thought
Mercantilism-main characteristics, Thomas Mur's views; Physiocracy- main features, Tableau Economique, taxation; Early Classicism: Adam Smith- Theory of Value, Division of labour, capital accumulation, distribution, views on trade and economic progress; David Ricardo-theory of value, theory of rent, distribution, ideas on international trade and development.

LO: This module summarizes the contributions of Adam Smith, David Ricardo, and Thomas to the field of economics.

Unit II: Classicism Vs Marxism
Thomas Malthus- population theory, glut theory; Karl Marx-dynamic of social change, theory of value, surplus value, theory of profit, crisis of capitalism, Johns Stuart Mill- ideas on value, distribution, views as a synthesizer.

LO: This module shall enable the students to get general insights into the two schools of thought, namely the Classical and Marxian.

Unit III: The Marginalists' Revolution
Economic ideas of Jevons, Walras and Menger, Bohm-Bowerk, Wicksell ; Marshall – Role of time element in price determination, ideas on consumer surplus, Marshal as a synthesizer.

LO: This module will help the students in gaining knowledge and understanding of the development of ideas within the field of economics and get a deeper understanding of the Marginalists' Revolution.

Unit IV: Indian Economic Thought
Main themes of Kautilya's Arthasashtra; Modern Economic Ideas: Dada Bhai Naoroji, M.K. Gandhi, village swaraj, non-violence, machines and labour, cottage industries; Comparison of Indian Economic thought with western Economic thought.

LO: This module aids the student in evaluating the relevance and applicability of Indian economic thought in

contemporary times.

Text Books

- ✓ *Gide, Charles and Rist, Charles (1973): A History of Economic Doctrines, Oxford University Press.*
- ✓ *Dasgupta, A K (1986): Epochs of Economic Theory, Oxford University Press, New Delhi.*

Reference Book:

- ✓ *O'Brien, D P (1975): Classical Economists, Oxford, Clarendon Press.*
- ✓ *Ekelund, Robert B. and Robert F. Hebert (1990): A History of Economic Theory and Method, third edition, New York: McGraw Hill.*
- ✓ *Henry W. Spiegel (1991): The Growth of Economic Thought, 3rd ed. Durham: Duke University Press*
- ✓ *Tom Bottomore (1980): Dictionary of Marxist Thought, Basic Blackwell Publishers.*
- ✓ *Roll, Eric, History of Economic Thought, Faber and Faber Ltd.*
- ✓ *L N Rangarajan (1992): Kautilya: The Arthasastra, edited, rearranged, translated and introduced; Penguin Books, New Delhi.*

Or

Money and Banking

Course Description

This course exposes students to the theory and functioning of the monetary and financial sectors of the economy. It highlights the organization, structure and role of financial markets and institutions. It also discusses interest rates, monetary management and instruments of monetary control. Financial and banking sector reforms and monetary policy with special reference to India are also covered.

Course Outcomes:

- Understanding money and its types along with their functions and different measures of money supply.
- Understanding the basic concepts of banking, and its functions and to examine the banking scenario in India.
- To gain knowledge of the functions of central banks and monetary policies and how they have evolved.
- Get an understanding of the conceptual framework of the financial market and institutions of India.

Unit I: Money

Definition and functions of money; Types of money: legal tender money and bank money, near money; Value of money and index number; construction of index number; WPI, CPI, PPI, GDP deflator, Cost of living index. Demand for money- Classical and Keynesian approaches, Patinkin and the Real Balance Effect; Friedman's Quantity theory of money. Supply of Money- Measures of money supply: M_1, M_2, M_3 and M_4 ; High powered money and money multiplier.

LO: This module will enable students to understand various concepts of money and money substitutes, functions of money, and monetary aggregates.

Unit II: Commercial Banking

Meaning and types; Functions of commercial banks; the process of credit creation and its limitations; Balance sheet and portfolio management, Banking sector reforms in India; Lessons from Global Financial Crisis and Policy Response in India.

LO: This module will make the students aware of basics of commercial Banking and Finance.

Unit III: Central Banking

Functions of a central bank; Quantitative and qualitative methods of credit control; Central Bank's Supervision and prudential measures for financial stability; current monetary policy of India, liquidity adjustment facility (LAF) through Repo and reverse repo operation, MSF.

LO: Upon completion of this module, students will be able to appreciate the effects of the major policy tools and understand how central banks affect the financial system of the economy.

Unit IV: Financial Markets

Financial Market, Meaning, Types, Money market and Capital Market, Primary and Secondary Market, Stock Exchanges, SEBI; Role of Financial Markets for Economic Development. Financial Instruments: Government securities, derivatives, futures and options, bond, debentures.

LO: This module shall help students to understand the nature of financial instruments and their usage.

Text Book

- ✓ *Bhole, L. M. (2017): Financial institutions and Market, 6th Ed, Tata McGraw hill, New Delhi.*
- ✓ *Mishkin, F. S. & Eakins S. G (2017): Financial Market and Institutions, 8th Ed, PE, New Delhi.*

Reference Book

- ✓ *Suraj. B. Gupta (2010): Monetary Economics: Institution, Theory and Practice, S. Chand.*
- ✓ *Gorden & Natrajan (2023): Financial Market and institutions, 3rd Ed, Himalaya Publishing house*

Or
Economy of Odisha

Course description
Using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in Odisha in pre- and post-Independence period, with particular emphasis of paradigm shifts and turning points. Given the rapid changes taking place in Odisha, the reading list will have to be updated annually.

Course Outcomes:

- To obtain a basic overview of the economy of Odisha in the pre-Independence period.
- To analyze the strengths and weaknesses of the macroeconomic scenario of Odisha's economy.
- To gain an understanding of the important economic sectors of Odisha and the challenges faced by them in recent times.
- To grasp the current economic problems in Odisha.

Unit I: Odisha Economy before 1947
Orissa's Economy in the Nineteenth Century: Benevolence or Exploitation, Forces of Nature, Animal Power, The Company Steps in, Public Works and Public Health, Education, Disintegration of Village Economy, New Social Environment, Changing Position of Social Classes, The Moneylenders, The Borrowers, Money-flows from Village to Metropolis, Pauperization of Peasantry, The Wage Earners, Demographic Changes, Profiting from Rural Adversity; Diarchy in 1919 and Separation of Provincial Finances from Central Government in 1937; Emergence of Federal Finance.

LO: This module will ensure that the students understand the features of Odisha's economy in the pre-independence period.

Unit II: Macro Economy of Odisha
A macro glance of Odisha economy: aggregate income, broad sectoral decomposition, performance of districts, employment, child labour and bonded labour, employment programmes, consumption expenditure, cost of living; Odisha State public finances.

LO: This module presents the ground realities of Odisha's macro-economic situation to the students.

Unit III: Agriculture, Industry, Infrastructure and Environment in Odisha
Agriculture: land ownership and land tenure, agricultural wages and rural unemployment, production and productivity of major crops, agricultural inputs, agricultural policy; Animal Husbandry; Fisheries
Industry: Investment, industrial policy, and the growth of large industries, mining and quarrying; Construction; tertiary sector: tourism, transport and power; Water Resources, Forest Resources

LO: Upon successful completion of this module, students will be able to appreciate the importance and contribultion of two important sectors, agriculture and industry, to Odisha's Economy.

Unit IV: Social Sector in Odisha

Poverty: income poverty and inequality; health sector: outcomes, infrastructure, finance, public health, NRHM; education: Literacy, Primary education, secondary education, higher education, SSA; human development

LO: This module presents the salient features of the social sector in Odisha to the students.

Text Readings

- ✓ *Nayak, P., Panda, S. C., Pattanaik, P. K. (2016): The Economy of Odisha: A Profile, Oxford University Press, New Delhi*
- ✓ *GoO (latest): Economic Survey, Planning and Coordination Directorate of Economic and Statistics, Bhubaneswar*

Additional Reading

1. GoO (2004): *Human Development Report 2004 Orissa*, Planning and Coordination Department, GoO, Bhubaneswar
2. Mahapatro, S. B. (1980): Inter-Industry Wage Differentials in Orissa: An Empirical Analysis, *Indian Journal of Industrial Relations*, 15(4): 525-536.
3. Vyasulu, V. and Arun, A. V. (1997): Industrialisation in Orissa: Trends and Structure, *Economic and Political Weekly*, 32(22): M46-M53.
4. Das, Binod S. (1976): Orissa's Economy in the Nineteenth Century, *Social Scientist*, 4(11): 32-46.
5. Das, Binod S. (1976): Orissa's Economy in the Nineteenth Century: Part Two, *Social Scientist*, 4(12): 38-50.
6. Mohanti, K. K. and Padhi, S. (1995): Employment Situation of Tribal Population in Orissa: 1981 Census Data, *Economic and Political Weekly*, 30(29): 1879-1882.
7. Nair, K. R. G. (1993): New Economic Policy and Development of Backward Regions: A Note on Orissa, *Economic and Political Weekly*, 28(19): 939-941.
8. Mohanty, B. (1993): Orissa Famine of 1866: Demographic and Economic Consequences, *Economic and Political Weekly*, 28(1/2): 55-66.
9. Haan, A. de and Dubey, A. (2005): Poverty, Disparities, or the Development of Underdevelopment in Orissa, *Economic and Political Weekly*, 40(22/23): 2321-2329.
10. Samal, K. C. (1998): Poverty Alleviation after Post-Liberalisation: Study of a Tribal Block in Orissa, *Economic and Political Weekly*, 33(28): 1846-1851
11. Nayak, P. and Chatterjee, B. (1986): Disguised Unemployment in Agriculture: A Case Study of Rural Orissa, *Indian Journal of Industrial Relations*, 21(3): 310-334.

SEMESTER VI

Core I 14. Introductory Econometrics

Course Description:
This course provides a comprehensive introduction to basic econometric concepts and techniques. It covers statistical concepts of hypothesis testing, estimation and diagnostic testing of simple and multiple regression models. The course also covers the consequences of and tests for misspecification of regression models.

Course Outcomes:

- To have a comprehensive introduction to basic econometric concepts and techniques.
- To gain an understanding of the statistical concepts of hypothesis testing, estimation, and diagnostic testing of simple and multiple regression models.
- To gain knowledge about the consequences, tests, and remedies of violation of Least Square assumptions.

Unit I: Introduction
Definition, Nature and scope of econometrics; Theoretical Probability Distributions: Binomial, Poisson and Normal distributions: their properties. Theory of Estimation: Estimation of parameters; properties of estimators – small sample and asymptotic properties; point and interval estimation.

LO: This module will enable the students to know about some common discrete and continuous theoretical probability distributions; and to know about estimators, point and interval, and the desirable properties of point estimators.

Unit II: Hypothesis Testing
Testing of hypotheses: defining statistical hypotheses; Simple and composite hypotheses; Null and alternative hypothesis; Type I and Type II errors, Critical region; Neyman-Pearson lemma; Power of a test; Test statistics: z, chi square, t and F.

LO: This module will enable the student to gain knowledge about statistical hypotheses and the procedure of testing of hypothesis; and have an understanding of type I and type II errors in the procedure of hypothesis testing.

Unit III: Linear Regression Analysis
Two variable linear regression model – Assumptions; Least square estimates, Variance and co-variance between Least square estimates; BLUE properties; Standard errors of estimates; Co-efficient of determination; Inference in a two variable linear regression model; ANOVA; Forecasting. Introduction to multiple regression models.

LO: This module will enable the students to understand the concept and usefulness of regression analysis and differentiate between Linear and non–linear relations; understand the difference between simple & multiple linear regression models and their estimation as well as inference drawn therefrom.

Unit IV: Violation of Classical Assumptions
Heteroscedasticity, Multicollinearity and Auto-correlation: Meaning, consequences, tests and remedies.

LO: This module will enable the student to understand the consequences, tests, and remedies of violation of Least Square assumptions.

Text Book:

- ✓ *Gujarati, D & Sangeetha (2007); ―Basic Econometrics‖, McGraw Hill Book Co.*

Reference Book:

- ✓ *Wooldrige, J. M. (2022): Introductory Econometrics: A modern Approach, 7th Ed, Cengage Publication*

Or

Public Economics I

Course description:
Public economics is the study of government policy from the points of view of economic efficiency and equity. The paper deals with the nature of government intervention and its implications for allocation, distribution and stabilization. Inherently, this study involves a formal analysis of government taxation and expenditures. The subject encompasses a host of topics including public goods, market failures and externalities.

Course Outcomes:

- The course will familiarize the students with the relevance, responsibilities, and sources of receipts of the government.
- Students will be able to understand the rationale behind the public provision of specific goods and services and what can be left to market for provision.
- Students will be able to understand the normative ideas behind public expenditure, taxation, and public debt as well as the budget of government and its impact on the economy.
- Students will be able to understand the methods of fiscal management by the government in India.

Unit I: Introduction to Public Finance and Public Budgets
The concept of Pareto Optimality. Pareto improvement and potential Pareto improvement. Public good verses private good; Free riding and public Good provision. Maximum Social advantage. Market failure and role of government; Public Budget: kinds of budget, economic and functional classification of the budget; Balanced and unbalanced budget; Balanced budget multiplier; Budget as an instrument of economic policy

LO: This module will give an idea of the goods to be provided by the government and market and the challenges faced by the government to provide public goods; and will also teach about different types of budgets and their implications for the economy.

Unit II: Public Expenditure
Meaning, classification, principles, cannons and effects, causes of growth of public expenditure, Wagner‘s law of increasing state activities, Peacock-Wiseman hypotheses. Pareto Optimality Criterion, social Allocation

LO: This module will educate on the principles behind public expenditure and the causes behind the rise in the public expenditure.

Unit III: Public Revenue
Sources of Public Revenue; Taxation - meaning, cannons and classification of taxes, impact and incidence of taxes, division of tax burden, the benefit and ability to pay approaches, taxable capacity, effects of taxation, characteristics of a good tax system, major trends in tax revenue of central and state governments in India, Introduction of GST in India. Issues and Challenges relating to GST.

LO: This module will educate on the sources of receipts for the government, theoretical ideas behind taxation, and implementation of GST in India.

Unit IV: Public Debt

Sources, effects, debt burden – Classical/ Ricardian views, Keynesian and post-Keynesian views; shifting - intergenerational equity, methods of debt redemption, debt management, tax verses debt.

LO: This module will give a fair idea of different aspects of the implications of public debt on the economy

Text Books:

- ✓ J. Hindriks and G. Myles (2006): *Intermediate Public Economics*, MIT Press.

Reference Book:

- ✓ R. A. Musgrave and P. B. Musgave (1989): *Public Finance in Theory and Practices.* McGraw Hill
- ✓ Bhatia H L (2018): *Public Finance.* Vikas Publishing House.

Or

Development Economics II

Course Description:

This is the second Module of the economic development sequence. It begins with basic demographic concepts and their evolution during the process of development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The governance of organizations is studied and this is then linked to questions of sustainable growth. The course ends with reflections on the role of globalization and increased international dependence on the process of development.

Course Outcomes:

- This course shall provide an introduction to basic demographic concepts and their evolution during the process of development.
- It will instill the ability to present a new interpretation of the dualistic structure of an economy and its implication for economic development.
- Thecourse will give an in-depth understanding of environmental economics and application of economic principles to resolve specific environmental problems and issues.
- It will equip the students with an ability to explain the phenomenon of globalization, the economics, and the politics of international agreements, trade, and production patterns.

Unit I: Population and Development

Demographic concepts: birth and death rates, age structure, fertility and its determinants, the Malthusian population trap and the microeconomic household theory of fertility; costs and benefits of population growth and the model of low-level equilibrium trap; rural-urban migration – the Harris Todaro migration model and policy implications.

LO: Upon successful completion of the module, the students will learn about the basic demographic concepts of birth and death rates, age structure, fertility and mortality, demographic transition and development, fertility choices and human capital formation, and migration models.

Unit II: Dualism and Economic Development

Dualism – geographic, social and technological; the theory of cumulative causation (Myrdal); the regional inequalities in the context of economic development; the inverted U relationship; international inequality and the centre periphery thesis; dependency, exploitation and unequal exchange; the dualistic development thesis and its implications.

LO: This module shall provide an understanding of the various concepts of dualism and the manner it has hindered the development of developing countries.

Unit III: Environment and Development

Basic issues of environment and development – Development and environment inter-linkage; Poverty, environmental degradation and externalities; common property resources, renewable and non-renewable resources; concept of sustainable development; basics of climate change.

LO: This module shall help students getting an idea about the global perspectives on contemporary environmental and natural resource issues and appropriate economic concepts for analyzing them.

Unit IV: International Trade and Economic Development and Financing Economic Development

Trade and economic development; export-led growth; terms of trade and economic growth – the Prebisch Singer Hypothesis; trade strategies for development – import substitution vs. export promotion; international commodity agreements; trade vs aid; Foreign finance, investment and foreign aid – controversies and support Modalities.

LO: The learners shall acquire an understanding of the linkage between International Trade and Economic Development, and trade strategies for development.

Text Book:

- ✓ *Todaro, Michael P and Stephen C Smith (2006): Economic Development, 8th Edition, Pearson*

Reference Book:

- ✓ *Thirlwall, A P (2011): Economics of Development, 9th Edition, Palgrave Macmillan.*

Core I 15. Computational Methods in Economics

Course Description
This course introduces the students to understand uses of computers and their applications in economics. After completion of the course, students will develop professional competency in working with MS Office.

Course Outcomes:

- To understand the uses of computers and their applications in Economics.
- To develop professional competency in working with MS Office.
- To get hands-on use of Microsoft Office applications- Word, Excel, PowerPoint, and Access.
- To gain basic soft skills in handling data, creation, and formatting of Word documents, and making presentations.

Unit I: Computer Fundamentals
The basic architecture of CPU and its functions – Input device and output device – Primary and secondary memory. Operating systems - concept and types, Windows- concepts and components; Basics of a computer network: LAN, WAN, and MAN; Introduction to internet and its applications; booting process, Machine language, and assembly language; Applications of computer in Economics, other fields.

LO: This module shall make the students understand the basics of computers – parts, memory, network, and internet.

Unit II: MS Word, PowerPoint, and Access Applications
MS Word: Word basics, creation of a document, use of tables, pictures, and charts; editing, formatting, and printing documents; MS PowerPoint: Features, Creation of Slides for presentation, Types of view, Slide master, Templates and Slide transition; MS-Access: Data Field, Record, Database file, Types of files, Types of records, Data type, Database evolution, Data transfer from Excel to Access

LO: Upon completion of this module, students shall be able to create text documents using MS Word, create interesting and appealing presentations using MS PowerPoint, and apply Database Management Software (DBMS) like MS Access to manage data of businesses and enterprises.

Unit III: Worksheet & MS Excel
Basics of worksheet –creating a worksheet, entering data into a worksheet, sorting data, autofill, saving & protecting a worksheet, Formatting of a worksheet. Previewing & Printing worksheet; Create an Excel chart; Drawing charts: Area, Bar, Column, Line, Pie, Scatter, etc. Move and Resize your chart; Charts Styles and Layouts; Chart Titles and Series Titles; Format chart Panel; Add labels to a Chart; Format chart segments; Format Axis titles; Format your Axis titles

LO: Upon completion of this module, students shall develop the ability to arrange data in spreadsheets using

graphing tools, pivot tables, and formulas.

Unit IV: MS-Excel Basic Function

Basic calculations: Sum, Sqrt, Max, Min, Count, Averages, Rank; Conditional and logical functions: IF, AND, OR; Estimation of correlation and regression; Hypothesis testing: t-test, F-test and Z-test Excel Pivot Tables; The LOOKUP Function; The VLOOKUP Function in Excel; Hyperlinks in Excel

LO: This module shall enable the learner to analyze data using MS Excel functions.

Text Books:

- ✓ *New Perspectives Microsoft Office Excel 2016, Comprehensive Enhanced Edition, by Parsons, et al, Nelson Publisher.*
- ✓ *Sinha, P. K. (2004): Computer Fundamentals, 6th Ed, BPB Publications, New Delhi.*

Reference Book

- ✓ *Raja Raman.V. (2014): Fundamentals of Computers, 6th Ed, PHI, New Delhi.*
- ✓ *Kerns R. L.(1992): Essentials of Microsoft Windows, Word and Excel, PHI.*
- ✓ *Alexis Leon & Mathews Leon: Introduction to Computers with Ms-Office, TMH.*

Or

Environmental Economics

Course Description

This course introduces the students to the basics of environmental economics to understand the fundamentals of environmental concerns and develop insights into valuation of environment.

Course Outcomes:

- To understand the basic concepts/principles of Environmental Economics
- To be able to analyse and apply the concepts to understand specific case studies.
- To develop insights into the valuation of the environment.
- To become capable to execute/create the Project or field assignment as per the knowledge gained in the course.

Unit I: Economy and Environment

Concepts of Environmental Economics, Natural Resource Economics, and Ecological Economics. Important environmental Problems (Air pollution, water pollution, deforestation, climate change and global warming), Economy-Environment inter-linkages, Role of environment for economic development, Effect of economic development (industrialization, urbanisation, modernization of agriculture) on environment, Consequences of environmental degradation on the economy and the wellbeing of the people and other living beings, concept of Environment-Kuznets Curve hypothesis.

LO: This module will aid in acquiring knowledge of the concepts related to Environmental Economics and in understanding the Environment-Economy interlinkage.

Unit II: The Economics of Pollution and Climate change

Environment and Market Failure, Nature of environment quality (Non-rivalry and non-excludability), Pollution as public bad, Pollution as negative externality. Pigouvian tax for optimal pollution, Property rights and bargaining for optimal pollution (Coase Theorem), Government‘s Command and Control method for controlling pollution. Climate change as market failure (Green house gas externality, lack of incentives for developing low carbon technology), policy measures for mitigations of climate change (carbon taxes and tradable carbon rights).

LO: This module will be useful for the students in understanding the nature of pollution and getting knowledge of pollution control and climate change mitigating tools.

Unit III: Valuation of Environment

Difficulties of valuation of eco-system services, Concepts of Economic value of environment (Use and non- use value, Option value, Existence value); Willingness to pay (WTP) and willingness to accept (WTA) compensation for improvement/deterioration of environment quality, Revealed Preference Method of valuation of environment (The hedonic price approach, Travel Cost approach)

Contingent Valuation method.

LO: Upon completion of this module, the learner shall gain knowledge of the different methods of valuing environmental services.

Unit IV: Natural Resources and Sustainable Development

Natural resources; renewable and exhaustible; management of exhaustible resources and the Hotelling's rule; management of renewable resources (case of fishery only) optimally, Concept of carrying capacity of Environment (related to resource use and pollution), Issues of irreversibility, uncertainty in the natural resource use and waste disposal, Sustainable Development: Concepts and Components (Social, Economic and Environmental), Daly's operational principles for sustainability, Sustainable Development Goals (SDGs).

LO: This module shall initiate an understanding of the limits of the use of natural resources from the point of view of their sustainability and Sustainable development.

Text Book:

- ✓ *Bhattacharya, R. N. (2002): Environmental Economics: An Indian Perspectives, OUP, New Delhi*

Reference Book:

- ✓ *Kolstad, C.D (1999): Environmental Economics. Oxford University Press, New Delhi*

Or
International Economics

Course Description
This course introduces the students to international trade and finance to understand the theories of international trade and develop insights into trade policy and balance of payments. The course also develops insight into the international financial system and the trade policy of India.

Course Outcomes:
- To understand the basic concepts/principles of International Trade and Finance.
- To acquire the ability to analyse the concepts to understand specific case studies and practical issues.
- To develop insights into trade policy and balance of payments.
- To develop an insight into the international financial system and the trade policy of India.

Unit I: Importance of Trade and Trade Theories
Importance of the study of International Economics; Inter-regional and international trade; Theories of Trade-absolute advantage (Adam Smith), comparative advantage (David Ricardo) and Opportunity cost (Haberler); Heckscher-Ohlin theory of trade – assumptions (Irreversible Factor intensity of goods, Perfect competition with homogeneous products, Constant returns to scale, equal access to technology to producers of all countries, difference in factor endowment between the countries), factor abundance, factor intensity and limitations (Leontief Paradox); Factor Price Equalization theorem.

LO: This module shall endow the knowledge of the different trade theories to the learners.

Unit II: Trade Policy
Concepts of terms of trade; Doctrine of reciprocal demand – Offer curve technique; Gains from trade, types; Free Trade vs Protected Trade, Tariffs- types, effects under partial and general equilibrium analysis; Quotas- effects its impact in partial equilibrium analysis; General Equilibrium analysis of tariff; the concept of optimum tariff.

LO: Upon successful completion of the module, students shall get an understanding of the different tools used by the Government to intervene in trade and their welfare implications.

Unit III: Exchange Rate and International monetary system
Concept and Types of Exchange Rate (bilateral vs. trade-weighted exchange rate, cross exchange rate, spot, forward, futures), Demand for and Supply of foreign exchange, Exchange Rate Determination: Mint Parity Theory, Purchasing-Power Parity Theory, Fixed versus Flexible exchange rate; IMF: Objectives of IMF, IMF‘s assistance to member countries (Rapid Financing

Instrument, Rapid Credit Facility Stand only) for BoP deficit correction., World Bank and WTO; Their achievements and failures; Their Role from the point of view of India

LO: This module will be useful for the students in getting to know about the exchange rate and theories relating to its determination and gaining knowledge of the different international financial institutions.

Unit IV: Balance of Payments

Concepts and components of balance of trade and balance of payments; deficit and surplus in the balance of payments, Disequilibrium in balance of payments; Various measures to correct deficit in BOPs (Expenditure switching and expenditure reducing policies, Direct control), Depreciation Vs. Devaluation; Elasticity approach to devaluation, Foreign trade multiplier.

LO: This module shall enable an understanding of the concept of disequilibrium in Balance of Payment (BOP) and the different measures for correcting the same.

Text Book:

- ✓ *Mannur H. G (2018), International Economics, Vikash Publishing/Sultan Chand*

Reference Books:

- ✓ *Salvatore Dominick (2016), International Economics, Wiley India.*
- ✓ *Sodersten Bo and Reed J (1994), International Economics, McMillan Publisher*
- ✓ *Dwivedi D. N. (2013), International Economics: Theory and Policy, Vikash Publishing.*

SEMESTER VII

Core I **16. Quantitative Methods**

Course description

This course is a continuation of the Mathematical methods for Economists courses in semesters IV and V. It aims to train the students to use the techniques of mathematical and statistical analysis, which are commonly applied to understand and analyze economic problems. It aids in learning the classical techniques involving functions and calculus, to gain knowledge about the elements of Game Theory as applicable to real life economic analysis and to initiate students into sampling tools and techniques, data collection, analysis, theory of estimation and hypothesis testing

Course Outcomes:

- To use the techniques of mathematical and statistical analysis, which are commonly applied to understand and analyze economic problems.
- Learning the classical techniques involving functions and calculus.
- Gaining knowledge about the elements of Game Theory as applicable to real-life economic analysis.
- To make use of sampling tools and techniques, data collection, analysis, theory of estimation, and hypothesis testing.

Unit I

Functions: Multivariable functions – Production functions; Partial derivatives; Total differential; Total derivatives; Jacobian and functional dependence. Quadratic forms; Optimization – Hessian and constrained optimization – bordered hessian- Economic applications;

LO: This module will enable the student to understand and apply the concept of multivariate functions to analyze production functions; and optimize functions with and without constraints.

Unit II

Game theory - Concept of Game, Types of Game, Two-persons-zero sum game, Nash Equilibrium, Prisoner‘s dilemma. Maximin - minimax principle; Saddle point solution, Dominant Strategy, Mixed Strategies; Graphical solution of 2 x n and m x 2 Games; Linear programming – Graphical solution to a linear programming

LO: This module will enable the student to know basic concepts of the Theory of Games, Nash equilibrium, saddle points for a two-person zero-sum game, and hence the value of the game. It will explain the concepts of mixed strategy technique using the probability approach; Linear Programming Problems, basic components, and assumptions; the notions of formulating a Linear Programming Problem with its economic applications and graphical solutions thereof.

Unit III

Random variable and its probability distribution, probability mass function and probability density function, expectation and variance of a random variable, laws of expectation and variance.

Theoretical probability distributions: Binomial, Poisson, and Normal probability distributions and their properties; Normal approximation to Binomial; Joint, marginal, and conditional probability distributions, independence of random variables, covariance, results on expectation and variance.

LO: This module will enable the students to understand random variables, discreet and continuous, and their probability distribution; and understand specific theoretical distribution and their applications.

Unit IV

Concept of an estimator and its sampling distribution; desirable properties of an estimator; Interval estimation; statistical hypotheses- null and alternative; Type I and Type II errors; power of a test, confidence intervals and hypothesis testing based on z, t, chi-square and F-distributions.

Methods of estimation of non-linear equations: parabolic, exponential, modified exponential, Gompertz and logistic relationships

LO: This module will enable the student to understand the concepts of estimation, point, and interval, as well as estimators and hypothesis testing; and methods of estimation of specific non-linear equations.

Text Reading:

- ✓ *Chiang, A. C. (1986): Fundamental Methods of Mathematical Economics, McGraw Hill.*

Suggested References:

- ✓ *Gupta, S. C. (1993): Fundamental Methods of Applied Statistics, S. Chand & Sons.*
- ✓ *Speigel, M.R. (1992): Theory & Problems of Statistics, McGraw Hill Book Co*
- ✓ *Yamane, Taro (1975): Mathematics for Economists, Prentice Hall of India, New Delhi.*
- ✓ *Mukherji & Guha (2011): Mathematical Methods & Economic Theory, Oxford University Press*

Core I 17. Research Methodology

Course description
The course intends to develop a research orientation among the students and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis.

Course Outcomes:

1. Getting initiated into Social Science Research and research process, and the theoretical perspectives in social science research.
2. Addressing the issues inherent in selecting a research problem, selecting an appropriate research design, and applying them in research/ project work.
3. Acquiring the knowledge on methods of collection of data and measurement of variables in a broad structural sense.
4. Having an idea of basic ethical principles for conducting scholarly research and acquiring the skills of writing research reports and implementing research projects/studies.

Unit I: Basics of Research
Introduction to Research: Meaning, Objectives, Motivation, Types, Approaches, Methods and Methodology, Significance, Research Process, Criteria of Good Research; Qualities of a Good Researcher, Research as a Career.

LO: This module introduces the basic concepts of research methodology in social science.

Unit II: Research Problem
Defining the Research Problem: What is a Research Problem? Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem; Research Design: Meaning, Need, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs.

LO: This module will help the learner to select an appropriate research problem and research design.

Unit III: Issues in Research
Measurement in Research, Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Techniques of Measurement Tools, Scaling and Important Scaling Technique Research Ethics: codes and ethics, permissions to research, responsibilities, confidentiality, feedback, participatory research; Research Proposal and literature review: research proposal, review

of literature: stages of review, using the library and internet, abstracting, word processing, plagiarism, Concept of IPR.

LO: Upon completion of this module, the students shall have the basic knowledge of the concept of measurement in research, ethical principles of research and ethical challenges, and review of literature.

Unit IV: Actions in Research

English in report writing: words, sentences, paragraph, writing style; The Report: improvingquality, sections, drawing conclusions, evaluation checklists, persistence; Common Citation Styles

LO: This module shall enable the learner to write good-quality research reports.

Text Book:

- ✓ *Kothari, C. R. (2004): Research Methodology: Methods and Techniques, New Age International Private Limited Publishers, New Delhi*.

Reference Books:

- ✓ *Guthrie, G. (2010): Basic Research Methods, Sage Publications India Private Limited, New Delhi*

Core I 18. Basic Econometrics

Course description

This course intends to further the Introductory Econometrics course of semester VI and revisit the Classical Linear Regression Models and regression diagnostics. It will help the students to develop an intuitive understanding of the material that will allow these econometric tools to be utilized effectively and creatively. On successful completion of this Course, students will be able to learn various basic econometric methods, estimation methods and related econometric theories and apply these methods to data or econometric modeling techniques.

Course Outcomes:

1. To further the Introductory Econometrics course of semester VI and go into greater details of the Classical Linear Regression Models and regression diagnostics.
2. Helping the students to develop an intuitive understanding of the material that will allow these econometric tools to be utilized effectively and creatively.
3. Learning various basic econometric methods, estimation methods, and related econometric theories and apply these methods to data or econometric modeling techniques.

Unit I

Meaning and scope of econometrics; Two variable linear regression model – its assumptions, estimation of parameters and properties of estimators; Gauss Markov Theorem, Coefficient of determination; Analysis of Variance of two variable LRM.

LO: This module will enable the student to apply the method of least squares to estimate the two-variable linear regression model and assess the results thereof.

Unit II

K–Variable LRM: Estimation of parameters, properties of estimators, Gauss–Markov theorem; Testing of significance of single co-efficient, Subset of Coefficients: ANOVA; Adjusted coefficient of determination.

LO: This module will enable the student to apply the method of least squares to estimate the general multi-variable linear regression model and test the statistical significance of the results.

Unit III

Prediction in two-variable and K–Variable LRM; Multicollinearity: Nature, detection, consequences, and remedy. Specification Errors and Measurement errors. Heteroscedasticity: Meaning, Consequences, detection, and remedy

LO: This module will enable the student to understand prediction in a two and multi-variable linear regression model; and gain an idea about the consequences and solution to violation of the least square assumptions like the absence of multicollinearity, correct specification of the model, correct measurement of variable, and homoscedasticity.

Unit IV

Generalized Least square and weighted least square estimation; Auto-correlation: Meaning, Detection, Consequences and remedy. Dummy variable models: Estimation; Testing the structural stability of regression models; Interaction effects; Seasonal analysis; Piecewise Linear regression

LO: This module will enable the student to gain an idea about the consequences and solution to violation of the least square assumption of absence of autocorrelation among errors; and understand dummy variables and their usage in regression analysis.

Text Reading

- ✓ *Johnston (1991): Econometric Methods, Mc Graw Hill Book Co*

Suggested References

- ✓ *Koutsoyiarnis, A. (1992): Introduction to Econometrics, OUP*
- ✓ *Dougherty, C. (1992): Introduction to Econometrics, OUP.*
- ✓ *Kmenta, J. (1997): Elements of Econometrics, University of Michigan Press*
- ✓ *Gujarati, D & Sangeetha (2007): Basic Econometrics, Mc Graw Hill Book Co.*

Core I **19.Economics of Growth and Development**

Course description

This course shall help the students learn the neoclassical growth models of Solow; Meade; Robinson; Kaldor and Pasinetti; render them capable of discussing Cambridge's criticism over the measurement of capital and understand the importance of endogenous growth theories which highlight human capital as an essential component for a country like India. It also aids in analyzing the investment decisions through investment criteria along with their merits and demerits.

Course Outcomes:

1. Understanding the transition of growth theories across schools of thought, and developing an insight into the non-economic factors influencing growth.
2. To equip students to critically analyze selected models of endogenous growth and delve into their theoretical, empirical, and analytical framework.
3. Examining the important contribution of capital & technology to the process of growth and development.
4. Understanding the dynamics of development policies.

Unit I

Theories of Economic Growth: Neo-Classical Growth Models of Solow and Meade; Mrs. Joan Robinson's Growth Model; Cambridge Criticism of Neo-Classical Analysis of Growth – Controversy on the Measurement of Capital.

LO: This module helps in a critical understanding of the growth and development theories and making a comparative analysis of the models of growth.

Unit II

Endogenous Growth, Intellectual Capital, Role of Learning, Education and Research, Optimal Savings and Ramsay Model, Two Sector Growth Model of Ujawa

LO: This module helps in understanding how investment made in education and research and development can lead to the creation of new ideas, technologies, and innovations that can propel economic growth.

Unit III

Growth Models of Kaldor and Pasinetti; Technological Progress – Embodied and Disembodied; Hicks- Harrod Neutrality Approach. Golden Rule of Capital Accumulation.

LO: Upon completion of this module, the student acquires the ability to appreciate Pasinetti's and Kaldor's contributions and the role of capital accumulation along with its implication in the progress of the economy.

Unit IV

Production Function Approach to Economic Growth; Total Factor Productivity; Growth Accounting; Transitional Dynamics; Convergence Hypothesis; Inequality and Development Reasons for a direct relation; reasons for an inverse relation; empirical studies. Human decision-making and development policy.

LO: This module makes the learner capable of understanding the way Total Factor Productivity growth contributes significantly to a country's transition and examines the growth-inequality relationships.

Text Reading

- ✓ *Todaro, M. P. (1994): Economic Development, Longman Publishing, New York.*
- ✓ *Acemoglu, D. (1995): Introduction to Modern Economic Growth, Princeton University Press.*
- ✓ *Jones, C. I. (2001): Introduction to Economic Growth, W. W. Norton & Company, New York.*
- ✓ *Thirwal, A.P. (2003): Growth and Development: With special reference to Developing Economies, Palgrave MacMillan, New York.*
- ✓ *Jones, H. G. (1984): Economic Growth, V. N. Reinhold Company, Ltd. England.*
- ✓ *Barro, R. J. & Sala – I – Martin, X. (2004): Economic Growth, PHI, New Delhi.*
- ✓ *Vanden–Berg, H. (2001): Economic Growth and Development, Mc Graw Hill, New York.*
- ✓ *Basu, Kaushik (2003): Analytical development economics: The less developed economy revisited, MIT Press Cambridge.*
- ✓ *World Development Report 2015: Mind, Society, and Behaviour*

SEMESTER VIII

Core I **20. Microeconomics III**

Course description

This course shall help the students in having a theoretical understanding of consumer behavior and decision-making and to get acquainted with recent advances in microeconomic theory and acquire the skills to apply the theoretical knowledge in research. It shall explore the Consumers‘ choice involving risk and uncertainty; Production function: types and properties; Theories of Cost and general equilibrium theory. The course also shall impart theoretical knowledge on distribution and welfare aspects of economic activities.

Course Outcomes:

1. To have an understanding of the basic tools of reasoning applied to analyze consumer behaviour and explore the Consumers‘ choices involving risk and uncertainty.
2. Getting a deeper knowledge about the paradigm of neo-classical economics.
3. Critically analyzing the marginal analysis.
4. To gain a fair knowledge about the distribution and welfare aspects of economic activities.

Unit I

Utility Function, Lexicographic Ordering, Price & Income elasticities of demand, Slutsky Equation, Homogeneous and Homothetic utility functions; Theory of Revealed Preference, Strong Axiom of revealed preference; The Substitution effect; Consumers‘ choice involving Risk and Uncertainty: N – M Utility Function, Utility – Expenditure duality, Inter-temporal consumption

LO: This module shall impart on the students an understanding of concepts like utility function, preference ordering, elasticity, Slutsky equation, Revealed preference theory, N-M Utility theory, duality in consumer theory, and inter-temporal consumption.

Unit II

Homogeneous production function, Cobb-Douglas, CES Production functions and their properties, multi-product firm and its equilibrium, Kuhn-Tucker conditions, duality in production, production under uncertainty, linear production functions

LO: This module shall help the students examine the commonly used production functions and firm’s equilibrium

Unit III

Critical evaluation of marginal Analysis: Baumol's sales Revenue maximization, Williamson's model of managerial discretion, Marris model of managerial enterprise. Theories of cost and pricing: full cost**,** average cost and Marginal cost pricing theories. Limit pricing theory of Bain and its recent developments including Sylos-Labinis model.

LO: This module shall provide a critical understanding of marginal analysis and explore modern theories of cost and pricing.

Unit IV

Neo-classical Approach, Product exhaustion theorem, Euler's theorem, distribution theories in imperfect product and Factor markets. Pareto optimal conditions; B-S Social welfare function, Compensation criteria, optimum welfare under market imperfections and externality.

LO: This module shall ensure that the learner is ableto understand and explain Euler's theorem and theories of distribution in product and factor markets; and develops an understanding of concepts of social welfare function, the compensation criteria, and optimum welfare under externality and market imperfections.

Text Books

- ✓ *Henderson, J. M. & Quandt, R.E. (1980): Micro Economic Theory – A Mathematical Approach, Mc Graw Hill Co.*
- ✓ *Koutsoyiannis, A: Modern Microeconomics, ELBS/Macmillan*
- ✓ *Gravelle, H & Rees, R (2004): Micro Economics, 3rd Edition, FT Prentice Hall, Pearson*
- ✓ *Mankiw, (2006): Principles of Micro Economics, Cengage Learning India, New Delhi*
- ✓ *Landsburg, S. E. (2008): Pricing, Cengage Learning India, New Delhi*

Reference Books

- ✓ *Varian, H. R. (1992): Micro Economic Analysis, WW Norton & Co., New York.*
- ✓ *Maddala, G.S. & Miller, E (2004): Micro Economics: Theory and Application, Tata Mc Graw Hill, New Delhi.*
- ✓ *Baumol, W. J. (1977): Economic Theory & Operation Analysis, Prentice Hall of India, New Delhi.*
- ✓ *Bilas, R. A. (1985): Micro Economic Theory, McGraw Hill Publishers.*
- ✓ *Michael Z. Wetzstein (2013): Microeconomic Theory: Concepts and Connections, 2nd Edition, Routledge*
- ✓ *Snyder, C & Nicholson, W (2008): Fundamentals of Micro Economics, Cengage learning, New Delhi.*

Core I **21. Macroeconomics III**

Course description

This paper aims to analyze and establish the functional relationship between economy level variables and aggregates. It provides a proper understanding of macroeconomic theoretical structure. It tries to educate the students on an extended and advanced IS-LM framework with the explanations on trade cycles and the new classical approach along with policy implications.

Course Outcomes:

1. Enhancing the understanding of wage-price flexibility with dynamic stochastic settings on an extended and advanced IS-LM framework.
2. Gaining conceptual clarity about the theoretical aspects, foundations, and principles of the trade cycle theories.
3. Having a critical understanding of a new school of thought called _new classical approach to macroeconomics and its policy implication‘.
4. Gaining an insight into and understand theories and practices relating to financial intermediation.

Unit I: Extended IS-LM

Keynesian views on interest. The IS-LM model; Change in general Equilibrium: a change in investment, a change in the money supply, Extension of IS-LM model with government sector (government spending, taxation); Relative effectiveness of monetary and fiscal policies; Extension of IS-LM models with flexible wage and flexible prices, Wage-Price flexible with Pigou Effect and other effects.

LO: This module shall impart clarity regarding wage-price flexibility in an extended IS-LM framework along with the effectiveness of monetary and fiscal policies.

Unit II: Trade Cycle Theories

Meaning and Characteristics of Trade Cycles; its different phases; Theories of Trade cycle: Schumpeter, Kaldor, Samuelson, Hicks, Goodwin‘s model of Trade Cycle, Hawtrey‘s Monetary Theory,Hayek‘s Over-investment Theory and Keynes‘ views on Trade Cycles Control of business cycle

LO: This module shall help the learner in developing a clear and comprehensive understanding of the fluctuations in a nation’s real GDP over time.

Unit III: New classical approach

The new classical critique of micro foundations, the new classical approach; Policy implications of new classical approach – empirical evidence. Lucas Critique and the need for microfoundations; the Dynamic General Equilibrium (DGE) approach to macro analysis: optimization problem of a representative household; optimization problem of a representative.

LO: Upon completion of this module, the learners shall be able to bring out the implications of Lucas' critique and examine the microeconomic foundations of macroeconomic models.

Unit IV

Financial intermediation – a mechanistic model of bank deposit determination; A behavioural model of money supply determination, a demand determined money supply process; RBI approach to money supply; money supply and open economy; control of money supply.

LO: This module shall impart an integrated overview of both theoretical and practical issues related to modern financial intermediation on the students.

Text Reading

- ✓ *Dornbusch, Fisher and Starz (2018): Macroeconomics, 13th Edition, Mc Graw Hill*
- ✓ *Richard T. Froyen (2005): Macroeconomics, 2nd Edition, Pearson Education Asia, New Delhi.*
- ✓ *Edward Shapiro (2001): Macroeconomics Analysis- Galgotia Publication Private Limited, 5th Edition, New Delhi.*
- ✓ *Gregory N. Mankiw (2010): Macroeconomics, 7th edition, Cengage Learning India Private Limited, New Delhi*

Reference Books:

- ✓ *R. Levacic and A Rebmann: Macro Economics - An Introduction to Keynesian-Neo-Classical Controversies*
- ✓ *Dwivedi, D. N. (2018): Macroeconomics -Theory and Policy. 5th Edition, Tata McGraw Hill.*
- ✓ *Romer, D (2012): Advance Macroeconomics, New York, McGraw Hill*
- ✓ *Acemoglu, D. (2009): Introduction to Modern economic Growth, Princeton University press.*

Core I **22. Public Economics II**

Course description

This course aims to provide the students with thorough analytical understanding to analyze public goods, externalities, market failures; economics of government expenditure, taxation and public borrowing. It helps to critically analyze fiscal policies/finance and its implication in Indian Economy. On successful completion of this course, the students will be able to apply the principles of public economics in analyzing various government policies.

Course Outcomes:

- To understand the evolutionary roles of government and the challenges to derive the social preferences.
- Getting education about the theories of taxation, and optimal direct and indirect taxes.
- To have an understanding of ways the governments select public projects through cost-benefit analysis.
- Learning why and how powers should be decentralized for the effective provisioning of public goods and the role of the finance commission in India in transferring funds from the Union to state and local governments.

Unit I: Role of Government

Role of government and fiscal functions-Allocation, Distribution and Stabilization branch; Private and public mechanism for allocating resources; Problems for allocating resources. Arrow's impossibility theorem; Median Voter Theorem

LO: This module will teach students the normative roles of the government and the challenges in aggregating the preferences of individuals to arrive at social preferences.

Unit II: Public Revenue

Optimal Taxation: Optimal commodity taxes, Optimal income taxes, Principles of tax equity– Benefit principle of taxation, Ability to pay principle, Efficiency of taxation- Excess burden and deadweight loss, Incidence of taxation- incidence under perfect competition- partial and general equilibrium analysis, incidence under monopoly. Gender Budgeting, Outcome Budgeting.

LO: This module will teach students about the optimal theories of direct and indirect taxes, gender budgeting, and

outcome budgeting.

Unit III Evaluation of Public Expenditure

What is cost-benefit analysis, cost benefit analysis and externalities, and consumer surplus, Shadow pricing, Disco Moduleng and the cost of capital. Effects of public expenditure on production, distribution and economic activities; public sector pricing policy-average cost and marginal cost pricing, Criteria for public investment- Social cost benefit analysis

LO: This module will educate students about the decision-making process in case of public sector projects and the implications of government spending on the economy

Unit IV: Budget and Fiscal federalism

Principles of multi-Module finance; The decentralisation theorem, Theory of club goods, Tiebout hypothesis: Voting with your feet, Fiscal federalism in India- Vertical and horizontal fiscal imbalances, corrective measures; Constitutional provisions; Theory of Grants- matching vs non matching grant, general vs earmarked grants Latest Finance Commission Recommendations, Devolution of resources and grants; Resource transfer from Union to States – Criteria for transfer of resources

LO: This module will teach students about the theoretical arguments for multitier government and their optimal size. It will also teach the role of the finance commission in India in transferring funds from union to state and local governments.

Text Reading

- ✓ *Cullis, J. & Jones, P. (2009): Public Finance and Public Choice. Oxford University Press.*
- ✓ *Musgrave, R. A. & Musgrave, P. B. (2004): Public Finance in Theory and Practice. Fifth edition, TATA McGraw-Hill*
- ✓ *Herber, B. P. (1967): Modern Public Finance. Richard D. Irwin, Homewood.*
- ✓ *Stiglitz, J. E (2000) Economics of the Public Sector. W W Norton*
- ✓ *Rangarajan, C. and D. K. Srivastava (2011) _Federalism and Fiscal Transfers in India'. Oxford University Press, New Delhi.*

Core I 23. Economics of Social Sector

Course Description

The course aims to acquaint and familiarize students with the economics of the social sector. The modules incorporated in this course provide an analysis of issues at the theoretical level and also with regard to the specificity of issues prevailing in the Indian context. The prime objective of the course is to expose the students to the issues and concerns of various social sectors in India

Course Outcomes:

1. To explore the relationship between education and the economy and identify the major ways education contributes to economic growth.
2. To develop an understanding of planning, financing, and cost-benefit analysis of education.
3. To get introduced to the use of economic models to understand the behaviors of actors in the healthcare sector.
4. To gain a general overview of India‘s Healthcare Sector.

Unit I: Introduction to Economics of Education

Economics of Education: definition, methods, evidence and policy, Classical Economists and Education; Human Capital: historical root, uses, sources, values, investment in human capital; education and economic growth: dimensions, sources, contribution

LO: This module shall enable the students to understand how education is related to the economy.

Unit II: Investment in Education

Education Production Function: concept, estimation, role in policy analysis; Costs of Education: direct and indirect; Benefits of Education: types, measurement; Returns to Education: meaning, type, estimation

LO: This module shall explain how expenditure on education can looked upon as an investment and discuss the rationale for cost analysis in education.

Unit III: The Demand for and supply of Health and Health Services

Demand for Health and health care: concept, a theoretical and empirical investigation, determinants;

Economics of moral hazards; Supply of health and health care: concept, determinant; Health Production: concept and estimation; Health and Development: theory and evidences;

LO: This module shall provide an overview on basic economic theories and models applied to health care provider and shall correlate health with development.

Unit IV: Overview of India's Health Sector

Features of Indian Health Sector; Health Care System in India: history, structure, programs, infrastructure, health information system; Public Health in India: Health Sector Reform in India.

LO: Upon completion of this module, the learner will get exposed to India's health care system and public health.

Text Reading

- ✓ *Cohn, Elchanan (1972):* ***The Economics of Education****, Lexington Books, D. C. Heath and Company, Lexington.*
- ✓ *Blaug, M. (1970):* ***An Introduction to the Economics of Education****, Allen Lane The Penguin Press, London*
- ✓ *Zweifel, P., Breyer, F. and Kifmann, M. (2009):* ***Health Economics****, Springer-Verlag Berlin Heidelberg*
- ✓ *Rout, H. S. ((2011):* ***Healthcare Systems: A Global Survey****, New Century Publication, New Delhi*

Additional Reading

- ✓ *Tu, P. N. V. (1969): The Classical Economists and Education, Kyklos, 22(4): 691-716.*
- ✓ *Blaug, M. (1985): Where are We Now in the Economics of Education?, Economics of Education Review, 4(1): 17-28.*
- ✓ *Levin, H. (1989): Mapping the Economics of Education. An Introductory Essay, Educational Researcher, 18(4):13–73.*
- ✓ *Machin, S. (2008): The New Economics of Education: Methods, Evidence and Policy, Journal of Population Economics, 21(1): 1-19.*
- ✓ *Schultz, T. W. (1961): Investment in Human Capital, American Economic Review, 51(1): 1-17.*
- ✓ *Kiker, B. F. (1966): The Historical Roots of the Concept of Human Capital, Journal of Political Economy, October 1966, 481-99*
- ✓ *Sweetland, S. R. (1996): Human Capital Theory: Foundations of a Field of Inquiry, Review of Educational Research, 66(3): 341-59.*
- ✓ *Kiker, B. F. (1969): Von Thunen on Human Capital, Oxford Economic Papers, 21(3): 339- 43.*
- ✓ *Becker, G. S. (1962): Investment in Human Capital: A Theoretical Analysis, Journal of Political Economy, 70(5): 9-49.*

Three Year Degree Course with Single Major and Two Minor

Semester	Core-I	Core-II	Core-III	Multi-disciplinary	AEC	SEC	VAC	Community Engagement & Services/ Field work /Internship	Total Minimum Credit
I	**2X4=8**	**1X4=4**		**1X3=3**	**1X4=4** Odia		**1x3=3** Environmental Studies and Disaster management		**22**
II	**2X4=8**		**1X4=4**	**1X3=3**	**1X4=4** English	**1X3=3**			**22**
									44
III	**3X4=12**	**1X4=4**		**1X3=3**			**1X3=3**		**22**
IV	**3X4=12**		**1X4=4**					**1x4=4**	**20**
									42
V	**3X4=12**	**1X4=4**				**1x3=3**	**1x3=3**		**22**
VI	**2X4=8**		**1X4=4**			**1x3=3**	**1x3=3**		**18**
									40
Total	**15X4=60**	**3X4=12**	**3X4=12**	**3X3=9**	**2X4=8**	**3x3=9**	**4x3=12**	**1x4=4**	**126**

In case a student opts for NCC and clears 'C' certificate additional 16 Credit shall be awarded and total credit shall be 126+16 = 142 Credit

***The BOS in each subject has to design a course for improving skill in their field.**

****Principles of Management can be offered as an option.**

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

English

Odisha State Higher Education Council, Bhubaneswar
Government of Odisha

Semester	Subjects
I	Core I - Introduction to Literary Studies
	Core II- Introduction to Language and Linguistics
II	Core III- British Poetry and Drama
	Core IV – European Classical Literature
III	Core V- Indian Classical Literature
	Core VI- British Poetry and Drama (17 and 18 century)
	Core VII- British Prose (18 Century)
IV	Core VIII- The Romantic Revival and English Literature of the Period
	Core IX- The Victorian Era
	Core X- The American Literary Renaissance
V	Core XI- Introduction to Indian Writing in English
	Core XII- Literary Criticism from Plato to Leavis
	Core XIII- Modern English Literature (20th Century)
VI	Core XIV- Literatures from the World-I
	Core XV- Indian Myths and Epics: New Perspectives
VII	Core XVI- Literary Theory and Criticism
	Core XVII- Women's Writings
	Core XVIII- Emerging Trends in Literary Studies
	Core XIX- Modern English Literature-II
VIII	Core XX- Postcolonial Literatures
	Core XXI- Literatures from the World-II
	Core XXII- Postmodernism and Literary Theory
	Core XXIII- Research Methods in Literary Studies

Programme Objectives (POs)

The objectives of the B.A. (Honours) English programme are manifold and start with imparting students with an in-depth knowledge and understanding through the core courses which form the basis of English namely, Classical Literature, British Literature, Comparative Literature, Indian Literature, American Literature, World Literature, Popular Literature, Translation, Language and Linguistics and ELT. The AEC, SEC, VAC and Community Engagement courses are designed for more specialized and/or interdisciplinary content to equip students with a broader knowledge base. Literary Theory course is aimed to equip the students to apply theory and criticism to study literature. The project is expected to give an effect of how research leads to new findings.

Programme Specific Outcomes (PSOs)

- Understanding the basics of English Literature and language; particularly concepts in Classical Literature, British Literature, American Literature, Translation, Language and Linguistics, ELT, Media Writing, Editing and Proofreading, Communication Skills and Professional Writing.
- Learn to think critically and analyze literary theories.
- Gain hands on experience to study Literature further.
- Gain hands on experience to use language further.
- Viewing English (Literature, Language and Linguistics) as a training ground for the mind for developing a critical attitude and the faculty of logical reasoning that can be applied to diverse fields.
- Develop an appreciation of English language, its connotations and interpret and appreciate the didactic purpose of literature.
- Take cognizance of the historical, social and cultural context of each literary work and thereby make connections between literature and society & appreciate literature's ability to stimulate feeling.
- Sensitize students to the aesthetic, cultural and social aspects of literature.
- Present an extensive view of the cultural and social patterns of the society in specific time and situations in which it flourished by covering all walks of human life- rational, irrational, carnal, and emotional.
- Make the students aware of literature written/translated in English speaking countries like UK/ USA
- Develop a more complex understanding of the history, literature, narrative

techniques, drama techniques, kind of fiction and drama existing in Britain, America and India.

- Augment the understanding of fundamental tenets of classical literature.
- Develop an understanding of the various connotations of the term 'New Literatures' and the difference from other terms like Commonwealth Literature etc.
- Develop an insight regarding the idea of world literature and the pertinent issues of feminism, racism and diasporic relocations.
- Provide job opportunities through 'skill-based' courses.
- Recreate a response through creative indulgences like script-writing, dialogue writing, and be able to exploit his/her creative potential through online media like blogging.
- Engage students with various strategies of drafting and revising, style of writing and analytical skills, diagnosing and developing scholarly methodologies, use of language as a means of creative expression, will make them effective thinkers and communicators.
- Demonstrate comprehension of and listener response to aural and visual information.
- Comprehend translation as a useful bridge between various linguistic regions.
- Assist students in the development of intellectual flexibility, creativity, and cultural literacy so that they may engage in life-long learning.
- Acquire basic skills to pursue translation as research and career.
- Introduce the learners to the nuances of the changing media scenario in terms of production of media content.
- Inculcate in them the skills of reporting, editing and feature writing in print medium to have a career perspective in media and journalism.
- Deepen knowledge in English literature for higher studies.
- Help the students to prepare for competitive exams.
- Create a possibility to emerge as prospective writers, editors, content developers, teachers etc.

Scheme of Evaluation

Midterm(20)+Final(80)=100 Marks

Midterm Test: 20 marks

5x1=5 (short answer, short notes, comprehension questions)
5x1=5(Analytical, perspective-based and critical-analysis questions)
5x2=10 (activity/practice/reports/case studies/response papers/assignments etc.)

The teacher will have the flexibility of conducting internal examinations or assess the student's learning outcomes through activities, short projects, case studies etc. from all 20 marks/ in parts

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Final Examination: 80 marks
Unit1:1 long answer question+ 1 short note/analysis (15+05) =20 marks
Unit 2: 1 long answer question+ 1 short note/analysis (15+05) =20 marks
Unit 3: 1 long answer question+ 1 short note/analysis (15+05) =20 marks
Unit 4: 1 long answer question+ 1 short note/analysis (15+05) =20 marks

Semester-I

Core I Introduction to Literary Studies

Course Objectives

- The course "An Introduction to Literary Studies" deals with questions concerning the nature of literature
- It will provide an understanding of the major literary genres and it gives an overview of the formation of the same.
- This beginner's course has been designed for students who have opted for a major in English and it will benefit students with a general introduction to literature as well as induce them for a more serious pursuit going ahead in this programme.
- The course will enable students to improve their proficiency through reading, respond to texts, draw lessons and insights from those, understand and appreciate other cultures and relate to events, characters and their own lives.
- It will also to expose students to models of good writing.
- It will develop the potential of students in a holistic, balanced and integrated manner encompassing the intellectual, spiritual, emotional and physical aspects in order to create a balanced and harmonious human being with high social standards.

Unit-1

What is literature? Literature and Society, Literature and Life, Literature and Science, the literary canon, genre, literary theory and criticism
Poetry: Lyric, Sonnet, Ballad, Ode, Elegy, Epic, Mock-Epic, Dramatic monologue
Prose: Novel, Novella, Short Story, Essay, Biography, Autobiography
Drama: Comedy, Tragedy, Tragi-comedy, one act-play, Epic play

Unit-2

Poems to be read: Sonnet no 130 by William Shakespeare, 'The Skylark' by P B Shelley, 'Human Seasons' by John Keats, 'The Brook'' by Lord Alfred Tennyson, "Because I could not stop for death" by Emily Dickinson, "Village Song" by Sarojini Naidu, "Love After Love" by Derek Walcott

Unit-3

Prose to be read: "The Bet" by Anton Chekhov, "The Verger" by Somerset Maugham, "The Fight between Leopards" by Jim Corbett, "The Night the Tiger came" by Manoj Das, "The Bicycle" by Dash Benhur, "The Man who Knew Too Much" by Alexander Baron, "The way to Equal Distribution" by Mahatma Gandhi, "A Call to Youth" by S. Radhakrishnan and "Miseries of the Rich" by G B Shaw

Unit-4

Drama to be read: *Doctor Faustus* by Christopher Marlowe Acr-5, Scene-2, or *As You Like It* by William Shakespeare, Act-II, Scene-VII, (Forest of Arden scene), *Ghasiram Kotwal* (Act-I) by Vijay Tendulkar or One Act play *The Bear* by Anton

Chekhov.

The teacher is supposed to acquaint the learners with the difference in tone, language and setting between a comedy, a tragedy and a tragi-comedy.

Prescribed Texts

Hillis Miller, "What Is Literature?" (Canvas); *The Norton Introduction to Literature*, Introduction (1-13)

"What is literature?" by Terry Eagleton in *An Introduction to Literary Theory* Blackwell Publication 1983, 1996

The Widening Arc: A Selection of Prose and Stories, Ed. Asima Ranjan Parhi, S Deepika, Pulastya Jani, Kitab Bhavan, Bhubaneswar, 2016.

"The Art of Fiction" by Henry James (available on the internet archive)

Melodious Songs and Memorable Tales, Gyanajuga, 2015.

Suggested Readings

- ✓ *Kennedy, X.J. and Dana Gioia. Literature: An Introduction to Fiction, Poetry, and Drama. 11th ed. Portable ed. New York: Longman, 2009.*
- ✓ *Gardner, Janet E. et al ed. Literature: A Portable Anthology, 2nd ed. Bedford/St. Martin's, 2009. ISBN: 978-0-312-46186-7*
- ✓ *Shelley, Mary. Frankenstein (Case Studies in Contemporary Criticism). Ed. Johanna M. Smith. Bedford/St. Martin's, 2000. ISBN: 978-0-312-19126-9*
- ✓ *Mays, Kelly J. The Norton Introduction to Literature, Portable 13th Edition. ISBN: 978- 0-393-42046-3*
- ✓ *Miller, Hillis. "What Is Literature?" (Canvas); The Norton Introduction to Literature, Introduction (1-13)*
- ✓ *Forster, E. M. Aspects of the Novel*
- ✓ ***https://archive.org/stream/in.ernet.dli.2015.136479/2015.136479.***
- ✓ ***https://www.thereader.org.uk/featured-poem-the-brook-by-alfred-lord-tennyson/***
- ✓ ***https://archive.org/stream/georgebernardsh00hendgoog/georgebernardsh00hendgoog_djvu.txt***
- ✓ ***https://archive.org/stream/in.ernet.dli.2015.136479/2015.136479.The-Works-Of-J-B-Priestley_djvu.txt***

Core II Introduction to Language and Linguistics

Course Objectives

- The course aims to familiarise students with the subject of linguistics and prepares them for further in-depth study of language-related issues.
- It will provide students an idea of language evolution, structure, and the way it functions.
- It aims to develop in the students the knowledge of linguistic sign, language structure, correlation of lingual and mental processes, language and speech, the structure of language, types of language units, systems of writing, linguistic diversity, etc.

Unit-1

- Language and Human Language
- Language and Society
- Nature and features of Human language; language and human communication; differences from other forms of communications
- Artificial intelligence and human language

Unit-2

- Linguistics and Language
- What is linguistics; development in the history of linguistic studies
- Contribution of linguistics to other areas of human inquiry
- Linguistics for jobs

Unit-3

- Phonetics and accuracy in pronunciation
- IPA
- Stress and Intonation
- Morphology

Unit-4

- Word formation processes
- Nature of sentences and connected texts
- Syntax and discourse
- Language and meaning: semantics

Prescribed Texts

An Introductory Text Book on Linguistics and Phonetics by R L Varshney
Global Englishes: A Resource Book for Students by Jennifer Jenkins, 3rd Edn, Special Indian Edition, Routledge, 2016

An Introduction to Language and Communication by Ekmajian et al
Indian English through Newspapers, Concept Publishing Company, New Delhi, 2008 by A R Parhi

Suggested Readings

- ✓ Linguistics by David Crystal
- ✓ "Localising the Alien: Newspaper English and the Indian Classroom", Asima Ranjan Parhi, English Studies in India, Springer, 2018. E Book-ISBN-978-981-13-1525-1.
- ✓ The Indianization of English (OUP) by Braj B Kachru
- ✓ Communicative Competence by Tanutrushna Panigrahi. Notion Press Publishing, India, Malaysia and Singapore
- ✓ David Crystal, English as a World Language
- ✓ A Course in Linguistics by Tarni Prasad. PHI
- ✓ Linguistics: A Very Short Introduction by P H Mathews. OUP

Students may be encouraged to refer to online resources

Semester-II

Core III British Poetry and Drama

Course Objectives

- The course seeks to provide the students a historical background of the literature of the time.
- It aims to introduce to the students British poetry and drama from the 14th to the 17th centuries.
- It aims to offer the students an exploration of certain seminal texts that set the course of British poetry and plays.

Unit-1

A historical overview

The period is remarkable in many ways. 14th century poetry evokes an unmistakable sense of "modern" and the spirit of Renaissance is marked in the Elizabethan Drama. The Reformation brings about sweeping changes in religion and politics. A period of expansion of horizons; both intellectual and geographical.

Unit-2

Chaucer: "The Wife of Bath's Tale"

Or

"Sir Gawain and the Green Knight" (Part 1, lines 1-490)

Unit-3

Thomas Campion: "Follow Thy Fair Sun, Unhappy Shadow", Sir Philip Sidney: "Leave, O Love, which reachest but to dust", Edmund Waller: "Go, lovely Rose", Ben Jonson: "Song to Celia", William Shakespeare: Sonnets: "Shall I compare thee to a summer's day?", "When to the seasons of sweet silent thought", "Let me not to the marriage of true minds."

Unit-4

William Shakespeare: *Macbeth* or *Twelfth Night.*

Marlowe: *The Jew of Malta* or Thomas Dekker: *The Shoemaker's Holiday*

Prescribed Texts

The Short Oxford History of English Literature by Andrews Sanders. Oxford: OUP

Weller Series: *Macbeth* & *Twelfth Night*

The Jew of Malta by Christopher Marlowe

The Shoemaker's Holiday by Thomas Dekker

Seventeenth-Century British Poetry, 1603-1660 edited by Rumrich and Chaplin. A Norton Critical Edition

The Broadview Anthology of Sixteenth-Century Poetry and Prose. Edited by Marie Loughlin; Sandra Bell; Patricia Brace

All prescribed pieces are available as digital copies at internet archive. www.archive.org

Suggested Readings

- ✓ *A History of English Literature: Traversing Centuries* by Chaudhury & Goswami. Orient Blackswan
- ✓ *Shakespeare: The Invention of the Human Sanders* by Harold Bloom
- ✓ 'Madness as Method: A Study of Shakespearean Tragic Hero', *Atlantic Critical Review*, Ed. Mohit K. Roy, Delhi,, Vol. 5, No.2, April-June 2006, pp.1-10.

- ✓ *Marlowe: A Critical Study* by J. B. Steane. Cambridge University Press
- ✓ *Critical Essays on Christopher Marlowe* by Emily Carroll Bartels. G.K. Hall

Core IV European Classical Literature

Course Objectives

- The objective of this course is to introduce the students to European Classical literature, commonly considered to have begun in the 8th century BC in ancient Greece and continued until the decline of the Roman Empire in the 5th century AD.
- It seeks to acquaint the students with the origins of the European canon.
- It aims to provide a historical overview of classical antiquity like ancient Greece, the rise and decline of the Roman Empire
- It will lead to a discussion on the cultural history of the Greco-Roman world centered on the Mediterranean Sea.

Unit-1

Homer *Odyssey* (Book I)
OR
Virgil *Aeneid* (Book I)

Unit-2

Sophocles *Oedipus the King*
OR
Aeschylus *Prometheus Bound*

Unit-3

Aristophane's *Frogs*
OR
Plautus *Asinaria*

Unit-4

Horace *Ars Poetica* or *Essay on Poetic Theory*
OR
Longinus *On the Sublime*, Chapter 7, 39

Prescribed Texts

All the texts are available for access on Project Gutenberg. https://www.gutenberg.org And in Internet Archive at www.archive.org with the same titles. Students may be encouraged to browse the sites.

Suggested Readings

- ✓ European Classical Literature by Amit Ganguly and Jay Bansal
- ✓ Hand Book On European Classical Literature by Biplab Banerjee
- ✓ Mimesis: The Representation of Reality in Western Literature by Erich Auerbach. USA: Princeton University Press. 2013.
- ✓ Ancient Greek Literature and Society by Charles Rowan Beye, Ithaca, New York: Cornell University Press. 1987

Semester-III

Core V Indian Classical Literature

Course Objectives

- This course aims at creating awareness among the students of the rich and diverse literary culture of ancient India.
- It purports to engage students with and discuss different genres of classical literature and their scope.
- It will introduce them to the Indian Epic tradition and show how they will assimilate the theory and practice of Sanskrit Classical drama, engage with Indian aesthetic theory such as Alankar and Rasa.
- It will enable students to understand the concept of Dharma and the heroic in Indian Classical Drama.

Unit-1

Vedic Literature: *SamjnanaSukta* Rig Veda X.19, *SivasankalpaSukta* Yajur Veda XXX.I.6 and *PurushaSukta* Yajur Veda XV. XXXI. 1-16

Unit-2

Selections from Epic Literature: Vyasa 'The Dicing' and 'The Sequel to Dicing,' 'The Book of the Assembly Hall', 'The Temptation of Karna', Book V 'The Book of Effort', OR 'Ayodhya Kanda' (Book II), 1st Canto of *The Ramayana of Valmiki*

Unit-3

Sanskrit Drama: Kalidasa, *Abhijnanasakuntalam*, Act IV.
Or
Bhavabhuti's *Rama's Last Act* (*Uttararamacharita*
Or
*Mrcchakatika*by Sudraka, Act I.

Unit-4

Aesthetics and Maxims: Bharata's *Natyashastra,* Chapter VI on Rasa theory
Sahitya Darpana of Vishvanatha Kaviraja Chaps- I& II
Nitisataka of Bhartrhari 20 verses from the beginning

Prescribed Texts

- ✓ The New Vedic Selection Vol 1, Telang and Chaubey, Bharatiya Vidya Prakashan, New Delhi
- ✓ The Mahabharata: tr. And ed. J.A.B. van Buitenen (Chicago: Brill, 1975) pp. 106-69.
- ✓ The Ramayana of Valmiki. Gita Press Edition.
- ✓ Abhijnanasakuntalam by Kalidasa. tr. M.R Kale, Motilal Banarasi Dass, New Delhi.
- ✓ Rama's Last Act (Uttararamacharita) by Bhavabhuti. tr. Sheldon Pollock (New York: Clay Sanskrit Library, 2007)
- ✓ Mrcchakatikaby by Sudraka, Act I, tr. M.M. Ramachandra Kale (New Delhi: Motilal Banarasidass, 1962)

- ✓ Bharata's Natyashastra. English Translation by M.M. Ghosh, Asiatic Society, Kolkata, 1950.
- ✓ Sahitya Darpana of Vishvanatha Kaviraja Chaps- I& II. English Translation by P.V. Kane, Motilal Banarsidass, New Delhi.
- ✓ The Satakatraya edited by D.D. Kosambi, Published in Anandashrama Series, 127, Poona, 1945. Also, English Translation published from Ramakrishna Mission, Kolkata

Suggested Readings

- ✓ Kalidasa. Critical Edition, Sahitya Akademi.
- ✓ B.B Choubey, New Vedic Selection, Vol 1, Bharatiya Vidya Prakashan, New Delhi
- ✓ H.H. Wilson (Tr.)-Rig Veda
- ✓ Bharata, Natyashastra, tr. Manmohan Ghosh, vol. I, 2nd edn. (Calcutta: Granthalaya,1967) chap. 6: 'Sentiments', pp. 100–18.
- ✓ J.A.B. VanBuitenen, 'Dharma and Moksa', in Roy W. Perrett, ed., Indian Philosophy, vol. V, Theory of Value: A Collection of Readings (New York: Garland, 2000) pp.33–40.
- ✓ Vinay Dharwadkar, 'Orientalism and the Study of Indian Literature', in Orientalism and the Postcolonial Predicament: Perspectives on South Asia, ed. Carol A. Breckenridge and Peter van der Veer (New Delhi: OUP, 1994) pp. 158–95
- ✓ 'Pedagogy and Indian Poetics: The Case of Michael Henchard'. Dialogue. Ed. S. Hajela and R.Sharma. Vol-VI, No.I, June 2010, pp.90-94.
- ✓ Universals of Poetics by Haldhar Panda 16

Core VI **British Poetry and Drama (17 and 18 century)**

Course Objectives

The objective of this course is to acquaint students with the Jacobean and the 18th century British poetry and drama.

It aims to familiarize students with the period of the acid satire and the comedy of humours.

It will expose the students to the period of supreme satiric poetry and the comedy of manners.

Unit-1

John Milton: "Lycidas" or "L'Allegro and Il Penseroso"

John Donne: "A Nocturnal upon S. Lucie's Day", "Love's Deity"

Andrew Marvel: "To His Coy Mistress", "The Garden", "A Dialogue between the Soul and the Body"

Unit-2

Ben Jonson: *Volpone* or *The Alchemist*

Unit-3

Pope: "Ode on Solitude", "Summer", "Sound and Sense", "The Dying Christian to his Soul" Robert Burns: "A Red Red Rose", "A Fond Kiss", "A Winter Night", "My Heart's in the Highlands"

Unit-4

Dryden's *All for Love* or Congreve's *The Old Bachelor*

Prescribed Texts

- ✓ *"Lycidas" by John Milton (Eds. Paul & Thomas), Orient Blackswan*
- ✓ *"L'Allegro and Il Penseroso" by John Milton (Eds. Paul & Thomas), Orient Blackswan*
- ✓ *Seventeenth-Century Poetry: An Annotated Anthology by Robert Cummings (Editor)*
- ✓ *Ben Jonson: Volpone*
- ✓ *Ben Jonson: The Alchemist*
- ✓ *Dryden's All for Love*
- ✓ *Congreve's The Old Bachelor*
- ✓ *Selected Poetry: Alexander Pope. Edited with an Introduction and Notes by Pat Rogers. Oxford World's Classics*
- ✓ *Complete Poems and Songs of Robert Burns. by Robert Burns*

Suggested Readings

- ✓ A History of English Literature: Traversing the Centuries - Chowdhury & Goswami, Orient Black swan

- ✓ The Norton Anthology of English Literature, Vol. B: The Sixteenth Century &The Early Seventeenth Century
- ✓ The Norton Anthology of English Literature: The Restoration and the Eighteenth Century

Course VII British Prose (18 Century)

Course Objectives

The objective of the paper is to acquaint the students with two remarkable forms of literature: Essay and novel.

It will make the students aware of the shift of emphasis from reason to emotion in the literature of the period.

It aims to expose students to the development of prose

Unit-1

Joseph Addison: "On Giving Advice", 'Reflections in Westminster Abbey", "Defence and Happiness of Married Life"

Richard Steele: "Recollections", "On Long-Winded People"

Unit-2

Daniel Defoe: *Robinson Crusoe*

Unit-3

Oliver Goldsmith: "A City Night-Piece", "On National Prejudices", "Man in Black"

Samuel Johnson: "Expectations of Pleasure frustrated", "Domestic Greatness Unattainable", "Mischiefs of Good Company", "The Decay of Friendship"

Unit-4

Thomas Gray: "Elegy written in a country churchyard"

Prescribed Texts

- ✓ Readings in English Prose of the Eighteenth Century (Houghton Mifflin Company, 1911), by Raymond Macdonald Alden
- ✓ "Elegy written in a country churchyard" by Thomas Gray
- ✓ Robinson Crusoe by Daniel Defoe
- ✓ "A City Night-Piece", "On National Prejudices", "Man in Black" by Goldsmith
- ✓ "Expectations of Pleasure frustrated", "Domestic Greatness Unattainable", "Mischiefs of Good Company", "The Decay of Friendship" by Samuel Johnson
- ✓ The Macmillan Anthology of English Literature: The Restoration and Eighteenth Century. Edited by Ian McGowan.

Suggested Readings

- ✓ *A History of English Literature*: Traversing the Centuries - Chowdhury & Goswami, Orient Blackswan

- ✓ *The Norton Anthology of English Literature*: The Restoration and the Eighteenth Century
- ✓ *English Literature*: William J. Long

Semester-IV

Core VIII The Romantic Revival and English Literature of the Period

Course Objectives

- The course aims at acquainting the students with the Romantic period and some of its representative writers.
- Another of its major objectives is to give the students a broad idea of the social as well as historical contexts that shaped this unique upheaval.
- It also aims to define what is romantic revival through the representative texts.

Unit-1

William Blake: "The Holy Thursday", "The Chimney-Sweeper" (from Songs of Innocence) "London", "A Poison Tree" (from Songs of Experience), 'The Tger'

Unit-2

William Wordsworth: "Tintern Abbey"
Samuel Taylor Coleridge: "Kubla Khan"

Unit-3

John Keats "Ode to a Nightingale" and "Ode on Melancholy"
P.B. Shelley: "Ode to the West Wind" and "To a Skylark"

Unit-4

William Wordsworth: "Preface to Lyrical Ballads" (2nd Edition)
OR
P.B. Shelley: "A Defence of Poetry"

Prescribed Texts

- ✓ *The Project Gutenberg eBook of Songs of Innocence and of Experience by William Blake*
- ✓ *https://www.poetryfoundation.org/poems/ (for Coleridge, Wordsworth, Keats, Shelly's poems)*
- ✓ *"Preface to Lyrical Ballads" by William Wordsworth (2nd Edition)*
- ✓ *"A Defence of Poetry" P.B. Shelley (https://www.poetryfoundation.org/articles/69388/a-defence-of-poetry)*

Suggested Readings

- ✓ The Routledge History of Literature in English
- ✓ History of English Literature: Traversing the Centuries: Chowdhury & Goswami
- ✓ Romantic Imagination by C. M. Bowra
- ✓ Pelican Guide to English Literature. Vol.5. Edited by Boris Ford

- ✓ 'Nature as Therapy: A Romantic Construct'. Rajiv Gandhi University Research Journal. Ed.Vol-10, No. 1-2, Jan-Dec 2011. pp.1-10.

Core IX **The Victorian Era**

Course Objectives

- The course seeks to expose students to the literature produced in Britain in the 19th century or of the politically known as the Victorian period.
- The focus of the course is mainly on prose (fictional and non-fictional) and criticism. The 19th century embraces three distinct periods of the Regency, Victorian and late Victorian.
- The course aims to provide to the students an understanding of the19th century British literature which is mainly famous for the Romantic Movement, but was also a witness to major socio-political developments like industrialization, technological advancements and large-scale mobilization of people from the rural to the urban centers.
- It will allow students to explore much of the prosaic activities/developments needed for the time and the culture and society debate.

Unit-1

Charles Lamb: "Old China" Tennyson: "Ulysses"
Leigh Hunt: "A Few Thoughts on sleep" Browning: "My Last Duchess"

Unit-2

Mary Shelly: *Frankenstein*
OR
Jane Austen: *Pride and Prejudice*

Unit-3

Charles Dickens: *Hard Times*
OR
Elizabeth Gaskell: *Mary Barton*

Unit-4

Mathew Arnold: "Culture and Anarchy" (Chapter 1)
OR
William Hazlitt: "Lectures Chiefly on the Dramatic Literature of the Age of Elizabeth" from *Lectures on English Poets*

Prescribed Texts

- ✓ ***Like all prescribed texts these texts are available on line at***
- ✓ *https://www.poetryfoundation.org/poems/*
- ✓ *Project Gutenberg https://www.gutenberg.org/*

- ✓ *The Nineteenth Century: 1798-1900 (Anthologies of English Literature) by Brian Martin*

Suggested Readings

- ✓ *Chapter 4, 5 from a Short Introduction to English Literature by Jonathan Bate*
- ✓ *The English Novel by Terry Eagleton*
- ✓ *The Cultural Critics by Leslie Johnson*
- ✓ *The Nineteenth-century English Novel by James Killroy*
- ✓ *https://onlinecourses.nptel.ac.in/noc21_hs28/preview*
- ✓ *The Oxford Handbook of the Victorian Novel ed by Lisa Rodensky*

Core X **The American Literary Renaissance**

Course Objectives

- This course aims to focus on the era of American (specifically United States) literature which literary critics often refer to as the American Renaissance. It marks the beginning of a period of remarkable change and growth in American literary sophistication and ambition.
- The course will explore how this period begins with the growing influence of Romanticism, which had swept through Europe since its beginnings in Germany in the late 18th century and inspired two generations of English writers in the decades since.
- The students will know how the era of the American Renaissance is identical with the era of American Romanticism; the terms are nearly interchangeable. Romanticism in this country took the form of American Transcendentalism, whose key thinker is Ralph Waldo Emerson. The decades that followed brought a succession of major writers — including but not limited to Nathaniel Hawthorne, Walt Whitman, Herman Melville, and Emily Dickinson — who engaged with this philosophical movement in various ways.

Unit-1

Genesis and evolution, and the defining myths of American Literature—city on a hill, the frontier spirit, the American Dream, manifest destiny, *epluribusunum*
Edgar Allan Poe: "The Raven" "The Tell-Tale Heart"

Emily Dickinson: "Because I could not stop for death", "The Soul selects her own Society", "I Died for Beauty", "I Dwell in Possibility"

Unit-2

Nathaniel Hawthorne: "The Birth-mark" Or "Young Goodman Brown"

Herman Melville: "Bartleby, the Scrivener"

Unit-3

Read Ralph Waldo Emerson, from *Nature* (First twenty pages of the text)

Walt Whitman, "Song of Myself"

Unit-4

Henry David Thoreau, from *Walden* (First twenty pages of the text)

Sojourner Truth, "Speech to the Women's Rights Convention"

Prescribed Texts**:**

- ✓ The Norton Anthology of American Literature, 7th Edition, Volumes A and B.
- ✓ The Annotated Emerson, edited by David Mikics (Belknap-Harvard)
- ✓ The Scarlet Letter and Other Writings by Nathaniel Hawthorne, edited by Leland Person (Norton)
- ✓ Leaves of Grass: First and Death-Bed Editions, by Walt Whitman, edited by Karen Karbiener (Barnes & Noble Classics)
- ✓ The Poems of Emily Dickinson, edited by R. W. Franklin (Belknap-Harvard)

Suggested Readings

- ✓ *Pelican Guide to English Literature. Vol. 9. American Literature. Ed. Boris Ford*
- ✓ *Highlights of American Literature. Dr. Carl Bode (USIS)*
- ✓ *A Short History of American Literature, Krishna Sen and Ashok Sengupta. Orient Black Swan, 2017*
- ✓ *Moby-Dick; Or, The Whale by Herman Melville, edited by Hershel Parker (Norton)*
- ✓ *The Story of American Literature. By Ludwig Lewisohn*
- ✓ *Norton Anthology of American Literature. (Head notes on authors and periods to be read)*

Semester-V

Core XI Introduction to Indian Writing in English

Course Objectives

- The objective of this course is to give the students an understanding of the evolution of Indian Writing in English and appreciate its literature from the period of western colonization to the twenty-first century.
- It aims to introduce students to major movements and figures of Indian Literature in English through the study of selected literary texts, to create literary sensibility and emotional response to the literary texts and to implant a sense of appreciation of literary text.
- This course aims to expose students to the artistic and innovative use of language employed by the writers and to instill values and develop human concern in students through exposure to literary texts.

Unit-1

- "Our Casuarina Tree" by Toru Dutt
- "Coromandel Fishers" by Sarojini Naidu
- "Night of the Scorpion" by Nissim Ezekiel
- "Introduction" by Kamala Das
- "The Bus" by Arun Kolatkar
- "The Frog and the Nightingale" by Vikram Seth
- "Her Garden" by Meena Alexander
- "Narcissus" by Easterine Kire

Unit-2

- "The Secret of Work" by Swami Vivekananda
- "India and Greece" & "The Old Indian Theatre" by Jawaharlal Nehru (Selection from The Discovery of India)
- "Religion in a Changing World" by Dr. S. Radhakrishnan (Religion, Science and Culture)
- Passages from *The Autobiography of an Unknown Indian* by Nirad C. Chaudhuri (*Picador Book of Modern Indian Literature* by Amit Chaudhuri

Unit-3

- *Final Solutions* by Mahesh Dattani

Or

- *Silence: The Court* by Vijay Tendulkar

Unit-4

- Under the Banyan Tree by R.K Narayan
- The Little Gram Shop by Raja Rao
- The Night Train at Deoli by Ruskin Bond
- Unaccustomed Earth by Jhumpa Lahiri

Prescribed Texts

- ✓ *A Clutch of Indian Masterpieces: Extraordinary Short Stories from the 19th Century to the Present edited by David Davidar*
- ✓ *Interminable Tales: The Short Stories. Published online by Cambridge University Press*
- ✓ *The Golden Treasury of Indo-Anglian Poetry by Gokak V.K, Sahitya Akademi, 2006*
- ✓ *The Oxford India Anthology of Modern Indian Poets by A. Mehrotra. OUP, 1993*
- ✓ *Contemporary Indian Poetry in English, Salem Peeradina, Macmillan 1972*
- ✓ *The Discovery of India, Jawaharlal Nehru, 1946*
- ✓ *Karma Yoga by Vivekananda, Advaita Ashrama Publication, 2012*
- ✓ *Religion, Science and Culture by Radhakrishnan, Orient Paperback*

Suggested Readings

- ✓ Picador Book of Modern Indian Literature. Amit Chaudhuri, 2001
- ✓ A Clutch of Indian Masterpieces by David Davidar, Aleph Books, 2016
- ✓ Lahiri, Jhumpa, Unaccustomed Earth, Random House India, 2008
- ✓ Collected Plays by Mahesh Dattani, Penguin, India.

Core XII **Literary Criticism from Plato to Leavis**

Course Objectives

This course seeks to introduce students to the tradition of Western Literary Criticism from Classical Antiquity to the Early Modern period.

It aims to guide students through several centuries of critical writing.

This paper is to be read in conjunction with a companion course in Literary theory in the following semester.

Unit-1

- Plato: The Republic (Book X)

OR

- Aristotle: The Poetics (Ch. 1, 2, 3, 4)

Unit-2

- Samuel Johnson: *Preface to Shakespeare*

OR

- S. T Coleridge: *Biographia Literaria* (Ch. 13 & 14)

Unit-3

- William Wordsworth: *"Preface" to Lyrical Ballads*

OR

- Matthew Arnold: "The Function of Criticism at the Present Time"

Unit-4

- T. S. Eliot: "To Criticize the Critic"

OR

- F. R. Leavis: "Under Which King, Bezonian?"

Prescribed Texts

- ✓ *Johns Hopkins Guide to Literary Theory and Criticism. Relevant chapters. Johns Hopkins University Press, US.*
- ✓ *Critical Approaches to Literature by David Daiches*
- ✓ *The Function of Criticism: From Spectator to Post-structuralism by Terry Eagleton (Chapter on Criticism from Norton Anthology)*

Suggested Readings

- ✓ *An Introduction to Literature, Criticism and Theory by Andrew Bennett and Nicholas Royle. Available online at https://bookoblivion.com*
- ✓ *The Norton Anthology of Theory and Criticism 2001, 2010 and 2018*

- ✓ *Literary Criticism: An Introduction to Theory and Practice by Charles E. Bressler*

Core XIII **Modern English Literature (20th Century)**

Course Objectives

- The course aims to present to the students a historical overview of the era
- It highlights the developments in society and economy, leading to a crisis in western society known as the First World War and the resultant change in the ways of knowing and perceiving.
- It presents the triggers for the modern consciousness, such as Marx's concept of class struggle, Freud's theory of the unconscious, Bergson's durée, Nietzsche's will to power and Einstein's theory of relativity.
- This also aims to familiarize the students with the new literature of Britain in the early decades of the 20th century. The course will mainly focus on the modernist canon, founded on Ezra Pound's idea of 'make it new', but will cover war poetry, social poetry of the 1930s and literary criticism.

Unit-1

- T.S. Eliot "The Love Song of J. Alfred Prufrock"
- W.B. Yeats "Sailing to Byzantium"
- Ezra pound "In a Station of the Metro"
- T.E. Hulme "Autumn"
- Hilda Dolittle "The Mysteries Remain"

Unit-2

- Wilfred Owen: "Dulce Et Decorumest"
- Siegfred Sassoon: "Suicide in the Trenches"
- W.H Auden: "The Unknown Citizen"
- Stephen Spender: "An Elementary Classroom in a Slum"
- Louis MacNeice: "Prayer before Birth"

Unit-3

Virginia Woolf: *Mrs. Dalloway* or James Joyce: Stories from *Dubliners* ("The Sisters", "Evelyn", "An Encounter", "Clay", "Two Gallants")

Unit-4

Literary Criticism: Henry James, "The Art of Fiction" or T.S. Eliot, "Tradition and Individual Talent"

Prescribed Texts

- ✓ ***Like all prescribed texts these texts are available online in their respective names at***
- ✓ *https://www.poetryfoundation.org/poems/*

- ✓ *Project Gutenberg https://www.gutenberg.org/*
- ✓ ***Additionally, teachers can help students to locate texts in other online valid websites.***

Suggested Readings

- ✓ *Pelican Guide to English Literature: The Modern Age (ed.) Boris Ford*
- ✓ *Jonathan Bate, English Literature: A Very Short Introduction, Oxford Paperback*
- ✓ *Peter Faulkner, Modernism. London: Methuen*
- ✓ *Peter Childs, Modernism, New Accents. Routledge*

Semester-VI

Core XIV Literatures from the World-I

Course Objectives

- This paper proposes to introduce the students to the study of world literature through a representative selection of texts from around the world.
- It aims to read beyond the classic European canon by including defining literary texts from other major regions/countries, except the United States of America, written in languages other than English, but made available to the readers in English translation.
- It aims to provide students an idea of non-European canon in literary studies.

Unit-1

The idea of world literature: Scope, definition and debates Uses of reading world literature

Unit-2

- Albert Camus *The Outsider*

OR

- Fyodor Dostoevsky *Notes from Underground*

Unit-3

- V S Naipaul *In a Free State*

OR

- Chimamanda Ngozi Adichie *Purple Hibiscus*

Unit-4

- Pablo Neruda "Death Alone", "Furies and Suffering", "There's no Forgetting", "Memory"

OR

- Octavio Paz "from San Ildefonso Nocturne", "Between Going and Staying the Day Wavers", "Humayun's Tomb", "Motion"

Prescribed Texts

- ✓ ***Like all prescribed texts these texts are available online in their respective names at***
- ✓ *https://www.poetryfoundation.org/poems/*
- ✓ *Project Gutenberg https://www.gutenberg.org/*
- ✓ ***Additionally, teachers can help students to locate texts in other online valid websites.***

Suggested Readings

- ✓ *The Complete Stories by Franz Kafka:*

- ✓ *http://www.vanderbilt.edu/olli/class materials/Franz_Kafka.pdf*
- ✓ *"What is world Literature?" (Introduction) David Damrosch http://press.princeton.edu/chapters/i7545.html*
- ✓ *Tagore's comparative world literature*
- ✓ *https://www.academia.edu/4630860/Rabindranath_Tagores_Comparative_World_Literature*
- ✓ *Dostoevsky's Notes from Underground*
- ✓ *http://www.gutenberg.org/files/600/600-h/600-h.htm*
- ✓ *Margaret Atwood's "Stone Mattress" http://www.newyorker.com/magazine/2011/12/19/stonemattress*
- ✓ *Margaret Atwood's Pretend Blood*
- ✓ *http://www.independent.co.uk/artsentertainment/books/features/first-lives-club-pretend-blood-a-short-story-by-margaret-atwood-1779529.html*
- ✓ *Alice Munro's short Stories http://www.newyorker.com/magazine/2013/10/21/the-bear-came-overthe mountain-2, http://www.newyorker.com/magazine/2008/09/08/face*
- ✓ *Poems of Octavio Paz :http://www.poetrysoup.com/famous/poems/best/octavio_paz*
- ✓ *Weltliteratur: John Wolfgang von Goethe in Essays on Art and Literature Goethe: The Collected Works Vol.3*
- ✓ *Rabindranath Tagore "World Literature": Selected Writings on Literature and Language: Rabindranath Tagore Ed. Sisir Kumar Das and Sukanta Chaudhuri Damrosch*
- ✓ *Goethe's "World Literature Paradigm and Contemporary Cultural Globalization" by John Pizer*
- ✓ *"Something Will Happen to You Who Read": Adrienne Rich, Eavan Boland' by Victor Luftig. JSTOR iv.*
- ✓ *Comparative Literature University of Oregon.*
- ✓ *David Damrosch, What is World Literature? Princeton University Press*
- ✓ *"WLT and the Essay" World Literature Today Vol. 74, No. 3, 2000. JSTOR Irish University Review, Vol.23 Spring 1, Spring-Summer.*

Core XV **Indian Myths and Epics: New Perspectives**

Course Objectives

- This course aims to study the literary aspects of the ancient Indian myths and their living values along with the studies of the Indian epic literature.
- While the primary purpose of the course is to make students understand and appreciate how the Indian mythic and epic literature are being re-imagined and re-mapped in the contemporary time, through the reading of primary sources in translation, the course aims to cover the important mythological themes and students will be able to assess the role of mythology as a central component of society and the theories that have been developed to understand its role in meaning-making.
- It demonstrates a basic literacy in the mythology that includes explanations of basic narratives, major figures, and context of the myths, myths' cultural expressions and the relationships between the texts.
- To explore the blurred space of gender and bust the western theoretical frame of gender and sexuality while reading Indian epics in a philosophical, literary and aesthetic blend not alien to spirituality.

Unit-1

A historical and cultural overview on the ancient Indian Literature, myths and epics and their retellings and adaptations

"Three Hundred Ramayanas" by A K Ramanujan

"Introduction" in *The History of Indian Literature, Volume-I* by Maurice Winternitz (Motilal Banarasidass Publishers, New Delhi)

"A Passage to India" by Walt Whitman

Unit-2

"Ancient Ballads of Hindustan-I" (Savitri) by Toru Dutta

From *Mirabai* translated by Robert Bly, 'The Dark one won't speak to me', 'You pressed Mira's seal of love', 'Dark One, how can I sleep?', O my friends, what can you tell me of Love'.

From *Sri Radha* by Ramakanta Rath, Section 1, 5, 13, 19 ('Come take half of the remainder of my life'), 42.

From *Of Sons and Fathers* by Asim Ranjan Parhi,

"Another February", "De-fathered", "Fathers are but Sons under Stress", "The Historic Burden" and "Crestfallen"

Unit-3

Drama

Vasavadutta by Sri Aurobindo

Unit-4

Shakuntala by Namita Gokhale

Prescribed Texts

- ✓ *A K Ramanujan's essay 'Three Hundred Ramayanas' The History of Indian Literature, Volume-I by Maurice Winternitz (Motilal Banarasidass Publishers, New Delhi)*
- ✓ *Love and the Turning Seasons, Ed. Andrew Schelling, page 165-166 and 173-174.*
- ✓ *Sri Radha by Ramakant Rath, translated by the poet, Grass Roots, Bhubaneswar.*
- ✓ *Of Sons and Fathers by Asim Ranjan Parhi Pakhsighara Prakashanee (Published by Bird Nest), Bhubaneswar.*
- ✓ *Plays by Sri Aurobindo: A Survey, S. Krishna Bhatta, Indian literature, Jan-Jun 1974, Sahitya Akademi.*

Suggested Readings

- ✓ *A K Ramanujan's essay 'Three Hundred Ramayanas' The History of Indian Literature, Volume-I by Maurice Winternitz (Motilal Banarasidass Publishers, New Delhi)*
- ✓ *The following essays provide reference material for the poems from Of Sons and Fathers:*
- ✓ *Ajanta Dutt in Indian Literature (UGC CARE), Vol.4, No.330. July-August 2022, Sahitya Akademi, New Delhi page, 180-182. https://www.jstor.org>indilite for the poems from Of Sons and Fathers.*
- ✓ *Mridul Bordoloi, Dibrugarh University Journal of English Studies (UGC CARE), Vol.31. 2022-2023.pp.89-98.www.dujes.co.in for the poems from Of Sons and Fathers.*
- ✓ *Vaisali, the last essay in BharatiyaManyaprad, An International Journal of Indian Studies, Ed. Neerja A Gupta, Vice Chancellor,Sanchi University of Buddhist Studies, Vol.-IX,May 2022. ISSN-2321-8444.*
- ✓ *Nanda Kishore Biswal, Pioneer, Bhubaneswar edition, 5.1.2023.*
- ✓ *B.Mohanta, Gandhigram Literary Review 7, Tamilnadu, Vol. 7, No. I, (2018), 2023.*
- ✓ *R. Swain, Transcript: Journal of Literature and Cultural Studies, Research Journal of Bodoland University, Kokrajhar, Assam, Volume 10, December 2022, published in May 2024. Pg. 175-178. Print copy ISSN-2347-1743.e-journal ISSN-2582-9858.*
- ✓ *"Fathers are but Sons under Stress", Review paper on the anthology of poems Of Sons and Fathers, Special Issue of The Odisha Journal of English Studies, Vol.14, Issue–I, 2024(Santwana Haldar).*
- ✓ *Preface and Introduction (Suman kumar Ghai and Dinesh Kumar Mali respectively) of Pitaon aur Putron ki, Yash Publications, New Delhi, 2024. Page 7-30.*
- ✓ *Review article, page 291-294 and Research article, Page 310-324 in Byanjana, June-August 2024.*
- ✓ *Plays by Sri Aurobindo: A Survey, S. Krishna Bhatta, Indian literature, Jan-Jun 1974, Sahitya Akademi.*
- ✓ *Indian English Novelists: An Anthology of Critical Essays. Madhusudan Prasad*
- ✓ *Indian Literature, All Volumes by Sisir Kumar Das*

Semester-VII

Core XVI **Literary Theory and Criticism**

Course Objectives

- This course aims to give the students a firm grounding in a major methodological aspect of literary studies known as theory.
- This will expose the students to the development of theory in the last half-century or more which is of critical importance in the academic study of literature.
- This course emphasises that far from being seen as a parasite on the text, theory has been seen as a discourse that provides the conceptual framework for literature.

Unit-1

Crisis in literary criticism and the search for a method
Rise of theory
What does it mean to theorise?

Unit-2

New Criticism and Formalism: Paradox, irony, tension, intentional and affective fallacy, heresy of paraphrase and of Formalism such as ostranenie, literariness, foregrounding, dominant and deviant
Cleanth Brooks, "The Language of Paradox"
Or
W.K. Wimsatt Jr. and Monroe Beardsley, "The Intentional Fallacy"
Viktor Shklovsky, "Art as Device"
Or
Roman Jakobson, "Linguistics and Poetics"

Unit-3

Structuralism and Poststructuralism: Emphasis on the main critical concepts of Structuralism such as binary opposition, synchrony and diachrony, syntagm and paradigm and of Poststructuralism such as collapse of the binary, difference, mise-en-abym, erasure
Gerard Gennette, "Introduction" to *Narrative Discourse* (https://archive.org/stream/NarrativeDiscourseAnEssayInMethod/NarrativeDiscourse-An EssayInMethod_djvu.txt)
Or
Roland Barthes, "Face of Garbo" and "French Fries" (from *Mythologies*)
Jacques Derrida, "On the Idea of the Supplement" (from *Of Grammatology*)
Or
Michel Foucault, "What is an Author?"
(http://artsites.ucsc.edu/faculty/Gustafson/FILM%20162.W10/readings/foucault.author.pdf) (Either of the two essays can be taught depending on availability)

Unit-4

Marxism and New Historicism: Emphasis on main critical concepts of Marxism such as base, superstructure, ideology, commodification, determination and of New Historicism such as power, resistance, high-low dialectic
Louis Althusser, "Letters on Art" (from *Lenin and Philosophy and Other Essays*)
Or
Georg Lukacs, "On Reification" (from *History and Class Consciousness*)

Raymond Williams, "In Memory of Lucien Goldmann"

Or

Stephen Greenblatt, "Learning to Curse" (Either of the two essays can be taught depending on availability)

Prescribed Texts

- ✓ *Modern Literary Theory: A Reader by Patricia Waugh (Anthology Editor), Philip Rice (Anthology Editor)*
- ✓ *Literary Theory: An Anthology, 3rd Edition by Julie Rivkin (Editor), Michael Ryan (Editor)*
- ✓ ***Like all prescribed texts these texts are available online in their respective names at***
- ✓ *https://www.poetryfoundation.org/poems/*
- ✓ *Project Gutenberg https://www.gutenberg.org/*
- ✓ ***Additionally, teachers can help students to locate texts in other online valid websites.***

Suggested Readings

- ✓ *Terry Eagleton, Literary Theory: An Introduction for Foreign Students*
- ✓ *David Robey and Anne Jefferson, Modern Literary Theory*
- ✓ *Jonathan Culler, Literary Theory: A Very Short Introduction*
- ✓ *Richard Barry, Beginning Theory*
- ✓ *Tony Bennett, Formalism and Marxism*
- ✓ *Terence Hawkes, Structuralism and Semiotics*
- ✓ *Christopher Norris, Deconstruction: Theory and Practice*
- ✓ *Veeser H. Aram (ed), The New Historicism Reader*
- ✓ *Greg Gerrard, Eco-Criticism*

Core XVII **Women's Writings**

Course Objectives

- The course aims to acquaint the students with the complex and multifaceted literature by women of the world.
- It proposes to provide students ideas reflecting the diversity of women's experiences and their varied cultural moorings.
- It has included different forms of literature by women authors: poetry, fiction, short fiction, and critical writings. In certain respects, it interlocks concerns of women's literary history, women's studies and feminist criticism.

Unit-1

In Defence of a Literature of Their Own and Discoursing at Par
Mary Wollstonecraft: "Introduction" from "A Vindication of the Rights of Women"
Virginia Woolf: "Chapter 1" from *A Room of One's Own*
Or
Simone de Beauvoir: "Introduction" from *The Second Sex*

Unit 2

Desiring Self: Fiction by Women from the Centre
Charlotte Bronte: *Jane Eyre*
Or
Emily Bronte: *Wuthering Heights*
Jean Rhys: *Wide Sargasso Sea*
or
Dorris Lessing: *The Grass is Singing*

Unit 3

Desiring and Dissenting Self: Fiction by Women from the Periphery
Krupabai Satthianadhan: *Saguna* or *Kamala*
or
Prativa Ray: *Yajnaseni*

Unit-4

Tongues of Flame: Poetry by Women from Across the World
*Any Four Poets to be read
Kamala Das "An Introduction" & "The Sunshine Cat"
Eunice de Souza "Women in Dutch Painting" & "Remember Medusa?"
Tishani Doshi "Ode to the Walking Woman" & "What the Body Knows"
Maya Angelou "Phenomenal Woman" & "I Know Why the Caged Bird Sings"
Sylvia Plath "Mirror" & "Barren Woman"
Margaret Atwood "This is a Photograph of me" & "The Landlady"

Prescribed Texts

- ✓ *Virginia Woolf, A Room of One's Own*
  https://victorianpersistence.files.wordpress.com/2013/03/a- room- of-ones- own-virginia-woolf-1929.pdf
- ✓ *Mary Wollstonecraft, A Vindication of the Rights of Women: Introduction*
  http://pinkmonkey.com/dl/library1/vindicat.pdf
- ✓ *Maya Angelou's Poems*
  http://www.poemhunter.com/i/ebooks/pdf/maya_angelou_2012_6.pdf

- ✓ *Sylvia Plath's Collected Poems*
  https://monoskop.org/images/2/27/Plath_Sylvia_The_Collected_Poems_1981.pdf
- ✓ *Margaret Atwood's Poems*
  http://www.poemhunter.com/margaret-atwood/poems/
- ✓ *Eunice de Souza, "Remember Medusa?" & "Women in Dutch Painting"*
  http://www.poetrynook.com/poem/remember-medusa
  http://www.gallerie.net/issue14/poetry1.html
- ✓ *Tishani Doshi's Poems*
  http://www.poemhunter.com/i/ebooks/pdf/tishani_doshi_2012_6.pdf
- ✓ *Simone de Beauvoir, The Second Sex*
  http://burawoy.berkeley.edu/Reader.102/Beauvoir.I.pdf

Suggested Readings

- ✓ *Toril Moi, Sexual Textual Criticism*
- ✓ *Elaine Showalter, A Literature of Their Own*
- ✓ *Sandra Gilbert and Susan Guber, The Mad Woman in the Attic*
- ✓ *Gill Plain and Susan Sellers, A History of Feminist Literary Criticism. Cambridge University Press. 2007.*
- ✓ *Essays to be read: Helen Carr, "A History of Women's Writing" and Mary Eagleton, "Literary Representations of Women"*
  https://mthoyibi.files.wordpress.com/2011/09/05-history-of-feminist-literary-criticism_gill-plain-and- sus.pdf

Core XVIII **Emerging Trends in Literary Studies**

Course Objectives

- This course aims to urge students and teachers to broaden their knowledge and alter the ways in which they read and appreciate literature in the current times.
- New social forces and influences have been changing the ways literature and literary studies are perceived and negotiated. This course will enable students to understand the changing trends in literary studies.
- This course will expose students to the emerging genres of literature

Unit-1

Literary Studies in the New Millenium: Genres, Theories and Styles

Unit-2

Introduction to Life Writing: Definition, evolution and the present models
Introduction to Travel Writings: Definition, historical evolution and forms

Unit-3

Introduction to Literature and Climate Change "The Living Mountain" by Amitav Ghosh

Unit-4

Introduction to Literature and the Digital Age: Reading and Writing in the digital media, Digital Humanities and Cyberliterature *Machines Like Me* by Ian McEwan, Jonathan Cape 2019

Prescribed Texts

- ✓ ***Like all prescribed texts these texts are available online in their respective names at***
- ✓ *https://www.poetryfoundation.org/poems/*
- ✓ *Project Gutenberg https://www.gutenberg.org/*
- ✓ ***Additionally, teachers can help students to locate texts in other online valid websites.***

Suggested Readings

- ✓ *The Norton Anthology of Theory and Criticism: Third Edition*
- ✓ *On Life-writing By Zachary Leader, Oxford University Press, 2015*
- ✓ *Encyclopedia of Life Writing, Edited by Margaretta Jolly, Vol-I, Routledge, 2001*
- ✓ *The Cambridge Companion to Travel Writing by Peter Hulme, Tim Youngs*
- ✓ *Cambridge University Press, Nov 21, 2002*
- ✓ *Literature and the Anthropocene by Pieter Vermeulen, Routledge, 2020*
- ✓ *Cambridge Companion to Literature and the Anthropocene by John Parham, Cambridge University Press, 2021*
- ✓ *The Great Derangement by Amitav Ghosh, Chicago University Press, 2016*
- ✓ *The New Climate WarBy Michael E. Mann, 2021*
- ✓ *"From Metaphors of the Forest to Obscurity of Hastags: Reading Richard Flanagan's The Living Sea of Waking Dreams" in Environmental Activism and Global Media, Springer, Switzerland, 2024. Page 309-324. https://doi.org/10.1007/978-3-031-55408-7. (Munira Salim and Asima Ranjan Parhi)*

- ✓ *Literature in the Digital Age: An Introduction (Cambridge Introductions to Literature) by Adam Hammond, 2016*
- ✓ *A Companion to Digital Literary Studies, edited by Ray Simens and Susan Schreibman. Blackwell Publishing, 2008. [Freely available at http://www.digitalhumanities.org/companion DLS/]*
- ✓ *Literary Studies in the Digital Age: An Evolving Anthology, edited by Kenneth Price and Ray Siemens. MLA Commons, 2013 Freely available: https://dlsanthology.commons.mla.org*

Core XIX **Modern English Literature-II**

Course Objectives

- This course aims to provide students exposure to British literary works of the modern period.

- The course also aims to present to the students the literature of the age which are marked by an anxiety about history, tradition and order and reflect a spirit of self-questioning, a flair for experimentation and a desire for innovation.
- It will expose students to the new writing techniques of the times.

Unit-1

- James Joyce: *A Portrait of the Artist as a Young Man*

  Or
- Virginia Woolf: *To The Light House*

Unit-2

- T.S. Eliot: "Burnt Norton" from *Four Quartets*

  Or
- W.B. Yeats: Selected Poems: "The Lake Isle of Innisfree", When You Are Old", Reconciliation", "A Coat", "Sailing to Byzantium", "Among School Children", "Leda and the Swan", "Byzantium", "Dialogue of Self and Soul"

Unit-3

- G.B. Shaw: *Saint Joan*

  Or
- Samuel Beckett: *Waiting for Godot*

  OR
- John Osborne: *Look Back in Anger*

Unit-4

- D. H. Lawrence: *Women in Love*

  OR
- E.M. Forster: *A Passage to India*

  Or
- William Golding: *Lord of the Flies*

Prescribed Texts

All the texts are available on the internet sites as well as in prints by all major international publishers in the same names.

Suggested Readings

- ✓ *Boris Ford (ed), Pelican Guide to English Literature: The Modern Age*
- ✓ *Malcolm Bradbury and James McFarlane (eds), Modernism*
- ✓ *G.S. Fraser, The Modern Writer and His World*
- ✓ *Peter Faulkner, Modernism (Critical Idiom: Methuen)*
- ✓ *Peter Childs, Modernism (New Critical Idiom: Routledge)*
- ✓ *Christopher Butler, Modernism (A Very Short Introduction: Oxford)*

Semester-XX

Core XX **Postcolonial Literatures**

Course Objectives

- This paper seeks to introduce the students to postcolonial literature, a body of literature that responds to the discourses of European colonialism and empire in Asia, Africa, Middle East, the Pacific and elsewhere.
- By focusing on representative texts situated in a variety of locations, the course aims to provide the students with the opportunity to think through and understand the layered response – compliance, resistance, mimicry and subversion - that colonial power has provoked from the nations in their search for a literature of their own.
- It also allows the students explore the various tools of postcolonial readings.

Unit-1

Definition and characteristics: Resistant descriptions, appropriation of the colonizer's language, reworking colonial art forms & etc.

Chinua Achebe: "English and the African Writer"

Ngugiwa Thiong'o: "The Quest for Relevance" from *Decolonising the Mind: The Politics of Language in African Literature*

Achebe, Chinua *"*An image of Africa: Racism in Joseph Conrad's Heart of Darkness*,"*

Scope and Concerns: Reclaiming spaces and places, asserting cultural integrity, revising history

Unit-2

- Raja Rao: *Kanthapura*

  Or
- R K Narayan: *The English Teacher*

Unit-3

- V S Naipaul: *The Mimic Men*

  Or
- Chinua Achebe: *No Longer at Ease*

Unit-4

- Nadine Gordimer: *July's People*

  Or
- J M Coetzee: *Life & Times of Michael K*

Prescribed Texts

- ✓ *Chinua Achebe: "English and the African Writer"*
- ✓ *Ngugiwa Thiong'o: "The Quest for Relevance" from Decolonising the Mind: The Politics of Language in African Literature*
- ✓ *Achebe, Chinua "An image of Africa: Racism in Joseph Conrad's Heart of Darkness," Research in African Literatures, Vol. 9, No.1, Special Issue on Literary Criticism. (Spring, 1978), pp. 1-15.* ***http://english.gradstudies.yorku.ca/files/2013/06/achebe-chinua.pdf***
- ✓ *Achebe, Chinua: "English and the African Writer"*

- ✓ *https://mrvenglish.wikispaces.com/file/view/English+and+the+African+Writer.pdf*
- ✓ *Thiong'o, Ngugi Wa. "The Quest for Relevance" from Decolonising the Mind: The Politics of Language in African Literature*https://www.humanities.uci.edu/critical/pdf/Wellek_Readings_Ngugi_Quest_for_Relevance.pdf
- ✓ *Ashcroft, Bill, Gareth Griffiths, Helen Tiffin. Post-Colonial Studies: The Key Concepts. New York: Routledge. 2007.*http://staff.uny.ac.id/sites/default/files/pendidikan/else-lilianissmhum*postcolonialstudiesthekeyconceptsroutledgekeyguides.pdf 18*

Suggested Readings

- ✓ *Ashcroft, Bill, Gareth Griffiths, Helen Tiffin. "Introduction", The Empire Writes Back: Theory and Practice in Post-Colonial Literature. London, New York: Routledge, 2nd edition, 2002.*
- ✓ *Bhabha, Homi K. The Location of Culture. Noida: Atlantic Books. 2012.*
- ✓ *Gandhi, Leela. Postcolonial Theory: An Introduction. OUP. 1998.*
- ✓ *Said, Edward. Orientalism. India: Penguin. 2001.*
- ✓ *Spivak, Gayatri Chakraborty. Can the Subaltern Speak?.UK: Macmillan.1998*
- ✓ *http://planetarities.web.unc.edu/files/2015/01/spivak-subaltern-speak.pdf*

Core XXI **Literatures from the World-II**

Course Objectives

- This course aims to present a survey of the literatures of the world through some of the major works of literature across the world.

- Students who take this course will increase their awareness of historical cultures; sharpen their critical reading, thinking, and writing skills; and deepen their cultural sensitivity.
- It will expose students to the varieties of literatures from across the globe and will satisfy the core-curriculum requirement.

Unit-1

- Jean-Baptiste Poquelin Moliere: *Tartuffe* Acts I-II (French)

  Or
- Ueda Akinari: "Bewitched" (Japan)

  Or
- Alexander S. Pushkin: "The Queen of Spades" (Russia)

Unit-2

- Rabindranath Tagore: "Punishment" (India)
- Mahashweta Devi: "Breast-Giver" (India)

  Or
- Luigi Pirandello: *Six Characters in Search of an Author* (Italy)

Unit-3

- Gabriel Garcia Marquez: "Death Constant Beyond Love" (Colombia)
- Tadeusz Borowski: "Ladies and Gentlemen, to the Gas Chamber" (Poland)

  Or
- Leo Tolstoy: *The Death of Ivan Ilyich* (Russia)

Unit-4

- Henrik Ibsen: *Hedda Gabler* (Norway)

  Or
- Franz Kafka: *The Metamorphosis* (Germany)

Prescribed Texts

- ✓ The Norton Anthology of World Literature A-C
- ✓ The Norton Anthology of World Literature D-F
- ✓ All the texts are available on the internet sites as well as in prints by all major international publishers in the same names.

Suggested Readings

- ✓ Reference Guide to World Literature. Publisher St. James Press
- ✓ Damrosch, David. How to Read World Literature. Malden, MA: Wiley-Blackwell, 2009
- ✓ D'haen, Theo. The Routledge Concise History of World Literature. London: Routledge, 2012.
- ✓ Gupta, Suman. Globalization and Literature. Cambridge, UK: Polity Press, 2009.
- ✓ Helgesson, Stefan, and Mads Rosendahl Thomsen. Literature and the World. London: Routledge, 2020.

✓ Pizer, John. The Idea of World Literature: History and Pedagogical Practice. Baton Rouge: Louisiana State University Press, 2006.

Core XXII **Postmodernism and Literary Theory**

Course Objectives

- This course offers an overview of the development of Literary Theory worldwide during after the modernist literary movement.

- It outlines the developed form of theory in the second half of the 20th century and the discussion is on the cultural perspectives regarding theory with a special focus on Marxism, Cultural Studies and Cultural Materialism.
- It exposes students to Feminist aspects of Theory and Queer studies, Postcolonial studies and Ecocriticism.
- The aim of this course is to make the students knowledgeable in the field of Theory that may help them to think critically about literary studies.

Unit-1

Cultural Materialism & New Historicism: Marxist framework of Culture and History, Historiography, Foucauldian notion of Power, Difference with Old Historicism, Stephen Greenblatt, Louis Montrose.

Unit-2

Feminism: The three waves in feminism, Gynocriticism, French Feminism- Ecriture feminine, Sexual Politics, Marxist Feminism, Lesbian Feminism, Backlash, Black Feminism, Dalit Feminism, Postfeminism, Womanism.

Queer Theory: Social constructionism of gender and sexuality, LGBTIQ, Transgender identity

Unit-3

Postmodernism: Critique of Enlightenment and Universalism, Habermas's notion of Modernity as an Incomplete Project, Lyotard's concept of incredulity towards metanarratives, Baudrillard's of Simulation, Simulacra and hyperreality, Brian McHale's ideas concept of Postmodernist literatures.

Unit-4

Postcolonialism: Eurocentrism, Orientalism, Alterity, Diaspora, Hybridity, Uncanny, Strategic Essentialism, Subaltern Studies, Postcolonial Critique of Nationalism

Eurocentrism: Anthropocentrism, Shallow Ecology vs Deep Ecology, Environmental Imagination, Ecofeminism

Prescribed Texts

- ✓ *Peter Barry: Beginning Theory*
- ✓ *Raman Selden: A Reader's Guide to Contemporary Literary Theory, 5th Edition*
- ✓ *Rice and Waugh: Modern Literary Theory: A Reader*
- ✓ *Bill Ashcroft, Gareth Griffiths and Helen Tiffin: Post Colonial Studies*
- ✓ *Terry Eagleton: Literary Theory: An Introduction.*

Suggested Readings

- ✓ *Bill Ashcroft, Gareth Griffiths and Helen Tiffin: Post Colonial Studies*
- ✓ *Chris Baldick: Oxford Concise Dictionary of Literary terms 3*
- ✓ *Hans Bertens: Literary Theory.*
- ✓ *Jonathan Culler: Literary Theory: A Very Short Introduction.*
- ✓ *M H Abrams: A Glossary of Literary Terms*
- ✓ *Margaret Drabble (Editor): The Oxford Companion to English Literature-Sixth Edition*

- ✓ *Terry Eagleton: After Theory.*
- ✓ *https://www.encyclopedia.com/literature-andarts/language-linguistics-and-literary-terms/literaturegeneral/literary-criticism*

Core XXIII Research Methods in Literary Studies

Course Objectives

- This course aims to acquaint students with the fundamentals of research.
- It will help students to write a 'Research project' in the final semester of the undergraduate programme.

- It will familiarize students with research ethics

Unit-1

Meaning and objectives of research, Types of research

Unit-2

Choosing an area and topic of research, preparing a research design

Unit-3

Primary and secondary sources, Plagiarism and Accessing library resources, Bibliographic citations

Unit-4

Research in Literary studies

Texts

- ✓ *Literary Research Guide by James Harner*
- ✓ *The Handbook of Literary Research by Correa et al*
- ✓ *The Craft of language and Literary Research by Qadri*
- ✓ *MLA Handbook, 8th, 9th edition*

Suggested Readings

- ✓ Literary Research Guide: An Annotated Listing of Reference. Sources in English Literary Studies
- ✓ By James L. Harner

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

History

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - History of India- I (From Prehistory to Vedic Age)
	Core II- Social Formations and Cultural Pattern of Ancient World
II	Core III- History of India-Ii: From State formation to early medieval (c.600BCE- c.750CE)
	Core IV - Social Formations and Cultural Patterns of the Medieval World
III	Core V- History of India-III (circa 750 -1206)
	Core VI- RISE OF THE MODERN WEST – I
	Core VII- History of India (c.1206 - 1526)
IV	Core VIII- Rise of the Modern West– II
	Core IX- HISTORY OF INDIA-Mughal India (c. 1526 - 1750)
	Core X- Historical Theories & Methods
V	Core XI- History of Modern Europe- I (c. 1780-1880)
	Core XII- HISTORY OF INDIA (c. 1750 - 1857)
	Core XIII- History of India (c. 1857 - 1950)
VI	Core XIV- History and Culture of Odisha-I (The Making of a Region from Early Times to 1568)
	Core XV- History of Orissa-I: The Making of a Region (Afghan Rule to Post Independence Period)
VII	Core XVI- History of Modern Europe II (c. 1880 - 1939)
	Core XVII- History of Modern China, 18th Century to the 20th Century
	Core XVIII- Evolution of Modern Political Thought in India
	Core XIX- Basic Principles and Methods in Archaeology
VIII	Core XX- Art and Architecture in India (Up to Medieval)
	Core XXI- A Short History of Contemporary Popular Cultures: Cinema &TV, Sports and Cuisine
	Core XXII- Tribes of Odisha through Ages
	Core XXIII- Reading Historical Essays and Writings

Programme Objectives & Outcomes

Past is before us all. Individual, family, villages, communities, regions, nations and humanity have all sense of their past. Hence, there are many claimants of and contestation of the past. In the face of such multiple claimants of the past, such as by tradition and myth of a community regarding certain notions of past, how does one foster historical thinking? Historical Thinking involves thinking about the issues of historical significance, continuity and change, progress and decline, and evidence thereof. Historical thinking involves asking relevant questions about past, discovering new sources or reanalysing the existing sources/evidence following historical methods

The UG Programmes are organised to provide the greatest flexibility to its students, with multiple entry and exit option. There are Core papers that provide the fundamental knowledge in the discipline of history and in the study of the History of India, Odisha and the World. The programme is otherwise envisaged to provide a large amount of choices so that students can tailor their education on the basis of their interests. These provide not just skills in history but also vital skills in other disciplines. The programs are interdisciplinary keeping in mind that specialisation in History is the key to access cognate skills from other disciplines. There are Skill Enhancement Courses, Multi-Disciplinary courses, Ability Enhancement Courses, etc which would facilitate overall knowledge and skill development of candidates.

Nature and Extent of the Programme

The programmes are designed in a very flexible manner with the option of multiple entry and exits. This flexibility makes the program one year certificate, two year diploma, three year degree with two majors, three year degree with One Major and two Minors, four year program with Honours with research and four year program without research. These flexibilities in Programs have been given later in the structure. Each semester is for the duration of sixteen weeks. In this syllabus, reference to important books along with link to video resources is given. Students are advised to go the website of E Pathsala, Consortium of education Communication (CEC), SWAYAM Portals to see excellent video materials.

Programme Objectives: Four Year Courses (PO)

PO 1: The Four Year History syllabus at Higher education of Odisha aims at the discipline of History which instructs students on how to read and process inform on people, societies,

cultures, events and places which are removed from our time and space. Knowledge of this past is critical in understanding the ways in which the present world is connected and responds to its history in sometimes overt and at other times more complex ways that is missed by most people.

PO 2: The program aims to develop a historical thinking that goes beyond the linear narrative of past and set it anchored to right historical thinking by developing critical analysis of the sources and their interpretation of the past.

PO 3: The Program provides information about different aspects of the past to students, to teach them how to use, analyse and interpretation of evidence, instruct them on how historians research, frame an argument and debate details which have bearing on the present.

PO 4: The program aims to develop local history by encouraging students to construct history of the locality by encouraging students to explore different dimensions of the past by collecting evidence from land officials, temples, archaeological sites, etc.

Program Outcomes (PO)

PO 1: After the completion of the four year program, students are expected to have acquired the skills of critical thinking, rational enquiry, effective communication, and exploring the relationship between past, present and historiography.

PO 2: The students will be able to know that history is a knowledge discipline and not rote memorisation of dates and events. It will enhance student's ability to carefully read a complex historical narrative by a historian in his historical writing, evaluate the use of evidence by the historians and possible selective use of evidence. In short, they are expected to construct historical narrative and formulate arguments based on a historiographical engagement

PO 3: Develop skill and knowledge of deciphering the primary sources, such as recognition of script, potteries, land records through their internship

PO 4: Develop responsible citizenry which respects gender concerns, human values and correct historical thinking and transmit them to society through community engagements

PO 5: The program enhances the Capability of students to assume leadership roles and apply the above mentioned analytical abilities in various other non-familiar contexts.

PO 6: Students will have the cognate skills such as reasoning, analysis and critical thinking

PO 7: Students will develop skill of picking up disparate sets of information from local sources and internet and weave a coherent argument with a view to reveal identifiable patterns of continuity and changes.

Graduate Attributes of History Program and Employment Opportunities

Upon successful completion with the above mentioned programme outcomes for the students, students will have attributes such as the ability to collect data from various data-mining sites, such as museum, archive, newspaper, material artefacts; analyse and process evidence and construct narrative of a particular aspect of past. Such skills will open up career opportunities in the following field

1. Museum, 2. Archives, 3.Research Institution, 4.Academic 5.Journalism 6. Development Studies 7. Archaeology 8.Archive 9.Cultural Institutions 10. International

Semester-I

Core I **History of India- I (From Prehistory to Vedic Age)**

Course Objectives

- What were the major changes in Indian history and how did they come about?
- What were the particular institutions and cultural elements in Indian society which may be considered different from those in other societies?
- Students will acquire knowledge regarding the early life and socio-cultural status of the people of ancient India. They can gather knowledge about the society, culture, religion and political history of Ancient India. They will learn about trade and urbanization of ancient civilization, like Harappan Civilization, Vedic civilizations etc
- Students will be oriented to appreciate the changes and continuity in ancient India and also learn about how various sources which are corroborated in order to construct the history of Ancient India

Course Outcomes

- Describe the antiquity of India's past and methods of construction of past
- Describe the different sources which are scientifically corroborated to construct the past
- Describe the beginning of farming communities and scientific methods which have come up in recent years
- Understand the Vedic roots of Indic civilisation

Unit-I: Reconstructing Ancient Indian History

1. Early Indian notions of History
2. Sources of Historical Writings and the Historiography concerned with this Period
3. Historical Geography (Major Harappan Sites and Sixteen Mahajanapadas).

Unit-II: Pre-historic Hunter-Gatherers and Food Production

1. Paleolithic Cultures: Upper, Middle and Lower; Tool Typologies in Three Phases, Distribution of Sites, Subsistence Pattern

2. Mesolithic Culture: Distribution of Sites, Tool typologies, Subsistence Pattern, Evidence of Foraging
3. Neolithic: Zones of Early Farming Cultures of Indian Subcontinent (Ash Mound sites of South India, Eastern India, Vindyan Fringe, North-Western India), Crops, Subsistence Pattern, Habitation Structure

Unit-III: The Harappan Civilization

1. Origin and nature; Harappa as Saraswati-Sindhu civilisation: Settlement Patterns and Town Planning (Study of Harappa, Mohenjodaro, Kalibangan, Dholavira and Lothal
2. Economic Life: Agriculture, Craft Productions and Trade (External and Internal)
3. Social and Political Organization; Religious Beliefs and Practices; Art

Unit-IV: Cultures in Transition

1. Early Vedic Age: Sources, Geography, Society, Polity, economy Religion and Literature
2. Later Vedic Age: Social Stratification (Varna and Gender), Polity, Religion, and Culture; Philosophy of Upanishads

3. Non-Harappan Chalcolithic Cultures and Megaliths: Malwa, Kayatha, Ahar, OCP, Eastern India, Megaliths in South India

Unit I:

The unit aims to familiarise the prehistoric cultures of the Indian subcontinent. There were several changes happening as part of evolution of human being: Tool typo-technology, gene mutation resulting in changes in biological changes, migration and human colonisation. The unit also acquaints students about the emergence of early farming communities in various agro-climatic regions of India from seventh millennium BC onwards covering the early farming settlements in Deccan, Central and eastern India. Students will be encouraged to list various tools of different prehistoric periods by visiting internet based sites of various museums such as Smithsonian, US. Odisha is quite rich in prehistoric rock art and sites. Students will be encouraged to visit these sites, if possible.

Unit II:

This unit makes people appreciate that history is source-based enterprise of knowing the past and hence, it requires acquaintance and mastery of the use and analysis of various sources of the past. Questions such as what kinds of sources used in the historical narrative, issues of authorial intention, such as why Asoka wrote in edicts what he wrote, authenticity of sources and use of selective sources in construction are made acquaintance to the students. Further, the students are encouraged to appreciate the differences between India's Ithihasa Purana tradition and modern historical tradition. It is also important to understand that when we study history, national political boundary should not come in the way of understanding a historical region.

Unit III:

The Harappan was the first urban civilisation of the Indian subcontinent. How was a civilisation different from culture? Students will be asked to do map pointing of the Harappan sites and internet search to understand the social differentiation, urban character and other features of the Harappan civilisation. At the end of this unit, students shall be familiar with various aspects of Harappan Civilization as well as the contested ways of looking at the Harappan Civilisation and its attributes, such as the recent nomenclature of Saraswati-Sindhu civilisation given to the Harappan civilisation.

Unit IV:

At the end of this unit, students will be able to understand that diffusion of agriculture and use of metal technology had wide variations in the Indian Sub-continent. It also makes people understand the ways the Vedic culture, which in many ways, shaped Indian civilisation.

Suggested Reading List:

- ✓ *BD Chattopadhyaya, A Survey of Historical Geography of Ancient India, Delhi, 1991*
- ✓ *B. Subba Rao, Personality of India, Varoda, 1958.*
- ✓ *BD Chattopadhyaya, The Concept of Bharatavarsha and Other Essays, Delhi, 2017*
- ✓ *D.K. Bhattacharya, An Outline of India's Prehistory R. S. Sharma, Material Culture and Social Formations in Ancient India, 1983.*
- ✓ *Upinder Singh, a History of Ancient and Early Medieval India.*
- ✓ *V.N. Mishra, Prehistoric Colonisation of South Asia Free download*

- ✓ *https://www.ias.ac.in/article/fulltext/jbsc/026/04/0491-0531#:~:text=Human%20colonization%20in%20India%20encompasses,stone%2C%20bronze%20and%20iron%20ages*
- ✓ *Bridget and Raymond Allchin,.(The Rise of Civilization in India and Pakistan. Cambridge: Cambridge University Press, Part III. Pp. 229- 346, 1982.*
- ✓ *Tony Joseph, Early Indians, The Story of Our Ancestors and Where We Came From, Delhi, Juggernaut Publciation.*
- ✓ *Romila Thapar, Early India: From Beginning to 1300 CE, Delhi Penguin, different editions*
- ✓ *A.L. Basham, The Wonder that was India, Vol.1, Delhi, Penguin, Different editions*
- ✓ *Romila Thapar: Cultural past, Delhi, OUP. 2004 edition, Section 1 only.*
- ✓ *R.S.Sharma, Material Culture and Social Formation in Ancient India, Delhi, Macmillan.*
- ✓ *The Vedic Age, Vol 1, Bharatiya Vidya Bhawan*
- ✓ *Sreedharan, E., A Textbook of Historiography, 500 BC TO AD 2000, Hyderabad: Orient Blackswan, Reprint 2009*

Internet Resources

Unit I: https://www.youtube.com/watch?v=WDUJkeFw-R4

Unit II: D.K. Bhattacharys in E Pathsala:

Anth P03 M15. Lower palaeolithic culture of India
https://www.youtube.com/watch?v=i_PpS70gXPo,

Anth P03 M10. Mesolithic cultural chronology,
https://www.youtube.com/watch?v=NRf30FRNX_Q
Unit III: Harappa | The Ancient Indus Civilization in https://www.harappa.com/. This is an excellent site developed by Mark Kenoyer, a noted expert on the Harappan Civilsiation.

Unit IV: https://www.khanacademy.org/humanities/world-history/world-history-beginnings/ancient-india/v/introduction-to-the-vedic-period

Activities to do

- ✓ *Read Asoka's Major Rock Edicts and Special Rock edict at Dhauli. Read Asokan Brahmi alphabet from internet.*

- ✓ *Document various temples and other buildings in your village. Prepare a listing.*
- ✓ *Take physical map of India and plot the distribution of the sites of Lower Palaeolithic age to the Harappan civilisations*
- ✓ *Grouping of students and presentation and Discussion on different Urban Civic Amenities of Culture of the Harappans*

Core II Social Formations and Cultural Pattern of Ancient World

Course Objectives

- Students will be able to understand the evolution of human society & how the society of agricultural and animal husbandry had begun in ancient times.
- They also learn how the human society had transformed from nomadic to civilized society in ancient history of the World.
- They can acquire knowledge about the Ancient Greek polities, society and cultural life.

Course Outcome

- Critical understanding on the interdisciplinary in understanding the evolution of homo sapiens
- Develop team spirit to make group presentation on Migration, evolution, tool technology
- Skill in developing prehistoric tool technology
- Develop appreciation of the global heritage
- Appreciate the difference between Senatorial democracy and popular democracy of Rome and Greece respectively

Unit-I: Evolution of Man

- Evolution of Man: From Hominoid to Homo Sapiens
- Paleolithic Cultures: Lower, Middle and Upper Paleolithic Cultures, Tool typologies and technologies, Migration of Homo Sapiens and Colonisation
- Mesolithic Cultures, Tool Typology, Foraging, Rock Art, Religion,

Unit-II: Neolithic Culture:

- Food Production : Major Sites in Fertile Crescent, Food Production, Habitation Structure, Pottery, Neolithic Revolution
- Development of Agriculture: Early Domesticated Plants in Fertile Crescent, China, India
- Animal Husbandry: Archaeological Evidence of Animal domestication, Characteristics of Domesticated Animals

Unit-III: Bronze Age Civilizations

- Egypt: (Natural and Cultural Settings, Major Developments in Old Kingdom, Middle Kingdome and New Kingdom, Society, economy, Religion, Art and Temple Architecture
- Mesopotamia: Developments in Sumerian, Babylonian and Assyrian periods: Natural and Cultural Setting, Cultural Developments from Ubaid period to emergence of Uruk as a state, religion, society, economy and cultures of Sumer; Developments in Imperial Ur, Code of Hammurabi, and Babylonian expansion, Introduction of Iron and Neo-Assyrian Empire
- China (Shang): Pre Shang Culture, Oracle Bones, Major Developments, Chinese Society

Unit-IV: Ancient Greece:

- Athens and Sparta: Natural & Cultural Setting of Ancient Greece, Development of Polis, Evolution of Oligarchic Spartan State, its Intuitional structure, and society;
- Polity, Economy & Society: Evolution of Athenian Democracy from Solon to Peloponnesian War), Athenian Economy
- Culture: Literature, Religion, Art and Architecture, Science

Unit I:

The unit aims at making students understand the interplay of environment, biology, gene in the evolution of human beings from hominoid to homonins. It aims to make students categorise different tools based on typo-technological classification. The unit adopts a multi-displinary approach to understand human evolution and culture.

Unit II

This unit familiarises the archaeobotanical and archaeozoological evidence of agriculture and domestication of animals in different regions of the world and diversities in crop production. The beginning of agriculture accelerated numerous other changes in human culture- growth of village settlements, more evidence of organised religions, technological changes such as pottery making. The paper would emphasise on understanding

Unit III

This unit makes people acquaint with the emergence of state and civilisation in few river valley civilisations of the world. It looks at patterns of similarities and changes in this civilisation so far as nature and ideology of kingship, religion is concerned. It looked at interrelation between religion and organisation of economic activities in these complex cultures.

Unit IV

The unit looks at various aspects of Ancient Greece as it is considered to have significantly to intellectual thought of the west. The paper looks at the evolution of city states of Ancient Greece and different trajectories of growth of various form of polities such oligarchy in Sparta and Democracy in Greece. It also examines Greek contribution in Mathematics, art, architecture and literature.

Suggested Text Books:

- ✓ *Brian Fagan and Nadia Durrani People of Earth, London, Routledge, 2019*
- ✓ *Brian Fagan & Chris Scarre, Ancient Civilisation, London Routledge, 2016*
- ✓ *Amar Farooqui, Early Social Formation, Delhi, Different editions*
- ✓ *Alex Castor, Between Two Rivers: The History of Ancient Mesopotamia, 2006, The Teaching Company*
- ✓ *History of Mankind Series, UNESCO*
- ✓ *V. Gordon Childe, What Happened in History?, 1942/2003 edition*
- ✓ *Bisman Basu, The Story of Man*
- ✓ *H.Neil&M.C.Willam, A World of History, Oxford, New York, 1907.*
- ✓ *H.R. Hall, Ancient History of the Near East, 1932.*
- ✓ *H.S. Baghela, World of Civilization*
- ✓ *Wenke, R.J. and D. Olzewski. (2007).Patterns in Prehistory: Humankind's First Three Million Years. New York: Oxford University Press, pp. 228-268*
- ✓ *Whitehouse, R. (1977). The First Civilizations, Oxford: Phaidon, Chapters 3, 4, 5, pp 33-115.*
- ✓ *Chang, K.C. (1987). Shang Civilization. New Haven, Conn: Yale University Press, pp. 263-288.*
- ✓ *Feng, Li. (2013). Early China, Cambridge: Cambridge University Press, pp. 1-111.*

Internet Resources

- ✓ *D.K. Bhattacharya, Archaeology, E Pathshala*
- ✓ *https://www.youtube.com/playlist?list=PL_NvvTU1Eq82GxCQfFRnRqRctB6hizSP8*
- ✓ *Homo Sapien Migration out of Africa: https://www.youtube.com/watch?v=IcdRkeTb6gM*
- ✓ *Human evolution: https://www.youtube.com/watch?v=DZv8VyIQ7YU*
- ✓ *Tool Technology: https://www.youtube.com/watch?v=dJ7bxvdJiGg&t=194s*
- ✓ *Origin of Egyptian Civilisation (Chicago) : https://www.youtube.com/watch?v=GEWGy6gP1jw*
- ✓ *Egyptian Civilisation: https://www.youtube.com/watch?v=CskfvgEItPA*

Activities to Do

1. Students should visit virtually various museums of the world, such as Smithsonian Museum, British Museum, Met Museum, to see various tools, artefacts
2. Visit virtually two important sites of prehistoric sites: Goebekli Tepe, Cattle Hyouyk in Turkey
3. Plot different sites of Fertile Crescent in a physical map of the Middle East
4. Forms Groups (for students of non-deltaic Odisha) to explore nearby nullah section to discover tool
5. Arrange talks of experts of local colleges and universities

Semester II

Core III History of India-Ii: From State formation to early medieval (c.600BCE- c.750CE)

Course Objectives

- Understand the process of state formation and 2nd urbanism in the period of Buddha
- Analyse the relation of socio-economic changes in early historical period and rise of heterodoxy religions such as Buddhism, Jainism, Ajivakas, Lokayat
- To make students appreciate the emergence of Asokan empire and Critically understand socio-economic and political changes ushered by them
- Understand the emergence of state system in the Deccan and Odisha in the post Mauryan period
- Understand the expanding cultural arc of India by analysing the influence of India in Southeast Asia
- Make students appreciate the changes and excellences in various spheres in the Gupta period
- Understand the changes and continuities between ancient India and the beginning of early medieval, especially the beginning of Samanta system

Course Outcomes

- Students will be able to understand the linkages between social, political, economic and cultural processes of early Historical Development
- They will be able to appreciate the context and the structure of the Mauryan empire and the policy of Asoka in a multicultural past of India
- Able to identify various Indo Greek and Kushana Coins
- Students will be able to understand the nature of Puranic religion and how Puranic-agamic religion created a sacred geography of India

Unit-I: Economy and Society (circa 600 BCE to circa CE 300):

1. Urban growth: Material conditions such as agricultural expansion, Janapada nivesa, Sixteen Mahajanapada, Urban centres: Trade & Commerce, Organisation of Production (Srenis), Trade Routes
2. Social stratification: Class, Varna, Jati, Gender

3. Buddhism and Jainism: Material milieu of Heterodoxies , Social Significance, Buddhist Sects,, Major Principles of Jainism,

Unit-II: Changing Political Formations (circa 300 BCE to circa CE 300):

1. The Mauryan Empire: Asoka's Policy of Dhamma, Reading Asokan inscriptions, Administration, economy, Decline
2. Post-Mauryan Polities: Kushanas, and Satavahanas and Sangam in deep South
3. Indic Cultural Arc: India's contact with China, Central Asia and Southeast Asia; Silk route and expansion of Buddhism

Unit-III: The Guptas:

1. Political Developments: Expansion, Fragmentation and Huna Invasion from Samudra Gupta to Skanda Gupta

2. Literary and Scientific Developments during the Guptas; education in Nalanda

3. Development of Puranic Religions: Temples, Tirthas, Hindu pantheon

Unit-IV: Towards Early Medieval India [circa CE fourth century to CE 750]:

1. Agrarian Expansion, Land Grants, Graded Land Rights and
2. Peasantry.
3. Varna, Proliferation of Jatis: changing norms of marriage and property.
4. Post- Gupta Polities - Pallavas, Chalukyas, and Vardhanas

Suggested Text Books:

- ✓ *Upinder Singh,. A History of Ancient and Early Medieval India: From the Stone Age, Delhi, Pearsonn, 2008.*
  to the 12th Century. Delhi: Pearson Longman. (More relevant parts are Chapters 6, 7 and 8) (Also available in Hindi)
- ✓ *D. D. Kosambi, An Introduction to the Study of Indian History, 1975.*
- ✓ *Romila Thapar,. (2012). Asoka and the Decline of the Mauryas. Delhi: Oxford University Press. PP. 119-227*
- ✓ *Romila Thapar,. The Mauryas Revisited, Calcutta, 1986.*
- ✓ *Allchin, F. R. (et al.)(1995).The Archaeology of Early Historic South Asia: The Emergence*

of Cities and States. Cambridge: Cambridge University Press. Chapter 6 (pp.73-98) & Chapter 10 (pp. 185- 221).

- ✓ *A. L. Basham, Wonder That Was India, Rupa.*
- ✓ *Aswini. Agarwal: The Guptas, Delhi*
- ✓ *H.P.Ray, The Winds of Change, Delhi, OUP. 1994*
- ✓ *R.S. Sharma, Indian Feudalism, Delhi, Macmillan, various edition*
- ✓ *, B. D. Chattopadhyaya (1994).The Making of Early Medieval India, Delhi: Oxford University Press. (Introduction, pp. 1-37.)*
- ✓ *Age of Imperial Unity, Bharatiya Vidya Bhawan Series, Vol 2.*
- ✓ *Suvira Jaiswal,. (1998).Caste: Origin, Function and Dimensions of Change, Delhi: Manohar. (pp.1-131.)*
- ✓ *R. S Sharma,. (1990).Sudras in Ancient India: A Social History of the Lower Order Down to*
  circa. A. D. 600.Delhi: Motilal Banarsidas. (pp. 90-254)
- ✓ *A.S Altekar, Eeducation in Ancient India, Delhi*

Internet resources

- ✓ ***Society and economy under the Mauryas by Ranabir Chakravarti*** ***https://www.youtube.com/watch?v=0PZxqlmoXkA&app=desktop***
- ✓ ***Kushana Coins: Arti Gupta.*** ***https://www.youtube.com/watch?v=iR4Y4tlUPbw***
- ✓ ***Science and Technology in the Gupta period.*** ***https://www.youtube.com/watch?v=NFOQt9TjNLM***
- ✓ ***Nalanda University in BBC*** ***https://www.youtube.com/watch?v=O67m2k70JLA***
- ✓ ***The Silk Road: Khan Academy*** ***https://www.khanacademy.org/humanities/world-history/ancient-medieval/silk-road/v/early-silk-road***
- ✓ ***Sangam Age (CEC)*** ***https://www.youtube.com/watch?v=HkPxVkK7TtU&list=PLNsppmbLKJ8KB9BAenzBGCEpD2KEaMgiY&index=119***

Activities

- ✓ *Group Discussion on the similarities and difference between Vedic Religion and Puranic Religion*
- ✓ *Visit www.sacredtexts.com and read Agganna Sutta. Prepare a report on the orgin and nature of state as given in Aganna Sutta*
- ✓ *Identify different Buddhist sites along the Silk Route up to China from Internet*

Core IV Social Formations and Cultural Patterns of the Medieval World

Course Objectives

- The Course seeks to develop a historical understanding of the major developments in some parts of the Ancient and Medieval world.
- The Course provides a scope for understanding the subject of slavery in its varied dimensions in the Ancient world. One of the objectives of the course is to highlight the interconnectedness of Greek and Roman religion, culture and society. We discuss the medieval world in the Course by analysing the nature of European 'feudal' society and economy of the 8th to the 14th centuries.
- Explores the process of emergence of Christendom and Papacy and the2nd Order
- The objective of paper is to the making of the three orders in Medieval Europe. By studying how the European social world shaped into an intricate structure comprising powerful institutions like monarchy and the Church.
- The Course provides a scope to understand the medieval economy of Western Europe, particularly through its agrarian dimensions and relatively newer labour systems like serfdom.
- And finally, the Course allows an undergraduate student to reflect on questions related to the emergence and spread of Islam. An enquiry into the role that it played in the transformation of a tribal identity to a Caliphal State in West Asia from the 7th to the 9th centuries widens the quest for 'training' students to understand the long-term historical processes.

Course Outcomes

- Upon completion of this course the student shall be able to: Identify the main historical developments in Ancient Greece and Rome.
- Gain an understanding of the restructuring of state and society from tribe-based polities to those based on territorial identity and citizenship.
- Trace the emergence and institutionalization of social hierarchies and marginalization of dissent.
- Explain the trends in the medieval economy.
- Analyse the rise of Islam and the move towards state formation in West Asia.

- Understand the role of religion and other cultural practices in community organisation

Unit-I: Polity and Economy in Ancient Rome

1. Polity, Society and economy in Ancient Rome
2. Expansion and Crisis, -Rise and fall of Julius Caesar, Augustus Caesar, Political Expansion, Crisis of roman empire
3. Cultural Developments: literature: Vigil, Ovid, Seneca, Histories: Livy, Tacitus; Art and Architecture

Unit-II: Economic Developments in Europe from 7th to 14th Centuries:

1. Feudalism- Major Debates, Origin, Forms, Structure, Two Phases of Feudalism & its Decline
2. Agricultural Production in Two Phases of Feudalism
3. Towns and Trade

Unit-III: Religion and Culture in Medieval Europe:

1. Medieval Church: Expansion of Christianity, Early Bishopries, Papacy at Rome, Schism in Church- Ecumenical Councils and Greta Schism between Eastern and Western Church of 1054
2. Monastic Communities: Benedictine, Dominicans, Franciscan order, Anchoress; Monasteries and Education & Health
3. Papacy: Growth of Papacy from St. Peter to Avingon Papacy

Unit-IV: Societies in Central Islamic Lands:

1. The Tribal background, Rise of Islam; Major pillars of Islam, expansion of Islam
2. Religious Developments: the Origins of Shariah, Ummah, Islamic Jurisprudence, Sufism,
3. Cultural Developments in Islamic World: Tarik Tardition of Historiography,

Unit I:

This unit makes students understand the differences between the democratic forms of polity of Greek versus the roman Republican form of Government. It makes people critically analyse how the Republican institutions emerged as a checks and balances between not only institutions such as Plebeian council and Senate but as largely emerged out of the assertions

of certain social groups. It also examines the shortcomings of the republican institutions and circumstances leading to the emergence of empire and rule of Caesars. Studnets are also acquainted with the slave mode of production and the crisis in it.

Unit II:

Christianity found its social support base from the poor and proletariat population of the Roman Empire. However, apart from the social base of Christianity which promised them a Kingdom of Heaven, the paper makes students understand that the spread of Christendom was also due to institution of Church. However, like other religion Christendom developed schism and split spread over many ecumenical types of council. Further it also explains how the Seas of Rome became primus parus status among other bisopries and became the seat of Pope. The Unit also looks at the politics-religious role of Pope as well.

Unit III:

This Unit will provide a detailed understanding of European feudalism and shifts in medieval society and economy. It deals with debates on the origin of Feudalism in order to make students appreciate that there exists no divergence of opinion on the forms and structures of Feudalism. Was it a strictly legalistic, militaristic relation between lord and vassals or it is mode of production characterised by serfdom of peasants or was it characterised by Chain of Dependencies? These debates on the origin as well the forms of feudalism are dealt in this unit

Unit IV

Apart from Unit II, Unit IV also deals with another Abrahmic religion, i,e Christianity. Rather than treating it as an imminent religion, the rise and Islam has been explained in terms of historical contingencies of time. Further, the unit deals with key concepts such as contractual origin of the State of Medina, the fusion of religious & political authority in the institution of Caliphate, the notion of Umma and Sultanates in the Islamic Caliphate, and the attitude of Islamic states towards non-Muslim

Suggested Text Books:

- ✓ *Perry Anderson, Passages from Antiquity to Feudalism.*
- ✓ *Marc Bloch, Feudal Society, 2 Vols, Londo, various editions*
- ✓ *Gorges Duby, Rise of Three Orders, Chicago, University of Chicago Press, 1982*
- ✓ *Roger Collins, Keepers of the Keys of Heaven: A History of Papacy, New York, 2009.*

- ✓ *Marshall G.S Hodgson, Ventures of Islam (Three Vols), Chicago, 1977*

Reference Reading:

- ✓ *J. Barrawclough, The Medieval Papacy.*
- ✓ *Cambridge History of Islam, 2 Vol.*
- ✓ *Will Durant, The Story of Civilization (vols. I & II).*
- ✓ *T.W. Wallbank& N.M. Bailey, Civilization –Past and Present.*
- ✓ *R. Coulborne, Feudalism in History,*

Internet Resources

- ✓ ***Monasticism:***

  https://study.com/academy/lesson/video/monasticism-from-st-benedict-to-cluny.html

- ✓ ***Eastern and Western Schism- https://www.youtube.com/watch?v=trMsytBdawc***

  https://www.youtube.com/watch?v=xecErbCeMW4&list=PLWfA8zVqI9oOysfzI_tM71h6fDQ0W235S&index=2

- ✓ ***Feudalism as socio-economic order***
  https://www.youtube.com/watch?v=xecErbCeMW4&list=PLWfA8zVqI9oOysfzI_tM71h6fDQ0W235S&index=2
- ✓ ***Transition from Feudalism to Capitalism:***
  https://www.youtube.com/watch?v=DZiMqGEqBFc&list=PLWfA8zVqI9oOysfzI_tM71h6fDQ0W235S

Activities to do

1. Group Discussion on whether Features of Feudalism in Europe are found in India during medieval period.

2. Recreate the life of Monks

3. Watch BBC documentary on Crusades together and discuss in the class room in debate mode whether cultural/civilisational clash between Islam and western Christianity goes back to Crusade time.

Semester III

Core V **History of India-III (circa 750 -1206)**

Course Objectives

- They can acquire knowledge about the society, economy and culture in early medieval India and can gather knowledge towards the Arabs Conquest of Northern part of India from this paper.
- Knowledge about the religious and Cultural changing scenarios especially impact Bhakti cult and Tantricism.
- With its focus on multiple historiographical approaches to various issues of historical significance during this period, the course will also apprise students of the divergent ways in which historians approach, read and interpret their sources.
- The paper debates about urban decay and emergence of new kind of cities in early medieval

Course Outcomes

- Understand the new periodisation and its basis
- critical analysis of the relation between political realm and religious realm
- interrelation between economy, society, polity and culture in the making of vernacular region
- Debates the emergence of medieval social order, including condition of peasantry
- Discusses the nature of brahmanical social order and relations with law books which reinforced an andro-centric brahmanical social order
- Explain, in an interconnected manner, the processes of state formation, agrarian expansion, proliferation of caste and urban as well as commercial processes.
- Discuss the major currents of development in the cultural sphere, namely bhakti movement, Puranic Hinduism, Tantricism, architecture and art as well as the emergence of a number 'regional' languages.

Unit –I: Studying Early Medieval India: Political Structures

1. Sources of early medieval and Debates on early Medieval
2. Evolution of Political structures: Rajputs, Tripartite Struggle and Cholas
3. Legitimization of Kingship; Brahmanas and Temples, Tirthas and Courtly culture
4. Issues of Islam Rule: Arab conquest of Sindh

Unit-II: Social and Economic Processes:

1. Agricultural Expansion: forest-dwellers, peasants and landlords
2. Proliferation of Castes: Varna Jatis, Peasantisation of tribes.
3. Trade and Commerce: Urban Centres, Inter-regional Trade, Maritime Trade and Forms of Exchange, Ayyavole, Manigrama Guilds

Unit-III: Religious & Cultural Developments:

1. Puranic Traditions & Vajrayana Buddhism
2. Islamic Intellectual Traditions: Al-Biruni
3. Regional Languages and Literature

Unit IV: Cultural Strands: Art, Architecture and religion

1. Evolution of Regional styles: Kalingan and Dravidian style of Temple Architecture
2. Tantric Saiva and Sakta Tradition: Kashmir Saivim
3. Bhaktism and Issue of Monism and Dualism: Alvars & Nayanars of South India; Sankara, Ramanuja, Madhava

Unit I:

The early medieval period is nowadays considered to be a distinct period in the periodisation of the Indian History. It was during this period that vernacular regions like Karnataka, Andhra, Odisha, Banga emerged as distinct cultural zones. The unit deals with Feudalism Model, Integrative Model and Segmentary Model of R.S. Sharma, Hermann Kule & B.D Chattopadhyaya and Burton Stein respectively. It tries to make students aware that Arab Invasion of Sindh did not mark a rupture from ancient India; rather changes in the social, economic and political sphere started emerging from the post Gupta period, the process of which was further accelerated in this period.

Unit II:

This unit looks at the proliferation of Jatis, the tribe and caste continuum, peasantisation of tribes and variation in caste systems within the framework of Chaturvana in India as a result of the spread of brahmanical-Puranic religion.

Suggested Text Books:

- ✓ *B.D. Chattopadhyaya, The Making of Early Medieval India, Delhi: OUP, 1994*

- ✓ *R.S. Sharma and K.M. Shrimali, (eds), Comprehensive History of India, Vol. IV (A& B).*
- ✓ *D.N. Jha, (2000). 'Introduction', The Feudal Order: State, Society and Ideology in Early*
  Medieval India, (ed.), D.N.Jha, Delhi: Manohar, pp. 1-60.
- ✓ *Hermann Kulke,and Rothermund (eds) , State in India (1000-1700), Delhi, OUP, 1997*
- ✓ *Derryl N. MacleanReligion and Society in Arab Sind. Leiden: E.J.Brill. (Chapter II: 'Conquest and Conversion', pp. 22-82, 1989*
- ✓ *K. A. NilakanthaSastri, The Colas, Delhi, OUP,*
- ✓ *Hermann Kulke,, Kesavapany & Sakhuja, (Eds.) (2009). Nagapattinam to Suvarnadvipa: Reflections on the Chola Naval Expeditions to Southeast Asia, Singapore: Institute of Southeast Asian Studies.*
- ✓ *R. Champakalakshmi (1996). 'From Devotion and Dissent to Dominance: The Bhakti of the Tamil Alvars and Nayanars', in Tradition, Dissent and Ideology, ed. R. Champakalakshmi & S. Gopal, pp. 135-63. New Delhi: Oxford University Press.*
- ✓ *H. Kulke and B. P. Sahu, (2018). History of Precolonial India: Issues and Debates, Delhi: Oxford University Press, Part II.*
- ✓ *M.G.S. Narayanan, and K. Veluthat. (2000). 'Bhakti Movement in South India', inThe Feudal Order: State, Society and Ideology in Early Medieval India, ed. D.N. Jha, pp. 385-410.*
- ✓ *, R.C. Majumdar ed. History and Culture of the Indian People: The Struggle for Empire. Bombay: Bharatiya Vidya Bhawan. Relevant part is Chapter XV ('Language and Literature'), pp. 297-397.*
- ✓ *Vijay Nath, Puranas and Acculturation: A Historico-Anthropological Perspective, New Delhi, 2001.*
- ✓ *Manu Devadevan, A Prehistory of Hinduism, Delhi, De Gryueter*

Internet Resources

1. Shiva Mantramarga: https://www.youtube.com/watch?v=QusnazlA1RU

2. Introduction to esoteric Buddhism: https://www.youtube.com/watch?v=5T2se0-_EWc

3. India- A Sacred Geography by Diana Eck:
https://www.youtube.com/watch?v=JcMMDaFzyEU

4. Purushottamakshetramahatmya of Skanda Purana:
https://www.youtube.com/watch?v=oSn2c3ywpKg

5. Feudalism :
https://www.youtube.com/watch?v=PjMVQr4Qcaw&list=PLNsppmbLKJ8KB9BAenzBGCEpD2KEaMgiY&index=67

Activities

1. Visit an old temple of your locality, document various activities of the temple; Identify economic, social, religious, political and cultural dimension of temple. Identify the major festivals of the temple and catchment of pilgrims. Prepare a report of the temple in the class room

2. Visit, if possible, the Buddhist Site of Diamond Triangle of Odisha. Try to answer why there were so many Buddha, Bodhisattva , gods and goddesses in Vajrayana Buddhism.

Core VI **RISE OF THE MODERN WEST – I**

Course Objectives:

- The focus of the course is on transition from feudalism to capitalism in Europe.
- The paper familiarises the student with important transitions and transformations in the economy, polity, and socio-cultural life from late medieval period to 1600 in various parts of Europe.
- The course shall critically examine the dynamics of economic and political power within Europe, and contact with the New World. The processes by which Europe's economy benefited from colonial expansion and exploitation of indigenous and slave labour will be explained.
- Students shall also engage with continuities and changes in intellectual and artistic realms; the social and economic milieu which influenced developments in religion;
- Will understand the emergence of nation state in the aftermath of 100 year religious War

Course Outcomes

- Upon completion of this course the student shall be able to: Outline important changes that took place in Europe from the medieval period.
- Acquire an integrated approach to the study of economic, social, political and cultural developments in Europe.
- Explain the processes by which major transitions occurred in Europe's economy, state forms, social structure and cultural life. Examine elements of early modernity in these spheres.
- Critically analyse linkages between Europe's state system and trade and empire.
- Understand the historically contingent nature of nation state in history and its locus in the Western Europe

Unit-I: Transition from Feudalism to Capitalism:

1. The problems of Transition: Economic Expansion, Industrial production
2. Trade and Commerce
3. Urban Development, Town Life

Unit-II: Early Colonial Expansion:

1. Motives, Voyages and Explorations.

2. The Conquests of America
3. Mining and Plantation, the African Slaves.

Unit-III: Renaissance and Reformation:

1. Its Social Roots Spread of Humanism in Europe.
2. The Renaissance: Art, Architecture, Sculpture, Painting and Literature
3. Origins and Spread of Reformation Movements.
4. Emergence of European State system: Spain, France, England, Russia

Unit-IV: Economic Developments of the Sixteenth Century:

1. Shift of economic balance from the Mediterranean to the Atlantic.
2. Commercial Revolution- Causes and Nature
3. Growth of Industries and its Impact

Unit I:

The unit makes students acquaint with debates on the decline of Feudalism in order to make students aware of the different perspectives of historians on past. The geographical discovery also brings in the issue of euro-centrism in our syllabus. Long before the European discovery of the New World and India, Arab and Viking traders traded with India in South East Asia. What is novel about geographical discovery was the colonialism of the European and destruction of indigenous people and civilisation in the New World. White Colonialism and Modernity of Europe are conjoint twins of the European project.

Unit II:

Renaissance marked the discovery of man and reason. Renaissance opened up a new world which was different from medieval Europe. The unit also makes students understand the European project of modern nation state was marred by religious wars, persecution and long period of blood which partially ended with the treat of Westphalia of 1648.

Unit III: This unit deals with different avatars of capitalism. Starting with mercantile and commercial capital, Europe slowly went to industrial capital. In the process, new financial institutions such as Bank of England, Shareholding Company, ledger account, etc emerged. The unit also acquaints with mercantilism as a school of thought and how it was challenged by Adam Smith and Ricardo.

Unit IV

As a result of the Atlantic route, theatre of commercial activities shifted from the Mediterranean to Atlantic. Empires such as Portuguese and Spanish empire emerged but later it was French, Dutch and English who controlled the Atlantic route. With the colonisation of the New World, triangular slave trade emerged. Colonialism provided capital and market so crucial for the start of the Industrial Revolution

Suggested Text Books:

1. John Merriman, A History of Modern Europe: From Renaissance to the Present Day, New York, 2010
2. Meenakshi Phukan, Rise of the Modern West: Social and Economic History of Early Modern Europe, Trinity Press
3. Arvind Sinha, Europe in transition: From Feudalism to Industrialisation, Delhi Manohar, 2016.
4. Charles A. Nauert, Humanism and the Culture of the Renaissance (1996).
5. Harry Miskimin, The Economy of Later Renaissance Europe: 1460 -1600.
6. Fernand Braudel, The Wheels of Commerce, London, 1983 (Civilisation and Capitalism 1500-1800)

Internet Video Resources

1. Feudalism to Capitalism Transition Debate:
https://www.youtube.com/watch?v=zBgfykmeimw

2. Renaissance from CEC: https://www.youtube.com/watch?v=DA519OihJTo&t=142s

3. Reformation and War of religions:
https://www.youtube.com/watch?v=ZKcKZlRMaqY

4. The Age of Discovery: A Complete Overview:

https://www.youtube.com/watch?v=5wG6XBbD8-g

Activities

1. Visit the British Parliament Website and prepare a report on the important events on the road to Democracy,

2. Group Discussion on European discovery, colonialism and underdevelopment of India

3. Plot on a map areas which were colonized by Europe's different colonial powers

Core VII **History of India (c.1206 - 1526)**

Course Objectives:

- This course seeks to engage students in an analytical understanding of the varied perspectives from which historians study the three centuries between the thirteenth and the fifteenth centuries. It provides them with a basic understanding of the political, economic and socio-cultural processes of the time especially with reference to Rajput polities, Gujarat sultanate, Vijayanagara state as well as the Delhi Sultanate. Sufism and major trends in bhakti 'movement' are explained to the students.
- Learners are also encouraged to engage with diverse corpus of sources available to historians for the period under study.
- The objective of the course is to understand the nature of sources and nature of historical construction by analyzing tarikh tradition and historical construction by colonial, Marxist and nationalist historians

Course Outcomes

- On completion of this course, the students shall be able to: Discuss different kinds of sources available for writing histories of various aspects of life during the thirteenth to the fifteenth centuries.
- Critically evaluate the multiple perspectives from which historians have studied the politics, cultural developments and economic trends in India during the period of study.
- Appreciate the ways in which technological changes, commercial developments and challenges to patriarchy by certain women shaped the times.
- Critically evaluate the way uncritical acceptance of a particular genre of historical sources would lead to a linear flat historical construction

Unit-I: Sultanate: Political Structures

1. Survey of Sources: (a) Persian Tarikh Tradition, (b) Vernacular Histories; (c) Epigraphy.
2. Consolidation of the Sultanate of Delhi: Balban, AlauddinKhaljis and MahammadbinTughluqs.
3. Theories of kingship: The Ruling Elites: Ulema, Sufis and the Imperial Monuments (art and architecture)

Unit-II: Emergence of Regional Powers

1. Bahamanis, Vijayanagar and Odisha.
2. Regional Art, Architecture and Literature in Vijayanagar and Odisha

Unit-III: Society and Economy:

1. Iqta and the Revenue-free Grants.
2. Agricultural production, Technology.
3. Market Regulations, Growth of Urban Centres.
4. Trade and Commerce, Indian Overseas Trade.

Unit-IV: Religion, Society and Culture:

1. Sufi Silsilas: Chishtis and Suhrawardis; doctrines and practices, Social roles
2. Bhakti Movements and Monotheistic Traditions: Kabir, Nanak, Ravidas and Sri Chaitanya.
3. Social Impact of the Bhakti Tradition: Rise of Liberal Thought, Ideology of Equality and Gender Relations

Unit I:

his course seeks to engage students in an analytical understanding of the varied perspectives from which historians study the three centuries between the thirteenth and the fifteenth centuries. It provides them with a basic understanding of the political, economic and socio-cultural processes, such as the emergence of Sultanate, Regional states, south Indian polity with the emergence of Vijayanagara, vernacular polity in Odisha, etc. Question such as did the Muslims rule mark the beginning of Islamic rule in India will be debated. However, the rule seems to have not only ushered political Islam, it also introduced new historical sources in Arabic, Persian and vernacular sources. Students will be acquainted with the tarikh. Malfuzat tradition of historical writing as well as to vernacular sources such Kaifiyat, Buruzi, Bhaktiaksyana tradition of tradition available at the vernacular level.

Unit II:

It deals with diverse and heterogeneous political developments in different geographies of India.

Unit III:

This unit will apprise students of the economic, ecological and technological changes during **this period and explore the inter-linkages between them.**

Unit IV:

This unit is chiefly focussed on the religio-cultural sphere with regard especially to Sufi and Bhakti doctrines and practices, but also with regard to gender and cross-confessional interactions.

Suggested Books:

- ✓ *Satish Chandra, Medieval India, Vol. I, Har Anand Publications, New Delhi.*
- ✓ *Sunil Kumar, The emergence of Delhi Sultanate, Ranikhet, Permanent Black, 2010*
- ✓ *Talbot, Cynthia. (2001).Precolonial India in Practice, Delhi: Oxford University Press. See especially, 'Introduction: Medieval India, a history in transition', pp. 1-17 and 'Conclusion: Toward a New Model of Medieval India', pp. 208-215*
- ✓ *Muzaffar Alam, 'The Languages of Political Islam in India, Ranikhet, Permanent Black., pp. 1-98.*
- ✓ *Carl W. Ernst, (1992).Eternal Garden: Mysticism, History and Politics at a South Asian Sufi Center. Albany: State University of New York Press, 1992. Read Chapter 4 'The Textual Formation of Oral Teachings in the Early Chishtī Order', pp. 62-84.*
- ✓ *J.L. Mehta, An Advanced Study of the History of Mevieval India, Vol.I.*
- ✓ *IrfanHabib, Medieval India: The Study of a Civilization, NBT, New Delhi.*
- ✓ *http://www.vijayanagara.org/default.html for the valuable website on excavations, survey and restoration work in Hampi, the capital of Vijayanagara.*
- ✓ *Krishna SharmaBhakti and the Bhakti Movement: A New Perspective. Delhi: Munshiram Manoharlal. ,2002, Pl read 'Chapter I: Towards a New Perspective', pp. 1-38.*

Internet resources

1. Foundation of Delhi Sultanate (Rajyasabha TV) :
https://www.youtube.com/watch?v=TJOsomraCaM&t=211s

2. Bhakti Movement: https://www.youtube.com/watch?v=gTJnn-HBoVQ

3. Viajyanagar: http://www.vijayanagara.org/default.html

4. Sultanate Architecture, History https://www.youtube.com/watch?v=iCtRzw5mSKQ

5. Sufism: https://www.youtube.com/watch?v=3dSdSGvhjBw

6. Technology in Medieval India:

Activities to Do

1. Read the life history of women Bhakti saints Like Mira Bhai. How did they defy Patriarchy?

2. Collect some information on medieval women Bhakti saints of Odisha and their life stories

Semester-IV

Core VIII **Rise of the Modern West– II**

Course Objectives

- The paper is oriented to make students understand the making of modern Europe and growth of institutions in Western Europe in its march towards modernity.
- This paper offers an in-depth historical analysis of economic, political and social transformations in Europe during the 17th and 18th centuries. Scientific and secular trends in history, important political shifts, modern scientific views, and intellectual developments of the 17th and 18th centuries will be analysed closely.
- The paper will trace the development of socio-economic and technological forces which went into the making of the Industrial Revolution in late 18th century Britain.
- The role of trade and empire, colonial networks, and slavery will be examined to emphasize their contribution to industrial capitalism.
- The course paper deals with the divergence debate will further help draw parallels and subsequent differences between Europe and Asia, and broaden our understanding of early modern Europe.

Course Outcome

- Upon completion of this course the student shall be able to: Explain major economic, social, political and intellectual developments in Europe during the 17th and 18th centuries.
- Contextualize elements of modernity in these realms.
- Discuss the features of Europe's economy and origins of the Industrial Revolution.
- Analyse the relationship between trade, empire, and slavery and industrial capitalism.
- Examine the divergence debate i.e the trajectory of History of western Europe and Asia and Africa

Unit-I: The English Revolution and European Politics in the 18th century:

1. Background: Socio-Economic and Political Crisis in 17th Century Europe.
2. Major Issues-Political and Intellectual Currents;
3. Parliamentary Monarchy;
4. Patterns of Absolutism in Europe

Unit-II: Rise of Modern Science

1. Development of Science from Renaissance to the 17th century
2. Impact of Modern Science on European society

Unit-III: Mercantilism and European Economy

1. Origin and spread of Mercantilism
2. Impact of Mercantilism on European economy
3. Agricultural and Scientific Background to the Industrial Revolution

Unit-IV: The American Revolution

1. Political currents
2. Socio-Economic Issues
3. Significance of the American Revolution

Unit I:

The Unit seeks to engage students about the shift in political power from privileged landowning and clergy class to bourgeoisie class in 17^{th} and 18^{th} century England. The composition of Parliament before the Glorious Revolution was dominated by old political elite whereas there had been tectonic shifts in economy and society. The Glorious Revolution of 1688 was the outcome. However, in many states of Europe, absolute monarchy was the norm.

Unit II:

The unit deals with the emergence of new world view call scientific outlook. This world view of science, based on Newtonian revolution of gravity, mechanics and calculus, created philosophical anxiety in Europe as it challenged the notion of Authority of God. The unit deals with major scientific discoveries, its impact, its philosophical basis and debates around the issue of reason and new Method of Francis Bacon

Unit III:

This unit deals with the history of chartered share holding company anchored in the principle of mercantilism. This led to monopoly mercantilism. The unit also deals with the agricultural evolution which inaugurated scientific animal husbandry and agriculture in England leading to the Industrial revolution.

Unit IV:

Student will also learn about American Revolution, its nature and limits in the backdrop of colonisation of America and its diverse demography.

Suggested Reading

- ✓ *Meenakshi Phukan, Rise of the Modern West: Social and Economic History of Early Modern Europe, Trinity Press*
- ✓ *Arvind Sinha, Europe in transition: From Feudalism to Industrialisation, Delhi Manohar, 2016.*
- ✓ *Marcus Hellyer, (Ed.) The Scientific Revolution. The Essential Readings. Oxford: Blackwell Publishers Limited, 2003.*
- ✓ *Henry, John. (2008). The Scientific Revolution and the Origin of Modern Science. London: Palgrave.*
- ✓ *Immanuel Wallerstein, The Modern World System, Vol. II, Mercantilism and the Consolidation of the European World Economy, 1600-1750. New York: Academic Press, 1980.*
- ✓ *G. Parker, and L.M. Smith, (Eds.). The General Crisis of the Seventeenth Century. London: Routledge, 1997. (Introduction, Chapters: 2, 4, 5 & 7). For political, climate and other crisis,*
- ✓ *E. Foner, Give Me Liberty! An American History. Vol. I. New York: W.W. Norton & Co. 2nd ed. , 2007.*

Reference Reading:

- ✓ *Harry Miskimin, The Economy of Later Renaissance Europe: 1460 - 1600.*
- ✓ *C.A Fisher, History of Modern Europe.*
- ✓ *F. Rice, The Foundation of Early Modern Europe*
- ✓ *David Thomson, Europe since Napoleon, Pelican Books, 1985*
- ✓ *Swain, J.E., A History of World Civilization, Eurasia Publishing House Pvt. Ltd.,New Delhi, 1994*

Internet Resources

1. Newton and Locke: Foundations of the Enlightenment (The Philosophers: Thinkers of the Enlightenment) https://www.youtube.com/watch?v=eqZ69I6l-I4
2. ***Glorius Revolution:*** ***https://www.youtube.com/watch?v=eqZ69I6l-I4***

Activities to do

1. **Go to the website of Parliament of UK. https://www.parliament.uk/about/living-heritage/evolutionofparliament/. Prepare a report on the evolution of Parliament.**

Core IX HISTORY OF INDIA-Mughal India (c. 1526 - 1750)

Course Objectives:

- The course intend to engage students into a critical discussion of political, institutional and cultural processes that led to the establishment and consolidation of the Mughal state in India.
- The students would familiarise themselves with the nature and variety of sources as well as the diverse and uneven ways in which historians have treated and interpreted them
- The Paper makes students appreciate students on the political, fiscal, revenue and other measures of the Mughals that led to stable political entity called Mughal empire
- The paper deals with in other geographies of the Indian subcontinent that were not ruled by the Mughals in the sixteenth century

Course Outcomes:

- Upon completion of this course the student shall be able to: Critically evaluate major sources available in Persian and vernacular languages for the period under study
- Compare, discuss and examine the varied scholarly perspectives on the issues of the establishment, consolidation and nature of the Mughal state.
- Explain the changes and continuities in agrarian relations, land revenue regimes, Bhakti and Sufi traditions
- Discuss how different means such as visual culture was used to articulate authority by the rulers
- Discern the nuances of the process of state formation in the areas beyond the direct control of the Mughal state.

Unit-I: Establishment of Mughal Rule:

1. India on the eve of advent of the Mughals
2. Military Technology: Fire Arms, gun powder
3. Sher Shah: Administrative and Revenue Reforms

Unit-II: Consolidation of Mughal Rule:

1. Incorporation of Rajputs and other Indigenous Groups in Mughal Nobility
2. Evolution of Administrative Institutions: zabti, mansab, jagir,madad-i-maash
3. Emergence of the Marathas; Shivaji; Expansion under the Peshwas

Unit-III: Society and Economy:

1. Land rights and Revenue system: Zamindars and Peasants
2. Trade Routes and patterns of Internal Commerce; overseas trade
3. Urban Centres, Craft and Technology

Unit-IV: Cultural Ideals:

1. Religious tolerance and sulh-i-kul; Sufi mystical and Intellectual Interventions
2. Art and Architecture
3. Mughal and Rajput Paintings: Themes and Perspectives

Unit I:

This unit seeks to engage students with the circumstances leading to Mughal rule in Delhi and the new military technology the Mughals brought to India. It also makes students appreciate various administrative and infraststutcural initiatives of Sher Shah Suri.

Unit II:

This unit seeks to locate the contribution of the Mughals. They brought about a political unity and stability by keeping a strict vigil on the northwest from which numerous foreign invasions were directed against India earlier. They brought revenue reforms by introducing Jarib system of Todarmal. Mughal mints ensured genuine currency in the Mughal Empire. Further, the Mansabdari system was military administrative structure which ensured position and status in the Mughal administration. The Mughals also pursued an inclusivity policy by including Hindu elements in the ruling nobility. Their inclusive policy is reflected not only in polity and administration but also in art, architecture and painting. The Policy of Sulh-i-Kul of Akabar was a bold attempt to bring about a unity of religions.

Unit III:

The unit seeks to highlight the economy of the Mughal Empire by focusing on trade, technology and agrarian structure. It seeks to make students aware of the structural strain in the Mughal economy vy pointing out the difference between Jama (Expected income) and Hasil (realisation of revenue)

Unit IV:

This unit focuses on the cultural landscape of India in the Mughal times.

Suggested Text Books:

- ✓ *Meena Bhargava, Understanding Mughal India, Delhi, Orient Balckswan, 2019.*
- ✓ *IrfanHabib, Agrarian System of Mughal India, 1526-1707., Delhi, OUP, 1999 Edition*
- ✓ *Irfan Habib,. (2008). Technology in Medieval India. c. 650-1750. New Delhi: Tulika(Also available in Hindi).*
- ✓ *Satish Chandra, Medieval India, vol.2, HarAnand Publications, New Delhi.*
- ✓ *Muzaffar Alam, and S Subrahmanyam Writing the Mughal World: Studies in Political Culture, Delhi: Permanent Black, 2014.*
- ✓ *Aquil, Raziuddin and Kaushik Roy (2012)- Warfare, Religion and Society in Indian History, Delhi: Manohar publishers and Distributors*
- ✓ *S.Nurul Hassan, Thoughts on Agrarian Relations in Mughal India,*
- ✓ *Ishwari Prasad, Life and Times of Humayun.*
- ✓ *Athar Ali Apparatus of Empire, Aligarh,*
- ✓ *Ebba Koch: Mughal Art and Architecture, 2002, Delhi, OUP*
- ✓ *MeenaBhargava: The Decline of Mughal Empire, (Debates on Indian History), Delhi, 2014*
- ✓ *Audrey Truschke Culture of Encounter: Sanskrit in Mughal Court*

Internet Resources

1. Red Fort: https://www.youtube.com/watch?v=BUAxqsvoc6k
2. Fatehpur Sikri: https://www.youtube.com/watch?v=mqY4Xpzr1L4
3. Mansabdari system (CEC): https://www.youtube.com/watch?v=9CTF0smmfVg
4. E Pathshala
5. Crossing Borders by Ebba Koch: https://www.youtube.com/watch?v=xyxECiy-ytQ
6. How India discovered Vasco Da Gama' by Historian Dr Sanjay Subrahmanyam: https://www.youtube.com/watch?v=DDy211XVUZ0

Activities to Do

1. Make a virtual tour of Fatehpur Sikri and find out typical features of Mughul Architecture, such as Bulbous dome, slender minarets, recessed arch, open hall, etc.
2. A class room discussion on Akbar's vision of India
3. Discover Persian words in your land and court records- such as Khata, Jama, Bahi, Muqdamas, Munshiff, Amin, etc

Core X **Historical Theories & Methods**

Course Objectives

- It explains the major interpretive frameworks that guide modern historical writings and identify the key elements of major contemporary theories of History.
- Students will learn to evaluate the similarities and differences between historical theories and identify the central issues and problems that a particular historical theory addresses.
- Students will also learn the use of appropriate analytical language in discussing historical interpretations and can formulate interpretation in historical narratives.

Course Outcomes

- Cognitive competence by understanding the theoretical underpinning of historical construction
- Analyse the changing discourse of history
- Critical aptitude about the nature and authenticity of sources
- Understand how historical theories shaped historical narrative in different periods
- Appreciate the evolution of the discipline of history as Humanities Subject to that of a Social science discipline to integration of archaeo-metric and other natural sciences in the construction of past

Unit-I: Meaning and Scope of History

1. Definition, Nature and Scope of History.
2. Object and Value of History.
3. History, Science and Morality.

Unit-II: Traditions of Historical Writing

1. Ancient Greek Traditions – Herodotus, Thucydides
2. Ancient Roman Traditions - Polybius, Livy and Tacitus
3. Medieval Understanding: Western – St. Augustine, Arabic – Ibn Khaldun.

Unit-III: History as Interdisciplinary Practice

1. History and Archaeology, History and Anthropology.
2. History and Psychology, History and Literature.
3. History and Political Science, History and Sociology

Unit-IV: Historical Methods

1. Sources of History: Written, Oral. Visual & Archaeological.
2. Historical facts.
3. Historical Causation.
4. Historical Objectivity

Unit I:

This unit deals with the nature of history as a knowledge discipline and its expanding scope in 20th century. Question such as whether it is a science or art, finality in history, difference between historical methods and scientific methods, nature of sources will be discussed.

Unit II:

This unit deals with the ancient Greco-Roman conception of history. It seeks to bring out difference between modern historiography and ancient and medieval notion of history.

Unit III:

The third unit deals with history's relation with other social sciences and how the development of sociology has changed the historical writing. Further it deals with the way methods of physical sciences are used in historical research

Unit IV:

It seeks to engage with students on historical causation and how historical causation is different from causation in natural sciences. It deals with the difference between evidence and historical facts and issues of objectivity in historical writing

Suggested Text Books:

1. B. Sheik Ali, *History: Its Theory and Method*, Macmillan, Reprinted, 1996.
2. E. H. Carr, *What is History?* , Penguin Books, Reprinted, 1983.
3. R.G. Collingwood, *The Idea of History*, OUP, Delhi,
4. E. Sreedharan, A Text Book of Historiography, Orient Longman, Reprinted, 2004.
5. Goldstein: historical Knowing

Reference Reading: Marc Bloch, The Historian's Craft.

1. G.T.Reiner, History: Its Purpose and Method.
2. K.Rajan, History: it's Theory & Method

Internet resources

1. Historical Causation: https://www.youtube.com/watch?v=mOrWbLvbmgU
2. Historical Objectivity: https://www.youtube.com/watch?v=FVm3eNMmCMY
3. Historiography (history of Historical writing): https://www.youtube.com/watch?v=XKRgibRw-Bw

Activities

1. Construct history of your class room
2. Construct the history of your local area
3. Group discussion on the nature of historical evidence

Semester-V

Core XI **History of Modern Europe- I (c. 1780-1880)**

Course Objective:

- They will learn about the French Revolution and its impact of European countries. Unity and power Makes people to strength which has showed in the French revolution in 1789.
- It shall also trace the patterns and outcomes of social upheaval throughout Europe in the first half of 19th century.
- The debates on the development and impact of industrial capitalism shall be discussed.
- The birth of new social movements, political ideas and structures shall be contextualised within developing capitalism of the nineteenth century.
- The paper intends to explore the relation between Capitalism and Imperialism and imperial conflict and discusses theories such as theory of Lenin, Hobson and Rosa Luxemburg
- Students will know about alternative to Capitalism such as Socialism, Nihilism, anarchism

Course Outcomes

- At the end of the course students will be able to identify what is meant by the French Revolution.
- Trace short-term and long-term repercussions of revolutionary regimes and Empire-building by France.
- Understand ideological alternatives to the ideology of capitalism and
- Delineate diverse patterns of industrialization in Europe and assess the social impact of capitalist industrialization.
- Students will analyse the debates on Capitalism, development theories and conflict
- Analyse patterns of resistance to industrial capital and the emerging political assertions by new social classes

Unit-I: The French Revolution (1789):

1. Socio, Religious, Economic and Political Conditions
2. Intellectual Currents.
3. Role of the Middle Classes

Unit-II: Revolution and its European Repercussions:

1. National Constituent Assembly
2. National Legislative Assembly
3. Napoleonic Consolidation- Reform and Empire

Unit-III: Restoration and Revolution: c. 1815 - 1848

1. Congress of Vienna Restoration of old Hierarchies
2. Revolutionary and Radical Movements- A) July Revolution (1830) and B) February Revolution (1848)

Unit-IV: Socio-Economic Transformation and Remaking of States (Late 18th Century to Late 19th Century)

1. Process of Capitalist Development: Agrarian and Industrial Revolutions in England and German States.
2. Evolution of Social Classes: Land Owners, Peasantry: Bourgeoisie and Proletariat
3. Popular Movements and the Formation of National Identities in Germany and Italy, Ireland

Unit I:

This paper shall provide a critical overview of the French Revolution, and acquaint the students with the repercussions of the revolution, both within and beyond France.

Unit II:

This unit deals with the making of the democratic nation-state of France through the up heavens and violence that France saw after the fall of Bastille.

Unit III:

This unit locates the continuous struggle between forces of status quo versus forces of change ushered in by the French Revolution. The status quoits wanted to go back to the days of the Absolute monarchies while forces of changes were resented by the idea of nationalism, and democracy.

Unit IV:

At the end of this unit students will be expected to demonstrate an understanding of the transformations of the political systems, social and economic in nineteenth century Europe. As a case study of fruition of the ideology of nationalism, it takes up the issue of Italian and German unification

Suggested Text Books:

- ✓ *David Thomson, Europe since Napoleon, Delhi, Penguin, various editions*
- ✓ *FrancoisFuret, The French Revolution 1770-1814. Oxford: Blackwell, pp.3-100 and 211-66. , (1988).*
- ✓ *T.S. Hamerow, Restoration, Revolution and Reaction: Economics and Politics in Germany [1815 - 1871].*
- ✓ *Anthony Wood, History of Europe, 1815 to 1960, 1983.*
- ✓ *Best, Geoffrey (Ed.); 'The Permanent Revolution, The French Revolution and its Legacy, 1789-1989'; London, 1988.*

Reference Reading:

- ✓ *E.J. Hobsbawm, Nations and Nationalism, Age of Revolution, Age of Capita and Age of Empire*
- ✓ *A .Wesley Rohem, The Record of Mankind, Health and Company, Boston, 1952.*
- ✓ *CMD Ketelbey, History of Modern Times since 1789, OUP, 2009.*
- ✓ *David Thomson, Europe since Napoleon, Pelican Books, 1985.*
- ✓ *Edward Mac Nall Burns et al, World Civilizations, vols. A,B,C,Goyal Saab, New Delhi.*

Internet Resources

1. French Revolution: https://www.youtube.com/watch?v=ywJkQhm9j0A

2. Historiography of French Revolution: https://www.youtube.com/watch?v=ywJkQhm9j0A

3. German unification: https://www.youtube.com/watch?v=ywJkQhm9j0A

4. Unification of Italy (CEC): https://www.youtube.com/watch?v=y0ztWqv1uVs

Activities;

1. Prepare a report on the historiography of French Revolution

2. Group Discussion on the novelty of nation-state and ideology of nationalism

3. Groups discussion on the question why did very often revolution end in dictatorship?

Core XII **HISTORY OF INDIA (c. 1750 - 1857)**

Course Objectives:

- Students of history will learn how to raise regional powers in India after the downfall of the Mughal Empire and in the course of time how to rise of the Company's absolute power in India.
- They can understand about the colonial nature of state during 200 years rule of the British power in this land.
- They can gather knowledge about how the Indian society, politics, religion and economy had changed during the Company's rule in India.
- They will understand how the company's economic exploitation made Indian revolutionary against the British rule.
- That ultimately paved the background of the Great Revolt of 1857.

Course Outcomes

- Appreciate the relation between capitalism and colonialism in the context of a colonial country like India
- Understand the domestic political economic and foreign policy that operated from the standpoint of the British Imperialism
- Analyse the discourses of Development by the Raj and the incidental benefits of such development on national consciousness
- Critically examines the coercive and hegemonic basis of the Raj
- Students will be able to develop team to discuss on the nature of 1857 Revolt

Unit-I: Expansion and Consolidation of Colonial Power:

1. Foreign Trade and Early forms of Economic Exploitations in Bengal
2. Dynamics of Expansion, with special reference to Bengal, Mysore and Odisha
3. Expanding frontiers: Foreign Policy of British India

Unit-II: Colonial State and Ideology:

1. Arms of the Colonial state: army, Police, Law
2. Imperial Ideology: Orientalism and Utilitarianism
3. Education: Indigenous and Modern.

Unit-III: Economy and Society:

1. Land revenue systems- Permanent, Ryotwari and Mahalwari.
2. Commercialization of Agriculture- Consequences
3. Drain of Wealth- Causes and Consequences
4. Growth of Modern Industry

Unit-IV: Popular Resistance:

1. Santhal Uprising (1856-57)
2. Indigo Rebellion (1860)
3. Movement of 1857- Causes and Consequences

Unit I & II:

This unit will discuss the structure and apparatus of governability by the Imperial British Power. The unit also looks at the way the EEC rule brought about fundamental transformation in peasants relation with the land and how it brought about the notion of individualism and eminent domain in then sphere of property and natural resources. It deals with consolidation of Colonial state through law, judiciary, army, police. The unit also deals with the emergence of cartographic British India with emphasis on extending India's natural frontier which led to war with Afghanistan and frontier extension in the north-eastern India.

Unit III:

This unit engages with the issue of disruption and change that British policies brought about in India's economy. Students will be acquainted with debates regarding the linkage between British policy, and famine, deindustrialisation debate and changes in Indian society brought about by the colonial rule.

Unit IV:

the fundamental changes brought about by colonial policies dispossessed many Indians. Many sections of India rose in protest against the British rule. These revolts vary from restoration to millenarianism. The unit discusses forms and nature of these protests.

Suggested Text Books:

- ✓ *Dharma Kumar and Tapan Raychaudhuri, (ed.)., The Cambridge Economic History of India, Vol. II.*

- ✓ *Bipan Chandra, K.N. Panikkar, Mridula Mukherjee, Sucheta Mahajan and Aditya Mukherjee, India's Struggle for Independence,,Delhi,*
- ✓ *Sumit Sarkar, Modern India (1885-1947), Delhi, Macmillan, various edition*
- ✓ *,Isita Banerjee Dubey, Modern India, Delhi, Cambridge University Press, 2019*
- ✓ *. Bandyopadhyay, (2017). From Plassey to Partition and After: A History of Modern India, New Delhi: Orient Blackswan, 2nd edition (Chapter 7, "Many Voices of a Nation").*
- ✓ *Metcalfe, Barbara D and Thomas R. (2002). A Concise History of India. Cambridge: Cambridge University Press,*

Reference Reading:

- ✓ *P.J. Marshall The New Cambridge History of India- Bengal The British Bridgehead, Cambridge, Cambridge University Press, 2008.*
- ✓ *R. Vlyanovsky, Agrarian India between the World Wars.*
- ✓ *G.Kaushal, Economic History of India, 1757-1956*

Core XIII **History of India (c. 1857 - 1950)**

Course Objectives:

- Students can acquire vast knowledge on local rebellion and movements like the Indigo rebellion, the Deccan Riots, the growth of the new middle class; the age of associations, the Aligarh movement, the Arya and the Prarthana Samaj aftermath of 1857.
- They will learn the real historiography of Indian Nationalism; Birth of Indian National Congress, The Moderates and the Extremists, Partition of Bengal, the Swadeshi movement in Bengal in 1905.
- They can acquire knowledge how to rise of Gandhi's power in Indian politics and his activities towards the freedom like, Rowlatt Satyagraha, Khilafat and Non-cooperation movement, The Swarajya party, Poona Pact, Civil Disobedience Movement, Quit India Movement.
- They also learn how to raise communal politics and opposition politics on the eve of the Freedom movement in India and aftermath of partition in India
- The paper deals with the making of independence and Constitution making in search of an equalitarian democratic society

Course Outcome

- After successful completion of the course, the students will be able to: Identify how different regional, religious, linguistic and gender identities developed in the late 19th and early 20th centuries.
- Outline the social and economic facets of colonial India and their influence on the national movement.
- Explain the various trends of anti-colonial struggles in colonial India.
- Analyse the complex developments leading to communal violence and Partition.
- Discuss the negotiations for independence, the key debates on the Constitution and need for socio-economic restructuring soon after independence

Unit-I: Cultural Changes, Socio and Religious Reform Movements:

1. The advent of Printing and its Implications
2. Reform and Revival: Brahmo Samaj, Arya Samaj, Aligarh Movement.
3. Emancipation of Women, Sanskritization and Anti-Caste Movements

Unit-II: Nationalism: Trends up to 1919:

1. Political Ideology and Organizations, Formation of INC
2. Moderates and Extremists.
3. Swedish Movement
4. Revolutionaries

Unit-III: Gandhian Nationalism after 1919: Ideas and Movements:

1. Mahatma Gandhi: His Perspectives and Methods
2. Non- Cooperation, Civil Disobedience, Quit India,
3. Subhas Chandra Bose and INA
4. Nationalism and Social Groups: Peasants, Tribes, Dalits and Women

Unit-IV: Communalism and Partition:

1. Ideologies and Practices, Muslim League
2. Hindu Maha Sabha
3. Partition and Independence
4. Making of the Constitution

Unit I: This unit looks at the different forms of responses to colonial encounter by various sections of India, including the rise of nationalism in literature

Unit II: This unit engages with the early forms of National movements in India

Unit III: This unit the fundamental transformation in National Movement with the coming of Gandhi. This unit deals with how Gandhi's politics represented a new model for mobilizing different social groups in the national movement.

Unit IV: It deals with events leading to partition of the British India and constitution making

Suggested Text Books:

- ✓ *Sumit Sarkar, Modern India, 1885-1947, Delhi, Macmillan, various edition*
- ✓ *Bipan Chandra, K.N. Panikkar, Mridula Mukherjee, Sucheta Mahajan and Aditya Mukherjee, India's, Struggle for Independence, Penguin.*
- ✓ *Jones, Kenneth Socio-Religious Reform Movements in British India. New Delhi: Cambridge University Press, 1994.*
- ✓ *O'Hanlon, Rosalind. (2002). Caste, Conflict and Ideology: Mahatma Jyotirao Phule and Low Caste*

  Protest in 19th Century Western India. Ranikhet: Permanent Black, pp. 3-11.

- ✓ *Chandra, Bipan. (1966). The Rise and Growth of Economic Nationalism in India: Economic Policies of Indian National Leadership, 1880–1905. New Delhi: People's Publishing House (Introduction).*
- ✓ *Bipan Chandra, et. al. India's Struggle for Independence, Delhi, Pensguin, Various editions.*

Reference Reading:

- ✓ *McLane, J.R. (1977). Indian Nationalism and the Early Congress. Princeton: Princeton University Press, pp.3-21; 89-178*
- ✓ *Hardiman, David. (2005). Gandhi in his time and ours. Delhi, Orient Blackswan, pp.1-81; 109-184.*
- ✓ *Bandyopadhyay, Sekhar. (Ed.) (2009). Nationalist Movement in India: A Reader. New Delhi: Oxford University Press, pp. 55-155.*
- ✓ *A. R. Desai, Social Background of Indian Nationalism, Popular, Bombay.*
- ✓ *Brown, Judith. (1972). Gandhi's Rise to Power. Indian Politics 1915-1922. New York: Cambridge University Press (Chapters 3,4,5,6,7,9).*

Internet Videos

1. Foundation of the Congress https://www.youtube.com/watch?v=gT9_zolVWXo&t=41s

2. Mahatma Gandhi and Mass Nationalism
https://www.youtube.com/watch?v=VjzboxNy8nw&t=774s

3. Militant Nationalism https://www.youtube.com/watch?v=cPf77YP-QtE&list=PLNsppmbLKJ8KB9BAenzBGCEpD2KEaMgiY&index=3

Activities to do

1. The class should be encouraged watch the film Traumas and horrors of partition.
2. Students should be encouraged to read Hind Swaraj of Gandhi and a write an essay on it.
3. Find out the unsung heroes in your district and prepare a report

Semester-VI

Core XIV **History and Culture of Odisha-I**

(The Making of a Region from Early Times to 1568)

Course Objectives:

- This paper aims at making students familiar with the major currents of political and socio-economic history of pre-colonial Odisha.
- The students will understand the significance of different ruling dynasties of ancient Odisha and the process of making of a region and state formation in ancient and early medieval Odisha
- This course paper will also make the students familiar with the political and administrative history of the Afghans, Mughals and the Marathas in Odisha.

Course Outcomes:

- The students will be able to appreciate the process of state formation in pre-colonial Odisha
- They will develop critical understanding of process of making of regional traditions.
- They will be able to trace the evolution of Odia script and language.

Unit-I: Locating Odisha as a Region

1. Historical Geography: Kalinga, Utkal, Kosala, Odra
2. Early Developments**:** Mauryan intervention and Kharavela(significance of Kalinga War and Understanding Hatigumpha Inscription).
3. Rise of Local States: Matharas, Eastern Gangas, Sailodbhavas

Unit-II: Towards Regional States

1. Bhaumakaras and Somavamsis: Land grants, Political Developments, Social formations: Occupational Groups under Bhaumakaras and Somavamsis
2. Imperial Gangas: Career and Achievements of Chodagangadeva and Narasimhadeva,
3. Emergence and Evolution of Kalinga Temple Architecture: Major Specimens of (Satrughneswara, Parsurameswara, Muketsvara, Lingaraja, Vaital, Hypetheral Temples of 64 Yoginis of Ranipur-Jharial and Hirapur)

Unit-III: Imperial Gajapatis: Apogee and Decline

1. Kapilendradeva's achievements, Setbacks to Kapilendra's Odisharajya from Bengal and South during the period of Purushottama and Prataparudra,
2. Administration and Culture under the Gajapatis
3. Historical events leading to the Decline of Hindu Kingdom of Odisha

Unit IV: Religion, Art and Architecture

1. Buddhism and Jainism in Odisha, Their art and architecture
2. Saiva-Sakta Religion: Origin and Growth, Iconogrraphic forms of Durga and Siva, Saptmatrkas
3. Vaisnava Religion: Origin and Growth, Forms of Visnu, Dasavatara sets and Cult of Jagannath

Unit I:

This unit acquaints students with the formation of distinct historical and cultural region called Odisha over centuries. In the dynamic formation of Odisha as historical regions, many sub regions such Kangoda, Kalinga, Odra and Kosala came together over time to form the region. This unit deals with early developments, such the Mauryan intervention and subsequent state formation under Kharavela.

Unit II:

This unit captures the formation of local and sub-regional entities such Kosala, Kangoda, Kalinga from 6th century CE. It also deals with the way regional kingdom emerged under the Gangas and Gajapatis. Before that the Somavasmis integrated Koasala and Utkala together

Unit III:

Unit III deals with the consolidation of a historical region under the Gajapatis

Unit IV:

This unit acquaints students with the way religions and sacred geography shaped Odisha as a historical region

Suggested Reading List:

- ✓ *K.C. Panigrahi, History of Odisha, Kitab Mahal.*
- ✓ *N.K Sahu, Mishra &Sahu, History of Odisha.*

- ✓ *S.K. Panda, Political and Cultural History of Odisha.*
- ✓ *A. C Pradhan, A Study of History of Orissa*
- ✓ *Tripathy, KB (1962) Evolution of Oriya Language and Script, Bhubaneswar: Sahitya Academy*
- ✓ *R. D Banarjee, History of Orissa, 2 vols.*
- ✓ *Acharya, Paramanand () Essays in History, Culture, Archaeology ofOrissa,*
- ✓ *Kishor Basa,, Mohanty, Pradeep (ed)(2000) Archaeology of Orissa, Delhi:Pratibha*
- ✓ *Kulke, H. (1982) 'Fragmentation and Segmentation versus Integration: reflections on the Concept of Indian Feudalism and the Segmentary State in Indian History'. Studies in History, Vol. IV, No. 2, 1982, pp.257-63.*
- ✓ *Upinder Singh, King, Brahamana and temples, Delhi, 1994.*
- ✓ *Bhairabi Prasad Sahu, Changing Gaze, Delhi, OUP, 2013 Sahu*
- ✓ *Bhairabi, P. Sahu 'Authority and Patronage in Early Orissa', in K. K Basa and P. Mohanty (eds) Archaeology of Orissa, vol. 1: 431-440, Delhi, Pratibha Prakashan 2000.*
- ✓ *Satyanarayan Rajaguru, Odishara Sansrutika Itihasa, Cuttack, Grantha Mandira*
- ✓ *Sahu, N.K Buddhism in Orissa, Bhubaneswar: Utkal University, 1958*
- ✓ *T. E Donaldson,. Hindu Temple Art of Orissa. 3 Vols, Leiden: Brill, 1987.*
- ✓ *T. E Donaldson,. The Iconography of Vaisnava Images in Orissa. New Delhi: India D.K. Printworld (P) Ltd., 2001.*
- ✓ *T. E Donaldson,. Iconography of the Buddhist Sculpture of Orissa. 2 Vols. (Volume I: Text;*
- ✓ *Volume II: Plates), New Delhi: India Indira Gandhi National Centre for the Arts in Association with Abhinav Publications, 2001.*
- ✓ *T. E Donaldson,. . Tantra and Sakta Art of Orissa. New Delhi: India D.K. Printworld (P) Ltd., 2002.*
- ✓ *T. E Donaldson,. Siva-Parvati and Allied Images: Their Iconography and Body Language. 2*
- ✓ *Vols, New Delhi: India D.K. Printworld (P) Ltd, 2007.*
- ✓ *K.C. Panigrahi, Arcaheologcial Remains of Bhubaneswar, Calcutta, Longman, 1961.*
- ✓ *Ramesh Prashad Mohpatra, Jaina Monuments of Orissa, Delhi, 1984.*
- ✓ *Subrata Kumar Acharya, palaeography of Inscriptions of Orissa,*

Internet Resources:

1. Kharavela by Subrata Kumar Acharya (E Pathshala): https://www.youtube.com/watch?v=zRAAOt2Q--U
2. Shaping of Daksina Kosala by Bhairabi Prasad Sahu: https://www.youtube.com/watch?v=blG1iPvotqA&t=971s
3. Changing narrative and shifting terrain of early medieval India: https://www.youtube.com/watch?v=Ofy8VAPi9n4
4. Tribal Deities at Princely Courts: The Feudatory Rajas of Orissa, https://www.youtube.com/watch?v=2jzmm6kVrN4

Activities to do

1. Visit Bhubaneswar, if possible, to understand the evolution of Kalinga Temple Architecture from 6^{th} -13^{th} century

Core XV **History of Orissa-I: The Making of a Region**

(Afghan Rule to Post Independence Period)

Course Objectives:

- This will also help students to understand and assess the nature, causes and impact of the several resistance movements in the 19th century Odisha with a special reference to the Paik rebellion of 1817.
- The paper will critically evaluate the process through which Odia nationalism emerged in late 19th century leading to the formation of a separate state on linguistic basis.
- It also focuses on the forms and agencies of colonial capitalism in changing the pre-colonial social order in Odisha as well as political arithmetic during colonial period.

Unit I: Afghan to Maratha Occupation of Odisha (1568-1803)

1. Afghan, Mughal and Maratha Occupation of Odisha: Events, Administration and Impact
2. Emergence of Garjat States: Case of Sambalpur and Mayurbhanj
3. Evolution of Odia literature (Panchasakhas and Riti Yuga)

Unit II:

1. British Occupation and Early Colonial Administration: Land Revenue, Salt Policy, Currency Policy, Jail and Police Administration.

2. Nature, form, Limitations and causes of Resistance Movements: Ghumsar Rebellion, Paik rebellion, Keonjhar Uprisings. Revolt of 1857 and Surendra Sai

3. Famine of 1866 – Causes, Consequences and significance

Unit III:

1. Growth of Press, Education, Language Movement and Odia Nationalism

2. Nationalist Politics in Odisha (Non-cooperation, Civil Disobedience and Quit India movements in Odisha)Developments leading to Formation of a separate Province of Orissa

3. Prajamandal Movement and Merger of Princely States

Unit IV: Odisha after Independence

1. Political Developments from 1952 to 1977
2. Economic and Industrial Development in Post Independent Odisha
3. Social Development in Post Independent Odisha: Education, women empowerment: policies and Programme.

Unit I:

This unit acquaints u the shift in political power with the coming of the Afghans, Moghuls and Marathas. This also deals with the developments in Odia literature from 15^{th} to 18^{th} century

Unit II:

The unit seeks to explain the structural changes brought about in Odisha after the British occupations of Odisha in 1803. It deals with various forms of resistance in different forms to these structural changes

Unit III:

This unit engages students with the quest for a united Odisha and rise of Odia consciousness. It also sees how both the aspirations- that of united Orissa province and struggle against colonial rule under Gandhian leadership merged. It also deals with the Garjat states and their unification after Independence leading to a united Odisha state.

Unit IV:

The unit seeks to explain the challenges of a backward region like Odisha and governance measures taken in the first quarter of Post-Independence period

Suggested Reading List:

- ✓ *P.K. Mishra & J.K. Samal, A Comprehensive History and Culture of Orissa- Vol. I & II*
- ✓ *K.M. Patra, Freedom Struggle in Odisha.*
- ✓ *J.K.Samal, Orissa under the British Crown.*
- ✓ *3.K.M.Patra, Orissa State Legislature & Freedom Struggle.*
- ✓ *A.C. Pradhan, A Study of the History of Odisha, Panchasheel.*
- ✓ *B.K. Mallik, Paradigm of Dissent and Protest :- Social Movements in Eastern India*

- ✓ *Chaudhury, Pradipta (1991) "Peasants and British Rule in Orissa", Social Scientist, Vol. 19, No. 8/9 (Aug. - Sep., 1991), pp.28-56.*
- ✓ *Mohanty, Nivedita (1982.) Oriya **nationalism:** quest for a united Orissa,1866-1936, New Delhi: Manohar,*
- ✓ *Mohanty, Sachidananda () Social Reform Movements in Orissa, Study of Sailabala Das,Delhi:*
- ✓ *Mohapatra, Bishnu N (2001) "Social Connectedness and Fragility of Social Capital: View from an Orissa Village", Economic and Political Weekly, Vol. 36, No. 8 (Feb. 24 - Mar. 2, 2001), pp.665-672*
- ✓ *Mubayi, Yaaminey. 2004. Altar of Power. The Temple and the State in the Land of Jagannatha, Delhi:Manohar.*
- ✓ *Nanda, CP (2008) Vocalising Silence: Political protest in Orissa-1930-42, Delhi: Sage.*
- ✓ *Pati Biswamoy (1992) "Of Movements, Compromises and Retreats: Orissa, 1936- 1939", Social Scientist, Vol. 20, No. 5/6 (May - Jun., 1992), pp.64-88*
- ✓ *Pati Biswamoy (1999) "Oriya Intellectuals Then and Now" Economic and Political Weekly, Vol. 34, No. 19 (May 8-14, 1999), p.1093*
- ✓ *Pati, Biswamoy (1998) Siting the Body: Perspectives on Health and Medicine in Colonial Orissa Author(s): Social Scientist, Vol. 26, No. 11/12 (Nov. - Dec., 1998), pp.3-26.*
- ✓ *Pati, Biswamoy (1999) "The Dialectics of Retreat: Orissa, 1943-1950," Social Scientist, Vol. 27, No. 7/8 (Jul. - Aug., 1999), pp.75-112.*
- ✓ *Pati, Biswamoy () "High'-'Low' Dialectic: Peasant in Oriya Literature" Economic and Political Weekly, Vol. 24, No. 14 (Apr. 8, 1989), pp.747-75*
- ✓ *Pati, Biswamoy (1992) "Dialectics of Transition: Orissa, 1943-50", Economic and Political Weekly, Vol. 27, No. 7 (Feb. 15, 1992), pp.353-364*
- ✓ *Pati, Biswamoy (Jul. 1983), "Peasants, Tribals and the National Movement in Orissa (1921-1936)" Social Scientist, Vol. 11, No. 7, pp.25-49.*
- ✓ *Pati, Biswamoy " Autonomous Enclaving", Economic and Political Weekly, Vol.25,No. 42/43 (Oct. 20-27, 1990), p. 2388.*
- ✓ *Pati, Biswamoy "Koraput: Perceptions in a Changing Society" Economic and Political Weekly, Vol. 25, No. 18/19 (May 5-12, 1990), pp.986-988*
- ✓ *Patra, K. M: Freedom Movement in Orissa,*
- ✓ *Pattnaik, J () Feudatory States inOrissa,*

- ✓ *Pattnaik, NR (ed.) Comprehensive History ofOrissa*
- ✓ *Pradhan, Prasant Kumar, (1998) Gandhians' rise to power : national movement, power politics & independence, 1920-47 AD, New Delhi : Commonwealth Publishers,*
- ✓ *Samal, J () Orissa under the British Crown,CalcuttaSinha, Surjit (1977) Kshatrisation . In MN Das (ed.), Sidelights on the History and Culture of Orissa,*

Internet Resources

1. Merger of princely states of Odisha:
https://www.youtube.com/watch?v=OCpBRgGnksQn

2. Merger of Princely States (Publication Division):
https://www.youtube.com/watch?v=Zp2om49-RS4

Activities to read

1. Find out the sequence of merger of various princely states with Odisha Province in 1947 and 1948.

2. Discuss in the classroom the life and times of a prominent freedom fighter of your locality. Prepare jointly a report

3. Group Discussion

Semester-VII

Core XVI **History of Modern Europe II (c. 1880 - 1939)**

Course Objectives:

- Students will learn about the post-war developments of Social, Political and Economic scenarios of the World and decolonization and the emergence of the Third world.
- They will learn about changing world political scenarios and emerging trends in culture, media and Revolution among European countries.
- It deals with the nature and impact of Imperialism between the two wars
- It deals with rise of Totalitarian regimes
- The paper deals with new movements in art and literature such as existentialism

Course Outcome

- Upon completion of this course the student shall be able to: Trace varieties of nationalists and the processes by which new nation-states were carved out.
- Discuss the peculiarities of the disintegration of large empires and remaking of Europe's map.
- Deliberate on the meaning of imperialism and the manifestations of imperialist rivalry and expansion in the 19th and early 20th century.
- Analyse the conflict between radical and conservative forces, and the gradual consolidation of ultra-nationalist and authoritarian regimes in Europe.
- Contextualise major currents in the intellectual sphere and arts

Unit-I: Liberal Democracy, Working Class Movements and Socialism in the 19th and 20th Centuries:

1. The Struggle for Parliamentary Democracy and Civil Liberties in Britain.
2. Forms of Protest during early Capitalism: Food Riots in France and England: Luddites and Chartism.
3. Early Socialist Thought; Marxian Socialism

Unit-II: The Crisis of Feudalism in Russia and Experiments in Socialism:

1. Emancipation of Serfs
2. Revolutions of 1905; the Bolshevik Revolution of 1917.
3. Programme of Socialist Construction.

Unit-III: Imperialism, War and Crisis: c. 1880-1939

1. Growth of Militarism; Power Blocks and Alliances: Expansion of European Empires– First World War (1914 – 1918)
2. Fascism and Nazism.
3. The Spanish Civil War.
4. Origins of the Second World War.

Unit-IV: Intellectual Developments since circa 1850: Major Intellectual Trends:

1. Mass Education and Extension of Literacy.
2. Institutionalization of Disciplines: History, Sociology and Anthropology.
3. Darwin and Freud.

Unit I:

At the end of this rubric the student will be familiar with the economic, social and political issues that democratic industrialised England faced in 19th century. Further, in contrast to Capitalism, thinkers began to search for alternative socio-economic system, which resulted in the rise of Socialism, nihilism, anti-property thinking.

Unit II:

At the end of this rubric the student will be familiar with the economic, social and political issues that troubled the Tsarist regime in Russia in the nineteenth century. She/he will develop an understanding of popular movements and the political ascendancy of the socialists eventually leading to the revolutions in the early 20th century.. It also deals with socialist programmes under Lenin and Stalin in the form for Five Year Plan and Nationalisation of Resources

Unit III:

At the end of these units, students will be able to understand the shortcomings of the Post war international political architecture inked at Paris Peace Conference. They will also understand the limits to which a capitalist economy can be given a free rein. Students will explore the nature of totalitarian regime. The student will be expected to demonstrate a familiarity with the historiographical debates and discussion associated with the rise and development of the fascist/Nazi state in Italy and Germany eventually leading to the outbreak of the Second World War.

Unit IV:

At the end of this unit, Students will be acquainted with the broad social and cultural changes of 20th centuries, such as expansion of literacy, mass culture. Students will also understand the intellectual climate of 20th century, especially the evolutionary biology of Charles Darwin and the role of unconscious in shaping human Behaviour (Freud) decisively changed our understanding of man and his behaviour, However, the crisis of capitalism, two world wars seriously dented faith in capitalism, hence, there were new isms such as Absurdism emerged in the post war period.

Suggested Text Books:

- ✓ *C.M. Cipolla, Fontana Economic History of Europe, Volume II the Present (1981). I: The Industrial Revolution.*
- ✓ *William Keylor, the Twentieth Century World, an International History, London, OUP, 1996.*
- ✓ *Carr.E.H., International Relations between the Two World Wars, 1919-1939, New*
    - o *York, 1966.*
- ✓ *Frank McDonoughThe Origins of the First and the Second World War. Cambridge: Cambridge University Press, 1997.*
- ✓ *James A. Winders, European Culture since 1848. New York: Palgrave, 2001.*
- ✓ *Bayly, C.A. The Birth of the Modern World, 1780-1914. Oxford: Blackwell Publishing, 2004, pp. 199-244.*
- ✓ *Iben Stein, Today's ism*
- ✓ *Wood, Alan. (2003). the Origins of the Russian Revolution 1861-1917. London and New York: Routledge.*

Internet resources

- ✓ ***Parliament of UK to see 1832 Reform Act***
- ✓ ***Germany and Italian Unification: https://www.youtube.com/watch?v=KSjDe9_jZk8***

- ✓ *Hannah Arendt's "The Origins of Totalitarianism"*
  https://www.youtube.com/watch?v=WAxl6BhiSzc

- ✓ *The Great Depression - https://www.youtube.com/watch?v=x4F5gIWS_Is*

Activities to do

1. Watch the movie Holocaust and discussion on the nature of anti-Semitism of Nazism

2. Discuss about various theories regarding the Capitalist Crisis in 1930s.

3. Find out why Occupy Wall Street Movement occurred in 2011. Why did it peter out soon? Have a peer group discussion.

Core XVII History of Modern China, 18th Century to the 20th Century

Course Objectives:

- The course intends to aid students in learning about the modern history of China.
- It is important to understand the contemporary society, polity, and history of modern China as the country rises as an economic superpower.
- By introducing the political and social history of China, student would be equipped to learn comparative histories and how Indian and Chinese experience of anti-imperialist struggle and nation-making.
- The course intends to introduce the students to formulations of World Capitalism and how it shaped and structured the "third world."

Course Outcomes:

- Students would learn about the rise of China as an economic superpower and what India can learn and be careful about.
- Students would learn; the basics of comparative history and would be able to contextualise the two Asian giants, viz. India and China together.
- Students would learn how Communism is a form of totalitarianism when it is put to practice in word as it happened it Mao's China.

Unit I: **China's confrontation with External and Internal Crises**

Introduction: Land, Politics and Culture; The Opium Wars and the Unequal Treaty System, Taiping Rebellion, and other Agrarian and popular movements.

Qing Restoration, Self-Strengthening; Hundred Days Reform; Expansion of Foreign Powers and "Scramble for Concessions;" Boxer Rebellion.

Unit II: Search for New Solutions

Revolution of 1911; Sun Yat Sen and his Contribution; The May Fourth Movement and its Significance

Unit III: Nationalism and Revolution

Rise of Communist party and KMT; Establishment of First United front: 1924-27; Chiang Kai Shek and KMT; The Nanjing Decade 1928-37; Mao Zedong and CPC: Growth of Revolution from the Countryside 1927-1935; Second Sino-Japanese War and Success of Communist Revolution 1937-49

Unit IV: Establishment of Communist State and its Challenges

Transition to Socialism and Factional Conflicts; Great Leap Forward; Cultural Revolution1966-76; Transition from Mao to Deng Xiaping, Opening of China, Socialism with Chinese Characteristics, Rise of China.

Suggested Readings:

- ✓ *Dikötter, Frank. The Age of Openness: China Before Mao, (University of Hong Kong Press: 2008)*
- ✓ *Dikötter, Frank, The Tragedy of Liberation: A History of the Chinese Revolution, 1945–1957 (University of Hong Kong Press: 2012)*
- ✓ *Fenby, Jonathan, The Penguin History of Modern China: The Fall and Rise of a Great Power, 1850 to the Present, Penguin, 2019*
- ✓ *Johnson, Ian, Wasserstorm, Jeffery N, The Oxford Illustrated History of Modern China, Oxford University Press, 2016.*

Unit I: After the end of Unit I , students will be able to understand the internal crisis and external control to which China was subjected to

Unit II: The unit seeks to engage with the rise of nationalism and nationalist leadership under Sun-Yat Sen

Unit III: this unit makes students understand the organisation, ideology, strategy and leadership of Chinese Communist party and their successful seizure of Power

Unit IV: It deals with the communist regime in the first thirty years and its experiment with capitalism since late 1970s

Readings:

- ✓ *Jean Chesneaux, China from the Opium Wars to the 1911 Revolution. Pantheon Books,1976*
- ✓ ----------*China from the 1911 Revolution to Liberation. Random House,1977*
- ✓ ----------*China: The People's Republic 1949-76. Pantheon Book,1979*
- ✓ *J.K. Fairbank (with Merle Goldman), China: A New History. Harvard University Press,1992*
- ✓ *Immanuel Y. Hsu, The Rise of Modern China, OUP, 1995 (5th Ed)*
- ✓ *Maurice J. Meisner, Mao's China, W. W. Norton & Co., 1999 (2nd Ed)*

- ✓ *Ranbir Vohra, China's Path to Modernization: A Historical Review from 1800 to thePresent. Prentice-Hall, 2000*

Internet Resources

1. Remembering Sun Yat-sen: https://www.youtube.com/watch?v=g5c5_CxYN-E
2. Communist seizure of power: https://www.youtube.com/watch?v=xRxzFqtex-k
3. Cultural Revolution: https://www.youtube.com/watch?v=8jEMlFCaI04
4. China's Success Story: https://www.youtube.com/watch?v=7UdCt_Rsevk

Activities to do

1. Arrange a Group discussion on how China emerged as a super power?

Core XVIII Evolution of Modern Political Thought in India

Course Objectives:

- The course intends to introduce students to major political ideas and ideologies in India. Moreover, they are to be provided with the understanding of evolution of the state, its reshaping and changing nature through a "close reading" of key thinkers and thoughts.
- Studying the evolution of political thoughts would equip students to appreciate the complex foregrounding of concepts such as equality, fraternity, and justice.
- Students would be equipped to understand the complex and layered structures of freedom struggle and thus they would be able to appreciate the process of nation-making.

Course Outcomes:

- Students would learn about the nature of political thought and ideologies and could then appreciate the fervour and diversities in Indian democracy.
- Students would learn the basics of intellectual history and how to read key historical texts with context.
- Students would learn and grasp the layered complexities of the nation-state and the kind of accommodations and adjustments any nation-state makes to manufacture citizenry and ideals.

Unit I: Encounter with the West

1. Early Nationalist Responses: Ram Mohan Roy, Bankim Chandra Chattopadhyay,Dayananda Saraswati
2. Reading Traditions with a Dissent: Jotirao Phule, Ramabai.
3. Economic Critique of Colonialism: Dadabhi Naoroji, MG Ranade, Gopalkrishna Gokhale.

Unit II: Revolutionary Action and Civilisational Thinking

1. Aurobindo Ghose and *Bhawani Mandir*,
2. Sachhindranath Sanyal and *Bandi Jeevan*
3. Revolutionaries: Ghadar Party, Hindustan Socialist Republic Association

Unit III: Nation and Nationalism

1. Rabindranath Tagore: A Life in Creative Unity, Nationalism
2. Mahatma Gandhi: Hind Swaraj, India of My Dreams
3. BR Ambedkar: Castes and Untouchability in Hindu Society, Annihilation of Caste

Unit IV: Communists and Socialists

1. M.N. Roy: From Marxism to Radical Humanism, Critique of Gandhian Thought and Action, Radical Humanism

2. Ram Manohar Lohia: Life in Indigenous Evolution, Main Currents of Lohia's Political and Social Thought, Political Thought of Lohia, Critique of Western Ideologies, New Socialism, Model of Political System for India; Social Thoughts of Lohia; Lohia as an Internationalist.

3. Deendayal Upadhyay: Indigenous Socialism, Integral Humanism

Unit I:

Students will learn how the cultural interaction with the West through Colonialism evoked different responses in the Indian intelligentsia. These responses to the Western cultural interactions were not limited only to the intelligentsia but were widespread to different subaltern groups as well. But since this paper concerns itself with modern political thought, the Unit I will begin with historically locating these responses with early nationalists, and emphasis the plurality of the responses through Raja Rammohan Roy, Bankim Chandra Chattopadhyay, and Dayanand Saraswati.

Unit II:

Students will learn how opposition to the Western domination was first manifested as an economic critique of Colonialism. Students will read about Dadabhai Naoroji, MG Ranade, and Gopal Krishna Gokhale, and their seminal contribution to the political underpinnings of colonialism and economic exploitation of the colonies.

Unit III:

Students will learn about the plurality of understanding about the conception and formulation of nation and nationalism. Through the political thoughts of Tagore, Ambedkar, and Gandhi, students will be introduced about the diversity of view on nationalism and how it was

imagined as an anti-colonial force despite the reservations of these three thinkers on xenophobia.

Unit: IV:

Students will learn about the two streams of political thought that are usually considered alien, i.e. Communism and Socialism, but with a slant difference. This unit will bridge the gap for them to understand that how Indian political thinkers made these alien ideologies "Indian" and connected them to the movements of the grassroots.

Suggested Readings:

- ✓ *Bhattacharya, Krishna Chandra. 1984. 'Swaraj in Ideas', Indian Philosophical Quarterly,XI(4[October]): 385–86.*
- ✓ *Chakrabarty Bidyut and Pandey, Rajendra Kumar, Modern Indian Political Thought, Text and Context, Sage India: 2009*
- ✓ *Chatterjee, Partha. 1986. Nationalist Thought and the Colonial World: A Derivative Discourse? New Delhi: Oxford University Press.*
- ✓ *Panthan Thomas, and Deutsch, Kenneth L. (eds), Political Thought in Modern India. New Delhi: Sage Publications.*

Reference Readings:

- ✓ *Anderson, Benedict. 1983. Imagined Communities. London: Verso*
- ✓ *Chakrabarty, Bidyut (ed.). 2004. Social and Political Thought in Modern India. New Delhi: Indira Gandhi National Open University (IGNOU).*
- ✓ *Chatterjee, Partha. 1994. The Nation and its Fragments: Colonial and Postcolonial Histories. New Delhi: Oxford University Press.*
- ✓ *Habib, Irfan. 1995. Essays in Indian History. New Delhi: Tulika.*
- ✓ *———. 1980. 'Barani's Theory of the History of the Delhi Sultanate', Indian Historical Review, VII (1–2): 113–15.*
- ✓ *Kangle, R.P. 1972. The KautilyaArthasastra. New Delhi: Motilal Banarasidas.*
- ✓ *Krishna Rao, M.V. 1958. Studies in Kautilya. New Delhi: MunshiramManoharlal.*
- ✓ *Oommen, T.K. 1990. State and Society in India: Studies in Nation-building. New Delhi:Sage Publications.*
- ✓ *Raychaudhuri, Tapan. 1999. Perceptions, Emotions, Sensibilities: Essays on India's Colonial Past and Post-colonial Experiences. New Delhi: Oxford University Press.*

- ✓ *Taylor, Charles. 1998. 'The Dynamics of Democratic Exclusion', Journal of Democracy, 9(4[October]): 144.*
- ✓ *O'Hanlon, Rosalind. 1985. Caste Conflict and Ideology: Mahatma Jyotirao Phule andLow Caste Protest in Nineteenth Century Western India. Cambridge: Cambridge University Press*
- ✓ *Tripathy, Amales. 1967. The Extremist Challenge: India between 1890 and 1910. Calcutta:Orient Longman.*

Internet Resources:

1. Introduction to Modern Indian Political Thought: A Course by NPTEL, IIT Guwahati (On Youtube).
https://www.youtube.com/watch?v=jKL4GTxLA6A&list=PLwdnzlV3ogoV46yMV5bv2Z6CljgHA6zBI

Activities to do

1. Reading extracts of seminal essays like 'Annihilation of Caste', 'Bhawani Mandir', 'Bandi Jivan', etc.

2. Debating how certain policies of the state should be categorised politically.

3. Collecting newspaper reports on different birth anniversaries of different political ideologues and leaders and analysing the contents of the essay and corresponding them with historical narratives on these leaders.

Core XIX Basic Principles and Methods in Archaeology

Course Objective:

Basic Principles and Methods of Archaeology is a lecture series that introduces Third semester students to key concepts and practical approaches in archaeology, highlighting their applications in interpreting the human past. The definition aims and scope of archaeology and its development as a discipline is introduced to the students. The nature of the archaeological record and the unique role of science in archaeology is explained. The course also provides understanding cultural development and diversity from human origin to civilization development. Legislation related to archaeology and the role of archaeology in heritage management is also discussed in this course.

Course Outcome:

On the successful completion of Introduction to Archaeology students will develop a strong foundation on the basic understanding of the nature, development and value of archaeology as a discipline.

Unit I: Introduction to Archaeology

1. Definition and scope of archaeology
2. Relationship of archaeology with History, Anthropology and Natural sciences
3. History of archaeology in world and Indian context

Unit- II: Field Methods & Techniques of Data Retrieval

1. Principles, Methods, and Techniques of Exploration
2. Principles, Methods, and Techniques of Excavation
3. Stratigraphy: Site formation process and reconstruction of cultural sequences.
4. Archaeological Recording: 3D measurement, Photography, Plan and Section Drawings.

Unit-III: Dating Methods in Archaeology

1. Relative and Absolute Dating Methods
2. Relative Dating: Seriation
3. Absolute Dating: Archaeometric methods such as Carbon dating, Potassium Argon, Thermo-luminescence

Unit- IV: Data Analysis, Report Writing and Publication

1. Archaeological data analysis: Stone Tools, Ceramics, Human Remains, Floral & Faunal remains and Metal Objects.
2. Report Writing and Publication, Preparation of text, Drawing, Archaeological Photography, and Preparation of manuscripts and proof reading.

Unit I:

Archaeology is the study of material remains dug out during scientific excavation. Materiality of material remains has emerged as important area of research in the construction of past. Large chunk of human past is unwritten and even when writing appeared, there were many cultures which did not have written records. Further, there are many writing systems, which were not decipher. This unit seeks to explain that archaeology as a discipline is important in the construction of past. This unit introduces students to this discipline and explains why in American universities Archaeology is part of Anthropology whereas in India Archaeology is offered by Department of Ancient Indian History and Culture. Material remains of the past warrants an understanding of not only human behaviour but also how human beings adapted with the environment. Hence this unit seeks to locate archaeology's intimate relations with geology, fluvial studies, botany and zoology and top of it with Physics and Chemistry,

Unit II:

Unit II seeks to make people understand basics methods of exploration and discovery of archaeological sites through field survey, Google earth and various methods of during exploration. Further the unit deals with methods of excavations, such as laying of trench, baulk methods versus Harrimatrix methods of excavation and scientific recording of artefacts and structures encountered during excavations

Unit III:

At the end of this unit, students are expected to know various archaeometric methods of measuring the date of archaeological materials.

Unit IV:

This unit makes students understand and acquire skills on various aspects of post excavation analysis, such as pottery identification, analysis, report writing

Recommended Books

- ✓ *Agrawal D.P: Archaeology in India, Copen Hagen Scandinavian Institute of Asian Studies, 1982.*

- ✓ *Aiken, M.J: Science based Dating in Archaeology, London, Longmans, 1990.*
- ✓ *Basker P: Techniques of Archaeological Excavation, London, Batsford, 1982.*
- ✓ *Chakrabarti D.K: Theoretical Perspectives in Indian Archaeology, MunshiramManoharlal, 1989. Ghosh A: Encyclopaedia of Indian Archaeology 2008,*
- ✓ *Chakrabarti, D.K. 1988. A History of Indian Archaeology: From the Beginning to 1947. New Delhi: MunshiramManoharlal.*
- ✓ *Childe, V.G. 1956. Piecing Together the Past: The Interpretation of Archaeological Data. London: Routledge and Kegan Paul.*
- ✓ *Clarke, D.L. Analytical Archaeology, London, 1978.*
- ✓ *Daniel, Glyn, E. 1981. A Short History of Archaeology. London : Thames and Hudson.*
- ✓ *Fagan, B. and C. De Corse 2005. In the Beginning: An Introduction to Archaeology (Eleventh Edition). New Jersey: Pearson Prentice Hall*
- ✓ *Hester, T.R.: Field methods in Archaeology, California, 1975.*
- ✓ *Rajan K.: Archaeology, Principles and Methods, Tanjavur, 2002.*
- ✓ *Rajan K.: Understanding Archaeology: Field Methods, Theories and Practices, Tanjavur, 2016.*
- ✓ *Raman K.V.: Principles and Methods in Archaeology, Madras 1976.*
- ✓ *Renfrew, C., and P. Bahn 2012. Archaeology: Theories and Methods and Practice. London: Thames and Hudson.*
- ✓ *Srivastava, K. M, New Era of Indian Archaeology, New Delhi: Cosmo Publication, 1882.*
- ✓ *Sri Mortimer Wheeler, Archaeology from the Earth, London, 1954*

Internet Resources

- ✓ D.K Bhattacharya's course on Archaeology in E Pathshala https://www.youtube.com/playlist?list=PL_NvvTU1Eq82GxCQfFRnRqRctB6hizSP8
- ✓ Sharma Centre for Heritage Education (Prof Shanti Pappu): https://www.youtube.com/@sharmacentreforheritageedu5327

Activities to do

1. Make a trench layout of 2x2 m in the nearby empty area and scientifically dig out, find out different layers, prepare field note, and a final report

2. Visit an archaeological site, if possible and participate in the excavation (Contact ASI or university 3).

Semester VIII

Core XX **Art and Architecture in India (Up to Medieval)**

Unit- I

1. Harappan Art & Architecture: Town planning, Bronze and Terracotta Art
2. Mauryan Art & Architecture: Rock-cut Caves, Monolithic Pillars and Stupas.
3. Sunga Art & Architecture: Stupa, Caityagriha and Vihara.

Unit- II

1. Buddhist Architecture at Bharut and Sanchi.
2. Stupas at Amaravati and Nagarjunikonda.
3. Kushana Art: Gandhara and Mathura School of Art

Unit- III

1. Rock-cut Cave Architecture of Western India, Ajanta and Ellora Caves.
2. Rock-cut Cave Architecture of Eastern India, Khandagiri and Udayagiri Caves.

Unit- IV

1. Evolution of Temple architecture of Gupta period.
2. Temple Architecture of Southern India (Chalukya, Pallava and Chola)
3. Temples of Central India: Khajuraho.

Unit I:

After the end of this unit students will be able to know about the diversities and homogeneity in the Harappan town planning. Further, students will be able to see continuities of the Harappan life worlds into present time through the study of Harappa, which shows Yogic postures and asana

Unit II:

The students will be able to know about the technical and aesthetic aspects of Buddhist art of India and variations in them, including understanding the Buddhist art form evolved out of osmosis of different cultural tradition.

Unit III:

The third units make students understand the rich rock cult tradition of Indian art and architecture, especially of Elora, Khandagiri and Udayagiri

Unit IV:

Temple as an architectural form has variations across various regions of India. This unit makes students understand these regional temple styles, its art, architecture and sculptures.

Recommended Books

- ✓ *P. Brown; Indian Architecture (Buddhist and Hindu Period), Mumbai, 1997.*
- ✓ *Edith Tomory ; A History of fine art, In India and the west, Chennai, 2009.*
- ✓ *V. Dehejia; Indian Art, London, 1997.*
- ✓ *R. Craven; Indian Art, London, 1997.*
- ✓ *S. P. Gupta; Elements of Indian Art, New Delhi, 2002.*
- ✓ *A.N. Parida; Early Temples of Orissa, New Delhi, 1999.*
- ✓ *K.S. Behera ; Temples of Orissa, Bhubaneswar, 1993.*
- ✓ *N.S. Ramaswami ; Indian Monuments, New Delhi, 1979.*
- ✓ *John and Susant Huntingon Art of India, Leiden, E.J Brill, 1984*
- ✓ *T.E. Donaldson, Hindu Temple Art of Odisha, Three vols, Leeiden*
- ✓ *C Sivaramamurti. (Indian Bronzes, Bombay: Marg Publications1962).*
- ✓ *George Michell, (1977).The Hindu Temple: An Introduction to its Meaning and Forms, New Delhi, B.I Publications*

Internet Resources

1. Gandhara and Mathura Art: https://www.youtube.com/watch?v=T050xO4VcUk
2. Amaravati art: https://www.youtube.com/watch?v=GHDcxlApMpU
3. Ajanta Art: https://www.youtube.com/shorts/i5hYCt7J1UM?feature=share
4.Nagara, Vesara, Dravida and Kalinga style: https://www.youtube.com/watch?v=tSHUzCkAuzI

Activities to

1. Study tour to Bhubaneswar to see temples, Khandagiri-Udayagiri rock cut monument and Dhauli Stupa and Asokan edicts

2. Visit to old temple of your locality and report on its art and architecture

Core XXI **A Short History of Contemporary Popular Cultures: Cinema &TV, Sports and Cuisine**

Popular culture refers to the aesthetic products created and sold by profit-seeking firms operating in the global entertainment market. **Today, average man spends about 10 hours watching IPL, Premier league or new media like Netflix, Facebook, Instagram in his/her smart phone.** The ubiquity (that is, it is everywhere) of the mass media and our popular culture is a fascinating area of understanding and grasping. The perspective of the culture creators (for profit mass media companies, individual, filmmakers and artists) and the ctand change popular culture. Critical Theorists (who take their cue from Marx and conflict theory) say that the mass media is an industry and designed to indoctrinate and subordinate the masses (audiences) into passivity and acceptance of the capitalist mode of consumption through our popular culture consumption. On the other hand, the functionalists say that popular culture is the social glue that binds together members of that social group and creates feeling of solidarity and group cohesion. The Paper introduces to the making of four important popular cultures: Hindustani Film, New Media, Cricket and Hockey and food

Course Objectives

- The Paper deals with the changing worldviews of Bollywood film over 75 years of India
- It explores the rise of Cricket as a National Passion
- The paper makes students appreciate the role of mass media on their perception of leisure, style and ideology
- It also explores the displacement of indigenous food and emergence of Junk food
- It explores the role of big business in the growth of popular cultures and their visible forms
- On the completion of this course students will be able

Course Outcomes

- To understand the role of Big Business in the making of popular culture
- To analyse the changing tropes of Bollywood cinema
- To relate the changing style, food habit and notion of leisure as a result of the popular cultures
- To correlate and explain the impact of new media on human societies

Unit I: Hindustani cinema in colonial and post-colonial period:

i. Early film makers and their social background; form and content of early cinema; Evolution, ideology, culture and nation, Communalism and nationalism in the Post Hindustani cinema
ii. Hindustani cinema in the late 1960s: New wave cinema; Changing representations of gender, class and caste; impact of left movements like the Naxalbari uprising, and women's movements; New directors and their concerns; Growing challenges to hegemonic commercial cinema.
iii. Liberalisation and Globalisation and NRI Life world in Hindustani Cinema:
iv. Social, political and cultural contours of Hindustani cinema in the age of globalization; continuation of the new wave cinema; rising influence of the NRIs and crossover cinema

Unit II: Television & New Media in web 2.0 and making of Popular Culture

i. Chitramala
ii. Ramayana and Mahabharata: Making of a Hindu Nation, Pangs of Partition: Traumas
iii. Web 2.0: Facebook, Instagram, a Narcissistic Self:

Unit III: Sports Culture: From Akhada to IPL

i. Sports in pre Colonial Period: Akhadas in Hindu monasteries, Chaturang (Polo and other sports)
ii. From Gentlemen's Game to National Passion: Colonial Sports: Cricket, Football and Hockey
iii. Hockey: Hockey and its origin, Golden Years of Indian Hockey, Decline and revival and Role Odisha

Unit IV: Cuisine: From paratha to Pizza: understanding regional, national and Cultural hybridism through Food

This unit will examine the multiple ways in which regional cuisines have marked cultural and social diversity and the ways in which these have been appropriated in the process of nation making

i. Food and Thought: Ayurveda on Typologies of food, Food and Its relation with human thought and health

ii. Making of Regional Food Traditions: Landscape ecology and Food, Temple Prasadam and Regional Food Culture: Study of Jagananth Temples 56 Bhogas,

iii. Making of National Food Culture and global Food: Pizza, Junk Food and Food MNCs in India

References

Cinema and Internet

Dissanayake W. and K.M. Gokul Singh, (1998). Indian Popular Cinema, A Narrative of Cultural Change. New Delhi : Orient Longman,

Fiske, John. (2001). Television Culture: Popular Pleasures and Politics. London: Routledge. (This edition published in the Taylor & Francis e-Library, 2001) Chap. 1, pp. 1-20

Spracklen, Karl. (2015). Digital Leisure, the Internet and Popular Culture: Communities and identities in a Digital Age. London: Palgrave Macmillan, pp. 1-52.

Ranganathan Maya & Usha M Rodrigues. (2010). Indian Media in a Globalised World, Sage Publications India Pvt. Ltd.

Storey, John. (1996). Cultural Studies and the Study of Popular Culture: Theories and Methods, Edinburgh: Edinburgh University Press.

Vasudevan, Ravi (ed.), 2000. *Making Meaning in Indian Cinema*. New Delhi: OUP

Raymond Williams, *The Country and the City*, London: Chatto & Windus, 1973.

Rajagopal, Arvind. (2001). Politics After Television: Hindu Nationalism and the Reshaping of the Public in India. Cambridge: Cambridge University Press.

Kapur, Geeta. (2000). When was Modernism: Essays on Contemporary Cultural Practice in India. New Delhi: Tulika.

Dwyer, Rachel. (2002). Cinema India: The Visual Culture of Hindu Film. New Jersey: Rutgers University Press.

Ranganathan Maya & Usha M Rodrigues. (2010). Indian Media in a Globalised World, Sage Publications India Pvt. Ltd

Sports:

Sen, Ronojoy (2015) Nation at Play: A History of Sport in India (Contemporary Asia in the World), Columbia University Press.

Gopal, Meena and Padma Prakash(2022) *Sports Studies In India: Expanding the Field*, Delhi: Oxford University Press.

Guha, Ramachandra; Vaidyanathan, T.G. (1994). An Indian Cricket Omnibus. India: Oxford University Press. ISBN 978-0-19-563427-3.

Guha, Ramachandra (2001). The Picador Book of Cricket. India: Pan Macmillan. ISBN 978-0-330-39613-4.

Guha, Ramachandra (2004). A Corner of a Foreign Field: An Indian history of a British sport. Picador. ISBN 978-0-330-49117-4.

Guha, Ramachandra (2005). The States of Indian Cricket: Anecdotal Histories. Permanent Black. ISBN 978-81-7824-108-1.

An Indian cricket century (Editor, works of Sujit Mukherjee, 2002)

Gidén, Carl; Houda, Patrick; Martel, Jean-Patrice (2014). On the Origin of Hockey. Createspace. ISBN 9780993799808.

Podnieks, Andrew; Szemberg, Szymon (2007). World of Hockey: Celebrating a century of the IIHF. Fenn Publishing. ISBN 9781551683072.

Internet resources

On Origin of Hockey:
https://archive.ph/20130418105313/http://www.eng.umu.se/e3ht02/camilla/history.htm

Food

Inglis, David and Gimlin Debra (eds.) (2009). The Globalisation of Food. New York: Berg Publishers.

Appadurai, Arjun. (1988). ‘How to Make a National Cuisine: Cookbooks in Contemporary India’, Comparative Studies in Society and History, Vol. 30, No. 1, pp. 3-24.

Ray, Utsa. (2014). *Culinary Culture in Colonial India: A Cosmopolitan Platter and the Middle Class*, Cambridge: Cambridge University Press.

Bourdieu, P. 1984. *Distinction: A Social Critique of the Judgement of Taste*. Boston, MA: Harvard University Press.

Core XXII **Tribes of Odisha through Ages**

Unit I: Defining Tribes of Odisha

1. Tribes of Odisha: Definition, Economic, social, linguistic, cultural, political Characteristics
2. Colonial Classification: Tribe versus caste, Primitive tribes, vulnerable tribe, Criminal Tribe
3. Tribes of Odisha: No. of Tribes, Demography and Distribution, Their linguistic diversities; Austro, Indo-Aryan and Dravidian

Unit II: Tribes in Pre Colonial Odisha

1. Situating Tribes in Early Historical and Early medieval Odisha: Pre Mauryas, Mauryas to Mandala States of early medieval Odisha,
2. Peasantisation of tribes and Proliferation of Sudra caste in early Medieval Odisha ; Integration of tribal cults in Brahmanical religion: Case of Jagnnath Cult
3. Feudatory States of Odisha: Model of Kshatriyaisation of Rulers with tribal background: Case Studies of Mayurbhanj, Dhenkanal, Bonai, Keonjhar

Unit III: Colonial Intervention in tribal Life worlds:

1. Unquiet Forests and Hills: Diverse Contexts of tribal resistance- Colonial revenue settlements, Forest Policies , Modern timber Industry and Railways, Cultural reform
2. Study of tribal resistance: Khonds of Ghumsar, Birsa Munda, Laxman Nayak, Dharani Nayak
3. Educating Tribes through Modern Education and Health: Christian Missionaries in tribal hinterland of Odisha, Dharani Penu and Small Pox

Unit IV: Tribes of Odisha in Post Independence Period:

1. Nehruvian Era (Five Principles) : Equality, Constitutional Protections, Affirmative Action, Tribal Sub Plan
2. Approaches to Tribes: Assimilation (Ghurye) , Isolation (Elvin) and Integration Approach
3. Development and Tribal Displacement: Study of Niyamgiri, Gandhamardan and Kalinganagar

References:

- ✓ *Encycopaedia on the Tribe of Odisha, SCST RI*
- ✓ *K.Suresh Sing*
- ✓ *Pati, Biswamoy (2015) the Diversities of Tribal Resistance in Colonial Orissa, 1840s-1890s Survival, Interrogation and Contests, Economic and Political Weekly,*
- ✓ *Panda, Shishir (1997) SITUATING TRIBALS IN EARLY HISTORY OF ORISSA, Proceedings of the Indian History Congress, Vol. 58 (1997), pp. 132-138.*
- ✓ *Pati, Biswamoy. South Asia from the Margins: Echoes of Orissa (1800-2000), Machester University Press.*
- ✓ *Report of the Scheduled Areas and Scheduled Tribes Commission 1960-1961 (Chairman U.N Dhebar), New Delhi, Manager of Publications, Vols. I and II, 1961.*
- ✓ *Pati, Biswamoy Tribals and Dalits in Orissa: Towards a Social History of Exclusion, c. 1800–1950, Delhi: OUP*

Core XXIII **Reading Historical Essays and Writings**

Course Objectives:-

1. The course paper aims at familiarizing students with some of the popular Historical writings and essays by historians, social scientists and public intellectuals.
2. To make students distinguish between different genres of historical writings.

Course outcomes:-

1. Students will be able to appreciate the nature and forms of historical writings on various aspects of the discipline of history.
2. The student will learn to organize their writings centering around a few arguments while deliberating on a theme.

Unit - I: - Understanding History as a discipline

1. History, Science and morality: E.H. Carr.
2. Myth and Reality: D.D. Kosambi
3. The many Worlds of Indian History: Sumit Sarkar
4. Contemporary politics and the Rewriting of History in India - Romila Thapar
5. The lessons of History: Will Durant and Ariel Durant

Unit - II: - Ideology, Faith and Religion

1- Hindutva or Hind Swaraj : U.R. Anantamurthy

2- Why I am an Atheist : Bhagat Singh

3- Three Hundred Ramayans : A.K. Ramanujam

4- Reading Freud's Future of an Illusion in Goa by Sudhir Kakakr

5- The Doctor and the saint : Arundhati Roy

Unit - III: - Politics, Nationalism and Modernity

1- The Nehruvian Political system and its aftermath : Rajni Kothari

2- Indian National Movement : The long term dynamics : Bipin Chandra

3- The idea of Provincializing Europe : Dipesh Chakrabarty

4- Ram Mohan Roy and the Break with the past : Sumit Sarkar

5- Reinventing Gandhi : Shiv Viswanathan

Unit - IV:-Visions and Visionaries

1-Outsider within : The worlds of Verrier Elwin : Ramachandra Guha

2-Why Socialism : Albert Einstein

3-The Argumentative Indian : Amartya Sen

4- Tagore and our Times : Jawaharlal Nehru

5- The Uncolonized mind : A Post-Colonial View of India and the West : Ashis Nandy

Suggested Reading List:

- ✓ *E.H. Carr - What is History, 1961, Penguin Books*
- ✓ *D.D. Kosambi - Myth and Reality*
- ✓ *Sumit Sarkar - Writing social History, OUP, 1977*
- ✓ *Romila Thapar - Indian society and the secular, Three Essays collective, 2016*
- ✓ *The Lessons of History - Will and Ariel Durant, Simon and ,1968,USA*
- ✓ *The Centenary Book of Tagore, - Sukamal Ghose, Modern India Press, Calcutta,1961*
- ✓ *India Dissents, 3000 years of difference doubt and Argument, Ed. Ashok Vajpeyi, Speaking Tiger, 2017*
- ✓ *Indian society and the secular - Romila Thaper, Three Essays collective,2016*
- ✓ *Mad and Divine : Spirit and Psyche in the moern world : Sudhir Kakkar*
- ✓ *The Ramachandra Guha Omnibus, R.C. Guha, OUP,2013*
- ✓ *Empire Nation : Partha Chatterjee, Permanent Black,2010*
- ✓ *Provincializing Europe : Dipesh Chakraborty, 2000*
- ✓ *Debating Gandhi : Ed A. Raghurama Raju, OUP, 2006*
- ✓ *Annihilation of caste : B.R. Ambedkar*
- ✓ *Bhagat Singh Reader : Chaman Lal*
- ✓ *History as it Happened: Selected Articles from Monthly Review (1949-1998), Compiled by B.S Ortiz and T.D Gupta, Cornerstone Publication, 2006.*

Unit I:

The students will learn to closely read some of the significant essays and readings in History and appreciate how as a discipline it engages with the past. The unit will also inculcate the habit of reading in students and they will be trained to appreciate the seminal essays in the discipline.

Unit II:

Students will read some seminal essays on contesting nature of religion, ideology, and what seem to be partisan aspects of history writing.

Unit III:

With this unit students will learn to read closely some of the seminal contributions in the perspectives to understand the modern nation-state.

Unit IV:

This unit will introduce essays on the interdisciplinary nature of the discipline by asking students to engage with contributions from Anthropology and Psychology and thereby appreciating the aspects of different milieu of the inquiries regarding the past.

Internet Resources

1. Can we read historical texts meaningfully? https://stanforddaily.com/2021/04/05/opinion-can-we-read-historical-texts-meaningfully/
2. On the Reading of Historical Texts
https://journals.sagepub.com/doi/10.3102/00028312028003495
3. What is the Benefit of Reading History Books?
https://popularhistorybooks.com/2021/11/19/whats-the-benefit-of-reading-history-books/

Activities to Do

1. Collective and personal reading of the texts and discussions.

2. Teacher will make close reading groups where they will guide students to work together on a text in small groups. Students will also be asked to write short summaries of all the readings and do short reviews of each essay and readings.

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

Mathematics

Odisha State Higher Education Council, Bhubaneswar
Government of Odisha

Semester	Subjects
I	Core I - Calculus & Analytic Geometry
	Core II- Introduction to Algebra & Number Theory
II	Core III- Real Analysis-I
	Core IV - Algebra-I
III	Core V- Probability
	Core VI- Differential Equations-I
	Core VII- Linear Algebra
IV	Core VIII- Real Analysis-II
	Core IX- Complex Analysis-I
	Core X- Algebra-II
V	Core XI- Real Analysis-III
	Core XII- Differential Equations-II
	Core XIII- Numerical Analysis & Scientific Computing
VI	Core XIV- Multivariable Calculus
	Core XV- Differential Geometry
VII	Core XVI- Measure Theory & Integration
	Core XVII- Algebra-III
	Core XVIII- Topology
	Core XIX- Mathematical Methods
VIII	Core XX- Functional Analysis
	Core XXI- Analytic Number Theory
	Core XXII- Complex Analysis-II
	Core XXIII- Differential Equations-III

Programme Outcome

- To prepare the students for a career in Mathematics.
- To prepare the students for Higher Education and Research in Mathematics.
- To develop a conceptual understanding of the subject and to develop an inquisitiveness in the subject.
- To enable the student to acquire basic skills necessary to understand the subject and to master the skills to handle equipment's utilized to learn the subject.
- To generally promote wider reading on the subject and allied inter disciplinary subject.

Core I

Semester-I

Calculus & Analytic Geometry

Course Objective:

The main emphasis of this course is to equip the student with necessary analytic and technical skills to handle problems of mathematical nature as well as practical problems. More precisely, main target of this course is to explore the different tools for higher order derivatives to plot the various curves and to solve the problems associated with differentiation and integration of vector functions.

Learning Outcomes:

After completing the course the student will be able to

- Trace a curve and find asymptotes.
- Talculate integrals of typical type using reduction formulae, etc.
- Calculate arc length, surface of revolution and know about conics
- Calculate triple products, gradient divergence, curl, etc.

Unit I

Hyperbolic functions, higher order derivatives, Leibnitz rule and its applications to problems of the type $e^{ax+b}sinx$, $e^{ax+b}cosx$, $(ax+b)^n sinx$, $(ax+b)^n cosx$, concavity and inflection points, asymptotes, curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves, L'Hospital rule, application in business, economics and life sciences.

Unit II

Riemann integration as a limit of sum, integration by parts, reduction formulae, derivations and illustrations of reduction formulae of the type $\int sin^n x dx$,$\int cos^n x dx$,$\int tan^n x dx$,$\int sec^n x dx$, $\int (logx)^n dx$,$\int sin^n x cos^n x dx$, definite integral, integration by substitution.

Unit III

Volumes by slicing, disks and washers methods, volumes by cylindrical shells, parametric equations, parameterizing a curve, arc length, arc length of parametric curves, area of surface of revolution, techniques of sketching conics, reflection properties of conics, rotation of axes and second degree equations, classification into conics using the

discriminant, polar equations of conics.

Unit IV

Triple product, introduction to vector functions, operations with vector-valued functions, limits and continuity of vector functions, differentiation, partial differentiation, div, curl and integration of vector functions, tangent and normal components of acceleration.

Books Recommended:

- ✓ *H. Anton, I. Bivens and S. Davis: Calculus,10th Ed., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.*
- ✓ *Shanti Narayan, P. K. Mittal: Differential Calculus, S. Chand, 2014.*
- ✓ *R. J. T Bell: An elementary Treatise on coordinate geometry, MacMillan and Company Limited, 2005.*

Books for Reference:

- ✓ *James Stewart: Single Variable Calculus, Early Transcendental, 8th edition, Cengage Learning, 2016.*
- ✓ *G.B. Thomas and R. L. Finney: Calculus, 9th Ed., Pearson Education, Delhi, 2005.*
- ✓ *M. J. Strauss, G. L. Bradley and K. J. Smith: Calculus, 3rd edition, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2007.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core II

Introduction to Algebra & Number Theory

Course Objectives:

To present a systematic introduction to number theory and a basic course on algebra.

Learning Outcomes:

After completing the course the student will be able to

- Understand the equivalence relations and concept of group with different examples.
- Understand the properties of cyclic groups, rings, and integral domain.
- Know divisibility and division algorithm and find *gcd* using Euclidean Algorithm.
- Solve linear Diophantine equations, find least common multiples,solve linear congruence applying the Chinese remainder theorem.

Unit I

Integers and equivalence relations**,** properties of integers, modular arithmetic, mathematical inductions, equivalence relations, Introduction to groups**,** symmetries of a square, the dihedral groups, definitions and examples of groups, elementary properties of groups, subgroups, examples of subgroups.

Unit II

Cyclic groups, properties of cyclic groups, classification of subgroups of cyclic groups, definitions and examples of normal subgroups, Introduction to rings, definition and examples of rings, properties of rings, subrings, definition and examples of integral domain and fields.

Unit III

Divisibility**,** division algorithms, prime and composite numbers, Fibonacci and Lucas numbers, Fermat numbers, greatest common divisor, Euclidean algorithm.

Unit IV

Fundamental theorem of arithmetic, least common multiple, linear Diophantine equations, congruence, linear congruence, Chinese remainder theorem, Wilson's theorem, Fermat little theorem, Euler's theorem.

Books Recommended:

- ✓ *Joseph A. Gallian, Contemporary Abstract Algebra (4th Edition), Narosa Publishing House, New Delhi, 1999.(IX Edition 2010).*
- ✓ *Thomas Koshy, Elementary Number Theory with Applications (2^{nd} Edition), Academic Press, 2007.*

Books for Reference:

- ✓ *I. N. Herstein: Topics in Algebra, Wiley Eastern Limited, India, 1975.*
- ✓ *David M. Burton: Elementary Number Theory (6th Edition), Tata McGraw-Hill Edition, Indian Reprint, 2007.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org.*

Core III

Semester II

Real Analysis-I

Course Objective:

The objective of the course is to introduce the basics of real number system and the properties of sequence and series of real numbers. The ideas of completeness, least upper bound property, denseness, limit, continuity and uniform continuity will also be introduced. This is one of the core courses essential to start doing mathematics.

Learning Outcomes:

On successful completion of this course, students will be able to

- Learn basics of real number system and test countability of a set.
- Know on sequence of real numbers and their basic properties.
- Test convergence of an infinite series.
- Find limit and continuity of functions and test uniform continuity of functions.

Unit I

Finite and infinite sets, countable and uncountable sets, examples, algebraic and order Properties of R, uncountability of R, completeness property of **R,** applications of the supermom property, Intervals, nested interval property, denseness of rationals in R.

Unit II

Sequence and their limits, limit theorems, monotone sequences, monotone Convergence theorem, subsequences, divergence criteria, monotone subsequence theorem, Bolzano Weierstrass theorem for sequences, Cauchy sequence, Cauchy's convergence criterion.

Unit III

Infinite series, convergence and divergence of infinite series, Cauchy criterion, Tests for convergence: comparison test, limit comparison test, ratio test, Cauchy's nth root test, Raabe's test, integral test, alternating series, Leibniz test, absolute and conditional convergence.

Unit IV

Limits of functions, limit theorems, some extensions of limit concept, continuous functions and their combinations, continuous functions on intervals, boundedness theorem, maximum

minimum theorem, intermediate value theorem, uniform continuity, examples, uniform continuity theorem.

Books Recommended:

- ✓ *R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 3rd Edn., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2002.*
- ✓ *G. Das and S. Pattanayak, Fundamentals of Mathematical Analysis, TMH Publishing Co., 30th reprints, 2021.*

Books for Reference:

- ✓ S. *C. Mallik and S. Arora, Mathematical Analysis, New Age International Publications.*
- ✓ *A. Kumar, S. Kumaresan, A basic course in Real Analysis, CRC Press, 2014.*
- ✓ *Brian S. Thomson, Andrew. M. Bruckner, and Judith B. Bruckner, Elementary Real Analysis, Prentice Hall, 2001.*
- ✓ *Gerald G. Bilodeau , Paul R. Thie, G. E. Keough, An Introduction to Analysis, Jones & Bartlett, Second Edition, 2010.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*

Core IV

Algebra-I

Course Objectives:

To present a systematic and rigorous study on algebraic structures like groups, rings and some important results with their applications. After pursuing this course, one can opt for advanced topics in groups, rings and their applications to
problems in physics, computer science and engineering.

Learning Outcomes:

After completing this course, students will able to

- Understand permutation groups with some results and application in Rubik's cube.
- Understand the concept of homomorphisms, isomorphisms, normal subgroups and factor groups.
- Explore more properties of rings and ideals rigorously.
- Get introduced to the concept of reducibility and irreducibility of polynomials and concept of unique factorization domain.

Unit I

Permutation groups, definition and notations, cyclic notation, properties of permutations, isomorphisms, definition and examples, Cayley's theorem, properties of isomorphisms, automorphisms, cosets, properties of cosets, Lagrange's theorem and consequences, an application of cosets to permutation groups, an application of cosets to Rubik's cube.

Unit II

External direct products, definition and examples, properties of external direct products, the group of units modulo n as an external direct product, applications, normal subgroups, factor groups, application of factor groups, internal direct products, group homomorphisms, definition and examples, properties of homomorphisms, the first isomorphism theorem.

Unit III

Characteristic of a ring, ideals, factor rings, prime ideals and maximal ideals, ring homomorphisms, definition and examples, the field of quotients, polynomial rings, notations and terminology, division algorithm and consequences.

Unit IV

Factorization of polynomials, reducibility test, irreducibility test, unique factorization in Z[x], divisibility in integral domains, irreducible, primes, unique factorization domain, Euclidean domain.

Books Recommended:

- ✓ *Joseph A. Gallian, Contemporary Abstract Algebra (9th Edition), Narosa Publishing House, New Delhi, 2010.*
- ✓ *I. N. Herstein, Topics in Algebra, Wiley Eastern Limited, India, 1975.*

Books for Reference:

- ✓ *John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.*
- ✓ *D. S. Dummit, R. M. Foote, Abstract Algebra, Wiley-India edition, 2013.*
- ✓ *Joseph 1. Rotman, An Introduction to the Theory of Groups, 4th Ed., Springer Verlag, 1995.*
- ✓ *M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core V **Semester III**

Probability

Course Objective:

The objective of the course is to make the student understand basics of probability which is of use in everyday life.

Learning Outcomes:

After completing the course the student will be able to

- Learn the basics of probability and random variables with axioms of probability.
- Know the discrete and continuous distributions and learn how to calculate mean, variance and moments of them.
- Learn on limit theorems with their applications and know about the conditional expectations.
- Learn on Markov chains and their applications.

Unit I

Sample space and events, probability axioms, probability defined on events, conditional probabilities, Independent events, Bayes formula, real random variables, discrete and continuous random variables, probability distribution function, probability mass/density functions, mathematical expectation, and properties, variance and standard deviation.

Unit II

Discrete distributions: uniform, binomial, Poisson, geometric, negative binomial, continuous distributions: uniform, normal, exponential, their expectations and variance, moments, moment generating function, characteristic function and computation of these for the distributions, joint distribution function and its properties, joint probability density functions, marginal and conditional distributions, independent random variables.

Unit III

Limit theorems: Markov inequality, Chebyshev's inequality, statement and interpretation of (weak) law of large numbers and strong law of large numbers, application to problems, conditional probability and conditional expectation, discrete case, continuous case, applications, expectation of function of two random variables, conditional expectations,

bivariate normal distribution, correlation coefficient, joint moment generating function and calculation of covariance, linear regression for two variables.

Unit IV

Central limit theorem for independent and identically distributed random variables with finite variance, Markov chains, Chapman-Kolmogorov equations, classification of states, Gambler Ruin problem.

Book Recommended

1. *Sheldon Ross, Introduction To Probability Models (9th Edition), Academic Press, Indian Reprint, 2007.*
2. *Robert V. Hogg, Joseph W. Mckean And Allen T. Craig, Introduction To Mathematical Statistics, Pearson Education, Asia, 2007.*
3. *Kai Lai Chung, Elementary Probability Theory With Stochastics Process, Springer International Students Edition, (Narosa Publ.)*

Book for Reference

- ✓ *Alexander M. Mood, Franklin A. Graybill and Duane C. Boes, Introduction to the Theory of Statistics, (3rd Edition), Tata McGraw- Hill, Reprint 2007.*
- ✓ *Chow Y S , Teicher H Probability theory Springer International edition*
- ✓ *Irwin Miller and Marylees Miller, John E. Freund's Mathematical Statistics with Applications (7th Edition), Pearson Education, Asia, 2006.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*

Core VI

Differential Equations-I

Course Objective:

Differential Equations introduced by Leibnitz in 1676 models almost all Physical, Biological, Chemical systems in nature. The objective of this course is to familiarize the students to various methods of solving differential equations, partial differential equations and to have a qualitative applications through models. The students have to solve problems to understand the methods.

Learning Outcomes:

After completing the course the student will be able to

- Get the idea to solve first order linear ordinary differential equations of different types those are arising in physical problems.
- Get the idea to solve second order linear ordinary differential equations of different types those are arising in physical problems.
- Get basic ideas of first order partial differential equations, its formulation in two, three variables and variable separable method for identify the solutions.
- Get idea to solve various mathematical models of ODEs and PDEs which may be helpful for simulation process.

Unit I

Differential equations and mathematical models, general, particular, explicit, implicit and singular solutions of a differential equation, exact differential equations and integrating factors, separable equations and equations reducible to this form, linear equations and Bernoulli's equation, compartmental model, population model for single species.

Unit II

General solution of homogeneous equation of second order, principle of superposition, Wronskian, its properties and applications, method of undetermined coefficients, method of variation of parameters, linear homogeneous and non-homogeneous equations of higher

order with constant coefficients, Euler's equations.

Unit III

Partial Differential Equations - Basic concepts and definitions, origin of first order PDEs, Classification of first order PDEs, Pfaffian differential forms and equations, solution of Pfaffian differential equations in three variables, Cauchy's problem for first order PDEs, linear equations of first order, integral surfaces passing through a given curve, Cauchy's method of characteristics, compatible systems, method of separation of variables for solving first order and second order partial differential equations.

Unit IV (Practical)

The students will implement the following problems in the computer Lab using *Matlab / Mathematica / Maple* etc.

1. Plotting of second order solution family of differential equations.
2. Plotting of third order solution family of differential equations.
3. Population growth model (exponential case only).
4. Population decay model (exponential case only).
5. Solution of Cauchy problem for first order PDEs.
6. Finding the characteristics for the first order PDEs.
7. Plot the integral surfaces of a given first order PDE with initial data.

Books Recommended:

- ✓ *J. Sinha Roy and S. Padhy: A course of Ordinary and Partial differential equations, Kalyani Publishers, New Delhi,2018.*
- ✓ *Belinda Barnes and Glenn R. Fulford, Mathematical Modeling with Case Studies, A Differential Equation Approaching Maple and Matlab, 2nd Edn. Taylor and Francis group, London and New York, 2009.*
- ✓ *Sneddon; Elements of Partial Differential Equations, McGraw-Hill, International Students Edition, 1957.*

Books for Reference:

- ✓ *G. F. Simmons, Differential equation, Tata McGraw Hill, 1991.*
- ✓ *J. N. Sharma and Kehar Singh, PDE for Engineers and Scientists, Narosa, New Delhi, 2009.*
- ✓ *Martin Braun, Differential Equations and their Applications, Springer International Student Ed.1978.*
- ✓ *S. L. Ross, Differential Equations, 3rd Edition, John Wiley and Sons, India, 2014.*
- ✓ *C.Y. Lin, Theory and Examples of Ordinary Differential Equations, World Scientific, 2011.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*

1. e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org

Core VII

Linear Algebra

Course Objective:

The objective of this course is to acquaint students with matrix operations, solution of system of equations, vector spaces and linear transformations. In addition, the student will learn about eigenvalues, diagonalization, canonical forms, etc., which has many applications in almost all areas of science and engineering.

Learning Outcomes: After completing the course the student will be able to

- Determine basis and the dimension of a finite-dimensional vector space, know the relation between rank and nullity of a linear transformation.
- The relation between matrix and linear transformation.
- To find solution of system of linear equations, compute eigenvalues, eigenvectors of a matrix and linear transformation.
- About orthogonality of vectors and application of it to different form of matrix, introduced to different operators.

Unit I

Vector spaces, subspaces, span of a set, more about subspaces, linear dependence, independence, product and quotient space, dimension and basis, linear transformations, range and kernel of a linear map, rank and nullity of linear map.

Unit II

Inverse of linear transformation, consequences of rank – nullity theorem, the space L(U, V), composition of linear maps, matrix associated with linear map, linear map associated with matrix, rank and nullity of a matrix, determinant minors and rank of a matrix, transpose of a matrix and special type of matrices, elementary row operations

Unit III

System of linear equations, matrix inversion, application of determinant to linear equations, eigenvalues and eigenvectors, similarity of matrices, invariant subspaces, minimal polynomial (eigenvalues and the minimal polynomial), upper triangular matrices, diagonalizable operators (diagonal matrices, conditions for diagonalizability).

Unit IV

Inner product space: inner products and norms, orthonormal bases, orthogonal complements, self-adjoint and normal operators, spectral theorems, isometries, unitary operators, characteristic polynomial, Cayley – Hamilton theorem, Jordan form, trace, quadratic form, application to reduction of quadrics.

Books Recommended:

- ✓ *V. Krishnamurthy. V.P. Mainra, J. L. Arora, An introduction to linear algebra, Affiliated East – West press Pvt. Ltd., New Delhi, 1976.*
- ✓ *Sheldon Axler, Linear algebra done right (Fourth edition),Springer, 2024.*

Books for References:

- ✓ *Seymour Lipschutz and Marc Lars Lipson, Linear Algebra (Schaum's outlines, Fourth Edition), McGraw Hill, New York, 2009.*
- ✓ *A. Ramachandra Rao and P. Bhimsankaram, Linear Algebra (Second Edition), Hindustan Book Agency, 2000.*
- ✓ *Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra (Fourth Edition), Prentice-Hall of India Pvt. Ltd., New Delhi, 2004.*
- ✓ *Gilbert Strang, Linear Algebra and its Applications, Thomson, 2007.*
- ✓ *S. Kumaresan, Linear Algebra- A Geometric Approach, Prentice Hall of India, 1999.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org ; https://linear.axler.net; and https://library.oapen.org/handle/20.500.12657/85067*

Core VIII **Semester IV**

REAL ANALYSIS-II

Course Objective:

As a second course in real analysis, the objective is to learn on the concept of differentiation, Riemann Integration and their applications. The series of functions and the improper integrals have also been introduced.

Learning Outcomes: After completing the course the student will be able to

- Learn working out problems on derivatives of function and their applications.
- Learn about Riemann Integration and their properties including Improper Integrals.
- Learn on pointwise and uniform convergence of power series.
- Learn to calculate value of improper integrals.

Unit I

Differentiability of a function at a point and in an interval, Caratheodory's theorem, algebra of differentiable functions, relative extrema, interior extremum theorem. Rolle's theorem, Mean value theorems, Cauchy's mean value theorem, Lagrange mean value theorem, intermediate value property of derivatives, Darboux's theorem, applications of mean value theorem, Taylor's theorem and applications.

Unit II

Riemann integration: partitions, conditions of integrability, definition of Riemann integral properties of the Riemann integral, Riemann integral as limit of a sum, mean value theorem for integrals, integration by parts, Fundamental theorems of calculus, Taylor theorem with remainder.

Unit III

Pointwise and uniform convergence of sequence of functions, Cauchy criterion for uniform convergence and Weierstrass M-test, uniform convergence and continuity, term by term integration and differentiation of a series, power series, Abel's theorem, Weierstrass approximation theorem, Taylor series

Unit IV

Improper integrals, integration of unbounded functions with finite limits of integration, comparison tests of convergence, infinite range of integration, integrand as product of

functions convergent at infinity, absolutely convergent integral,tests of convergence, convergence of Beta and Gamma functions, applications.

Books Recommended:

- ✓ *R.G. Bartle D.R. Sherbert, Introduction to Real Analysis, John Wiley and Sons (Asia) Pvt. Ltd., Singapore*
- ✓ *G. Das and S. Pattanayak, Fundamentals of Mathematics Analysis, TMH Publishing Co.*
- ✓ *S. C. Mallik and S. Arora, Mathematical Analysis, New Age International Ltd., New Delhi.*

Book for Reference:

- ✓ *K. A. Ross, Elementary Analysis: The theory of Calculus, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.*
- ✓ *Charles G. Denlinger, Elements of Real Analysis, Jones and Bartlett (Student Edition), 2011.*
- ✓ *A. Kumar, S. Kumaresan, A basic course in Real Analysis, CRC Press, 2014*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*

Core IX

Complex Analysis-I

Course Objectives:

The objective of the course is to introduce the theories for functions of a complex variable. The concepts of analyticity and complex integration and its applications, are discuss in detail. This course is prerequisite to many other advance analysis courses such as advanced complex analysis, geometric functions, theory, potential theory, theory of entire and meromorphic functions, etc.

Learning Outcomes:

After completing the course the student will be able to

- Understand the geometric aspects of complex numbers system, convergence of series of complex numbers.
- Understand the significance of complex differentiability, analyticity and construction of analytic functions from given harmonic functions.
- Relate the notion of line integral, Cauchy fundamental theorems on integrals and its applications.
- Classify the nature of singularities, properties of zeros and poles and be able to know the applications of residue theorem.

Unit I

Basic properties of complex number and, Stereographic projection, power series, absolute convergence, uniform convergence, Cauchy-Hadamard formula for the radius of convergence, circle of convergence, exponential, logarithmic, sine and cosine functions for complex numbers.

Unit II

Continuity and differentiability of a complex valued function, analytic function, necessary and sufficient conditions for analytic functions, Cauchy-Riemann equations (Cartesian and polar form), harmonic and conjugate harmonic functions, construction of analytic function (Milne-Thomson's method).

Unit III

Line integral, path independence, complex integration, Green's theorem, anti-derivative

theorem, Cauchy-Goursat theorem, Cauchy integral formula, Cauchy's inequality, derivative of analytic function and its generalizations, Liouville's theorem, Morera's theorem, Taylor's and Laurent's theorem, expansion of analytical function in Taylor and Laurent series.

Unit IV

Zeroes of an analytic function, singularities of complex functions and its classifications, residues, Cauchy's residue theorem, residue at infinity, residues at poles and its examples, maximum modulus theorem.

Books Recommended:

- ✓ *Elias M. Stein & Rami Shakarchi: Complex Analysis, Princeton University press, Princeton and Oxford, 2003.*
- ✓ *Joseph Bak and Donald J. Newman: Complex analysis (3rd Edition), Undergraduate Texts in Mathematics, Springer-Verlag, NewYork, 1997.*

Books for Reference:

- ✓ *S. Ponnusamy and Herb Silverman: Complex variables with Applications: Birkhauser, (2006) (Indian Edition 2012).*
- ✓ *H. A. Priestly: Introduction to Complex Analysis, Oxford University Press, 2008.*
- ✓ *Donald Sarason: Complex Function Theory: AMS, Second Edition, 2007.*
- ✓ *James Ward Brown and Ruel V.Churchill: Complex Variables and Applications (Eighth Edition), McGraw-Hill International Edition, 2009.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core X

Algebra-II

Course Objectives:

To present a systematic study on finite abelian groups, Sylow's theorems and Modules.

Learning Outcomes:

After completing the course the student will be able to

- Know on finite abelian groups, the class equation and Sylow's theorems.
- Know on applications of Sylow's theorems and test the simplicity of groups.
- Learn on group action, composition series, nilpotent groups and solvable groups.
- Solve problems in modules and related results.

Unit I

Fundamental theorem of finite abelian groups, isomorphism classes of abelian groups, proof of the fundamental theorem, Sylow's theorems, conjugacy classes, the class equation, Sylow's first theorem, Cauchy theorem, Sylow's second and third theorems.

Unit II

Application of Sylow's theorem, finite simple groups, non-simplicity tests, the simplicity of alternating group A_5, free groups, classification of groups of order up to 15, characterization of dihedral groups.

Unit III

Group actions and permutation representations, composition series and holder programs, nilpotent groups, solvable groups.

Unit IV

Introduction to modules, definition and examples, direct sum, free modules, quotient modules, homomorphisms, simple modules, modules over PIDs.

Books Recommended:

- ✓ *Joseph A. Gallian, Contemporary Abstract Algebra (4th Edition), Narosa Publishing House, New Delhi, 1999.(IX Edition 2010).*
- ✓ *D. S. Dummit, R. M. Foote, Abstract Algebra, Wiley-India edition, 2013.*
- ✓ *C. Musili, Introduction to Rings and Modules, Narosa Publishing House.*

Books for Reference:

- ✓ *John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.*
- ✓ *N. Herstein, Topics in Algebra, Wiley Eastern Limited, India, 1975.*
- ✓ *M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.*
- ✓ *S. Nanda, Topics in Algebra, Allied Publishers, New Delhi.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in; http://ocw.mit.edu; http://mathforum.org*

Core XI **Semester V**

Real Analysis-III

Course Objective:

After a first course in real analysis in undergraduate program, the ideas of uniform continuity, uniform convergence and approximation by polynomials are crucial in analysis. In addition to the functions of bounded variation and their integrators, the student has to learn differentiating functions from R^n to R^m. The techniques of integration of a function with respect to another function and the basic ideas of finding a Fourier series are also included.

Learning Outcomes:

After completing the course the student will be able to

- Find the Fourier series of a function.
- Calculate Riemann Stieltjes integrals and know whether a function is of bounded variation or not.
- Learn how to define derivatives on R^n including the existence of partial derivatives, inverse function theorem and implicit function theorem.
- Learn about metric spaces and their topological properties.

Unit I

Basic concepts of Fourier series, Fourier series of even and odd functions, half range series, Fourier series on other intervals, orthogonal systems of functions, theorem on best approximation, properties of Fourier coefficients, Riesz-Fisher theorem, Riemann-Lebesgue lemma, Dirichlet integral, Integral representation for the partial sum of a Fourier series**,** convergence of Fourier series.

Unit II

Function of bounded variation, examples, total variation, function of bounded variation expressed as difference of increasing functions, rectifiable paths, Riemann-Stieltjes integrals, properties and techniques, necessary and sufficient condition for existence of the integral, mean value theorem for Riemann-Stieltjes integrals, reduction to Riemann integrals.

Unit III

Differentiation in R^n, partial derivatives, directional derivatives, sufficient condition for differentiability, chain rule, , mean value theorem, Jacobians, contraction mapping principle, inverse function theorem, implicit function theorem, rank theorem, differentiation of integrals, Taylor theorem in many variables.

Unit IV

Metric spaces, definitions and examples, open and closed sets, interior and exterior points, convergence and completeness, continuity and uniform continuity, compactness, connectedness.

Books Recommended:

- ✓ *W. Rudin, Principles of Mathematical Analysis, McGraw Hill, 3rd edition.*
- ✓ *T. Apostol, Mathematical Analysis, Pearson, 2nd edition.*
- ✓ *S C Malik and Savita Arora, Mathematical Analysis- New Age International, 5th edition*

Books for Reference:

- ✓ *Terrence Tao, Analysis-I, Hindustan book agency.*
- ✓ *Terrence Tao, Analysis-II, Hindustan book agency*
- ✓ *K. A. Ross, Elementary Analysis: The theory of Calculus, Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.*
- ✓ *Charles G. Denlinger, Elements of Real Analysis, Jones and Bartlett, Student Edition, 2011.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XII

Differential Equations-II

Course Objective:

The objective of this course is to understand basic methods for solving nonlinear first order ordinary differential equations and existence of solutions along with some special type of second order ordinary differential equations of mathematical physics. Also, students will be exposed to second order partial differential equations arising in thermal physics and thermodynamics.

Learning Outcomes:

After completing the course the student will be able to

- Understand first order nonlinear ordinary differential equations and existence of solutions
- Learn the methods to find solutions of second order linear ordinary differential equations with constant coefficients and variable coefficients.
- The different methods for solving first and second order partial differential equations and can take more courses on wave equation, heat equation, diffusion equation, gas dynamics, nonlinear evolution equations etc. All these courses are important in engineering and industrial applications for solving boundary value problems.
- Get idea to solve various mathematical models of ODE and PDE which may be helpful for simulation process.

Unit I

Existence and Uniqueness of Solutions: Lipschitz condition, Gronwall type inequality, successive approximations, Picard's theorem, non-uniqueness of solutions, continuation and dependence on initial conditions, existence of solutions in the large.

Unit II

Solution of second order ODE with constant coefficients, power series solutions of ordinary and singular points, and special functions of Legendre's differential equations, Bessel's differential equations and their properties.

Unit III

Charpit's method, special types of first order PDE, Jacobi's method, Linear second order PDE, canonical forms of second order PDE and characteristics curves, one dimensional wave equation, its origin and elementary solutions, vibration of an infinite string, vibration of a

semi finite string, vibration of a string of finite length, existence of unique solution.

Unit IV (Practical)

Laboratory work for the following problems using *MATLAB / Mathematica / Maple* etc.

1) Plot the Fourier series of the following functions:
   i. $f(x) = x^2, x \in [-1, 1]$
   ii. $f(x) = \begin{cases} 1, & 0 < x < \pi \\ -1, & -\pi < x < 0 \end{cases}$
   iii. $f(x) = \sin x, \ 0 < x < \frac{\pi}{2}$
2) Solution of wave equation $\frac{\partial^2 u}{\partial t^2} - c^2 \frac{\partial^2 u}{\partial x^2} = 0$ for the following associated conditions:
   (i) $u(x,0) = \varphi(x), u_t(x,0) = \sigma(x), x \in \mathbb{R}, t > 0$
   (ii) $u(x,0) = \varphi(x), u_t(x,0) = \sigma(x), u(0,t) = 0 \ x \in (0,\infty), t > 0$
   (iii) $u(x,0) = \varphi(x), u_t(x,0) = \sigma(x), u_x(0,t) = 0 \ x \in (0,\infty), t > 0$
   (iv) $u(x,0) = \varphi(x), u_t(x,0) = \sigma(x), u(0,t) = 0, \ u(l,t) = 0, \ 0 < x < l, t > 0$
3) Solution of one dimensional heat equation $\frac{\partial u}{\partial t} - k \frac{\partial^2 u}{\partial x^2} = 0$ for the following conditions
   (i) $u(x,0) = \varphi(x), u(0,t) = a, u(l,t) = b, 0 < x < l, t > 0$
   (ii) $u(x,0) = \varphi(x), x \in \mathbb{R}, 0 < t < T$
   (iii) $u(x,0) = \varphi(x), u(0,t) = a, x \in (0,\infty), t \geq 0.$

Books Recommended:

- ✓ *Deo and Raghavendra, Text Book of Ordinary Differential Equations, Tata McGraw-Hill Pub. Company Ltd, New Delhi,2017.*
- ✓ *Simmons G F, Differential equation, Tata McGrawHill,1991.(Ch-5. 28-30, Ch-8. 44-47, Ch-6, 33-36)*
- ✓ *I. Sneddon, Elements of Partial Differential Equations,McGraw-Hill, International Students Edition.(Ch-2. 10,11,13; Ch-3. 4-7; Ch-5. 1,2), 2006.*
- ✓ *Tyn Myint-U and Lokenath Debnath, Linear Partial Differential Equations for Scientists and Engineers, 4th edition, Birkhauser, Indian reprint,2014.*

Books for Reference:

- ✓ *J. N. Sharma and Kehar Singh, PDE for Engineers and Scientists, Narosa, New Delhi,2009.*
- ✓ *T Amarnath, An Elementary Course in Partial Differential Equations, Narosa Publications, 2003.*
- ✓ *Martin Braun, Differential Equations and their Applications, Springer International Student Ed. 1978.*
- ✓ *S. L. Ross, Differential Equations, 3rd Edition, John Wiley and Sons, India, 2014.*
- ✓ *C.Y. Lin, Theory and Examples of Ordinary Differential Equations, World Scientific, 2011.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ;* http://mathforum.org
- *Suggested digital platform: NPTEL/SWAYAM/MOOCs*

Core XIII

Numerical Analysis & Scientific Computing

Course Objectives:

The objective of this course is to acquaint the students with a wide range of numerical methods to solve algebraic and transcendental equations, linear system of equations, interpolation and curve fitting problems, numerical integration, initial and boundary value problems, etc. Develop adequate skills to apply those methods in real world problems.

Learning Outcomes:

After completing the course the student will be able to

- Understand the errors in computation, find the roots of algebraic and transcendental equations, familiarize with convergence, advantages and limitations of those numerical techniques, learn to apply Gauss−Jacobi, Gauss−Seidel methods to solve system of linear equations.
- Get aware of using interpolation techniques to solve polynomials.
- Learn numerical differentiation and integrations by using different techniques.
- Understand the techniques to find approximate solutions of ODE and PDE.

Unit I

Errors in approximation, absolute, relative and percentage errors, round-off error, solution of algebraic and transcendental equations: bisection method, Regula-Falsi method, secant method, method of iteration, Newton Raphson method, order of convergence, systems of simultaneous equations: Gauss elimination method, Gauss Jordon method, LU decomposition method, Iterative methods: Jacobi method and Gauss-Seidel method.

Unit II

Finite differences, interpolation techniques for equal intervals-Newton forward and backward, Gauss forward, Gauss backward, interpolation, interpolation with unequal intervals-Newton's divided difference method, Lagrange method, Hermite interpolation,

Numerical differentiation using Newton forward and backward formulae, numerical integration using Newton-Cotes formulas, trapezoidal rule, Simpson rules, Gauss-Legendre, Gauss-Chebyshev formulas.

Unit III

Solution of ordinary differential equations: Taylor series method, Picard's method, Euler method, Euler modified method, Runge–Kutta methods.

Unit IV (Practical)

Practical / Lab work to be perform in Computer Lab:
Use of computer algebra system (CAS) software: Python/ Sage Math / Mathematica/ MATLAB/ Maple/ Maxima/ Scilab/ R or any other (open source) software etc., for developing at least the following numerical programs:

1. Bisection method, Newton-Raphson method and Secant method.
2. LU decomposition method.
3. Gauss−Jacobi method and Gauss−Seidel method.
4. Lagrange interpolation and Newton interpolation.
5. Trapezoidal rule and Simpson's rules.
6. Taylor series method, Picard's method, Euler method, Euler modified method and Runge−Kutta Methods.

Note: ***Non-programmable scientific calculator is allowed in the examination.***

Books Recommended:

- ✓ *M. K. Jain, S. R. K. Iyengar & R. K. Jain: Numerical Methods for Scientific and Engineering Computation, New Age International Publisher, India, 2016.*
- ✓ *R. K. Gupta: Numerical Methods: Fundamentals and Applications, Cambridge University Press, 2019.*

Books for Reference:

- ✓ *Brian Bradie: A Friendly Introduction to Numerical Analysis. Pearson Education India. Dorling Kindersley (India) Pvt. Ltd. Third impression, 2011.*
- ✓ *Curtis F. Gerald & Patrick O. Wheatley: Applied Numerical Analysis, Pearson Education. India, 2007.*
- ✓ *S. D. Conte & S. de Boor: Elementary Numerical Analysis: An Algorithmic Approach, 1980.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XIV **Semester VI**

Multivariable Calculus

Course Objectives:

The primary objective of this course is to introduce students, the extension of the studies of single variable differential and integral calculus to functions of two or more independent variables with the geometry and visualization of curves and surfaces. To aware the students about the techniques multiple integrations and higher order derivatives.

Learning Outcomes:

After completing the course the student will be able to

- Learn the concept of limit, continuity and differentiations of functions of more than one.
- Understand the maximization and minimization of multivariable functions with the given constraints on variables.
- Learn about inter-relationship amongst the line integral, double, and triple integral formulations.
- Familiarize with the Green's, Stokes' and Gauss divergence theorems and their applications.

Unit I

Functions of several variables, limit and continuity of functions of two variables: partial differentiation, total differentiability, sufficient condition for differentiability, chain rule for one and two independent parameters, directional derivatives, the gradient, maximal and normal property of the gradient, tangent planes.

Unit II

Extrema of functions of two variables, method of Lagrange multipliers, constrained optimization problems, double integration over rectangular region, double integration over non rectangular region, double integrals in polar co-ordinates.

Unit III

Triple integrals, triple integral over a parallelepiped and solid regions, volume by triple integrals, cylindrical and spherical co- ordinates, change of variables in double integrals and triple integrals.

Unit IV

Definition of vector field, divergence and curl, line integrals, applications of line integrals: mass and work, fundamental theorem for line integrals, conservative vector fields, independence of path, Green's theorem, surface integrals, integrals over parametrically defined surfaces. Stokes' theorem, the divergence theorem.

Books Recommended:

- ✓ *M. J. Strauss, G. L. Bradley and K. J. Smith: Calculus, 3rd Edition, Dorling Kindersley (India) Pvt. Ltd. Pearson Education, Delhi, 2007.*
- ✓ *E. Marsden, A. J. Tromba and A. Weinstein: Basic Multivariable Calculus, Springer Student International Edition, Indian reprint, 2005.*

Book for References:

- ✓ *S. C. Mallik and S. Arora: Mathematical Analysis, New Age International Publications, New Delhi, 2005.*
- ✓ *Tom Apostol: Mathematical Analysis, Narosa Publishing House, 2002.*
- ✓ *G. B. Thomas and R. L. Finney: Calculus, 9th Ed., Pearson Education, Delhi, 2005.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XV

Differential Geometry

Course Objective:

The objective of this course is to explore geometry of curves and surfaces in R^2 and R^3 with their intrinsic properties and curvatures.

Learning Outcomes:

After completing the course the student will be able to

- Understand the notion of plane curves, space curves, curvature, torsion and the existence of space curves.
- Learn the theory of sur faces and learn to calculate first fundamental forms.
- Learns on geodesics on a surface and learns to calculate curvatures.
- Learns calculating second fundamental forms, curvatures and discovers minimal surfaces.

Unit I

Theory of Space Curves: space curves, arc length, tangent, normal and binormal, osculating plane, curvature, torsion, Serret-Frenet formulae, contact between curves and surfaces, osculating circles and spheres, involute and evolutes, existence of space curves, Helices.

Unit II

Theory of surfaces: parametric curves on surfaces, surfaces of revolution, helicoids, metric, direction coefficients. First Fundamental forms.

Unit III

Geodesics, canonical geodesic equations, nature of geodesics on a surface of revolution, normal property of geodesics, Torsion of a geodesic: geodesic curvature, Gauss-Bonnet theorem, Gaussian curvature, surfaces of constant curvature.

Unit IV

Second Fundamental forms, principal curvatures, lines of curvature, Rodrigue's formula, conjugate and asymptotic lines. Developables, developable associated with space curves and curves on surfaces, minimal surfaces. Fundamental Theory of surfaces.

Books Recommended:

- ✓ *T.J. Willmore, An Introduction to Differential Geometry, Dover Publications, 2012.*
- ✓ *Pressley, Elementary Differential Geometry, Springer International Edition, 2014*

Books for References:

- ✓ *O'Neill, Elementary Differential Geometry, 2nd Ed., Academic Press, 2006.*
- ✓ *C.E. Weatherburn, Differential Geometry of Three Dimensions, Cambridge University Press 2003.*
- ✓ *D.J. Struik, Lectureson Classical Differential Geometry, Dover Publications, 1988.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XVI **Semester VII**

Measure Theory & Integration

Course Objectives:

The aim of this course is to provide a foundation for student to many branches of mathematics such as functional analysis, harmonic analysis, ergodic theory, and probability theory, etc.. In this course, the students will be introduced to, Lebesgue measure and integration, signed measures, Hahn-Jordan decomposition, Radon-Nikodym derivative and product measures.

Learning Outcomes:

After completing the course the student will be able to

- Calculate Riemann-Stieltjes integrals and Lebesgue integrals of simple measurable functions.
- Know how to calculate Lebesgue Integral of any measurable functions and learn how to apply monotone and dominated convergence theorems.
- Learn the concept of measure on abstract spaces and work on various modes of convergence of a sequence of measurable functions.
- Learn on complex measures, Radon Nikodym derivatives and related results.

Unit I

Lebesgue outer measure, measurable sets, Borel sets, regularity, measurable functions, Borel and Lebesgue measurability, non-measurable sets, integration of nonnegative functions, simple functions, Lebesgue integration of simple function.

Unit II

Approximation of measurable functions by simple functions, Lebesgue integral of measurable functions and properties, Fatou's lemma, monotone convergence theorem, Lebesgue dominated convergence theorem, integration of series, Riemann and Lebesgue integrals, differentiation, Dini derivatives, Lebesgue differentiation theorem.

Unit III

Abstract measure spaces, measure and outer measure, extension of a measure, uniqueness of the extension, completion of a measure, integration with respect to a

measure, Modes of convergence, convergence in measure, almost uniform convergence, fundamental in measure convergence, Egorov's theorem.

Unit IV

Signed measure, absolute continuity, Hahn decompositions, Jordan decomposition, Lebesgue decomposition, Radon-Nikodym theorem, applications of Radon Nikodym Theorem, product measure, Fubini theorem.

Books Recommended:

- ✓ *G. De Barra: Measure Theory and Integration, New age International, 1981.*
- ✓ *H. L. Royden: Real Analysis, Pearson, Fourth Edition, 2010.*

Books for Reference:

- ✓ *H. L. Royden and P. M. Fitzpatrick: Real Analysis, Fourth Edition, Pearson Asia Education Ltd and China Machine Press, 2010.*
- ✓ *C. D. Aliprantis, O. Burkinshaw: Principles of Real Analysis, Elsevier, 2011.*
- ✓ *J . Yeh: Real Analysis (Theory of Measure and Integration), 3rd Edition, World Scientific Publication, 2024.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XVII

Algebra-III

Course Objectives:

To present a systematic study of field theory and Galois theory.

Learning Outcomes:

After completing the course the student will be able to

- Understand the basic concept of field extension, and splitting fields.
- Understand the significance of separable extension, cyclotomic polynomials, Galois group.
- Understand the structures and properties of finite fields, composite extensions, simple extensions.
- Determine the Galois group of a polynomial and understand the conditions under which polynomial equations can be solved using radicals.

Unit I

Basic theory of field extension, algebraic extension, classical straightedge and compass construction, splitting fields and algebraic closures.

Unit II

Separable and inseparable extension, Cyclotomic polynomials and extensions, Galois theory, basic definitions, The fundamental theorem of Galois theory.

Unit III

Finite fields, Composite extensions and simple extensions, cyclotomic extensions and abelian extensions over Q, Galois groups of polynomials over Q.

Unit IV

Solvability and radical extension, Insolvability of quintic, computations of Galois group over Q.

Books Recommended:

- ✓ *D. S. Dummit, R. M. Foote, Abstract Algebra, Wiley-India edition, 2013.*
- ✓ *Joseph A. Gallian, Contemporary Abstract Algebra (4th Edition), Narosa Publishing House, New Delhi, 1999.(IX Edition 2010).*

Books for Reference:

- ✓ *John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.*
- ✓ *I.N. Herstein, Topics in Algebra, Wiley Eastern Limited, India, 1975.*

- ✓ *e-Learning Source http://ndl.iitkgp.ac.in; http://ocw.mit.edu; http://mathforum.org*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*

Core XVIII

Topology

Course Objective:

This is an introductory course in Topology. The objective of this course is to have knowledge on topological spaces, continuity, connectedness, compactness and separation axioms. Topology on quotient spaces, product spaces and metric spaces are also discussed. The student will also learn on basic ideas of algebraic topology such as homotopy, fundamental groups and covering spaces.

Learning Outcomes:

After taking the course the student will be able to

- Know on basics of topological spaces with examples and is able to construct new topologies using idea of product topology, quotient topology, etc .
- Solve problems involving continuous maps, homeomorphisms between two spaces , connectedness and compactness.
- Learn examples and properties of Hausdorff, regular, normal, separable, first and second countable spaces.
- Understand more results in separation axioms and learn on basic concepts of algebraic topology like homotopy, fundamental groups, and covering spaces.

Unit I

Cartesian product of a family of sets, Axiom of choice and its equivalents(without proof),Topological spaces, examples, open sets, closed sets, basis and subbasis for a topology, closure and interior of sets, subspace topology, order topology, continuous functions, homeomorphisms, product topology, quotient topology.

Unit II

Metric topology, standard topology, uniform topology, lower limit topology, connectedness, examples, local connectedness, Path-connectedness, connected subsets of real line, compact spaces, examples, locally compacts spaces, sequential compactness, limit point compactness, compact subsets of real line.

Unit III

Countability axioms, first and second countable spaces, separable and Lindolf spaces, separation axioms, regular & completely regular space, normal spaces, Urysohn Lemma.

Unit IV

Urysohn metrization theorem, Tychonoff theorem, compactness in metric spaces, compact open topology homotopy of paths, fundamental group, covering space.

Books Recommended:

- ✓ *J R Munkres, Topology: A First Course, Pearson, 2nd edition, 2000.*
- ✓ *M A Armstrong, Basic Topology. Springer, 1983.*

Books for Reference:

- ✓ *K. D. Joshi, Introduction to General Topology, Wiley Eastern Limited.*
- ✓ *T. S. Singh, Elements of Topology, CRC press (special Indian Edition) 2015.*
- ✓ *O. Viro, O Ivanov, V Kharlamov and N Netsvetaev, Elementary Topology, problem Text book, American Mathematical society, 2008.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XIX

Mathematical Methods

Course Objective:

The objective of this course is to prepare a student in basics of Integral transforms, Integral equations and calculus of variations. These tools have applications in other science and engineering fields and are necessary to understand.

Learning Outcomes:

After completing the course the student will be able to

- Calculate Laplace transform, Fourier transform and apply them in areas of differential equations immediately.
- **F**ind solutions of Volterra integral equations.
- Find solutions of Fredholm integral equations.
- Use methods in calculus of variations to solve extremal problems in Differential equations and physics.

Unit I

Laplace transforms: definitions, properties, Laplace transforms of some elementary functions, convolution theorem, inverse Laplace transformation and applications. Fourier transforms: definitions, properties, Fourier transforms of some elementary functions, convolution, Fourier transform of derivatives, Fourier transforms as a limit of Fourier series.

Unit II

Volterra Integral Equations: Basic concepts, relationship between linear differential equations and Volterra integral equations, resolvent kernel of Volterra integral equations, solution of integral equations by resolvent kernel, The method of successive approximations, convolution type equations, solutions of integral differential equations with the aid of Laplace transforms.

Unit III

Fredholm integral equations: Fredholm equations of the second kind, fundamentals, iterated kernel, constructing the resolvent kernel with the aid of iterated kernels, integral equations with degenerate kernels, characteristic numbers and eigen functions, solution of homogeneous integral equations with degenerate kernel, non-homogeneous symmetric equations, Fredholm alternatives.

Unit IV

Calculus of variations: extremal of functional, The variation of a functional and its properties, Euler's equations, field of extremals, sufficient conditions for the extremum of a functional, conditional extremum moving boundary problem, discontinuous problems, one sided variations, Ritz method.

Books Recommended:

- ✓ *A. J. Jerri; Introduction to Integral Equations with Applications, John-Wiley & SONS, INC., 1999.*
- ✓ *Lokenath Debnath; Integral Transforms and Their Applications, CRC Press, New York.*
- ✓ *A. S. Gupta; Calculus of Variations with Applications, PHI, Pvt. Ltd., New Delhi.*

Books for Reference:

- ✓ *I. Sneddon, The use of Integral Transformations (Tata McGraw Hill), 1972.*
- ✓ *Murray R Spiegel, Laplace Transforms, Schaum's Series, 1965.*
- ✓ *Gelfand and Fomin, Calculus of Variations, Dover Pub, 2003.*
- ✓ *Krasnov, Problems and Exercises in Calculus of Variations, Mir Publ., 1970.*
- ✓ *Ram P Kanwa, Linear Integral Equations (Academic Press), 2013.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XX **Semester VIII**

Functional Analysis

Course Objective:

The objective of this course is to introduce students to L^p spaces, Banach Spaces, Hilbert Spaces etc. Students will also be exposed to bounded linear operators on Hilbert spaces which is required to study quantum mechanics, scattering theory and spectral theory, etc. Knowledge of real Analysis, measure theory and linear algebra is pre requisite for this course

Learning Outcomes:

After completing the course the student will be able to

- Handle inequalities in L^p spaces, and normed linear spaces.
- Learn all basic results on Hilbert spaces for further application.
- Know on Fourier series with respect to an orthonormal basis and related results and basic results of Banach space
- Know on more results on Banach spaces and bounded linear operators with spectrum on Banach spaces.

Unit I

Review of Metric spaces (not a part of examination), L^p and l^p spaces, inequalities (Holder, Minkowski, Jensen), completeness of Lp, denseness and separability, normed linear spaces, properties of normed linear spaces, continuity of linear maps.

Unit –II

Inner product spaces, examples, Hilbert spaces, examples, closed subspaces, existence of a unique element of smallest norm, orthogonal complements and properties, projection theorem, Riesz representation theorem, orthonormal sets, Gram-Schimdt orthonormalization.

Unit – III

Orthonormal basis, Fourier expansion, Bessel's inequality, Riesz-Fischer theorem, Parseval's formula, Banach spaces, examples, Hahn Banach theorem, Baire's category theorem.

Unit IV

Open mapping theorem, closed graph theorem, uniform boundedness principle, duals of $L^p[a, b]$, bounded linear operators on Banach spaces, spectrum of a bounded operators and properties, resolvent set and examples.

Books Recommended:

- ✓ *B. V. Limaye -Functional Analysis, 3rd Ed, 2014.*
- ✓ *E. Kreyszig-Functional Analysis –Wiley-India, 2007.*

Books for Reference

- ✓ Goffman and Pedrick A first Course in Functional Analysis, AMS, 2017.
- ✓ J. B. Conway, A course in Functional Analysis, 2nd Ed., Springer, 2006
- ✓ P. K. Jain and O. P. Ahuja, Functional Analysis, 2nd Ed., New Age International Publication, New Delhi, 2004
- ✓ Markus Haase, Functional Analysis: An Elementary Introduction, American Mathematical Society, 2014.
- ✓ Suggested digital platform: NPTEL/SWAYAM/MOOCs.
- ✓ e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org

Core XXI

Analytic Number Theory

Course Objectives:

The aim of this course is to study number theory by using analytic tools such as inequalities, limits, calculus, etc.

Learning Outcomes:

After completing the course the student will be able to

- Understand the arithmetical functions and their relations.
- Find the average order of multiplicative functions and know the distribution of prime numbers.
- Know the prime number theorem and Ramanujan's sum
- Know the basic theory of Riemann zeta function and related L-function.

Unit I

The arithmetical functions and their relations, Mobius function, Euler totient function, Mangolt function, Liouville's function, The, divisor function, The Dirichlet product of arithmetical functions, Dirichlet inverses and Mobius inversion formula, multiplicative functions. The Bell series of an arithmetical function and Dirichlet multiplications, Derivatives of arithmetical functions, The Selberg identity.

Unit II

The big oh notation, Euler's summation formula, some elementary asymptotic formulas, averages of arithmetical functions, The average order of divisor functions, The average order of Euler totient function, The average order of Mobious and Mangoldt functions, The partial sums of a Dirichlet product, applications to the Mobius and Mangoldt functions, some elementary theorems on distribution of prime numbers, Chebyshev's functions and their relations with $\pi(x)$.

Unit III

Some equivalent forms of the prime number theorem, Shapiro Tauberian theorem, The partial sums of the Mobius function, brief sketch of an elementary proof of the prime number theorem, Ramanujan's sum and generalizations, quadratic residues, Legendre's symbol and its properties, Gauss's lemma, The quadratic reciprocity law, The Jacobi symbol.

Unit IV

The half-plane of absolute convergence of a Dirichlet series, Euler products, analytic properties of Dirichlet series, mean value formulas for Dirichlet series, an integral formulas for the coefficients and the partial sums of a Dirichlet series, The Riemann zeta function and the L-function, properties of the gamma function, integral representation for the Hurwitz zeta function, analytic continuation of the Hurwitz zeta function, analytic continuation of the Riemann zeta function and the L-function.

Books Recommended:

- ✓ *T. M. Apostol, Introduction to Analytic Number Theory, Springer International Edition, 2010.*
- ✓ *Analytic Number Theory: Exploring the Anatomy of Integers, Jean-Marie De Koninck, Florian Luca, American Mathematical Society, 2012.*

Books For Reference:

- ✓ *A Primer of Analytic Number Theory: From Pythagoras to Riemann, Jeffrey Stopple, Cambridge University Press, 2003.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XXII

Complex Analysis-II

Course Objectives:
This course introduces the basic concepts of conformal mappings, entire functions, Weierstrass infinite products, Hadamard's factorization theorem, Gamma function, Zeta function and normal family.

Learning Outcomes: On the completion of this course, students will be able to

- Solve problems involving conformal mappings.
- Understand the applications of Cauchy integrals and properties of harmonic functions.
- Handle Gamma function, Riemann zeta function and familiarize with analytic continuations.
- Solve problems involving infinite products, equicontinuity and normal family.

Unit I

Mappings of elementary functions and cross ratio, bilinear transformations and its properties, mapping of some elementary functions, mappings of z^2, e^z, $\sin z$, $\log z$, z+1/z, etc., conformal mappings.

Unit II

Maximum modulus theorems, Schwartz lemma, Argument principle, Rouche's theorem, applications to fundamental theorem of calculus, uniqueness and identity theorems, Hurwitz's theorem, Harmonic functions, mean value theorem, Poisson integral formula, Harnack's inequality and theorem, Hadamard three circle theorem.

Unit III

Weierstrass' factorization theorem, Gamma function and its properties, Riemann zeta function, Riemann's functional equation, Mittag-Leffler's expansion theorem and its applications, analytic continuation, uniqueness of direct analytic continuation, uniqueness of analytic continuation.

Unit IV

Canonical products, Jensen's formula, Poisson-Jensen formula, Hadamard's three circles theorem, order of an entire function, exponent of convergence, Borel's theorem, Hadamard's factorization theorem. equicontinuity, normal family, families of analytic functions.

Books Recommended:

- ✓ *L. V. Ahlfors: Complex Analysis: McGraw Hill, 3rd Edition (2017).*
- ✓ *S. Ponnusamy and Herb Silverman: Complex variables with Applications: Birkhauser, (2006) (Indian Edition 2012).*

Books for References:

- ✓ *J. Bak and D. J. Newman: Complex analysis (3rd Edition), Undergraduate Texts in Mathematics, Springer-Verlag, NewYork, 1997.*
- ✓ *H. A. Priestly: Introduction to complex analysis, Oxford University Press, 2008.*
- ✓ *D. Sarason: Complex Function Theory: AMS, Second Edition, 2007.*
- ✓ *E. M. Stein and R. Shakarchi: Complex analysis: Princeton University Press, 41 William Street, Princeton, New Jersey, 2003.*
- ✓ *John B. Conway: Function of one complex variable: Springer International Student Edition, Narosa Publishing House, Second Edition, 2002.*
- ✓ *R. V. Churchill, J. W. Brown and R. F. Verhey: Complex variables and applications, McGraw Hill, 9th Edition, 2013.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Core XXIII

Differential Equations-III

Course Objective:

The objective of this course is to

- Understand the basic methods for qualitative behavior of solutions of ordinary differential equations and boundary value problems,
- Understand the basic methods to solve system of differential equations,
- Expose students about some of the real life problems using the system of differential equations,
- Expose the students to canonical forms of hyperbolic, elliptic and parabolic PDEs.

Learning Outcomes:

On the completion of this course, students will be able to

- Handle oscillation properties of ordinary differential equations and sturm Liouville differential equations
- Know existence and uniqueness theorems and application to mathematical modelling.
- Learn solutions of heat equation and various boundary value problems for Laplace equation
- Solve various PDEs using Green's function

Unit I

- **Oscillation of Second Order Linear Differential Equations:** Fundamental results, Sturm's Comparison Theorem and Hille-Wintner type oscillation.
- **Second Order Boundary Value Problem:** Sturm-Liouville differential equation, eigen value problems, Green's function and Picard's Theorem.

Unit II

System of first order equations, existence and uniqueness theorems, fundamental matrix, homogeneous and nonhomogeneous linear systems with constant coefficient, mathematical formulation of Predatory-pray model, epidemic model of influenza, battle model and their solutions.

Unit III

One dimensional heat equation and its origin, Heat conduction problem for an infinite rod and finite rod, existence and uniqueness of solution, two dimensional heat equation and Laplace equation, boundary value problems, maximum and minimum principles, uniqueness and continuity theorems, Dirichlet problem for a circle, Dirichlet problem for annulus, Neumann problem for a circle.

Unit IV

Solution of heat equation, wave equation, Laplace equation and Helmholz equation by Green's function method and examples.

Books Recommended:

- ✓ *Deo and Raghavendra; Text Book of Ordinary Differential Equations, Tata McGraw-Hill Pub. Company Ltd, New Delhi, 2017.*
- ✓ *Belinda Barnes and Glenn R. Fulford; Mathematical Modeling with Case Studies, A Differential Equation Approaching Maple and Matlab, 2nd Ed., Taylor and Francis group, London and NewYork,2009.*
- ✓ *Tyn Myint-U and Lokenath Debnath; Linear Partial Differential Equations for Scientists and Engineers, 4th edition, Birkhauser, Indian reprint,2014.*

Books for References:

- ✓ *K. Shankar Rao, Introduction to partial differential equations, PHI learning private Ltd., 2011.*
- ✓ *J. N. Sharma, K. Singh, Partial Differential Equations for Engineers and Scienists, Narosa, 2nd Edition, 2009.*
- ✓ *Robert C.McOwen: Partial Differential Equations, Pearson Education Inc., 2002.*
- ✓ *Martin Braun, Differential Equations and their Applications, Springer International Student Ed., 1978.*
- ✓ *S.L. Ross, Differential equations,3rd Ed., John Wiley and Sons, India, 2014.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

THRUST AREAS FOR DISSERTATION/PROJECT WORK

The student should work for his dissertation in a topic in one of these areas or any area related to these:

1. Topics in Number theory and its applications to Cryptography, Coding theory, etc.
2. Topics in recent development in Group theory, Ring and Field theory
3. Special topics in Number theory like Ramanujan Sum, Distribution of primes
4. Fibonacci and Lucas numbers, Riemann Zeta function, etc.
5. Linear algebra, Matrix theory and applications.
6. Representation theory.
7. Topics in Ordinary Differential Equations such as Stability theory, Oscillation theory.
8. Bifurcation and Catastrophe theory.
9. Finite element method.
10. Initial and boundary value problems in Ordinary and Partial differential equation.
11. Difference equations.
12. Discrete dynamical system such as Julia sets, Horse shoes, Cellular Automata. etc., with topological properties and applications.
13. Fractional calculus.
14. Complex analysis.
15. Fractals and their applications.
16. Geometric function theory including univalent (harmonic) mappings, Quasi conformal maps in one and several variables.
17. Orthogonal polynomials in **R** and **C**, *q*-Calculus and Moments problem.
18. P-adic analysis and P-adic fields.
19. Measure theory.
20. Functional analysis and applications.
21. Summability theory.
22. Geometry of Banach spaces.
23. Ergodic theory.
24. Information theory.
25. Fourier analysis.
26. Wavelets.
27. Fixed point theory.
28. General Topology.
29. Combinatorial Topology.
30. Differential Topology.
31. Algebraic topology including Homology, Homotopy theory, Fundamental groups, Covering spaces, CW complexes, etc.
32. Algebraic Geometry and related topics.
33. Normed algebras.
34. Topics in Operator theory and Operator algebras.
35. Operators on function Spaces including Composition operators, Toeplitz operators, Hankel operators, etc.
36. Spectral theory for bounded and unbounded operator on Hilbert space including Scattering theory.
37. Mathematical modeling (Pollution modeling, Epidemic modeling, Population modeling, etc.).
38. Mathematical Biology including Mathematics of life sciences.

39. Differentiable manifolds, differential forms and related topics.
40. Lie Groups and Lie algebras.
41. Knots and Braids.
42. Relativity, Cosmology and Gravitation, etc.
43. Nonlinear programing problems and applications.
44. Queuing theory.
45. Optimization and Combinatorial optimization.
46. Topics in Artificial Intelligence, Machine learning, Manifold learning and Principal component analysis, etc.
47. Data structure and Data base management, etc.
48. Fuzzy theory and Rough sets.
49. Topics in applications of Probability, Stochastic models including Markov Process, Brownian process, Birth and Death processes, Renewal and Branching, and Reliability, etc.
50. Time series and Forecasting.
51. Topics in Integrable Models such as KDV and KP equation , Toda Lattice, Veselov Novikov, Davey Stewartson and Benney equations, etc.
52. Topics in Image Processing, Signal processing, discrete Image processing, etc.
53. Topics in Graph theory and Combinatorics.
54. Topics in Numerical analysis, Numerical solution for ODE and PDE, etc.
55. Time scale calculus.
56. Computational fluid dynamics.
57. Projective geometry.
58. Finite Field

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

Philosophy

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - Introduction to Philosophy
	Core II- Introduction to Moral Philosophy
II	Core III- Living Philosophy of Vedas and Upanishads
	Core IV - Logic and Scientific Method Introduction
III	Core V- Greek Philosophy
	Core VI- Modern European Philosophy
	Core VII- Systems of Indian Philosophy
IV	Core VIII- Ethical Theories
	Core IX- Social and Political Philosophy
	Core X- Systems of Indian Philosophy
V	Core XI- Modern European Philosophy
	Core XII- Applied Ethics
	Core XIII- Philosophical Analysis
VI	Core XIV- Philosophy of Religion
	Core XV- Symbolic Logic
VII	Core XVI- Upaniṣadic Philosophy for Life: Textual Study of Isa Upaniṣad
	Core XVII- Contemporary Indian Philosophy
	Core XVIII- Post-Kantian Philosophy - I
	Core XIX- Post-Kantian Philosophy
VIII	Core XX- Existentialism and Phenomenology
	Core XXI- Linguistic & Analytic Philosophy
	Core XXII- Meta-Ethics
	Core XXIII- Symbolic Logic: Quantification Theory

Programme Outcome

Philosophy, as a program of study, has disciplinary outcomes, which are qualitative and humane specific as the following.

A. Learning Discipline-Cantered Skills

1. Enhancement of Critical Thinking Skills: Students opting for the course may have ample opportunities to develop critical thinking skills, such as the ability to analyse, evaluate, and construct arguments, by which they can identify challenges and assumptions, predispositions, etc., underlying thoughts, beliefs, and conceptualization.

2. Practicing Logical Approach and Techniques: Philosophy involves various types of reasoning and argumentations in formal and informal logic. By practicing these, students can learn to construct valid arguments, identify logical fallacies, and follow rigorous methods of reasoning. This training in logical reasoning enhances their ability to analyze complex problems and arrive at well-founded conclusions.

3. Proficiency in Analytical Skills: Students of philosophy are likely to well acquire analytical skills, philosophical methods, and reasoning while doing rigorous philosophical analysis; this will help inculcate the ability to interpret complex texts, identify logical fallacies, and construct coherent arguments.

4. Inculcation of Communication Skills: Students of philosophy will engage in argumentations, which may help to enhance their communication skills, including the ability to articulate complex ideas clearly, persuasively, and effectively to diverse audiences. Analytic and Linguistic philosophy will be helpful for this.

5. Developing Problem-Solving Abilities: Philosophy students will develop problem-solving abilities by applying philosophical methods and analyzing concepts to address real-world issues and challenges. This will help them to contribute innovative solutions in various fields. Philosophy also fosters creative problem-solving by encouraging individuals to think outside the box and consider alternative perspectives. By engaging with philosophical questions and debates, students develop the ability to generate innovative solutions to complex problems and explore new ways of thinking about familiar issues.

6. Development of Decision-Making Capacity: Philosophy provides individuals with a framework for making sound decisions based on careful reasoning and ethical considerations. By honing their judgment skills through philosophical inquiry, students become better equipped to navigate real-world challenges and make informed choices in their personal and professional lives.

7. Abstract levels of Inquiry: Students who study the program will better develop proficiency in abstract levels of inquiry, including the ability to find foundational truth, speculate over and

address the profound questions about ultimate Reality, knowledge, existence, morality, and the human condition, and formulate hypotheses to solve the riddles for themselves

8. Better Dealing with Axiological Issues for Meaningful Life: Students pursuing the course will cultivate ethical reasoning abilities, and moral sensitivity, which will enable them to engage in thoughtful reflection on ethical and aesthetic values principles and make well-reasoned ethical judgments in personal and professional contexts. Students can learn to assess ethical dilemmas, consider different perspectives, and make morally responsible decisions by exploring ethical theories and case studies.

9.Being equipped with knowledge, skills, ethical values, engagement with philosophical ideas, and contributions to intellectual discourse will help lead the most meaningful and purposeful lives in an increasingly complex and interconnected world. 9. Meta-cognition: Philosophy, in general, and epistemology, in particular, is a metalevel of study in so far as it encourages meta-cognition, or thinking about thinking, the same thought processes, beliefs, and assumptions, leading to greater self-awareness and intellectual humility. This self-reflective practice enhances their ability to recognize biases, question.

10. Better Interdisciplinary Understanding: Students will gain an interdisciplinary understanding of philosophy, including its connections to other disciplines such as psychology, sociology, political science, literature, and the natural sciences.

11. Develop Cultural Awareness: Students will develop cultural awareness and sensitivity by studying diverse philosophical traditions worldwide, including Western, Eastern, African, and Indigenous philosophies. The study of Vedanta will enable them to practice universal fraternity, and Yoga Philosophy will shed personal blemishes. Students will cultivate a sense of global citizenship and social responsibility, recognizing the ethical dimensions of individual and collective actions and striving to contribute to a more just, inclusive, and sustainable world.

12. Holistic Attitude for Perfection: This course will help maintain and enhance intellectual curiosity, a love of wisdom, a passion for inquiry, and open-mindedness. It helps to learn self-reflection and self-examination. These are key to personal growth through philosophical inquiry, cultivating intellectual humility, openness to new ideas, and a deeper understanding of themselves and their place in the world. At the same time, it will also help foster an attitude for perfection that will always extend beyond the classroom, enriching students' personal and professional lives.

B. Scope for Higher Education:

Learning philosophy enriches one's intellectual and personal development. It provides a strong foundation for further higher education by fostering critical thinking, interdisciplinary understanding, ethical reasoning, communication skills, problem-solving abilities, cultural awareness, and a lifelong passion for learning. Engaging with philosophy can significantly enhance thinking and judging skills in various ways so that students can do well in their higher education.

C. Employability:

learning philosophy enhances the scope for employability as the students can equip themselves with thinking, analyzing, judging, and communicating skills by promoting critical thinking, logical reasoning, analytical skills, ethical reasoning, meta-cognition, creative problem-solving, and decision-making abilities. These skills are not only valuable in academic contexts but also in everyday life, enabling individuals to engage more effectively with the world around them and make well-informed decisions.

D. Enhancing Humane Capability:

Engaging with philosophy can indeed significantly enhance humane capability, which refers to one's capacity for empathy, compassion, ethical reasoning, and moral sensitivity. By developing, Empathy, Understanding, and Compassion, Philosophy encourages individuals to consider alternative perspectives and explore different perspectives, cultures, and experiences; by engaging with philosophical texts and ideas, individuals develop empathy and a deeper understanding of the diverse range of human thought and emotion., and empathize with the experiences and viewpoints of others. By studying philosophical texts and engaging in philosophical discussions, individuals develop empathy and compassion for diverse individuals and communities, fostering a sense of interconnectedness and solidarity with others. This enriched capacity for ethical reflection and moral sensitivity contributes to individual well-being and the promotion of a more compassionate and just society. Engaging with philosophy enhances humane capability by fostering ethical development, empathy, compassion, moral reasoning, virtue cultivation, social justice advocacy, global citizenship, and personal flourishing.

Core I **Semester I**

Introduction to Philosophy

Introduction:

Introduction to Philosophy provides a foundational understanding of the key concepts, methods, and questions central to philosophical inquiry. Through readings, discussions, and critical analysis, students will explore major philosophical traditions and engage with open-ended questions about reality, knowledge, and ethics. This course serves as a gateway to the rich and diverse world of philosophical thought, fostering critical thinking skills and intellectual curiosity.

Course Outcomes:

- Familiarize students with major philosophical themes, theories, and thinkers.
- Develop critical thinking skills for analysing and evaluating philosophical arguments
- Understanding of the fundamental concepts in philosophy.
- Cultivate the ability to articulate and defend reasoned positions on philosophical issues.
- Explore the relevance of philosophy to everyday life and contemporary issues in the relation of philosophy with some other disciplines.
- Encourage intellectual curiosity and open-mindedness in approaching philosophical questions.
- Understanding of the theories of reality.
- Understanding of the basic metaphysical, epistemic, and ethical concepts and doctrines.

Learning Outcome:

Unit-I

Students will have a basic understanding of Philosophy through the nature, function, and different branches of Philosophy. They will be able to explain the relationship of Philosophy with other modes of thinking.

Unit-II

By the end of Unit 2, students will appreciate the Metaphysical branch of Philosophy and related issues. They will have an awareness of different kinds of Metaphysical doctrines like Monism, Dualism, and Pluralism which can help them understand human existence and the world at large.

Unit-III

Students will be familiar with the Epistemological branch of Philosophy and sources of knowledge. They will be able to differentiate truth from falsehood and be aware of different doctrines of epistemology, such as Rationalism, Empiricism, and Skepticism.

Unit-IV

By the end of Unit 4, Students will have learned about the branch of ethics and various ethical doctrines such as Deontology, Teleology, and Virtue Ethics

Unit-I:

Definition, Nature & Function of Philosophy, Branches of Philosophy, Value of Philosophy, Misconceptions about Philosophy, and in relation to other modes of thinking like Science, Social Science & Theology.

Unit-II:

Introduction to Metaphysical issues: Appearance and Reality, Mind and Matter, Substance and Attribute, Universal and Particular;

Unit-III:

Introduction to Metaphysical Doctrines: Monism, Dualism, Pluralism, Realism and Idealism.

Unit-IV:

Basic understanding of Belief, Opinion and Knowledge, Sources of Knowledge, Introduction to Epistemological Doctrines: Skepticism, Empiricism, Rationalism.

Prescribed Books:

- ✓ *Bertrand Russell, the Problems of Philosophy, Surjeet Kaur Publications.*
- ✓ *John Hospers: An Introduction to Philosophical Analysis, Routledge, India.*

Reference Books:

- ✓ *G.T.W Patrick, Introduction to Philosophy*
- ✓ *A.C. Ewing, the Fundamental Questions of Philosophy*
- ✓ *G.W Cunningham, Problems of Philosophy*

E-Resource:

- ✓ *https://en.wikipedia.org/wiki/Philosophy#*
- ✓ *https://issuu.com/showkeenbilal/docs/material_b.a_1st.docx#:~:text=Philosophy%20provides%20to%20science%20the,critical%20work%20of%20the%20intellect.*
- ✓ *https://youtu.be/5k_omSj7IrQ?si=qq5EZrSM3LUW0wQX*
- ✓ *https://youtu.be/foUbGnsF4zg?si=KCP0cj98wCsdA3L5*
- ✓ *Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);*

Unit-I

1. Logic deals with _____.
2. What is the definition of Philosophy? Describe its nature and function.
3. Define how philosophy is related to science, social science & theology.

Unit II

1. What is the distinction between appearance and reality?

2. Define substance.

3. What are attributes?

Unit III

1. Who does advocate the abstract monism?
2. What is realism?
3. How time is different from space? Briefly describe.
4. Critically analyze “idea is only real”.

Unit IV

1. Berkley is a _____.
2. What is Skepticism?
3. A critical analysis between truth, belief, and opinion …
4. Briefly discuss empiricism and rationalism.

Core II **Introduction to Moral Philosophy**

Introduction:

An Introduction to Moral Philosophy is an engaging study of the realm of ethics, exploring questions about what is right and wrong, good and bad, and how we ought to live our lives. Throughout the course, students will engage in discussions, debates, and critical analyses of ethical theories and their applications to real-world issues. Assignments might include readings from classic and contemporary texts, writing reflections on moral dilemmas, and presentations on ethical topics of interest.

Course Outcomes:

1. Attaining knowledge of the relation between moral philosophy and other important disciplines.
2. Understanding of the basic ethical concepts and theories.
3. Understanding the moral standards and judgments.
4. Understanding of the fundamental concepts in Hindu ethics.

Learning Outcome :

Unit-I: Students will be able to distinguish between Ethics and Morality. They will be able to interpret events with a more rational basis.

Unit-II: By the end of Unit 2, Students can analyze the nature of a moral judgment. They will be able to differentiate between moral and other forms of judgment.

Unit-III: Students will have an understanding of the evolution of Moral Consciousness. They will be able to trace the development of Moral consciousness from Custom to Conscience

Unit-IV: Students will have a familiarity with the Indian tradition of Morality. They will have an awareness of concepts like Dharma, Guṇa-Karma-Svabhāva; Puruṣārtha.

Course Components:

Unit-I: Definition, Nature, and Scope of Moral Philosophy, Distinction between Morality and Ethics; Ethics in Relation to Other Disciplines: Sociology, Politics, Economics, and Theology;

Unit-II: Psychological Basis of Ethics: Moral and Non-Moral Actions, Voluntary Actions, **Moral** Judgement: Nature of Moral Judgement, Moral and other types of Judgments: Logical, Factual and Aesthetic Judgments, Object and Subject of Moral Judgement; Morality and Legality;

Unit-III: Moral and nonmoral senses of "Good," Good and its senses, morality and cultivation of traits, morality of traits vs. morality of principles;

Unit-IV: Moral concepts: Right, duty and virtue, Moral pathology: Theories of Punishment, capital punishment;

Prescribed Books:

- ✓ *J. N. Sinha- A Manual of Ethics, New Central Book Agency Pvt. Ltd., Calcutta*

Reference Books:

- ✓ *N.C. Padhi & S.C. Panigrahi, Ethics: Indian and Western, Ananya Publications, Cuttack.*

E-Resource:

- ✓ *https://www.distanceeducationju.in/pdf/BA%20Sem%20III%20Course%20No%20PL-301%20Philosophy.pdf*
- ✓ *https://www.thebalancedyoga.com/tby-news/25/1/2018/dharma-yoga-3-types-of-dharma*
- ✓ *https://youtu.be/bK-afeC9TwQ?si=RDDaCxc-UNmnG0Pb*
- ✓ *https://www.lawtool.net/post/moral-judgment-philosophy#:~:text=A%20moral%20judgement%20presupposes%20a,of%20judging%20or%20moral%20faculty%20.&text=Ethics%20%2C%20Logic%20and%20Aesthetics%20are,norms%20of%20ideals%20of%20life%20*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

(1) Ethics Is Derived From ------Word.

(2) What Is Ethics?

(3) Explain the Nature and Scope of Ethics

(4) Discuss the relationship between Sociology, Ethics, and Politics.

Unit – II

(1) What Is Moral Judgment?

(2) What Is the Nature of Moral Judgement?

(3) Discuss the Relation to Morality and Legality

(4) Give An Exposition of Moral Judgement or Explain Logical, Factual, and Aesthetic Judgment.

Unit – III

1- The "Hedonism" Derived from Greek Word "Hedone" Means _____
2- What Is a Moral Standard?

3- What Is Customary Morality and Reflective Personal Morality?

4- What Is Utilitarianism? Explain Mill's Utilitarianism.

Unit – IV

1- How Many Purushartha Are Told in Indian Ethics?

2- What Is Dharma?

3 – Explain Briefly - Svadharma and Sadharana Dharma.

4- State and Explain the Definition of Purusharth and Discuss Its Classification.

Core III **Semester II**

Living Philosophy of Vedas and Upanishads

Introduction:

Philosophy of the Vedas and Upanishads are living philosophy not only in India but also in some parts of the World. It is living in the sense that Philosophy is alive as the undercurrent of the myriad cultures of India or Indian cultures. Philosophy is the lifeline of great cultures and exhibition of great humanity, and therefore, is a practical philosophy of ideal human life, cultures, and conducts. This may not give direct employment, as all subjects should not be judged similarly on the scale of employability, but it surely enhances the quality of the personality of the individual and, in that way, will indirectly help to gain employment and maintain it in a better way. Studying the philosophy of Vedas and Upanishads can be a profound journey into the rich spiritual and philosophical heritage of India. It may offer insights into the nature of existence, the self, and the ultimate reality, as speculated by the ancient sheers and their way of best life.

Course Outcomes:

- Understanding of some of the basic ideas expressed in the Vedas and Upanishads.
- Understanding of the issues concerning the origin of life, the aspects of life (karma), death, and rebirth.
- The knowledge concerning the individual self, Brahman, and the relation between self and Brahman.
- Understanding of the true Indian way of life.

Learning Outcome:

Unit-I: The learning outcomes of Unit-I aim is to provide students with a deep understanding of the foundational concepts and philosophical underpinnings of Hinduism as presented in the Vedas and related texts and to foster critical thinking and reflection on their relevance in today's world.

Unit-II: The learning outcomes of Unit-II aim is to deepen students' understanding of Vedic cosmology, rituals, philosophical concepts, and moral principles, and to encourage critical analysis and reflection on the nature of existence, karma, and the afterlife as depicted in Vedic literature.

Unit-III: The learning outcomes of Unit- III aim here is to deepen students' understanding of the philosophical and spiritual insights presented in the Upanishads, foster appreciation for traditional methods of study and spiritual inquiry, and encourage critical reflection on the nature of the self, reality, and ultimate liberation.

Unit-IV: The learning outcomes of Unit- IV the s aim here is to deepen students' understanding of key philosophical concepts, ethical principles, and spiritual practices presented in the Upanishads, fostering critical reflection on the nature of reality, human existence, and the pursuit of ultimate truth and liberation.

Course Components:

Unit-I: Introduction to *Vedas, Śruti, Smṛti and Vedāṅgas*, Veda as *Apauruṣeya*, Vedic Thoughts on Human Action and Destiny, Socio-Religious Systems. *Varṇa Dharma* and *Asrama Dharma, Puruṣārthas*

Unit-II: Vedic Cosmology, Important Divine Figures as Cosmic Forces, Karma and its types, Vedic Rituals at Different Stages of Life, *Virāṭ Puruṣa* (*PuruṣaSukta*), *Yajña* and *Tapasyā*, *Satya and Ṛta*, *Svarga, Narka*, Life, Death and Rebirth.

Unit-III: Introduction to *Upaniṣad*: Meaning of '*Upaniṣad' Guru-Śiṣya* and ĀśramaTraditions for Study, Number, and Status of Upaniṣads; Individual Self, Brahman, Ātman, Identity of Brahman and Ātman, Status of Gods and Goddesses, Experience, Reason, Intuition and Revelation.

Unit-IV: *Vidyā / Parāvidyā-Avidya / Aparā Vidyā, Māyā*, Status of Universe*; Karma*, *Jñāna* and Bhakti; Preyas, Śreyas and Niḥśreyas; Birth-Death-Rebirth and Freedom; Ethics and Religion of Upaniṣads.

Prescribed Books:

- ✓ *Arthur Berriedale Keith: The Religion and Philosophy of the Veda and Upanishads*
- ✓ *S. Radhakrishnan: Indian Philosophy, Vol .1.*
- ✓ *Paul Deussen: the Philosophy of the Upanishads, A S Geden (Tr.)*
- ✓ *T.M.P. Mahadevan: Invitation to Indian Philosophy*

Reference Books:

- ✓ *S. Radhakrishnan: The Principal Upanishads.*
- ✓ *Sri Aurobindo: the Secret of the Vedas with Selected Hymns*
- ✓ *Patrick Olivelle: the Early Upanisads, Annotated Text and Translation*
- ✓ *Robert Hume: The Thirteen Principal Upanishads, Oxford University Press, London.*
- ✓ *Mohanty, Aditya Kumar: Upanisads Re-discovered, Elite Publications, Bhubaneswar.*
- ✓ *Swami Ranganathananda, Eternal Values for A Changing Society, 'Philosophy and Spirituality', Vol. I., Bharatiya Vidya Bhavan, Bombay.*
- ✓ *P. T. Raju, the Philosophical Traditions of India, MLBD, Delhi.*

E-Resource:

- ✓ *https://egyankosh.ac.in/bitstream/123456789/34649/1/Unit-2.pdf*
- ✓ *https://www.britannica.com/topic/Hinduism/Karma-samsara-and-moksha*
- ✓ *https://youtu.be/ZetCDho_u7c?si=NGLi_4ys0yWw6dCC*
- ✓ *https://youtu.be/PvBA7xXfLvk?si=hsrEeDz5Z_gV4DwS*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1._____ Is the Oldest Veda?

2. What Is Different Between Ashram Dharma and Varna Dharma?

3. What Is the Role of Religion In the Social System?

4. What Is Purusharthas Explain the Four Aims of Life.

Unit – II

1. According to Veda There Are _____ Types of Karma.

2. What Is Karma?

3. What Is Yajna and Tapashya?

4. Explain the Death and Rebirth System.

Unit – III

1. the Word Upanishad Derived From _____ Word?

2. What Is Guru Shishya and Ashrama Tradition?

3. What Is Brahman?

4. Identity: The Relationship Between Brahman and Atman?

Unit – IV

1. Vidya s of _____ Kinds?

2. What is Vidya and What is Avidya?

3. What Is Yajna and Bhakti?

4. Explain the Ethics and Religion of the Upanishad.

Core IV **Logic and Scientific Method Introduction**

This Course on Logic and Scientific Method provides students with a foundation in critical thinking, reasoning, and the scientific method. Throughout the course, students would engage in theoretical discussions on logical and scientific reasoning and how to apply them to real-world problems with examples. Assignments might include analyzing scientific articles, designing experiments, and critically evaluating research methodologies.

Course Outcomes:

- Understanding of the nature and scope of Logic.
- Knowledge of the kinds of propositions and the relationship between them.
- Ability to construct sound arguments.
- Testing validity of arguments.
- Understanding of the role of logic in scientific inquiry.

Learning Outcome:

Unit-I The learning outcomes of Unit I aim to equip students with a solid foundation in logical reasoning, critical thinking, and argumentation, providing them with essential skills for analyzing and evaluating information, constructing coherent arguments, and engaging in rational discourse across various domains.

Unit-II The learning outcomes of Unit II aim to equip students with the foundational skills necessary for logical analysis and argumentation, enabling them to identify and evaluate propositions accurately, analyze arguments effectively, and communicate ideas clearly and logically.

Unit-III The learning outcomes of Unit III aim to equip students with the skills necessary for advanced logical analysis and argumentation, enabling them to identify and evaluate deductive arguments accurately, analyze syllogisms effectively, and apply logical reasoning in various academic and professional contexts.

Unit-4 The learning outcomes of Unit IV aim to equip students with the skills necessary for effective scientific inquiry, enabling them to apply inductive reasoning methods, evaluate causal claims, and draw informed conclusions based on empirical evidence. Additionally, students should enhance their critical thinking abilities, enabling them to engage critically with scientific literature and make reasoned judgments about the validity and reliability of scientific findings.

Course Components:

Unit-I: Definition, Nature, and Scope of Logic, Laws of Thought, Deductive and Inductive Arguments, Validity & Soundness of Arguments.

Unit-II: Sentence and Proposition, Classification of Propositions (from the standpoint of Quality & Quantity), Transforming ordinary sentences to propositions,

Distribution of terms, Seven-fold relation of propositions, Square of opposition of propositions,

Unit-III: Inference-Immediate Inference (Conversion and Obversion), Mediate

Inference (Syllogism): Figure & Moods, Testing of Validity of Arguments by Syllogistic Rules.

Unit-4: Inductive Reasoning & Scientific Enquiry: Causation, Mill's Five Experimental Methods.

Prescribed Book:

- ✓ *Morris R. Cohen & Ernest Nagel, Introduction to Logic & Scientific Method, Allied Publishers Ltd., New Delhi.*
- ✓ *Ganesh Prasad Das, Basics of Logic, Pt. I & Pt. II, Pancashila, Bhubaneswar, 2007.*

Reference Books:

- ✓ *Cohen Copi & Mac Mahan, Introduction to Logic (14th Edition)*
- ✓ *Alex Rosenberg, Philosophy of Science: A Contemporary Introduction.*

E-Resource:

- ✓ *https://egyankosh.ac.in/bitstream/123456789/37950/1/Unit-1.pdf*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/84670/1/Unit-3.pdf*
- ✓ *https://youtu.be/4TFzqxntqv8?si=4L-gHoffnGG12eGN*
- ✓ *https://youtu.be/Wvae-B0MTSE?si=cWislEy6mdqgNn9G*
- ✓ *Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);*

Unit-1:

1- Truth is the property of a _____.
2- What Is the Logical Definition of a term?
3- What are the principles of logic?
4- State and explain the nature and scope of Logic.

Unit-2

1- According to the principle of Quality, there are _____ kinds of propositions.
2- What is the distribution of terms?
3- 3- Discuss the seven-fold relation of propositions.
4- What is the square of the opposition of propositions? Discuss.

Unit -3

1- The Obverse of the 'E' proposition is_____. 2-
2- What Is an inference?
3- Explain the rules of conversion.
4- What is a Syllogism? Explain all the Syllogistic Rules.

Unit-4

1 - An Inductive Argument passes from known to _____.
2-What is inductive reasoning?
3- Explain the distinction between 'The Law of Uniformity of Nature' and 'The Law of Causation'.
4- Explain Mill's Joint Method of Agreement and Difference.

Core V **Semester III**

Greek Philosophy

Introduction:

Greek philosophy is an enriching endeavor that delves into the roots of Western thought. From the pre-Socratic philosophers like Thales and Heraclitus to the towering figures of Socrates, Plato, and Aristotle, Greek philosophy has profoundly influenced various fields such as ethics, metaphysics, epistemology, and politics.

Course Outcomes:

1. Basic understanding of the philosophical issues, ideas, concepts, etc. of ancient Greek thinkers (as specified in the course)
2. Ability to critically explain the ideas and concepts of the Greek thinkers.
3. Ability to compare, analyze, and evaluate the stands taken by the Greek thinkers.

Learning Outcome:

Unit-I Students will be able to describe the nature and salient features of Early Greek Philosophy. They will be familiar with the theories of the reality of ancient Greek Philosophers like Thales, Anaximander, Anaximenes, Heraclitus, Democritus, Anaxagoras, and Empedocles.

Unit-II Students will have a comprehensive understanding of the Problem during Pre-Socrates through the works of Parmenides, and Zeno. They will gain perspective on Socrates' Dialectical Method.

Unit-III Students will be able to describe Plato's Theory of Knowledge, Theory of Ideas, World and Soul, Society and Ideal State

Unit-IV Students will be able to critically analyze Plato's theory of ideas They will be familiar with Aristotle's work on physics and Metaphysics, Form, and Matter.

Unit-I: Nature of Greek Philosophy, Salient features of early Greek Thought; Reality: Thales, Anaximander and Anaximenes, Heraclitus, Democritus, Anaxagoras and Empedocles.

Unit-II: Parmenides: Theory of Being and Permanence; Zeno: Arguments against pluralism, (Zeno's) Paradox; Problem before Socrates and his approach, Socratic Dialectical method, Epistemology, Concept of knowledge, Ethics of Socrates.

Unit-III: Plato's Theory of Knowledge, Theory of Ideas, Theory of World and Soul, Ethics, Society and Ideal State.

Unit-IV: Criticism of Plato's Theory of Ideas; Aristotle's View of Physics and Metaphysics: Form and Matter, Theory of Causation, Philosophy of Nature, God and Soul: Logic and Ethics.

Prescribed Books:

- ✓ *W. T. Stace, Greek Philosophy*
- ✓ *Frank Thilly, A History of Philosophy*
- ✓ *Y. Mashih, A Critical History of Western Philosophy: Greek Medieval and Modern, MLBD, New Delhi.*
- ✓ *Peter Adamson, Classical Philosophy: A History of Philosophy without Any Gaps, Vol. 1. , Oxford University Press.*
- ✓ *Dhaneswar Sahoo, Greek Darshanara Itihasa, (Odia), Text Book Beauro, Odisha Rajya Pathya Pustaka Pranayana O Prakaśana Samsthā, Pustaka Bhavan, Bhubaneswar.*

Reference Books:

- ✓ *Burnet - Greek Philosophy*
- ✓ *B. A. G. Fuller - A History of Greek Philosophy*
- ✓ *Bertrand Russell - A History of Western Philosophy,*

E-Resource:

- ✓ *https://en.wikipedia.org/wiki/Ancient_Greek_philosophy#:~:text=The%20early%20Greek%20philosophers%20(or,in%20favor%20of%20reasoned%20discourse.*
- ✓ *https://youtu.be/E6peYD9uvQY?si=pVbwHekx3BempztW*
- ✓ *https://youtu.be/-5vnhG50NqU?si=Sm3SFtb7KC3XBCnN*
- ✓ *https://plato.stanford.edu/entries/aristotle-metaphysics/*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/35319/1/Unit-2.pdf*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit-I

1- Thales believed _____ to be the basic substance of everything in nature.

2- What Is Atomism?

3- How Does Heraclitus View the Relationship Between Stability & Change?

4- What Role Did Greek Mythology & Religion Play In Shaping the Early Philosophical Inquire of Greek Thinkers?

Unit-II

1- According to Socrates, Knowledge Is _____.

2- What Is Socratic Method?

3- What Are the Central principles of Socrates' Ethical Philosophy?

4- How Does Parmenides Critique the Notion of Change & Plurality In His Philosophy?

Unit-III

1- Plato Believed In the _____ of the Soul.

2- What Is Form?

3- According to Plato, What Is the Relationship Between the Material World & the World of the Form? (3),

4- What Are the Key Features of Plato's Ideal State As Described In "The Republic"?

Unit-IV

1- Aristotle Combined Both Matter and _____

2- What Are the Different Types of Soul Aristotle Identifies & How Does He Categorize Them?

1. 3- What Is Aristotle’s Main Criticism of Plato's Theory of Form?
2. 4- How Does Aristotle Define Each of the Four Causes: Material, Formal, Efficient & Final?

Core VI **Modern European Philosophy**

Introduction:

This course on modern European philosophy encompasses the rich and diverse philosophical movements that emerged from the Renaissance to the contemporary era. Throughout the course, critical analysis of philosophical arguments, and discussions of historical context and intellectual influences can deepen students' understanding of modern European thought and its relevance to contemporary issues.

Course Outcomes:

- Ability to mark the development of Western philosophical thought from Bacon to Leibnitz.
- Ability to understand the basic problems countered by the aforesaid thinkers and their responses to the problems.
- Ability to see the rationalist current in Western philosophy.
- Ability to compare and evaluate the common issues undertaken by the thinkers.

Learning Outcome:

Unit- I: The learning outcomes of Unit I aim to equip students with a solid understanding of Francis Bacon's contributions to the reform of science, his theory of idols, and his development of the inductive method. Additionally, students should enhance their critical thinking abilities and scientific inquiry skills, enabling them to engage effectively in empirical research and evidence-based reasoning.

Unit-II: The learning outcomes of Unit I aim to equip students with a solid understanding of René Descartes' philosophical contributions, including his methodological skepticism, foundationalism, proofs for the existence of God, mind-body dualism, and rationalist epistemology. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with Descartes' ideas and broader philosophical discourse.

Unit-III: The learning outcomes of Unit III aim to equip students with a solid understanding of occasionalism, Spinoza's rationalism, and his metaphysical, epistemological, and ethical ideas. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments.

Unit- IV The learning outcomes of Unit IV aim to equip students with a solid understanding of Leibniz's philosophical contributions, including his theory of monads, views on mind and matter, the solution to the mind-body problem through pre-established harmony, and his theodicy. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments.

Course Components:

Unit- I: Francis Bacon: Challenges for Bacon, Reform of Science, Theory of Idolas, Inductive Method.

Unit-II: Rationalism, Rene Descartes Problems for Descartes, Method, and Criterion for Knowledge, Universal Doubt and Search for Certainty, Cogito-Ergo-Sum, Proofs for the Existence of God, External World, Mind-Body Dualism, Innate Ideas.

Unit-III: Benedict De Spinoza: Rationalism, Methods, Substance, Attribute and Modes, Theory of Knowledge, Concept of God, Monism, and Pantheism.

Unit- IV: Gottfried Wilhelm Leibnitz: Theory of Monads, Mind and Matter, Mind-Body problem and Pre-established Harmony, Theodicy.

Prescribed Book: -

1. *Ratnakar Pati, History of Modern European Philosophy, A. K. Mishra Agencies, Cuttack.*
2. *Y Masih, A Critical History Of Modern Philosophy, Motilal Banarsidass Publishers, Delhi*

Reference Books*:* -

1. Ira Sen Gupta: A History of Western Philosophy

2. Frank Thilly: History Of Western Philosophy,

3. *Hrudananda Ray and Ganeswara Das, Pāśchātya Darśanara Itihasa (Ādhunika Yuga) (Odia), Odisha Rajya Pathya Pustaka Pranayana O Prakaśana Samsthā, Pustaka Bhavan, Bhubaneswar.*

E-Resource:

1. *https://plato.stanford.edu/entries/francis-bacon/*
2. *https://plato.stanford.edu/entries/descartes-epistemology/*
3. *https://youtu.be/0UCoLSHelkE?si=feeNr-SNIw0XyI_g*
4. *https://youtu.be/JbCm7ecjO6g?si=0qMiunxzLM0obsGN*
5. *https://egyankosh.ac.in/bitstream/123456789/80575/1/Unit-6.pdf*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1. Novum Atlantis Is the Work of _____.

2. Write a Short Note On Idola Tribus.

3. Explain Bacon's Theory of Idolas.

4 . Discuss the Inductive Method of Bacon.

Unit – II

1.“I Think Therefore I Exist ”Is the Statement of _____.

2. What Do You Mean By Idea?

3. Discuss the Relation Between Mind & Body In Descartes Approach?

4 . Briefly Explain Cogito-Ergo -Sum?

Unit – III

1. the Relation Between Mind and Body Is Known An_____ For Spinoza.

2. Explain Spinoza’s Abstract Monism.

3. Explain the Concept of Substance, Attributes, and Modes In the View of Spinoza.

4. Define the Substance and Explain the Various Nature of Substance In Spinoza’s Philosophy

Unit – IV

1._____ Advocated the Concept of Pre-Established Harmony.

2. Explain, Pre-Established Harmony.

3. Discuss Leibnitz's Explanation of Mind and Matter.

4. Briefly Explain the Theory of Monads

Core VII **Systems of Indian Philosophy**

Introduction:

This course provides an overview of Indian philosophical thought, emphasizing its historical development, cultural context, and distinctive features. It also discusses the importance of dharma (duty/righteousness), karma (action), and moksha (liberation) in Indian philosophical traditions. These issues are perennial in life, and know-how regarding the same will enlighten the students.

Course Outcomes:

1. Understanding of the basic tenets of Indian Philosophy.
2. Understanding of the philosophy of Charvaka, Jainism, Buddhism, Samkhya, and Yoga from metaphysical and epistemological standpoints.
3. Ability to find out the role of the discussed philosophical systems in guiding our modern life**.**

Learning Outcome:

Unit-I The learning outcomes of Unit-I aim to equip students with a solid understanding of Vaishesika philosophy, including its foundational concepts, metaphysical framework, and ethical principles. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Vaishesika tradition

Unit-II The learning outcomes of Unit-II aim to equip students with a solid understanding of Nyāya philosophy, including its epistemological framework, metaphysical principles, ethical teachings, and perspectives on liberation. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Nyāya tradition.

Unit-III The learning outcomes of Unit-III aim to equip students with a solid understanding of Pūrva Mīmāṁsā philosophy, including its perspectives on karma, Yajña, Dharma, and epistemology. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Pūrva Mīmāṁsā tradition.

Unit-IV The learning outcomes of Unit- -IV aims to equip students with a solid understanding of Advaita and Viśiṣṭādvaita Vedanta philosophies, including their metaphysical frameworks, theological perspectives, and paths to liberation. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Vedantic tradition.

Course Components:

Unit-I: Salient Features of Indian Philosophy and Basic Concepts,Carvaka: Epistemology and Metaphysics.

Unit-II: Introduction to Jainism: Epistemology: *Syādvāda, Anekāntavāda*, Ethics - *Triratna's, Sallekhaṇā*.

Unit-III: Introduction to Buddhism: Four Noble Truths, Doctrine of Momentariness, Theory of Dependent Origination, No Soul Theory, Nirvana, Noble Eightfold Paths, Paramitās, Ideals of Pratyeka Buddha, Bodhisattva, and Arhata.

Unit-IV: Introduction to SamkhyaYoga: Dualism of Purusa and Prakriti, God and World, Causation, Theory of Evolution, Twenty-Four Tattvas, Liberation according to *Sāṁkhya, Astāṅga Yoga of Patanjali*.

Prescribed Books: -

- ✓ *Dutta & Chatterjee - An Introduction to Indian Philosophy*
- ✓ *Sharma, C. D: A Critical Survey of Indian Philosophy, Motilal Banarsidass Publishers Pvt. Ltd., Delhi.*

Reference Books: -

- ✓ *S. Radhakrishnan, Indian Philosophy (Vol.1 & 2)*
- ✓ *R. K. Puligandla, Fundamentals of Indian Philosophy.*
- ✓ *M. Hiriyana, Outlines of Indian Philosophy.*
- ✓ *J.N. Mohanty, Classical Indian Philosophy, Oxford University Press.*
- ✓ *J. N. Sinha, Outlines of Indian Philosophy, New Central Book Agency.*
- ✓ *Gauranga Charan Nayak, Bharatīya Darshan (Odia), Odisha Rajya Pustaka Pranayana O Prakāshan Somstha, Bhubaneswar.*
- ✓ *P. T. Raju, the Philosophical Traditions of India, MLBD, Delhi.*

E-Resource:

- ✓ *https://en.wikipedia.org/wiki/Indian_philosophy#:~:text=Indian%20philosophies%20share%20many%20concepts,practices%20(moksha%2C%20nirvana).*
- ✓ *https://en.wikipedia.org/wiki/Charvaka#:~:text=The%20Charvaka%20epistemology%20holds%20perception,for%20Charvaka%2C%20external%20and%20internal.*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/34657/1/Unit-4.pdf*
- ✓ *https://www.egyankosh.ac.in/bitstream/123456789/35230/1/Unit-4.pdf*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/38170/1/Unit-3.pdf*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/38171/1/Unit-4.pdf*
- ✓ *https://youtu.be/UI4AfJlD4po?si=9tCA1mtrLVIZhr2K*
- ✓ *https://youtu.be/ARkWgJcnLYo?si=5uYIMQbniLc57ELv*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1. Charvaka Philosophy otherwise known as _____.
2. Mention the nature of Charvaka's Philosophy.
3. Briefly discuss Charvaka Epistemology.
4. Discuss what are the salient features of Indian Philosophy?

Unit – II

1. Name the Second Jewel of Jainism.
2. Briefly mention the essence of Jaina ethics.?
3. Briefly describe Jaina's Epistemology.
4. Critically discuss Jaina Anekantavada.

Unit – III

1. Liberation in Buddhism is called _____?
2. Mention the four Noble Truths of Buddhism.
3. What Is Nirvana and How can It be attained as Per Buddhistic Thought?
4. Discuss the Theory of Dependent Origination.

Unit – IV

1. Who Was the founder of Yoga Philosophy?
2. What is Purusa in Samkhya Philosophy?
3. Briefly mention the relationship Between Purusha and Prakriti.
4. Discuss Astanga Yoga of Patanjali.

Core VIII **Semester IV**

Ethical Theories

Introduction:

This course on ethical theories would provide students with a comprehensive understanding of various approaches to moral philosophy and the principles that guide ethical decision-making. Throughout the course, readings of primary texts, case studies, ethical dilemmas, and class discussions will help students develop critical thinking skills and ethical reasoning abilities. Additionally, assignments and projects can encourage students to apply ethical theories to real-world situations and articulate their moral perspectives.

Course Outcomes:

1. Understanding of the various ethical theories.
2. Ability to decide a particular course of action that is ethically justifiable in a given context.
3. Ability to compare and evaluate the ethical theories.
4. Knowledge of the theories of punishment

Learning Outcome:

Unit-I Students will be able to identify different theories of Morality. They will gain a better orientation from the ethical perspective.

Unit-II By the end of this unit, students will have a larger awareness of Plato's, Aristotle's, and Kant's theory of Morality.

Unit-III Students will be able to reflect on the theory of utilitarian theory the impact of actions guided by it, and the theories of punishment.

Unit-IV Students can identify the basics of the Indian Theories of Morals and describe the key characteristics that distinguish for welfare of the individual and society.

Course Components:

Unit-I: Moral Sense, Moral Sentiments, Springs of Action; Theories of Morality: Hedonism: Psychological and Ethical; Egoism and Altruism;

Unit-II: Plato's and Aristotl's Ethics: Virtue Ethics and Eudaemonism**,** Phronesis**;** Kant's Ethics - Deontological theory**.**

Unit-III: Theories of Morality:Utilitarianism: Bentham, Mill, Sidgwick and Rashdall. Theories of Punishments.

Unit-IV: Indian Ethics: Three Ṛunas. The four goals of life (*Puruṣārthas*), Dharma: Nature and Kind, Karma and its divisions, Niskama Karma and Lokasangraha**.**

Prescribed Books: -

- ✓ *Sinha, J.N.- A Manual of Ethics, New Central Book Agency Pvt. Ltd., Kolkata*
- ✓ *Lilly, William - An Introduction to Ethics, Allied Publishers Ltd., New Delhi*

Reference Books: -

- ✓ *W. Frankena– Ethics*
- ✓ *S.C. Panigrahi, and N.C. Padhi, Ethics: Indian and Western, Ananya Publications, Cuttack.*

E-Resource:

1. https://iep.utm.edu/hedonism/
2. https://www.britannica.com/topic/intuitionism-ethics
3. https://youtu.be/Q5ihj_p-p_I?si=zLM3OPIO8a2ghJ_u
4. https://youtu.be/rV8f7vrxg94?si=NIf2XrqhnEd7hxYJ
5. https://youtu.be/0vNXd9m0fiw?si=zWvsr2Rj7k8pdED7

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit-I

1. Moral sentences arouse moral _____and _____.
2. What are the types of hedonism?
3. What is the meaning of ethics of egoism?
4. What is altruism? Explain.

Unit-II

1. What is utilitarianism?
2. What are the types of utilitarianism?
3. What is Bentham's utilitarianism?
4. What is Mill's utilitarianism?

Unit-III

1. What is Eudaimonism?
2. What is Plato's approach to ethics?
3. What are the key ideas of virtue ethics?
4. What is deontological theory?

Unit-IV

1. Dharma is generally understood as ____?
2. What is the theory of Puruṣārtha?
3. How does Karma theory impact on Indian psyche?
4. Describe the Kiskarma Karma?

Core IX **Social and Political Philosophy**

This course on social and political philosophy would explore the fundamental concepts, theories, and debates concerning social theories and the exercise of political power. It introduces central questions, such as the nature of justice, the legitimacy of political authority, and the relationship between individuals and society, etc. It also examines theories of the state of nature, which propose hypothetical scenarios to explain the origin and legitimacy of political authority.

The course contains readings of texts, contemporary articles, case studies, and class discussions, which will help students critically engage with social and political issues and develop their informed perspectives on matters of justice, power, and governance. Assignments and projects can encourage students to apply theoretical concepts to real-world contexts and develop practical solutions to social and political problems.

Course Outcomes :

- Understanding and justification of the relationship between an individual and society
- Understanding of the various political ideals, doctrines, and ideologies.
- Ability to compare and evaluate the ideologies and apply them under appropriate contexts.

Learning Outcome:

Unit I Students will be equipped to handle social issues affecting individual and collective levels.

Unit II Students will be able to identify different Political Ideals and inculcate them for protection of rights

Unit III Students can contribute as better citizens by understanding the notion of democracy.

Unit IV the student will be able to describe the Political ideologies of Marxism, Anarchism, and Sarvodaya and can identify the distinct features between them.

Course Components:

Unit- I: Sociality, Social science & Social laws, Philosophy of Social Science: Relation

Between Individual &Society (Mechanical,Organic &Idealistic view)

Unit- II: Political Ideals and Systems- Justice, Liberty, Equality; Anarchy, Monarchy, Democracy and forms of governance systems.

Introduction to Political Doctrines- Humanism, Secularism, Feminism, Philosophy of Ecology.

Unit- III: Democratic Ideals- Democratic Government, Conditions for Successful

Functioning of Democracy, Current Electoral Systems, Human Rights

Unit-IV: Political Ideologies- (a) Socialism and Marxism (b) Kautilya on political idelology- Ruller (*Rājā*) and the Rulled (*Prajā*), (c) Sarvodaya (Gandhi and Vinova), (d) Vasudhaiva kutumbakam.

Prescribed Books: -

- ✓ Mackenzie: *Social & Political Philosophy,* Surjeet Publication.
- ✓ Sukhbir Singh- *A History of Political Thought,* Rastogi Publication.
- ✓ O.P. Gauba - *An Introduction to Political Philosophy*

Reference Books: -

- ✓ Sushila Ramaswamy- *Political Theories: Ideas &Concepts*
- ✓ D.D. Raphel, *Problems of Political Philosophy*, Humanities Press International.
- ✓ J. P. Suda, History of Political Philosophy, K. Nath and Co.

E-Resource:

- ✓ *https://iep.utm.edu/soc-sci/*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/53951/1/Block-2.pdf*
- ✓ *https://youtu.be/asdQwSul8Io?si=1l0IGppZipEiXgQL*
- ✓ *https://nios.ac.in/media/documents/srsec317newE/317EL4.pdf*
- ✓ *https://youtube.com/playlist?list=PL4YBp90QwimiN7x3zWNLVsg2yG7ZTFAVq&si=PirZq6Rbi2RPWuIV*

  Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1._____ Is the Founder of Social Science.

2. What Is Social Science?

3. Explain the Social Law.

4. Explain the philosophy of Social Science & the relationship between individual and society.

Unit – II

1. The word 'Feminism' Is Derived From _____.

2. What Is Justice?

3. What Is Equality? Explain the Types of Equality.

4. Write A Short Essay on Feminism.

Unit – III

Democracy Derives from the Word _____ &_____.

2. What Is Democracy?

3. Explain the Conditions for the Successful Functioning of Democracy.

4. Describe the Human Rights.

Unit – IV

1.The Word Sarvodaya Means_____

2. What Is Socialism?

3. Examine the salient features of Marxism.

4. According to Gandhi, What Is Sarvodaya? Explain**.**

Core X **Systems of Indian Philosophy**

Introduction:

This course on systems of Indian philosophy would provide a deep dive into the diverse philosophical traditions that have evolved on the Indian subcontinent. Understanding Indian philosophical thought and its enduring effect on students will be beneficial. Assignments and projects can encourage students to apply philosophical concepts to contemporary issues and engage in cross-cultural dialogue.

Course Outcomes:

- Understanding of the philosophy of Nyaya, Vaisesika, Mimamsa, and Vedanta from metaphysical and epistemological standpoints.
- Understanding of important concepts like self, God, bondage, and liberation
- Ability to find out the role of the philosophical systems in guiding our modern life.

Learning Outcome:

Unit-I The learning outcomes of Unit-I aim to equip students with a solid understanding of Vaishesika philosophy, including its foundational concepts, metaphysical framework, and ethical principles. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Vaishesika tradition.

Unit-II The learning outcomes of Unit II aim to equip students with a solid understanding of Nyāya philosophy, including its epistemological framework, metaphysical principles, ethical teachings, and perspectives on liberation. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Nyāya tradition.

Unit-III The learning outcomes of Unit- III aim to equip students with a solid understanding of Pūrva Mīmāṁsā philosophy, including its perspectives on karma, Yajña, Dharma, and epistemology. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Pūrva Mīmāṁsā tradition.

Unit-IV The learning outcomes of Unit- -IV aims to equip students with a solid understanding of Advaita and Viśiṣṭādvaita Vedanta philosophies, including their metaphysical frameworks, theological perspectives, and paths to liberation. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the Vedantic tradition.

Course Components:

Unit-I: Vaishesika: *Dharma*, Categories (*SaptaPadārthas*), Atomism, God, Karma, Adṛṣṭa, Bondage and Liberation.

Unit-II: Nyāya: Pramāṇas: Pratyakṣa, Anumāna, Upamāna and Śabda;Pramā and Apramā, Causation, Concept of Self and God, Apavarga.

Unit-III: Pūrva Mīmāṁsā: Theory of Karma, Yajña and Svarga, Apurva, Dharma, Epistemology.

Unit-IV: Uttara Mīmāṁsā**:** Śankara' Advaita and Rāmānuja's Viśiṣṭādvaita: Brahman, Īśvara, Jagat and Jīva, Avidyā / Māyā and Liberation, Jñāna and Bhakti as paths for Liberation.

Prescribed Books: -

- ✓ *Sharma, C.D: A Critical Survey of Indian Philosophy, Motilal Banarsidass Publishers Pvt. Ltd., Delhi*
- ✓ *Dutta, D.M and Chatterjee, S.C: An Introduction to Indian Philosophy,*
- ✓ *Hiriyana, M: Outlines of Indian Philosophy*

Books for Reference: -

- ✓ Radhakrishnan, S*: Indian Philosophy (Vol-I and II)*.
- ✓ Sinha, J.N: *Outlines of Indian Philosophy,* New Central Agency Pvt. Ltd., Kolkata
- ✓ Puligandla, R.K: *Fundamentals of Indian Philosophy*. Central Book Agency.
- ✓ Gauranga Charan Nayak, Bharatīya Darshan (Odia), Odisha Rajya Pustaka Pranayana O Prakāshan Somstha, Bhubaneswar.
- ✓ P. T. Raju, the *Philosophical Traditions of India*, MLBD, Delhi.
- ✓ Biranchi Naraayana Sahoo, *Nyāya O Vaśeṣika Darśana,* (Odia), Odisha Rajya Pathya Pustaka Pranayana O Prakaśana Samsthā, Pustaka Bhavan, Bhubaneswar.

E-Resource:

- ✓ https://en.wikipedia.org/wiki/Vaisheshika
- ✓ https://youtu.be/G7zpSaRsJJM?si=NqI--xTfQlN-gjJ5
- ✓ https://en.wikipedia.org/wiki/Nyaya
- ✓ https://youtu.be/xsw6511qDvY?si=WEclckIQXkN5tcgh
- ✓ https://www.britannica.com/topic/Indian-philosophy/Purva-Mimamsa-the-Bhatta-and-Prabhakara-schools
- ✓ https://youtu.be/X7abfsMK8U0?si=bdPJdtVvUOYIb3Cm

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1. __ Is the Founder of Vaisashika Philosophy?

2. Distinction Between Karma and Adrsta?

3. How Many Types of Padaratha and Mentioned In Vaisashika?

4. What is the atomism of Vaisashika Philosophy?

Unit – II

1. There Are Five Members of the Nyaya Syllogism. The first Is Called ___.

2. What Are Prama and Aprama?

3. What Are the Five Propositions of the Indian Syllogism?

4 . Explain the Nine Arguments to Prove the Existence of God.

Unit – III

The Word Mimamsa Literally Means _?

2. What Is the Dharma of Mimamsa School?

3. What Is Yajna and Svarga?

4. Explain the Prabhakar Epistemology.

Unit – IV

1. According to Shankara Ultimate Reality Is _?

2. What Is the Liberation of Sankara?

3. According to Ramanuja What Is Isvara, Jagat, and Maya?

4. Explain, Sankara's Concepts of Maya.

Core XI **Semester V**

Modern European Philosophy

Introduction:

Modern European philosophy explores the foundational role of reason in forming beliefs and judgments for all branches of philosophical inquiry. By studying this course, students can recognize the pitfalls

Course Outcomes;

1. Ability to mark the development of Western philosophical thought from Locke to Kant.
2. Ability to understand the basic problems countered by the aforesaid thinkers and their responses to the problems.
3. Ability to see the empiricist current in Western philosophy.
4. Ability to find a synthetic approach in Kantian philosophy.
   Ability to compare and evaluate the common issues undertaken by the thinkers.

Learning Outcome:

Unit- I The learning outcomes of Unit- I aim to equip students with a solid understanding of John Locke's philosophical contributions, including his empiricist epistemology, theory of knowledge, and metaphysical concepts. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the empiricist tradition.

Unit-II The learning outcomes of Unit-II aim to equip students with a solid understanding of George Berkeley's philosophical contributions, including his rejection of materialism and defense of subjective idealism. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within the idealist tradition.

Unit- III The learning outcomes of Unit- III aims to equip students with a solid understanding of Immanuel Kant's philosophical contributions, including his response to previous philosophical challenges, his transcendental idealism, and his attempt to reconcile empiricism and rationalism. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within Kant's transcendental philosophy.

Unit- IV The learning outcomes of Unit- IV aim to equip students with a solid understanding of Immanuel Kant's continued philosophical contributions, including his analysis of metaphysical illusions the limits of reason, and the possibility of synthetic a priori knowledge. Additionally, students should enhance their critical thinking abilities and philosophical analysis skills, enabling them to engage effectively with complex philosophical concepts and arguments within

Course Components:

Unit- I: John Locke: Refutation of Innate ideas, Sensation, Reflection, Simple and Complex Ideas, Theory of Knowledge and Types of Knowledge; Substance, Modes, and Relations.

Unit-II: George Berkeley: Criticism of Lockean Empiricism, Refutation of Abstract Ideas and Matter, Subjective Idealism of Berkeley (Ese-est-percipi), Theory of Knowledge.

David Hume: Impression and Idea, Theory of Knowledge, the Ideas of Necessary Relationship and Interpretation of Causality, Skepticism.

Unit- III: Immanuel Kant: Problems before Kant, Reconciliation of Empiricism and Rationalism, Copernican Revolution. Kant's System of Knowledge: Transcendental Aesthetics: Space and Time as A-priori Conditions of Perception, Transcendental Logic: Transcendental Analytic (Categories of Understanding), Transcendental Deduction (Synthesis & A-Perception), Schematism of Categories.

Unit- IV: Immanuel Kant: Types of Judgments / Propositions: Possibility of Synthetic A-priori Judgment, Introduction to Transcendental Dialectic: Paralogism, Antinomies and Ideals of Pure Reason.

Prescribed Books: -

- ✓ *Pati, R.K: History of Modern European Philosophy, P.C. Dwadash Shreni & Co. Pvt Ltd., Aligarh.*
- ✓ *Masih, Y: A Critical History of Modern Philosophy, Motilal Banarsidass Publishers, Delhi*

Reference Books: -

- ✓ Ira Sen Gupta: *A History of Western Philosophy*
- ✓ Frank Thilly: *History of Western Philosophy*
- ✓ Hrudananda Roy, *Kant: An Exposition of Critique of Pure Reason,* Akash Publication, Cuttack.
- ✓ Hrudananda Ray, *Pāśchātya Darśanara Itihasa* (Ādhunika Yuga) (Odia), Odisha Rajya Pathya Pustaka Pranayana O Prakaśana Samsthā, Pustaka Bhavan, Bhubaneswar.

E-Resource:

- ✓ https://en.wikipedia.org/wiki/Early_modern_philosophy
- ✓ https://youtu.be/A907p_cDQDo?si=Hku80gc33lcIJb4L
- ✓ https://youtube.com/playlist?list=PLXg2akZbOGjkSVPAy65NctIxJkqmFQt3v&si=DV8tCWoO9i9kwAI

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1)_____ Refuted the Innate Ideas of Descartes.

2) What Is a Simple Idea According to Locke?

3) Why Locke's Theory Is Called Representational Realism?

4) Critically Examine the Importance of Locke's Theory of Knowledge.

Unit – II

1)_____ Is Regarded as the Founder & Father of Idealism.

2) What Is Secondary Quality According to Berkeley?

3) Explain the Chief Characteristics of Subjective Idealism.

4) What Is "Esse-Est-Percipii"? Discuss How Berkeley's Idealism Is Different From Solipsism.

Unit – III

1)For_____ Space and time Are Only Appearances.

2) Briefly Explain Space and Time According to Kant.

3) Why Kant Stated That Knowledge Is the Joint Venture of Sensibility?

4) Critically Examine Kant's Account of the Copernican View of the Revolution.

Unit- IV

Causality' According to Kant Is ___.

2) What Is the Ideal of Pure Reason?

3)What Is Kant's Paralogisms?

4) Discuss Kant's Transcendental Dialectical Method.

Core XII **Applied Ethics**

Introduction:

This course on applied ethics delves into the real-world application of ethical theories and principles across various fields like medicine, business, technology, and politics. In such a course, students might explore case studies, engage in debates, and analyze ethical dilemmas to understand how ethical frameworks can be used to address complex issues in practical settings. Topics could range from bioethics (e.g., end-of-life care, genetic engineering) to environmental ethics (e.g., climate change, conservation), to ethical considerations in artificial intelligence and data privacy. It's a crucial subject for anyone interested in understanding how ethics shapes decision-making and behavior in today's world.

Course Outcomes:

1. Attaining a basic understanding of the philosophy behind the ethical theories.
2. Attaining the basic ability to critically explain the different ethical issues, concepts, principles, theories, etc.
3. Ability to evaluate and apply an appropriate ethical theory in the given context/situation in areas of environmental, bio-medical, business, and media ethics.

Learning Outcome:

Unit- I Students will be familiarized with the practical aspect of ethics so that they can achieve clarity and rationality concerning their decisions and actions.

Unit-II By the end of Unit 2, students will be able to value Environmental Ethics and incorporate it into their day-to-day activities to ensure sustainable development

Unit-III Students will gain awareness of Medical Ethics through issues like euthanasia, Abortion, Privacy, etc. This will help them in forming a decision considering the pros and cons of the given dilemma.

Unit-IV Students will be able to understand the value of ethics in business. They can incorporate the learning to deal with the evolving issues in the field of business such as Confidentiality, Whistleblowing, and Cyber security.

Course Components:

Unit- I: Introduction to Applied Ethics: Nature and Scope of Applied Ethics; Moral Status of Animals: All Lives are Equal, Animals Rights, Reverence for life.

Unit-II: Environmental Ethics: Anthropocentrism, Non-anthropocentrism: Bio-Centrism, Eco-centrism, Shallow and Deep Ecology;

Unit-III: Medical Ethics (Bioethics): Right to Life, Hippocratic Oath, Sanctity of Life, Euthanasia; Abortion, Surrogacy: Patient-Doctor Relationship,

Unit-IV: (a) Business Ethics- Rights and Obligations of Stake Holders, Corporate Social Responsibility; Ethics of Promotion / Advertisement; (b) Media Ethics –Anonymity and Confidentiality, Privacy, (c) Cyber-Security, Challenges of Artificial Intelligence.

Prescribed Books: -

1. *Theroux, J.P, Ethics: Theory & Practice*
2. *Singer, Peter: Practical Ethics*
3. *Singer, Peter: Animal Liberation*

Reference Books: -

- ✓ *Jagadeb, Jayanti: Bio-medical Ethics, Utkal Studies in Philosophy: M 5, Dept., of Philosophy, Utkal University.*
- ✓ *Tom Regan - Animal Rights,*

E-Resource:

- ✓ https://youtube.com/playlist?list=PLFAD37CC113DAA688&si=34paalFF35QQOfMd
- ✓ https://www.egyankosh.ac.in/bitstream/123456789/82253/1/Unit-1.pdf
- ✓ https://youtu.be/wbIUFZ00eMI?si=jAFpFJCZEGBvHFSz
- ✓ https://youtu.be/ltW7KVYJ1go?si=EC0AtuO0-fvb8NMd
- ✓ https://youtu.be/q28EnXH8pQ8?si=MJUe4_9UL23fgAxj
- ✓ https://youtu.be/4QzBdeUQ0Dc?si=accAVhCdonBuKysp
- ✓ https://youtu.be/I9FOswjTSGg?si=-9GwNTRhIUtjJd84

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words)

Unit-1

1. Applied ethics otherwise called ____.

2. What is animal rights?

3. Discuss the views of different thinkers about animal rights.

4. Define what is applied ethics. What are the different branches of applied ethics?

Unit-2

1. The word Anthropos means____?

2. what is Bio-centrism?

3. What is the difference between deep ecology and shallow ecology?

4. Discuss what is environmental ethics? What is the need for such ethics in present-day society?

Unit-3

1. Etymologically the term euthanasia means____?

2. what is the Hippocratic oath?

3. Discuss the doctor-patient relationship.

4. Define what is medical ethics? What are the rights and obligations of healthcare professionals?

Unit-4

1.____ is the full form of CSR?

2. What is media ethics?

3. Describe justice and honesty in business ethics.

4. Discuss what is cyber security. What are the challenges of artificial intelligence?

Core XIII **Philosophical Analysis**

Introduction:

This course on philosophical analysis introduces methods and tools that analytical philosophers use to critically examine and analyze concepts, arguments, and theories. It's often foundational in philosophy programs and serves as a basis for more specialized studies in various philosophical fields.

In this course, students may explore different approaches to philosophical analysis, such as logical analysis, conceptual analysis, linguistic analysis, and argument analysis. They might also study key philosophical texts and engage in close readings and discussions to understand how philosophers have historically approached problems and constructed their arguments.

Course Outcomes:

- Ability to know the fundamental elements in the usage of language.
- Attaining knowledge of different kinds of definitions.
- Knowing the criteria of sentence meaning.
- Knowledge of different truth possibilities.
- Knowledge of theory and law and their role in explanation

Learning Outcome:

Unit-I This unit will make students' communication easy and precise without any linguistic confusion in practical life.

Unit- II This unit clarifies the relation between a word and what it means, which will make the way for the use of language clearly in real life.

Unit- III Without any vagueness, making a sentence is not an easy task. This unit is helpful for students to make meaningful sentences which is useful in practical life.

Unit-IV This unit makes a clear distinction between linguistic truth, logical truth, and practical truth. Which will shape a mind to use language appropriately.

Unit-I Word Meaning: Meaning of the word “meaning”, Ambiguity and Vagueness

Unit- II Definitions: Denotative, Connotative, and Ostensive Defining and Accompanying Characteristics, Stipulative, Reportive, and Persuasive definition.

Unit- III Sentence Meaning: Sentence and Proposition; Word Meaning and sentence meaning, Criteria of sentence meaning, Basic fathers of Senence meaning in Indian Philosophy- *Akānkṣā, yogyatā, Sannidhi* and *Tātparya*, *Anvitābhidhāna Vāda* and *Abhihitanvaya Vāda*.

Unit-IV Analytical Truth and Logical Possibility; Theories of Truth- correspondence, coherence, and truth as works, Theory, Law, and Explanation.

Prescribed book: -

- ✓ *John Hospers, An Introduction to Philosophical Analysis, Allied Publishers Pvt. Ltd., New Delhi.*

Reference Books: -

- ✓ *Alston: Philosophy of Language*

E-Resource:

- ✓ https://semantics.uchicago.edu/kennedy/docs/ambivague.pdf
- ✓ https://plato.stanford.edu/entries/definitions/
- ✓ https://philarchive.org/archive/KUCLM
- ✓ https://plato.stanford.edu/entries/truth-correspondence/
- ✓ https://youtu.be/nWCI6hR9g4s?si=xgS8Z85viDy-hsfa

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit-1

1. what is word?

2. what are the differences between natural signs and conventional signs? explain with examples.

3. Narrate the reason for the vagueness of a word.

4. what is ambiguity and how many types of ambiguity are there? Explain with proper examples.

Unit-2

1 what do you mean by Ostensive definition?

2 Give an example of a reportive definition.

3 what is the difference between the stipulative definition and the reportive definition?

4 Narrate the scope denotational definitions

Unit-3

1 the meaning of a sentence is called _____

2 what is semantic ambiguity?

3 Difference between proposition & sentence.

4 what are the criteria for a meaningful Sentence according to Indian Philosophy?

Unit IV

1. An analytic proposition is a proposition whose negation
2. what is the coherence theory of truth?
3. what is a Synthetic proposition? give 2 examples of synthetic propositions.
4. what is possibility? Discuss different types of possibilities.

Core XIV **Semester VI**

Philosophy of Religion

Introduction:

This course on the philosophy of religion contains philosophical inquiry into religious beliefs and practices. It delves into questions concerning the nature, existence, and meaning of God or the divine, as well as the relationship between religion and other aspects of human experience such as morality, knowledge, and existence. In this course, students will examine various arguments for and against the existence of God, such as the cosmological argument, the teleological argument, and the problem of evil. They will also explore different conceptions of the divine across different religious traditions and philosophical perspectives, from monotheism to polytheism to non-theistic philosophies.

Course Outcomes:

- Attaining the basic knowledge of the philosophical issues, concerns, positions, and arguments concerning religion.
- Able to explain and also critically analyze the chief issues, concerns, positions, and arguments in the philosophy of religion.
- Able to critically evaluate the main philosophical positions and arguments therein to have a balanced view of religion and religious ideas.

Learning Outcome:

Unit-I Religion gives meaning and purpose to life, reinforcing social unity and stability, serving as an agent of social control of behavior, promoting physical and psychological well-being, and motivating people to work for positive social change.

Unit-II This unit gives the right to atheists to make their points against theists. It can dominate the argument on God which justifies the point of secularism given by the Indian constitution.

Unit-III Augustine Philosophy gives more important to faith over reason which makes the way to God which is a supreme authority.

Unit-IV Religion is a diverse and conflict topic. It is not an easy task to select the proper language for communication. This unit shows what is the problem in religious language by this someone can choose the proper language for religious discourse.

Course Components:

Unit-I: Introduction to Philosophy of Religion; Concept of God; Proofs for the belief in the existence of God.

Unit-II: Proofs against the belief in the existence of God; Religion and Morality.

Unit-III: the Problem of Evil: Augustinian Theodicy, Irenaean Theodicy, Process Theodicy, Reason, Revelation, and Faith.

Unit-IV: Problems of Religious Language: Cognitive and Non-Cognitive; Verification and Falsification Theory; Karma, Rebirth and Reincarnation.

Prescribed Book:-

- ✓ *Hick, John- Philosophy of Religion, Prentice-Hall of India Pvt. Ltd., New Delhi*

Reference Books:-

- ✓ *Masih, Y - Introduction to Religious Philosophy, Motilal Banarsi Dass Publishers Pvt. Ltd., Delhi*
- ✓ *Arvind Sharma- Philosophy of Religion, Rupa Publisher.*

E- Resource:

- ✓ *https://youtu.be/39t1FmBiT9w?si=aKlSoRlhp3adYe0r*
- ✓ *https://youtu.be/bqTv7gOLXXE?si=fRSypwoPSNklPc9_*
- ✓ *https://iep.utm.edu/religion/#:~:text=Philosophy%20of%20religion%20is%20the,to%20the%20various%20theistic%20religions.*
- ✓ *https://www.britannica.com/topic/existence-of-God*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/35477/1/Unit-2.pdf*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1. Religion Is Derived From __Word.
2. What Is Polytheism?
3. What Is the Concept of God In the Philosophy of Religion.?
4. What Is the Philosophy of Religion? Discuss its nature and Scope.

Unit – II

1. the Distance Between God and Man Is__.
2. What Is Morality?
3. Discuss the Distinction Between Religion and Morality.
4. Discuss the Proof of Disbelief In the Existence of God.

Unit III

1. Evil Is Due to Misuse of ___.
2. What Is Free Will?
3. What Is the Problem of Evil?
4. Discuss the Existence of God and Evil.

Unit – IV

1. Religion Is the "Form of Life With Its Own Language Game" Is Written By ___.
2. What Is Cognitive Religious Language?
3. What Is Non-Cognitive Religious Language?
4. Explain Rebirth and Reincarnation.

Core XV **Symbolic Logic**

Introduction:

This course on symbolic logic is a preliminary study of the formal systems used to represent and analyze logical reasoning. It's a foundational subject in philosophy and mathematics, providing tools for precise reasoning and argumentation. In this course, students learn about propositional logic, which deals with the logical relationships between propositions (statements). They study the syntax and semantics of propositional logic, learning how to symbolize statements using logical connectives, and how to evaluate the validity of arguments.

Course Outcomes:

- Ability to translate the arguments in ordinary language to their respective symbolic forms by the use of propositional variables and logical constants.
- Gaining knowledge of the rules of logic and their symbolic forms.
- Ability to know different types of truth functions and the distinction between valid and invalid arguments.
- ability to derive conclusions from the given set of premises
- Ability to prove the validity or the invalidity of the given argument

Learning Outcome:

Unit-I Sometimes, arguments formulated in English or any other natural language are often difficult to understand, because of the ambiguity & vagueness of the words. and to solve these difficulties, Symbolic logic is the best medium to put the arguments in a symbolic form & comprehend it very easily.

Unit- II Propositional calculus is the part of symbolic logic. In Propositional calculus, we can determine whether the given proposition is tautology or not.

Unit-Ill Also, there are certain truth tables, which can evaluate whether the given proposition is valid or not. & the Predicate calculus appreciates how argument involving predicates can be formalized semantically & syntactically & how these are connected.

Unit-IV In this unit, we deal with certain formulas & basic concepts prescribed by George Boole to solve algebraic problems.

Course Components:

Unit-I: Chapter- I- Introduction (Sections 1 to 4).

Chapter- II- the Calculus of Propositions (Sections 1 to 5).

Unit- II: Chapter-Ill - Calculus of Propositions (Sections 1 to 6).

Unit-Ill: Chapter-IV - Calculus of Propositions (Sections 7 to 9).

Chapter- V = the Elements of Predicate Calculus (Sections 1 to 9).

Unit-IV: Appendix (Sections: 1 to 4).

Prescribed Book: -

1. *Basson & O' Corner: Introduction to Symbolic Logic, Oxford University Press*

Reference Books: -

- ✓ *Das, Ramesh Chandra: Basics of Symbolic Logic, Utkal Studies in Philosophy-25, Centre for Advanced Study, Utkal University. Bhubaneswar.*

E-Resource:

- ✓ *https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/symbolic-logic-0*
- ✓ *https://youtube.com/playlist?list=PLdaynbt2YwqHqbeCCDstZwkmkwI2zdsNS&si=bKr8wbDZ8p6eWS7Z*
- ✓ *https://youtu.be/7owHn2UDivw?si=gDcfKbNKF8w_sLXt*
- ✓ *https://en.wikipedia.org/wiki/Propositional_calculus*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit-1

1. Logic deals with-------

2. According to relation how many kinds of propositions? and what are they?

3. Distinguish between sentence and proposition.

4. What is an argument? Discuss the distinction between Deductive and Inductive arguments.

Unit-2

1. The converse of an E-proposition is --------proposition

2. What is the Ostensive definition?

3. Write ten General syllogistic Rules.

4. Explain with a diagram the meaning of the traditional square of opposition.

Unit-3

1. In which type of logic the conclusion is more general than the premises?

2. Give an example of a valid argument.

3. What is Disjunctive function? Give an example.

4. State and explain fundamental principles of logic.

Unit-4

1.-------tried to solve the problem of induction by an inductive syllogism.

2. Construct the truth tables for this formula and point out in this case whether the formula is tautologous, self-contradictory, or contingent.

A) .(P ⊃ Q)⊃(~Q ⊃ ~P)

B)[(P ⊃ Q) . (Q ⊃ R)] ⊃ (P ⊃ R)

3. What is syllogism?

4.State and Explain the dictum de omni et nullo?

Core XVI **Semester VII**

Upaniṣadic Philosophy for Life: Textual Study of Isa Upaniṣad

Introduction:

This course on Upanishadic philosophy for life would introduce the profound spiritual and philosophical teachings found in the Upanishads to the students. A text, namely *Iṣā upaniṣad* is taken for study to explore the nature of reality, the self (Atman), and the ultimate reality (Brahman), offering insights into the purpose of life in the path to fulfillment of worldly and spiritual realization.

Course Outcomes:

1. Understanding of some of the basic ideas expressed in the *Iṣā upaniṣad*.
2. Understanding of the issues concerning the origin of life, the aspects of life (karma), death, and rebirth.
3. The knowledge concerning the individual self, Brahman, and the relation between self and Brahman.

Learning Outcome:

Unit-I Isaupanisad emphasizes the unity of oneness & stresses the balance of possession with knowledge, without the desire to obtain the higher goal

Unit-II Mantra 1-6 refers to the fact that everything in this world belongs to the supreme reality or Brahman. One must eradicate all his I-ness & doing selflessly all his actions instead of thinking, he is the agent of the action. & most importantly realization of the self & all human being are the manifestation of the supreme being.

Unit-Ill In this verse, the terms vidya & avidya have been variously interpreted here. Those who follow the path of vidya or knowledge must need proper realization within itself otherwise it will lead to greater darkness like those who follow the path of avidya. & One should know the perfection of the personality of God & his transcendental name & form.

Unit-IV We are suffering because of our past actions & desires. When We request to the lord that He leads us right path to reach near Him & free us from all of our past sins, then there will be no hindrance to our progress.

Unit-I: Introduction to *Upaniṣads*: the Term Upaniṣad, Number, Dates, and Authorship of the upaniṣad, the Upaniṣad as Vedānta, and how it is different from the Brāhmaṇa, Āranyaṇaka (from Introduction Part of the Principal Upaniṣads of S. Radhakrishnan)

; Introduction and Significance of *Īśa Upaniṣad*.

Unit-II: *Īśa Upaniṣad* – Mantra 1- 6; Ethics, Karma & Rebirth of the Upanisad Philosophy (from Introduction Part of the Principal Upaniṣads of S. Radhakrishnan) (from Introduction Part of the Principal Upaniṣads of S. Radhakrishnan)

Unit-Ill: *Īśa Upaniṣad – Mantra* 7- 12; Knowledge and Ignorance in the Upaniṣad (from Introduction Part of the Principal Upaniṣads of S. Radhakrishnan)

Unit-IV: *Īśa Upaniṣad – Mantra* 13- 18, Life as Eternal (from Introduction Part of the Principal Upaniṣads of S. Radhakrishnan)

Prescribed Book:-

- ✓ *S. Radhakrishnan, the Principal Upanishads,*
- ✓ *Gambhiranand, Eight Upanisads, Īśa Upaniṣad (With the commentary of Sankarāchārya); Advaita Asrama, Calcutta.*
- ✓ *Basanta Kumar Dash, Philosophy of Isopanisad and the Gita, Gyanajuga Publication, Bhubaneswar.*

E- Recourses:

- ✓ *https://en.wikipedia.org/wiki/Isha_Upanishad#:~:text=The%20Isha%20Upanishad%20is%20significant,or%20%22Deity%20Lord%22%20respectively.*
- ✓ *https://youtube.com/playlist?list=PLAPrVB8wngPlXT3YldJsQLeL-l_2Vyw4G&si=N0RGVg7nVjTr7Nu7*
- ✓ *Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);*

Unit – I

1. Iṣāupaniṣad is named upon the word_____

2. What is the meaning of Upaniṣada?

3. Explain the way the Iśaupaniṣad prescribes a living for 100 years with enjoyment, but not to be embellished with sins.

4. Describe the contention of the Iśaupaniṣad from verses 1 to 5.

Unit – II

(1) Paryagāt means _____ in the Iśāupaniṣad.

(2) Whom do all aspire for?

(3) Explain Verse 8 of the Iśāupaniṣad.

(4) Elaborate on Verse 9 to 12 of the Iśāupaniṣad.

Unit - III

1. Asnāveera means_____
2Translate verse 7 of the Iśā upaniṣad**.**

3. Explain Verse 14 of the Iś āupaniṣad.

4. Explain and remark on Verse 15-16 of the Iśāupaniṣad.

Unit – IV

1- the adhyātma is called _____ in the Iśāupaniṣad

2- What is meant by *a-karma lipyate nare*?

3 – Explain Briefly - Sambhūti and Asambhūti of the Iśāupaniṣad.

4- State the central philosophy of the Iṣā ūpaniṣad.

Core XVII **Contemporary Indian Philosophy**

Introduction:

This course on contemporary Indian philosophy would explore the diverse ranges of philosophical thoughts emerging from India in the modern and contemporary periods. This field encompasses philosophical movements and thinkers from the 19th century onwards, addressing both traditional Indian philosophical systems and their engagement with modernity and global intellectual currents. In this course, students will study the responses of Indian philosophers of modernization, as well as their reflections on topics such as identity, ethics, politics, and spirituality in the contemporary world.

Course Outcomes:

- Knowledge concerning the philosophical positions and the problems, issues, concepts, etc. dealt with by different contemporary Indian thinkers as prescribed in the course.
- Understanding of the chief current in contemporary Indian thinking and its relevance to social reality.
- The ability to compare and analyze common issues, concepts, etc., is dealt with by different thinkers to frame out one's philosophical position concerning some issue or problem.

Learning Outcome

Unit -I: Tagore's religion is based on the divinization of man and the humanization ofGod. While explaining the meaning of the humanization of God, he said 'Humanization of God does not merely mean that God is God of humanity but also it means that it is the God in every human being. Vivekananda Philosophy is the basis for universal peace and co-existence. It brings up a sense of socio-cultural relation in the world; and keeps the humanitarian service for living and leading a peaceful co-existence in the human society of the world.

Unit-II: Purpose of Sri Aurobindo's Philosophy is to find and serve the Divine. the Divine is not far, He is in ourselves, deep inside and above the feelings and the thoughts. With the Divine is peace and certitude and even the solution to all difficulties **Unit- III** Its fundamental objective is to create non-violence and non-exploitative property relationships. Gandhi believed that the concept of possession and accumulation of private property were the sources of violence and in contradiction with the Divine reality that all wealth belongs to all people.

Unit- IV: Radhakrishnan argued that modern education should be a synthesis of what Vedas and Upanishads call parā and aparā vidyā, that is, the study of the matters relating to the everyday lived world, and those relating to the transcendental, the infinite, whose aim is to study the nature of Self, Atman, and Brahmn.

Course Components:

Unit-I: Tagore: Nature of Religion, Reality, and God; Nature of Man (Finite, Infinite and both Finite -Infinite, Humanism.

Vivekananda: God, World and Mayā, Liberation: Ways for Liberation. Universal Religion and Practical Vedanta,

Unit-II: Sri Aurobindo: Evolution and Involution; Reality as Sacchidananda, Supermind and Gnostic Being, Triple Transformation and Integral Yoga.

Unit- III: Mahatma Gandhi: Truth, God, and Non-violence, End and Means, Satyāgraha, Social and Political Ideas, Education.

Jyotirao Phule: Critical Understanding of Caste-System

B.R. Ambedkar: Annihilation of Caste, Neo-Buddhism

Unit- IV: S. Radhakrishnan: Man, Reality and Religion, Ways of Knowing, Intellect and Intuition, Idealism.

J. Krishna Murty: Man and Nature, Human Crisis, Philosophy of Education.

Prescribed Book: -

- ✓ *B.K Lal: Contemporary Indian Philosophy MLBD, Delhi.*
- ✓ *T.M.P Mahadevan and V. Saroja: Contemporary Indian Philosophy*

Books for Reference: -

- ✓ N.K. Devaraja, *Indian Philosophy Today*
- ✓ S.K. Maitra, *An Introduction to Philosophy of Sri Aurobindo*
- ✓ G.P. Despande (ed.), *Selected Writings of Jotirao Phule*, Leftword books: New Delhi.
- ✓ Ambedkar, B.R. *Annihilation of caste, Navayana*.

E-Recourses:

- ✓ *https://youtube.com/playlist?list=PLPaE0MzSxPePDJ_mPhmO-vLYcnrmTfEAA&si=yjoDa71lpEsn5iP0*
- ✓ *https://ebooks.inflibnet.ac.in/icp03/chapter/rabindranath-tagore/*
- ✓ *https://www.jetir.org/papers/JETIR1902540.pdf*
- ✓ *https://nowgonggirlscollege.co.in/attendence/classnotes/files/1621445021.pdf*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/20647/1/Unit-12.pdf*
- ✓ *https://iep.utm.edu/radhakri/*
- ✓ *https://www.raijmr.com/ijrsml/wp-content/uploads/2020/12/IJRSML_2020_vol08_issue_8_Eng_01.pdf*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

(A) the author of '*Gitanjali*' is____.

(B) What is the basis of Universal Religion?

(C) Explain the Reality and God according to R.N. Tagore.

(D) What is Vivekananda's view on Practical Vedanta?

Unit – II

(A)According to _ evolution is possible through involution.

(B) What is integral yoga?

(c) State and explain the Super Mind and *gnostic* being according to Sri Aurobindo.

(D) Briefly explain reality as *Sacchidananda* according to Sri Aurobindo.

Unit – III

(A) According to Gandhiji_includes love, sacrifice, sympathy, and non-killing.
(B) What is Jyoti Rao Phule's understanding of the caste system?
(C) What is Neo-Buddhism?
(D) Briefly explain and examine the concept of *satyagraha.*

Unit – IV

(A)_____says, "Religion is not a creed or code but an insight into reality".

(B) Distinguish between intellect and intuition.

(C) What is the Philosophy of Education? Discuss.

(D) Define Radhakrishnan's idealistic view of life.

Core XVIII **Post-Kantian Philosophy - I**

Course Outcomes :

1. Understanding of the philosophical methods, ideas, doctrines, etc. in the post-Kantian period of Western Philosophy.
2. Understanding of some of the metaphysical, epistemological, and ethical aspects as dealt with by the philosophers (as specified in the course).
3. Ability to compare, analyze, and evaluate the philosophical positions of the prescribed thinkers.

Learning Outcome:

Unit-I: Understand the historical development and key principles of Hegel's dialectical method.

Apply the dialectical method to analyze and synthesize philosophical concepts and historical events. Analyze Hegel's concept of Spirit (Geist) and its significance in his philosophy. Critically evaluate the coherence and validity of Hegel's Absolute Idealism in contrast with other philosophical systems. Define Bradley's distinction between appearance and reality and its significance for metaphysics and epistemology. compare and contrast Bradley's approach to appearance and reality with other philosophical perspectives, such as realism and idealism.

Unit- II: It focusses upon Bradly's idealism and Bergson's critique of materialism and mechanism in favor of a more dynamic and intuitive understanding of reality, "Creative Evolution" Define Bergson's distinction between the two sources of morality (sympathy and obligation) and religion (emotion and mysticism).

Unit-Ill: It explains Schopenhauer's exposition of the principle of sufficient reason and its four aspects (ground, reason, cause, and motive), criticisms of Immanuel Kant's transcendental idealism, focusing on key areas such as the nature of reality and the limits of human knowledge. It also focusses upon Schopenhauer's concept of the world as representation (idea) and its relation to his broader philosophical framework, and doctrine of the will as the fundamental aspect of reality. It also explores his pessimistic view of human existence and the world as characterized by suffering and conflict and his ethical theory, emphasizing the role of compassion and moral awareness in transcending egoism and suffering.

Unit-IV It explains Herbert Spencer's concept of the "Unknowable" as the ultimate reality beyond human understanding. It aims to increase awareness of Spencer's theory of biological evolution, including his concept of adaptation and survival of the fittest, and the evolution of the human mind, including his ideas on intelligence, consciousness, and mental faculties.

Course Components:

Unit-I: Introduction to Hegel's Philosophy: Dialectical Method, the nature of Spirit, Absolute idealism, Internalization and alienation, Ethics.

Unit- II: Introductory reading of Bradley: Concept of Appearance and Reality. Henery Bergson: the revolt against materialism, creative evolution, the two sources of morality and religion.

Unit-Ill: Arthour Sopenheaure: Schopenhauer's Critique of Kant, the world as idea, the World as Will: the will to live and the will to reproduce, the world as evil, Ethics

Unit-IV: Herbert Spencer: First principle – the Unknowable, Evolution- the evolution of life, the evolution of mind, the evolution of society, the evolution of morals.

Prescribed Book:-

- ✓ *D. M. Dutta, Chief Currents of Contemporary Philosophy*
- ✓ *Will Durant, the story of philosophy,*
- ✓ *Bertrand Russell, History of Western philosophy.*
- ✓ *T. Z. Lavine, From Socrates to Sartre: the Philosophic Quest,*

Reference Books:-

- ✓ *Passmore, A Hundred Years of Philosophy*

E- Recourses:

- ✓ *https://egyankosh.ac.in/bitstream/123456789/38410/1/Unit-3.pdf*
- ✓ *https://plato.stanford.edu/entries/hegel/*
- ✓ *https://youtu.be/aap7_bN3_5A?si=0JF6i7DG2tHn86AK*
- ✓ *https://youtu.be/lK46IeOA3v8?si=J0X2K0NCO33Mr7Su*
- ✓ *https://plato.stanford.edu/entries/bergson/*
- ✓ *https://plato.stanford.edu/entries/schopenhauer/*
- ✓ *https://youtu.be/nVms37PRLvY?si=6Eua71aSCwv-mSXe*
- ✓ *https://youtu.be/p8nHwEF436s?si=nlYod9fMi8N4BhcR*
- ✓ *https://iep.utm.edu/spencer/*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1- Hegel's Idealism Is Known As_____[1]

2- What Is 'Being' According to Hegel? [2]

3- Explain Hegel's Conception of 'Geist'. [3]

4- Explain the Distinction Between Appearance and Reality As Per Bradley.[7]

Unit – II

* _____ Is the Follower of Creative Evolution.

2- What Is Bergson's Concept of Multiplicity?

3- Explain Bergson's Two Sources of Morality & Religion.

4- Explain Bergson's Philosophy of Memory. Explain Its Various Forms.

Unit – III

1- Who Said 'Will to Live & Will to Reproduce'?

2- Explain Schopenhauer’s Concept of 'World As Idea?

3- What Is Schopenhauer’s Notion of Moral Awareness?

4- Explain the Fourfold Root of the Principle of Sufficient Reason As Schopenhauer’s Criticism of Kant.

Unit – IV

1- The author of 'First Principle' Is _____.

2- What Is Spencer's Concept of 'Unknowable'?

3- What Is Spencer's Concept of Mind?

4- Explain Spencer's Concept of Evolution.

Core XIX **Post-Kantian Philosophy - II**

Introduction:

This course on post-Kantian philosophy would explore the philosophical developments that emerged in the wake of Immanuel Kant's critical philosophy. Kant's work, particularly his "Critique of Pure Reason," laid the groundwork for many subsequent philosophical movements by challenging traditional metaphysical assumptions and emphasizing the role of human subjectivity in shaping our understanding of reality. In such a course, students will study a range of thinkers and movements that arose in response to, or dialogue with, Kantian philosophy.

Course Outcomes:

- Understanding of some specific philosophical approaches, ideas, doctrines, etc. in the Post-Kantian period of Western Philosophy.
- Understanding of some of the metaphysical and epistemological aspects as dealt with by the philosophers (as specified in the course).
- Ability to compare, analyze, and evaluate the philosophical positions of the prescribed thinkers.

Learning Outcome

Unit-I Understand Kierkegaard's concept of despair as a fundamental aspect of the human condition. Evaluate the transitions between stages and their significance for individual development. Understand Kierkegaard's concept of truth as subjective rather than objective.

Unit- II Understand Nietzsche's critique of traditional religious and moral systems. Examine Nietzsche's concept of value creation as central to human existence Examine Nietzsche's concept of the will to power as a driving force in human behavior and creativity. Explore the role of self-fashioning in Nietzsche's vision of human excellence and fulfillment.

Unit-Ill Analyze James's pragmatic theory of truth and its emphasis on practical consequences. Examine James's pluralistic worldview, which emphasizes the diversity and multiplicity of human experience. Explore the practical implications of Dewey's educational philosophy for teaching practices and educational reform. Discuss the challenges and opportunities of applying Dewey's ideas to contemporary issues in science policy and political theory.

Unit-IV

Understand Whitehead's contributions to mathematics and logic, including his work on the foundations of mathematics and symbolic logic. Familiarize yourself with Whitehead's philosophy of science, which emphasizes the importance of process, creativity, and relationality in scientific inquiry. Explore Whitehead's philosophy of education, which emphasizes the importance of cultivating creativity, curiosity, and critical thinking in students. Analyze key concepts in Whitehead's metaphysics, such as actual entities, prehensions, and the process of concrescence. Explore Whitehead's philosophy of religion, which seeks to reconcile religious experience with a scientific worldview.

Course Components:

Unit-I: Soren Kierkegaard: Kierkegaard's Analysis of Human Existence: Despair, Social Critique, and Anxiety, the "Spheres of Existence" or "Stages on Life's Way subjectivity as Truth

Unit- II: Friedrich Nietzsche: Critique of Religion and Morality, Value Creation, Nietzsche's Meta-ethical Stance and the Nature of Value Creation, Some Nietzschean Values: will to power, superman, Decadence, Aristocracy, Affirmation,

Unit-Ill: William James: Pragmatism, Pluralism, principles of Psychology;

John Dewey: Education, Instrumentalism, Science and Politics.

Unit-IV: Whitehead: Philosophy of Science, Philosophy of Education, Metaphysics, Religion.

Prescribed Book: -

- ✓ *D. M. Dutta, Chief Currents of Contemporary Philosophy*
- ✓ *Will Durant, the story of philosophy,*
- ✓ *Bertrand Russell, History of Western philosophy.*
- ✓ *T. Z. Lavine, From Socrates to Sartre: the Philosophic Quest, New York Bantam Books.*

Reference Books: -

- ✓ *Passmore, A Hundred Years of Philosophy*.

E- Recourses:

- ✓ *https://en.wikipedia.org/wiki/Philosophy_of_S%C3%B8ren_Kierkegaard*
- ✓ *https://youtu.be/D9JCwkx558o?si=V-jfEXY4wzEWrBkJ*
- ✓ *https://en.wikipedia.org/wiki/Philosophy_of_Friedrich_Nietzsche*
- ✓ *https://www.britannica.com/biography/Friedrich-Nietzsche/Nietzsches-mature-philosophy*
- ✓ *https://youtu.be/wUFSM0f_LFc?si=ZY4-XVZ0Pdahjllt*
- ✓ *https://youtu.be/7pc_eQ99kTI?si=O1UsIOCAmn11lA4e*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit I

1. Stages of life's way related to _____.
2. What is Kierkegard's view on Aesthetics?
3. What is the difference between faith, love, and hope according to Kierkegaard?
4. How does Kierkegaard analyze human existence?

Unit II

1. God is dead said by _____.
2. Explain the concept given by Nietzsche Freedom of Spirit
3. How does Nietzsche explain truthfulness and honesty?
4. Elaborate Nietzsche's Pluralism.

Unit III

1. Practical Utility related to ____.
2. Write the names of three pragmatist philosophers.
3. What is Pluralism by William James?
4. Elaborate on Willam James' principle of Psychology.

Unit IV

1. Process philosophy is given by whom?
2. What is Mathematics and Logic according to Whitehead?
3. Difference between the philosophy of Science, and the Philosophy of Education according to Whitehead.
4. Elaborate Metaphysics & Religion of Whitehead.

Core XX **Semester VIII**

Existentialism and Phenomenology

Introduction:

This course on existentialism and phenomenology is a preliminary study of two influential philosophical movements of the 20th century that focus on human existence, experience, and consciousness. By studying existentialism and phenomenology, students gain insights into fundamental questions about human existence, subjectivity, and meaning, while also developing critical thinking skills and an appreciation for the diversity of philosophical approaches to these issues.

Course Outcomes:

1. Knowledge of the problems concerning existence and the position/stand taken in existentialism;
2. Understanding of different concepts as dealt with by thinkers (as specified in the course) in existentialism and phenomenology.
3. Ability to compare, analyze, and evaluate the existentialist positions of the thinkers.

Learning Outcome:

Unit-I: Students will understand the phenomenological method developed by Husserl, including the process of bracketing or epoché, which involves suspending presuppositions and judgments about the world. Examine Husserl's theory of essences, which posits that essences are the invariant features that define the identity of a given phenomenon. Explore the implications of Husserl's rejection of psychologism for his phenomenological approach to philosophy and science.

Unit- II: Students will understand Husserl's concept of intentionality as the directedness of consciousness towards objects. Examine Husserl's notion of the life-world (Lebenswelt) as the pre-theoretical, intersubjective horizon of everyday experience. Analyze the relationship between noema and noesis in Husserl's account of intentionality and its role in the constitution of meaning. Examine Husserl's approach to ethics within the framework of phenomenology.

Unit-Ill: Students will understand Heidegger's approach to phenomenology, which he develops in dialogue with Husserl's method. Examine Heidegger's concept of Dasein, which he defines as the being. Understand Heidegger's understanding of being as a process or event rather than a static substance. Examine Heidegger's account of human existence as being in the world, which emphasizes the inseparability of self and world. Understand Heidegger's concept of temporality (Zeitlichkeit) as the horizon within which Dasein's existence unfolds.

Unit-IV: Students will understand Sartre's adaptation of the phenomenological method, which he employs to analyze the structures of human consciousness and existence. Examine Sartre's magnum opus, "Being and Nothingness," which provides a comprehensive account of his existential philosophy. Understand Sartre's concept of radical freedom, which he famously summarizes as "existence precedes essence." Examine Sartre's concept of bad faith, which

refers to the self-deceptive strategies individuals employ to evade their freedom and responsibility.

Course Components:

Unit-I: Husserl's Phenomenology: Method, Theory of Essences, Critique of Psychologism.

Unit- II: Husserl's Phenomenology: Intentionality, Life-world, noema and noesis, Ethics.

Unit-Ill: Heidegger: Phenomenological Method, the CONCEPT of BEING (DASEIN), the Process of Being, Man as Being in the World.

Unit-IV: J.P. Sartre: Phenomenological Method, Being and Nothingness, Freedom, Bad Faith.

Prescribed Book:-

- ✓ *Dermot Moran, Introduction to Phenomenology, Routledge.*
- ✓ *M. K. Bhadra, A Critical Survey of Phenomenology and Existentialism, ICPR and Allied Publishers.*

Reference Books:-

- ✓ *Dan Jahavi, Phenomenology: the Basics, Routledge.*
- ✓ *T. Z. Lavine, From Socrates to Sartre: the Philosophic Quest,*
- ✓ *J. N. Mohanty, the Philosophy of Edmund Husserl: A Historical Development, Yale University Press.*

E- Recourses: -

- ✓ *https://youtu.be/ePQIagmcCXc?si=W0DPSIcywHv7BdGU*
- ✓ *https://plato.stanford.edu/entries/phenomenology/*
- ✓ *https://youtu.be/IvA9FxsM9G8?si=KVoqC3UquvsxG7bK*
- ✓ *https://iep.utm.edu/heidegge/#:~:text=%E2%80%9CPhenomenology%2C%E2%80%9D%20he%20says%2C,indirectly%20through%20some%20existing%20entity.*
- ✓ *https://youtu.be/fZiD9g1Wf1M?si=QviQdm1XfWQk0-a0*
- ✓ *https://www.jstor.org/stable/44652903*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit-I

A) For Husserl, _____ Is Called the Essence of Life?

B) Give An Example of Essence.

C) What Is the Essence According to Husserl?

D) What Are the Main Ideas of Edmund Husserl's Phenomenology?

Unit- II

A) The Word Noema derives from the Greek Word _____.

B) Give two examples of Noema.

C) What is the Noesis thought Process?

D) What is the Ethics of Husserl's Phenomenology?

Unit-Ill

A) Dasein is a German word which means _____.

B) Write any Famous line by Martin Heidegger.

C) What is the Dasein Principle?

D) What is the main idea of Heidegger?

Unit-IV

A) _____is the Phenomenological Text written by Sartre.

B) What is the Concept of Bad Faith?

C) What is Freedom For Sartre?

D) Critically explain Being and Nothingness in Sartre’s Philosophy.

Core XXI **Linguistic & Analytic Philosophy**

Introduction:
This course on linguistic and analytic philosophy would discuss the philosophical movements that emerged in the 20th century, primarily in the English-speaking world, and which focused on the analysis of language and the clarification of concepts. This course on Philosophical Methods would likely delve into various approaches, techniques, and frameworks that philosophers use to analyze, understand, and evaluate concepts, arguments, and theories.

Course Outcomes :

1. Knowledge of the problems and positions taken in Analytic Philosophy (with reference to the philosophers in the course).
2. Analysis and evaluation of the different linguistic concepts.
   Developing an understanding of the relationship between language and reality

Learning Outcome

Unit-I: It gives us a clear-cut view of Frege's thoughts on idealism and sense and reference.
Unit- II: It gives the Russell's thought in a scientific manner
Unit-Ill: This unit clarifies the dogmas regarding metaphysics that are going on in the common mind.
Unit-IV: Wittgenstein gives a practical way of living in a society without any prejudices and dogmas.

Course Components:
Unit-I: G. Frege: On Sense and Reference. G.E. Moor: Refutation of Idealism: Defense of Commonsense, Proof of the External World

Unit- II: Russell: Logical Atomism, Logical Constructions, Incomplete Symbols.

Unit-Ill: A. J. Ayer: Rejection of Metaphysics; Verification Theory and Meaning; Linguistic Theory of Necessary Propositions.

Unit-IV: Wittgenstein: Picture Theory of Meaning; Saying and Showing; Meaning and Use; Language Games; Critique of Private Language.

Prescribed Book: -

- ✓ *Alexander Miller, Philosophy of Language, Routledge,1998.*
- ✓ *A. P. Martinich (ed.) The Philosophy of Language, Oxford University Press,1990.*
- ✓ *R.C. Pradhan, Recent Developments in Analytic Philosophy, ICPR,2001.*

Reference Books: -

- ✓ *Robert R. Ammerman (ed.), Classics of Analytic Philosophy, Tata Mc Graw-Hill,1965.*
- ✓ *P.K. Mohapatra and S.C. Panigrahi(ed.), Perspective in Analytic Philosophy, Cuttak,1992.*

E- Recourses:

- ✓ *https://www.jstor.org/stable/2181485*
- ✓ *https://youtu.be/Moo18_vbYIA?si=KVkm7DKm82KDLOiL*
- ✓ *https://youtu.be/1QRwn4kJFr0?si=fmxK-UWDdPQjBP-4*
- ✓ *https://plato.stanford.edu/entries/moore/*
- ✓ *https://youtu.be/crMkssn252k?si=PRwlr1xGvSBUBO-y*
- ✓ *https://plato.stanford.edu/entries/logical-atomism/*
- ✓ *https://youtu.be/RNCSzSbgp0I?si=AaWUz2q8o_gX_foV*
- ✓ *https://plato.stanford.edu/entries/ayer/*
- ✓ *https://youtube.com/playlist?list=PLxYDMSdfTAgR7sBdkYHLsJZjAY_kNi9ZT&si=xQNfSpVWQPTz2CqU*
- ✓ *https://plato.stanford.edu/entries/wittgenstein/*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit – I

1-In the Philosophy of Language _____ made the distinction between sense and reference.

2- What is the refutation of idealism?

3. Examine the argument given by G.E. Moore in defense of commonsense and give two examples of it.

4. Give an exposition of Frege on Sense and Reference.

Unit – II

1. Logical Atomism started in _____ Century.

2. What is Logical Construction?

3. What is an Incomplete Symbol and give an example of it?

4. Critically examine Logical Atomism with examples.

Unit – III

1. Logical Positivism was started from _____.

2. What is the definition of linguistic theory of necessary propositions?

3. Define the verification theory of meaning.

4. Why did A.J. Ayer reject metaphysics?

Unit – IV

1._____ wrote *Tractatus -Logico- Philosophicus.*

2. What Is a *Language Game*?

3. Critically examine the idea of private language and private sensation.

4. Give a brief exposition of the *Picture Theory of Meaning.*

Core XXII **Meta-Ethics**

Introduction:

This course on meta-ethics will give a preliminary Idea on the fundamental issues of the nature, status, and meaning of ethical language and judgments. The course would begin with an overview of meta-ethical questions. In this course, students would be engaged with some key figures in meta-ethics, analyze philosophical arguments, and participate in discussions to deepen their understanding of the complexities of ethical discourse and inquiry.

Course Outcomes:

1. Understanding of the fundamental questions on the assumptions relating to moral beliefs and practices.
2. Understanding of the significance of various moral concepts and judgments.
3. Ability to provide a basis for the justification of moral judgments.

Learning Outcome:

Unit-I: Meta Ethics tries to find out what counts as right and wrong while applied ethics aims at further defining what is right and wrong according to our individual preferences (or society's conventional values). Metaethics does not directly apply to any particular situation and can be used with any branch of ethics.

Unit- II: Ethical cognitivists hold that ethical sentences do express propositions: that they can be true or false.

Unit-Ill: Ethical non-cognitivism claims that prescriptions have a different nature than descriptive sentences; they have no truth values, they do not describe anything, and they have a different illocutionary role

Unit-IV: Supernaturalism, also called the divine command theory, says that moral judgments describe God's will. Calling something "good" means that God desires it. Ethics is based on religion. The Ten Commandments are from the Old Testament; they express God's will and the moral rules

Course Components:

Unit-I: Ethics; Types of Ethics; Introduction to Meta-Ethics, Moral Epistemology, Moral Psychology.

Unit- II: Ethical Cognitivism: Moral Realism: Ethical Naturalism and Ethical Non-Naturalism; Moral Anti-Realism: Moral Subjectivism; Moral Relativism,

Unit-Ill: Ethical Non-Cognitivism: Emotivism, Quasi Realism, Universal Prescriptivism.

Unit-IV: Error Theory, Expressivism, Moral Supernaturalism, Moral Constructivism.

Prescribed Book:-

- ✓ *Andrew Fisher, Metaethics: An Introduction, Acumen Pub Ltd, 2011*
- ✓ *H.L., McCloskey, Meta, and Normative Ethics. the Hague: MartinufNijhof, 1969.*
- ✓ *Fisher, Andrew. Metaethics: An Introduction. New York: Routledge, 2011.*
- ✓ *Mark Schroeder, Noncognitivism In Ethics. New York: Routledge, 2010.*

Reference Books:-

- ✓ *David Copp (ed), the Oxford Handbook of Ethical Theory, edited by. New York: Oxford University Press, 2006.*
- ✓ *Alexander Miller, An Introduction to Contemporary Metaethics, Cambridge: Polity Press, 2003*

E- Recourses

- ✓ *https://youtu.be/fctf9m52Jfg?si=A0aIWQ7rgK6vNk4N*
- ✓ *https://en.wikipedia.org/wiki/Ethics*
- ✓ *https://youtu.be/beTFkIGwF2c?si=yNuTx2ntgod49BDC*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/81083/1/Unit-10.pdf*
- ✓ *https://egyankosh.ac.in/bitstream/123456789/81082/1/Block-3.pdf*
- ✓ *https://youtu.be/beTFkIGwF2c?si=SgwjaPr9uGpYzTxB*
- ✓ *https://www.jstor.org/stable/43820798*
- ✓ *https://youtu.be/ycfRRJAkJLA?si=5QdX5BE-Dy_BdCGR*

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit I

1. Meta ethics focuses upon _____
2. Give a brief definition of meta ethics.
3. What is the difference between ethics & meta-ethics?
4. What are the differences & similarities between moral epistemology and moral psychology?

Unit II

1. Ethical naturalism explains ethical concepts in terms of _____.
2. What is Moral Relativism?
3. Explain the difference between Ethical Naturalism and Ethical Non-Naturalism.
4. Discuss the Divine command theory given by St. Augustine.

Unit III

1. Emotivism is developed by _____
2. What is Quasi Realism?
3. What is the difference between quasi-realism and Emotivism?
4. What is the significance of prescriptivism in moral philosophy?

Unit IV

1. Who introduced error theory?
2. What is an example of expressivism?
3. What is the idea of supernaturalism? Discuss briefly.
4. What is moral constructivism? Discuss its significance in moral development.

Core XXIII **Symbolic Logic: Quantification Theory**

Introduction:

This course on Symbolic Logic: Quantification Theory will provide a preliminary formal study of logical quantifiers and their role in expressing general statements about objects within a domain. It shall help explore applications of quantification theory in various fields, such as mathematics, computer science, linguistics, and philosophy. This could involve discussing how quantification theory is used to formalize mathematical proofs, analyze programming languages, or express statements about the semantics of natural language.

Course Outcomes :

1. Ability to translate arguments to their respective symbolic forms in propositional logic.
2. Ability to translate A, E, I, and O propositions by the use of quantifiers
3. Ability to prove the validity of arguments.
4. Ability to derive the required conclusion from the given propositions in propositional logic and Quantification theory.

Learning Outcome:

Unit-I

Define singular propositions as statements that refer to specific individuals or objects. Define general propositions as statements that apply universally or conditionally to classes of objects or individuals. Define validity as a property of deductive arguments where the conclusion necessarily follows from the premises. identify different methods for proving the validity of deductive arguments, including truth tables, formal proofs, and logical equivalences. Introduce preliminary quantification rules for manipulating quantified propositions, including rules for negating quantifiers, distributing quantifiers over logical connectives, and instantiating quantifiers.

Unit- II

Distinguish between valid and invalid arguments, recognizing that an invalid argument can have true premises and a false conclusion. Identify different methods for proving the invalidity of deductive arguments, including counterexamples, truth tables, and formal proofs by contradiction. Define multiply-general propositions as statements that involve multiple quantifiers, such as propositions that contain both universal (∀) and existential (∃) quantifiers. Introduce quantification rules specifically tailored for multiply-general propositions, including rules for nested quantifiers, mixed quantifiers, and multiple quantifiers in the same proposition.

Unit-Ill

Apply the universal instantiation rule to instantiate universal quantifiers (∀) with specific individuals or objects. Apply the existential generalization rule to introduce

existential quantifiers (∃) and assert the existence of objects satisfying certain conditions. Apply the existential instantiation rule to instantiate existential quantifiers (∃) with specific individuals or objects. Apply the universal generalization rule to generalize from specific instances to universal claims.

Unit-IV

Apply techniques for recognizing fallacies and avoiding invalid reasoning in logical analysis. Understand the role of counterexamples in proving invalidity. Identify examples of logical truths involving quantifiers, such as tautologies involving universal quantification (∀) and existential quantification (∃).

Course Components:

Unit-I: Singular Propositions and General Propositions; Proving Validity; Preliminary Quantification Rules.

Unit- II: Proving Invalidity; Multiply-General Propositions.

Unit-Ill: Quantification Rules: Universal Instantiation; Existential Generalization; Existential Instantiation; Universal Generalization.

Unit-IV: More on Proving Invalidity; Logical Truths Involving Quantifiers

Prescribed Book: -

- ✓ *Irving M. Copi, Symbolic Logic, 5th Ed. Prentice Hall of India. New Delhi.*

Reference Books: -

- ✓ *Patric Suppes, Introduction to Logic, Affiliated East-West Press Pvt., Ltd. New Delhi.*
- ✓ Irving M. Copi, Carl Cohen, and Kenneth Mc Mahon, *Introduction to Logic*, Person Publication, Delhi.
- ✓ M.L. Ahuja, *Perspectives of World Religions*

E- Recourses

- ✓ ***https://www.jstor.org/stable/2251963***
- ✓ ***https://youtu.be/GBGOkO9x8LA?si=FoGbqF9UaHqKp3mK***
- ✓ ***https://egyankosh.ac.in/bitstream/123456789/34852/1/Unit-3.pdf***
- ✓ ***https://youtu.be/83stYALTuT8?si=Nx1WKL0-FpyNu_qk***
- ✓ ***https://youtu.be/zMtToQelLN8?si=frmuP8zRcsA_zSVV***
- ✓ ***https://egyankosh.ac.in/bitstream/123456789/34851/1/Unit-2.pdf***
- ✓ ***https://youtu.be/UN6Hd4UlrnM?si=VKYn0OFLJPc6yMeq***
- ✓ ***https://egyankosh.ac.in/bitstream/123456789/34854/1/Unit-4.pdf***

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit I

1. (x)Fx is a ___.

2. What is a General proposition?

3. What is the validity of an argument?

4. Explain all the Rules of Quantification.

Unit II

1. There are ___ rules of Quantification.

2. What is a multiply general proposition?

3. What is Existential generalization?

4. Prove the invalidity of the following, in each case using the suggested notation:

*1. All anarchists are bearded. All communists are bearded. Therefore all anarchists are communists. (Ax, Bx, Cx)

2. No diplomats are extremists. Some fanatics are extremists. Therefore some diplomats are not fanatics. (Dx, Ex, Fx)

3. All generals are handsome. Some intellectuals are handsome. Therefore some generals are intellectuals. (Gx, Hx, Ix)

Unit III

1. When a universal proposition is derived from a Universal truth function is called __

2. What is instantiation?

3. What is Existential Generalization?

4. What is Universal generalization?

Unit IV

1. Some journalists are not kibitzers. Some kibitzers are not lucky. Therefore, some journalists are not lucky. (Jx, Kx, Lx) Symbolize the above

2. Some politicians are leaders. Some leaders are not orators. Therefore, some orators are not politicians. (Px, Lx, Ox)

None but the brave deserves the fair. Every soldier is brave. Therefore, none but soldiers deserve the fair. (Dx: x deserves the fair; Bx: x is brave; Sx: x is a soldier)

Symbolize the above

3. Proof the Validity of no 1 question.

4. Proof the invalidity of no 2 question.

Model Curriculum for Three/Four Year Degree Course (With Multiple Entry /Exit Option)

Based on NEP-2020

Physics

Odisha State Higher Education Council, Bhubaneswar
Government of Odisha

Semester	Subjects
I	Core I - Mathematical Physics-I
	Core II- Mechanics
II	Core III- Electricity and Magnetism
	Core IV - Mathematical Physics-II
III	Core V- Waves and Optics
	Core VI- Mathematical Physics-III
	Core VII- Thermal Physics
IV	Core VIII- Analog Systems
	Core IX- Basic Instrumentation
	Core X- Nuclear and Particle Physics
V	Core XI- Digital Systems
	Core XII- Quantum Mechanics and Applications
	Core XIII- Solid State Physics
VI	Core XIV- Electromagnetic Theory
	Core XV- Statistical Mechanics
VII	Core XVI- Mathematical Methods in Physics
	Core XVII- Classical Mechanics
	Core XVIII- QUANTUM MECHANICS
	Core XIX- LABORATORY: COMPUTATIONAL PHYSICS
VIII	Core XX- Classical Electrodynamics
	Core XXI- QUANTUM MECHANICS-II
	Core XXII- Electronics
	Core XXIII- Laboratory: Optics and Modern Physics Lab

PROGRAMME OUTCOMES : B.Sc. PHYSICS

PO1: Acquire adequate knowledge of the subject

PO2: Craft a foundation for higher learning

PO3: Be initiated into the basics of research

PO4: Imbibe sound moral and ethical values

PO5: Become conscious of environmental and societal responsibilities

PO6: Attain skills for communication and career

PO7: Learn to tolerate diverse ideas and different points of view

PO8: Become empowered to face the challenges of the changing universe

PROGRAMME: B.Sc. PHYSICS

Course Outcomes

1. Understand the basic concepts of methodology of science and the fundamentals of mechanics, properties of matter and electrodynamics, Mathematical Physics.
2. Understand the theoretical basis of Mathematical Physics,quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics and thermodynamics
3. Understand and apply the concepts of electronics in the designing of different analog and digital circuits
4. Understand the basics of computer programming and numerical analysis
5. Apply and verify theoretical concepts through laboratory experiments

Core I **Semester I**

Mathematical Physics-I

Course Outcomes

- Basic understanding of Differential equations and their solutions, conceptual understanding of calculus.
- Basic understanding of vector calculus and its differentiation.
- Use of vector calculus to understand vector integration. Dirac delta function and its properties.
- Understanding of orthogonal curvilinear coordinates and its application in vector differentiation.
- To understand the basic algorithm in application to functional algebra and error analysis.

Unit I

- **Calculus -I:** Plotting of functions, Intuitive ideas of continuous, differentiable functions and plotting of curves, Approximation: Taylor and binomial series (statements only), First Order Differential Equations and Integrating Factor, Second Order Differential equations: Homogeneous Equations with constant coefficients, Wronskian and general solution, Statement of existence and Uniqueness Theorem for Initial Value Problems, Particular Integral.

- **Calculus-II:** Calculus of functions of more than one variable: Partial derivatives, exact and inexact differentials. Integrating factor with simple illustration, Constrained Maximization using Lagrange Multipliers,

Unit II

- **Vector algebra:** Recapitulation of vectors: Properties of vectors under rotations. Scalar product and its invariance under rotations, Vector product, Scalar triple product and their interpretation in terms of area and volume respectively, Scalar and Vector fields.

- **Vector Differentiation:** Directional derivatives and normal derivative, Gradient of a scalar field and its geometrical interpretation, Divergence and curl of a vector field, Del and Laplacian operators, Vector identities.

Unit III

- **Vector Integration:** Ordinary Integrals of Vectors, Multiple integrals, Jacobian, Notion of infitesimal line, surface and volume elements, Line, surface and volume integrals of Vector fields, Flux of a vector field, Gauss ' divergence theorem, Green's and Stokes Theorems and their applications (no rigorous proofs)
- **Dirac Delta function and its properties:** Definition of Dirac delta function. Representation as limit of a Gaussian function and rectangular function, Properties of Dirac delta function

Unit IV

Orthogonal Curvilinear Coordinates: Orthogonal Curvilinear Coordinates, Derivation of Gradient, Divergence, Curl and Laplacian in Cartesian, Spherical and Cylindrical Coordinate Systems, Comparison of velocity and acceleration in cylindrical and spherical coordinate system.

Text Books:

- ✓ *Mathematical Methods for Physicists, G.B.Arfken, H.J.Weber, F.E.Harris (2013,7th Edn.,Elsevier)*
- ✓ *Advanced Engineering Mathematics, Erwin Kreyszig (Wiley India)*

Reference books:

- ✓ *Mathematical Physics C. Harper (Prentice Hall India)*
- ✓ *Complex Variable: Schaum's Outlines Series M. Spiegel (2nd Edition, Mc- Graw Hill Education)*
- ✓ *Complex variables and applications, J. W. Brown and R.V. Churchill*
- ✓ *Mathematical Physics, Satya Prakash (SultanChand)*
- ✓ *Mathematical Physics, B. D. Gupta (4th edition, Vikas Publication)*
- ✓ *Mathematical Physics and Special Relativity, M. Das, P.K. Jena and B.K.Dash (Srikrishna Prakashan)*
- ✓ *Mathematical Physics –H.K.Das, Dr. Rama Verma (S. ChandPublishing)*
- ✓ *Mathematical Physics, B.S. Rajput,(Pragati Prakashana*

LAB: Credit-1

The aim of this Lab is not just to teach computer programming and numerical analysis but to emphasize its role in solving problems in Physics.

- Highlights the use of computational methods to solve physical problems
- Evaluation done not on the programming but on the basis of formulating the problem
- Aim at teaching students to construct the computational problem to be solved
- Students can use any one operating system Linux or Microsoft Windows

Introduction and Overview: Computer architecture and organization, memory and Input/output devices. Basics of scientific computing: Binary and decimal arithmetic, Floating point numbers, algorithms, Sequence, Selection and Repetition, single and double precision arithmetic, underflow and overflow emphasize the importance of making equations in terms of dimensionless variables, Iterative methods. Algorithm Errors and error Analysis: Truncation and round off errors, Absolute and relative errors, Floating point computations. Systematic and Random Errors, Propagation of Errors, Normal Law of Errors, Standard and Probable Error.

Review of C and C++ Programming: Introduction to Programming, constants, Variables andFundamentals data types, operators and Expressions, I/O statements, scanf and printf, c in and c out, Manipulators for data format- ting, Control statements (decision making and looping statements) (If Statement, Ifelse Statement, NestedIfstructure, ElseIfStatement, Ternaryoperator, Goto Statement. Switch Statement. Unconditional and Conditional Looping. While Loop. Do-While Loop. FOR Loop. Break and Continue Statements. Nested Loops), Arrays (1D and 2D) and strings, user defined functions, Structures and Unions, Idea of classes and objects.

Programs: Sum and average of a list of numbers, largest of a given list of numbers and its location in the list, sorting of numbers in ascending descending order, Binary search.

Random number generation: Area of circle, area of square, volume of sphere, value of τ.

Reference Books:

- ✓ Introduction to Numerical Analysis, S.S. Sastry, 5th Edn., 2012, PHI Learning Pvt. Ltd.
- ✓ Schaum's Outline of Programming with C++.J.Hubbard, 2000, Mc Graw– HillPub.
- ✓ Numerical Recipes in C: The Art of Scientific Computing, W.H.Pressetal, 3rd Edn. 2007, Cambridge UniversityPress.
- ✓ A first course in Numerical Methods, U.M. Ascher and C. Greif, 2012, PHI Learning.
- ✓ Elementary Numerical Analysis, K.E. Atkinson, 3rd Edn. , 2007 , Wiley India Edition.
- ✓ Numerical Methods for Scientists and Engineers, R.W. Hamming, 1973, Courier Dover Pub.
- ✓ An Introduction to computational Physics, T.Pang,2ndEdn., 2006,Cam- bridge Univ.Press.

Core II

Mechanics

Course Outcomes

- To Learn the basic concepts of Rigid body dynamics, Radius of Gyration, Moment of Inertia,Non-Inertial Systems
- To Understand the concept of Elasticity, Fluid motion and Types of Vibration
- To understand the concept of Newtonian theory through Gravitation, Central force motion, Keplar's laws, GPS
- To learn the concept of Special theory of Relativity, Michelson- Morley experiment, Lorentz transformation, Relativistic Doppler effect.
- Apply the basic concepts of Mechanics in experiments.

Unit I

- **Rotational Dynamics:** Centre of Mass, Motion of CoM, Centre of Mass and Laboratory frames, Angular momentum of a particle and system of particles, Principle of conservation of angular momentum, Rotation about a fixed axis, Moment of Inertia, Perpendicular and Parallel Axis Theorems, Routh Rule, Calculation of moment of inertia for cylindrical and spherical bodies, Kinetic energy of rotation, Euler's Equations of Rigid Body motion, Motion involving both translation and rotation. Moment of Inertia of a Flywheel.
- **Non-Inertial Systems:** Non-inertial frames and fictitious forces, uniformly rotating frame, Laws of Physics in rotating coordinate systems, Centrifugal force, Coriolis force.

Unit II

- **Oscillations**:

  Damped oscillation. Equation of motion and solution (cases of oscillatory, critically damped and overdamped) Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor, Bar Pendulum, Katers Pendulum
- **Elasticity:** Relation between Elastic constants, Twisting torque on a Cylinder or Wire, Bending of beams, External bending moment, Flexural rigidity, Single and double cantilever
- **Fluid Motion:** Kinematics of Moving Fluids: Poiseuilles Equation for Flow of a Liquid through a Capillary Tube, Surface tension, Gravity waves and ripple
- **Viscosity:** Poiseuilles Equation for Flow of a Liquid with corrections.

Unit III Gravitation and Central Force Motion

Law of gravitation, Gravitational potential energy, Inertial and gravitational mass, Potential and field due to spherical shell and solid sphere, Motion of a particle under a central force field, Two-body problem and its reduction to one-body problem and its solution, Differential Equation of motion with central force and its solution, The first Integrals (two), Concept of power Law Potentials, Kepler's Laws of Planetary motion, Satellites. Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS).

Unit IV

Special Theory of Relativity: Michelson-Morley Experiment and its out-come, Postulates of Special Theory of Relativity, Lorentz Transformations, Simultaneity and order of events, Lorentz contraction, Time dilation, Relativistic transformation of velocity, Frequency and wave number, Relativistic addition of velocities, Variation of mass with velocity, Massless Particles, Mass- energy Equivalence, Relativistic Doppler effect, Relativistic Kinematics, Transformation of Energy and Momentum.

Text Books:

- ✓ *Mechanics, D.S. Mathur (S. Chand Publishing)*
- ✓ *Introduction to Special Relativity, R. Resnick (John Wiley)*

Reference Books:

- ✓ *Introduc tion to Mechanics Daniel Klapnner and Robert Kolenkow, McgrawHill. Mechanics by K.R Simon*
- ✓ *Mechanics, Berkeley Physics, vol. 1, C.Kittel, W. Knight, etal (Tata McGraw- Hill)*
- ✓ *Physics, Resnick, Halliday and Walker (8/e.2008,Wiley)*
- ✓ *Theoretical Mechanics-M.R. Spiegel (Tata McGrawHill).*
- ✓ *Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands (Pearson)*
- ✓ *Mechanics-M.Das, P.K.Jena and R.N. Mishra (SrikrishnaPublications)*
- ✓ *Classical Mechanics , Gupta Kumar & Sharama,(Pragati Prakashan)*
- ✓ *Classical Mechanics, J.C.Upadhyaya, (Himalaya Publishing Home*)

LAB : Credit 1

(Minimum 4 experiments are to be done):

1. To study surface tension by capillary rise method.
2. To determine the height of a building using a Sextant.
3. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
4. To determine the Moment of Inertia of a Flywheel.
5. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuilles method).
6. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
7. To determine the value of g using Bar Pendulum.
8. To determine the value of g using Kater's Pendulum.

Reference Books:

- ✓ *Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House.*
- ✓ *Advanced level Physics Practical's, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.*
- ✓ *A Text book of Practical Physics, I. Prakash and Ramakrishna, 11thEdn, 2011, Kitab Mahal.*

Core III

Semester – II

Electricity and Magnetism

Course Outcomes

- To understand the basic concepts of Electricity and Magnetism
- To Understand the various phenomena in Electricity and Magnetism
- To Understand Circuit analysis and network theorems
- To Explain the Dynamics of Charged Particles
- To Apply the acquired knowledge in Experiment.

Unit 1 : Electric Field and Electric Potential

- **Electric field:** Electric field lines, Electric flux, Gauss Law with applications to charge distributions with spherical, cylindrical and planar symmetry, Conservative nature of Electrostatic Field. Electrostatic Potential, Potential and Electric Field of a dipole, Force and Torque on a dipole, Potential calculation in different simple cases, Laplace and Poisson equations, The Uniqueness Theorem, Method of Images and its application to (1) Plane Infinite Sheet and (2) Sphere.
- Electrostatic energy of system of charges, Electrostatic energy of a charged sphere, Conductors in an electrostatic Field, Surface charge and force on a conductor.

Unit II Magnetic Field

- Magnetic Force, Lorentz Force, Biot Savarts Law, Cur- rent Loop as a Magnetic Dipole and its Dipole Moment (analogy with Electric Dipole), Amperes Circuital Law and its application to (1) Solenoid (2) Toroid (3) Helmhotz coil, Properties of curl and divergence, Vector Potential, Ballistic Galvanometer: Torque on a current Loop, Current and Charge Sensitivity, Electromagnetic damping, Logarithmic damping, CDR.

Unit III

Dielectric Properties of Matter: Electric Field in matter, Polarization, Polarization Charges, Electrical Susceptibility and Dielectric Constant, Capacitor (parallel plate, spherical, cylindrical) filled with dielectric, Displacement vector D, Relations between E, P and D, Gauss Law in dielectrics. Magnetic Properties of Matter: Magnetization vector (M), Magnetic Intensity (H), Magnetic Susceptibility and permeability, Relation between B, H, M, Ferromagnetism, B-H curve and hysteresis.Electromagnetic Induction: Faradays Law, Lenz's Law, Self -Inductance and Mutual Inductance, Reciprocity Theorem, Energy stored in a Magnetic Field, Introduction to Maxwell's Equations.

Unit IV

- **Electrical Circuits:** AC Circuits: Kirchhoffs laws for AC circuits, Complex Reactance and Impedance, Series
- **LCR Circuit:** (1) Resonance (2) Power Dissipation (3) Quality Factor, (4) Band Width, Parallel LCR Circuit.
- **Network theorems:** Kirchoff's law for electrical circuits, Ideal Constant-voltage and Constant-current Sources.
- **Network Theorems:** Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, Maximum Power Transfer theorem, Applications to DC circuits. Transient Currents Growth and decay of current in RC and LR circuits.

Text Books:

- ✓ *Introduction to Electrodynamics – D.J. Griffiths (Pearson, 4th edition, 2015)*
- ✓ *Foundations of Electromagnetic Theory-Ritz and Milford (Pearson*)

Reference Books:

- ✓ *Classical Electrodynamics, J. D. Jackson (Wiley).*
- ✓ *Electricity and Magnetism D. C. Tayal (Himalaya Publishing house)*
- ✓ *Electricity, Magnetism and Electromagnetic Theory- S. Mahajan and Choudhury (Tata McGraw Hill)*
- ✓ *F eynman Lectures Vol.2, R. P. Feynman, R. B. Leighton, M. Sands (Pearson)*
- ✓ *Electricity and Magnetism, J. H. Fewkes and J. Yarwood. Vol. I (Oxford Univ. Press)*
- ✓ *Classical Electromagnetism, H.C.Verma, Bharati Bhawan*

LAB: Credit-1
(Minimum of 6 experiments are to be done)

Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, c)DC Current, (d) Capacitances, and (e) Checking electrical fuses.

1. To study the characteristics of a series RC Circuit.
2. To determine an unknown Low Resistance using Potentiometer.
3. To determine an unknown Low Resistance using Carey Fosters Bridge.
4. To compare capacitances using DeSauty's bridge.
5. Measurement of field strength B and its variation in a solenoid (determine dB/dx)
6. To verify the Thevenin and Norton theorems.
7. To determine self-inductance of a coil by Andersons bridge.
8. To study response curve of a Series LCR circuit and determine its (a) Reso- nant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width.
9. To study the response curve of a parallel LCR circuit and determine its (a)
10. Anti-resonance frequency and (b) Quality factor Q.

Reference Books:

- ✓ Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia
- ✓ Publishing House
- ✓ A Text Book of Practical Physics, I.Prakash and Ramakrishna, 11th Ed., 2011, Kitab Mahal
- ✓ Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- ✓ A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.

Core IV

Mathematical Physics-II: Credit-3

The emphasis of the course is on applications in solving problems of interest to physicists. Students are to be examined on the basis of problems, seen and unseen.

Course Outcomes

- Conceptual understanding of Fourier series and its application in periodic function.
- Understanding the various special functions and its properties.
- Understanding various polynomials and special integrations.
- To learn the applications of partial differential equation.
- To apply the acquired knowledge to solve problems.

Unit I Fourier Series- I

Periodic functions, Orthogonality of sine and cosine functions, Dirichlet Conditions (Statement only), Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients, Complex representation of Fourier series, Expansion of functions with arbitrary period, Expansion of non-periodic functions over an interval, Even and odd functions and their Fourier expansions and Application, Summing of Infinite Series, Term-by-Term differentiation and integration of Fourier Series, Parseval Identity.

Unit II Frobenius Method and Special Functions

Singular Points of Second Order Linear Differential Equations and their importance, Singularities of Bessel's and Laguerre Equations, Frobenius method and its applications to differential equations: Bessel, Legendre and Hermite Differential Equations, Legendre and Hermite Polynomials: Rodrigues Formula, Generating Function, Orthogonality

Unit III

- **Polynomials:** Simple recurrence relations of Legendre and Hermite Polynomials, Expansion of function in a series of Legendre Polynomials, Associated Legendre Differential Equation, Associated Legendre polynomials, Spherical Harmonics. Spherical Bessel's Function (1^{st} and 2^{nd} kind).

- **Some Special Integrals:** Beta and Gamma Functions and relation between them, Expression of Integrals in terms of Gamma Functions, Error Function (Probability Integral).

Unit IV Partial Differential Equations

Solutions to partial differential equations using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Conducting and dielectric sphere in an external uniform electric field. Wave equation and its solution for vibrational modes of a stretched string.

Text Books:

- ✓ *Mathematical Methods for Physicists, G.B.Arfken, H.J.Weber, F.E.Harris.(2013, 7th Edn.,Elsevier)*
- ✓ *Advanced Engineering Mathematics, Erwin Kreyszig (Wiley India*)

Reference Books:

- ✓ *Mathematical Physics and Special Relativity, M. Das, P.K. Jena and B.K. Dash (Srikrishna Prakashan)*
- ✓ *Mathematical Physics–H. K. Dass, Dr. Rama Verma (S. Chand Publishing)*
- ✓ *Mathematical Physics C. Harper (Prentice Hall India)*
- ✓ *Complex Variable: Schaum's Outlines Series M. Spiegel (2nd Edition, McGraw Hill Education)*
- ✓ *Complex variables and applications J.W.Brown and R.V.Churchill*
- ✓ *Mathematical Physics, Satya Prakash (Sultan Chand)*
- ✓ *Mathematical Physics B. D. Gupta (4th edition, Vikas Publication)*
- ✓ *Mathematical Physics, B.S.Rajput, Pragati Prakashan*

LAB: Credit 1

The aim of this Lab is to use the computational methods to solve physical problems. Course will consist of lectures(both theory and practical) in the Lab. Evaluation done not on the programming but on the basis of formulating the problem.

Topics

Introduction to Numerical computation software Scilab: Introduction to Scilab, Advantages and disadvantages, Scilab computation software Scilab environment, Command window, Figure window, Edit window, Variables and arrays, Initialising variables in Scilab, Multidimensional arrays, Subarray, Special values, Displaying output data, data file, Scalar and array operations, Hierarchy of operations, Built in Scilab functions, Introduction to plotting, 2D and 3D plotting (2),

Branching Statements and program design, Relational and logical operators, the while loop, for loop, details of loop operations, break and continue statements, nested loops, logical arrays and vectorization (2) User defined functions, Introduction to Scilab functions, Variable passing in Scilab, optional arguments, preserving data between calls to a function, Complex and Character data, string function, Multidimensional arrays (2) an introduction to Scilab file processing, file opening and closing, Binary I/o functions, comparing binary and formatted functions, Numerical methods and developing the skills of writing a program(2).

Curve fitting, Least square fit Goodness of fit, standard constant Deviation: Ohms law to calculate R, Hookes law to calculate spring constant

Solution of Linear system of equations by Gauss elimination Solution method and Gauss Seidal method. Diagonalization matrices, Inverse of a matrix, Eigen vectors, problems: Solution of mesh equations of electric circuits (3meshes), Solution of coupled spring mass systems (3meshes).

Solution of ODE First order Differential equation Euler, modiftedEuler Runge-Kutta second methods Second order differential equation. Fixed difference method:

First order diferential equation

- Radioactivedecay
- Current in RC, LC circuits with DCsource
- Newtons law ofcooling
- Classical equations of motion

Second order Differential Equation

- Harmonic oscillator (no friction)
- Damped Harmonic oscillator

- Overdamped
- Critical damped
- Oscillatory
- Forced Harmonic oscillator
- Transient and Steady state solution
- Apply above to LCR circuits also

Reference Books:

- ✓ *Mathematical Methods for Physics and Engineers, K.FRiley, M.P.Hobson and S. J.20 Bence, 3rd ed., 2006, Cambridge University Press.*
- ✓ *Complex Variables, A.S. Fokas and M.J. Ablowitz, 8th Ed., 2011, Cambridge Univ. Press.*
- ✓ *Firstcourseincomplexanalysiswithapplications,D.G.ZillandP.D.Shana-han, 1940, Jones and Bartlett.*
- ✓ *Simulation of ODE/PDE Models with MATLAB, OCTAVE and SCILAB: Scientific and Engineering Applications: A.V. Wouwer, P. Saucez, C.V. Fern- ndez. 2014 Springer.*
- ✓ *Scilab by example: M. Affouf 2012, ISBN: 978-1479203444*
- ✓ *Scilab (Afreesoftwareto Matlab):H.Ramchandran,A.S.Nair.2011S.Chand andCompany*
- ✓ *Scilab Image Processing: Lambert M. Surhone. 2010 Beta script Publishing*

Core V **Semester III**

Waves and Optics

Course Outcomes

- Basic understanding of propagation of light, its application and wave nature.
- To Understand the concepts of wave motion.
- To Understand the concepts of interference and its application.
- To Understand the concepts of diffraction and its application.
- To Apply the acquired knowledge of optics in Experiment

Unit I

Geometrical optics: Fermat's principle, reflection and refraction at plane interface, Matrix formulation of geometrical Optics, Cardinal points and Cardinal planes of an optical system, Idea of dispersion, Application to thick Lens and thin Lens, Ramsden and Huygens eyepiece. Wave Optics : Electromagnetic nature of light. Definition and properties of wave front Huygens Principle. Temporal and Spatial Coherence.

Unit II

Wave Motion: Plane and Spherical Waves, Longitudinal and Transverse Waves, Plane Progressive (Traveling) Waves, Wave Equation, Particle and Wave Velocities, Differential Equation, Pressure of a Longitudinal Wave, Energy Trans- port, Intensity of Wave. Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods, Lissajous Figures (1:1 and 1:2) and their uses, Superposition of Harmonic waves.

Unit III

Interference: Division of amplitude and wave front, Young's double slit experiment, Lloyds Mirror and Fresnels Bi-prism, Phase change on reflection: Stokes treatment, Interference in Thin Films: parallel and wedge-shaped films, Fringes of equal inclination (Haidinger Fringes), Fringes of equal thickness (Fizeau Fringes), Newton's Rings: Measurement of wavelength and refractive index. Interferometer : Michelson's Interferometer-(1) Idea of form of fringes (No theory required), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index, and (5) Visibility of fringes, Fabry-Perot interferometer.

Unit IV

Fraunhoffer diffraction: Single slit, Circular aperture, Resolving Power of a telescope, Double slit, Multiple slits, Diffraction grating, Resolving power of grating. Fresnel Diffraction: Fresnel's Assumptions, Fresnel's Half-Period Zones for Plane Wave, Explanation of Rectilinear Propagation of Light, Theory of a Zone Plate: Multiple Foci of a Zone Plate, Fresnel's Integral, Fresnel diffraction pattern of a straight edge, as lit and a wire.

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Text Books:

- ✓ *A text book of Optics N. Subhramanyam and BrijLal (S.Chand Publishing)*
- ✓ *Optics - Ajoy Ghatak (McGraw Hill)*

Reference Books

- ✓ *Optics-E. Hecht(Pearson)*
- ✓ *Fundamentals of Optics-F. A. Jenkins and H. E. White(McGraw-Hill)*
- ✓ *Geometrical and Physical Optics R.S. Longhurst (Orient Blackswan)*
- ✓ *The Physics of Vibrations and Waves- H. J .Pain(John Wiley)*
- ✓ Optics P. K. Chakraborty.
- ✓ Principles of Optics-Max Born and Emil Wolf (Pergamon Press)
- ✓ The Physics of Waves and Oscillations-N. K. Bajaj (Mc Graw Hill)

LAB: Credit-1

(Minimum 5 experiments are to be done)

1. To determine the frequency of an electric tuning fork by Melde's experiment and verify 2-T law.
2. To plot the I-D curve and to determine the refractive index of a prism
3. To determine refractive index of the Material of a prism using sodium source.
4. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source.
5. To determine wavelength of sodium light using Newton's Rings.
6. To determine wavelength of (1) Na source and (2) spectral lines of Hgsource using plane diffraction grating.
7. To determine dispersive power and resolving power of a plane diffraction grating.

Reference Books:

- ✓ Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
- ✓ A Text Book of Practical Physics, I. Prakash and Ramakrishna, 11th Ed., 2011, Kitab Mahal
- ✓ Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- ✓ A Laboratory Manual of Physics for undergraduate classes, D. P. Khandelwal, 1985, Vani

Core VI

Mathematical Physics-III

Course Outcomes

- Understanding and application of Complex function variables.
- Understanding the concept of Fourier Integral transform.
- To Understand the properties and application of Fourier integral transformation.
- To Understand the properties and application of Laplace integral transformation.
- To Apply the acquired knowledge to solve problems.

Unit I

- **Complex Analysis:** Brief Revision of Complex Numbers and their Graphical Representation Euler's
- formula, De Moivres theorem, Roots of complex Numbers, Functions of Complex Variables, Analyticity and Cauchy-Riemann Conditions, Examples of analytic functions, Singular functions: poles and branch points, order of singularity, branch cuts, Integration of a function of a complex variable, Cauchys Inequality, Cauchys Integral formula, Simply and multiply connected region, Laurent and Taylors expansion, Residues and Residue Theorem, Application in solving Definite Integrals.

Unit II

- **Integral Transforms-I:** Fourier Transforms: Fourier Integral theorem, Fourier Transform, Examples, Fourier Transform of trigonometric, Gaussian, finite wave train and other functions, Representation of Dirac delta function as a Fourier Integral, Fourier transform of derivatives, Inverse Fourier Transform.

Unit III

- **Integral Transforms-II:** Convolution theorem, Properties of Fourier Trans- forms (translation, change of scale, complex conjugation), Three dimensional Fourier transforms with examples, Application of Fourier Transforms to differential equations: One dimensional Wave and Diffusion/Heat flow Equations.

Unit IV

- **Laplace Transforms:** Laplace Transforms (LT) of Elementary functions,
- **Properties of Laplace Transforms:** Change of Scale Theorem, Shifting Theorem, LTs of Derivatives and Integrals of Functions, Derivatives and Integrals of Functions, Derivatives and Integrals of LTs. LT of Unit Step function, Dirac Delta function, Periodic Functions, Inverse LT, Application of Laplace Transforms to Differential Equations: Damped Harmonic Oscillator, Simple Electrical Circuits.

Text Books:

- ✓ *Mathematical Methods for Physicists, G.B.Arfken, H.J.Weber, F.E.Harris (2013,7thEdn.,Elsevier)*
- ✓ *Advanced Engineering Mathematics, ErwinKreyszig (WileyIndia)*

Reference Books:

- ✓ *Mathematical Physics and Special Relativity– M.Das, P.K.Jena and B.K. Dash (Srikrishna Prakashan)*
- ✓ *Mathematical Physics–H. K. Dass, Dr. Rama Verma (S. Chand Publishing)*
- ✓ *Mathematical Physics C. Harper (Prentice Hall India)*
- ✓ *Complex• Variable: Schaum's Outlines Series M. Spiegel (2nd Edition , Mc- Graw Hill Education)*
- ✓ *Complex variables and applications J.W.Brown and R.V.Churchill*
- ✓ *Mathematical Physics, Satya Prakash (Sultan Chand)*
- ✓ *Mathematical Physics B.D.Gupta (4thedition,VikasPublication)*
- ✓ *Mathematical Physics B.S.Rajput, Pragati Prakashan*
- ✓ *Mathematical physics-III,(University Physics), Dr. Ranjan Kumar Bhuyan, Himalaya Publishing House*

LAB: Credit-1

Scilab based simulations (XCos) experiments based on Mathematical Physics problems like

. Solve simple differential equations like:

$\frac{dy}{dx} = e^{-x}$ with $y(x = 0) = 0$

$\frac{dy}{dx} + e^{-x} = x^2$ with $y(x = 0) = 0$

$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = -y$ with $y(x = 0) = 0,\ y'(x = 0) = 1$

$\frac{d^2y}{dx^2} + e^{-x}\frac{dy}{dx} = -y$ with $y(x = 0) = 0,\ y'(x = 0) = 1$

. Direct Delta Function:

Evaluate $\int_{-3}^{3} dx \frac{x=3}{\sqrt{2\pi a^2}}\ e^{-\frac{(x-2)^2}{2\sigma^2}}$, for $\sigma = 0.1,\ 0.01,\ 0.001$ and show that it tends to 5.

. Fourier Series:

Program to sum; evaluate the Fourier Coefficients of a given periodic function (Square Wave)

. Frobenius Method and Special Functions:

$$\int_{-1}^{1} d\mu \; P_n\mu \, P_m\mu = \frac{2}{2n+1}\delta_{m,n}$$

Plot $P_n(x)$, Legendre polynomial of degree n, and $J_n(x)$, Bessel function of first kind. Show Recursion relation.

- Calculation of error for each data point of observations recorded in experiments done in previous semesters (choose any two)
- Calculation of least square fitting manually without giving weightage to error. Confirmation of least square fitting of data through computer Programme.
- Evaluation of trigonometric functions e.g. SinΘ, Given Bessel's function at N points, find its value at an intermediate point.

Complex analysis: Calculate $\int \frac{dx}{x^2+2}$ and check it with computer integration.

Integral transform: FFT of e^{-x^2}

Reference Books:

- ✓ *Mathematical Methods for Physics and Engineers, K.FRiley, M.P.Hobson and S. J. Bence, 3rd ed., 2006, Cambridge University Press.*
- ✓ *Mathematics for Physicists, P.Denneryand A.Krzywicki, 1967, Dover Publications.*
- ✓ *Simulation of ODE/PDE Models with MATLAB, OCTAVE and SCILAB: Scientific and Engineering Applications: A. Vande Wouwer, P. Saucez, C.V. Fernndez. 2014 Springer ISBN: 978-3319067896*
- ✓ *Scilab by example: M. Affouf, 2012. ISBN: 978-1479203444*
- ✓ *Scilab (AfreesoftwaretoMatlab): H.Ramchandran, A.S.Nair.2011 S.Chand And Company, Scilab Image Processing: Lambert M. Surhone. 2010 Betas cript Publis*hing.

Core VII

Thermal Physics

Course Outcomes

- Basic understanding ofthermodynamics and various thermal variables.
- Understanding various thermodynamics potential applications and their properties.
- To Understand the concepts of ideal gas and its thermal properties.
- To Understand the concepts of real gas and its thermal properties.
- To Apply the acquired knowledge ofthermodynamics in Experiments

Unit I

- **Introduction to Thermodynamics** Recapitulation of Zeroth and First law of thermodynamics,
- **Second Law of Thermodynamics:** Reversible and Irreversible process with examples, Kelvin-Planck and Clausius Statements and their Equivalence, Carnot's Theorem, Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.
- **Entropy:** Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy, Entropy of a perfect gas, Principle of increase of Entropy, Entropy Changes in Reversible and Irreversible processes with examples, Entropy of the Principle of Increase of Entropy, Temperature Entropy diagrams for Carnot's Cycle, Third Law of Thermodynamics, Unattainability of Absolute Zero.

Unit II

- **Thermodynamic Potentials:** Extensive and Intensive Thermodynamic Variables. Internal Energy, Enthalpy, Helmholtz Free Energy, Gibbs Free Energy, Their Definitions, Properties and Applications, Surface Films and Variation of Surface Tension with Temperature, Magnetic Work, Cooling due to adiabatic demagnetization.
- **Phase Transitions:** First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations.
- **Maxwells Thermodynamic Relations:** Derivations and applications of Maxwells Relations, Maxwells
- Relations: (1) Clausius Clapeyron equation (2) Relation between $C_{p\ and}\ C_{v}$ (3) TdS Equations, (4) Joule- Kelvin coefficient for Ideal and. Vander Waal Gases (5) Energy equations (6) Change of Temperature during Adiabatic Process.

Unit III

- **Kinetic Theory of Gases**
- **Distribution of Velocities:** Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification, Sterns Experiment, Mean, RMS and Most Probable Speeds, Degrees of Freedom, Law of Equipartition of Energy (No proof required), Specific heats of Gases.
- **Molecular Collisions:** Mean Free Path, Collision Probability, Estimates of Mean Free Path,
- **Transport Phenomenon in Ideal Gases:** (1) Viscosity, (2) Thermal Conductivity and (3) Diffusion. Brownian Motion and its Significance.

Unit IV

Real Gases: Behavior of Real Gases: Deviations from the Ideal Gas Equation, The Virial Equation, Andrews Experiments on CO2 Gas. Critical Constants, Continuity of Liquid and Gaseous State. Vapour and Gas, Boyle Temperature, Van der Waals Equation of State for Real Gases, Values of Critical Constants, Law of Corresponding States, Comparison with Experimental Curves, P-V Diagrams, Joules Experiment, Free Adiabatic Expansion of a Perfect Gas, Joule- Thomson Porous Plug Experiment, Joule- Thomson Effect for Real and Van der Waal Gases, Temperature of Inversion, Joule-Thomson Cooling.

Text Books:

- ✓ *Thermal Physics, A. B. Gupta (Books and allied Ltd)*
- ✓ *Heat and Thermodynamics, M.W. Zemansky, Richard Dittman (McGraw- Hill)*

Reference Books:

- ✓ Theory and experiments on thermal Physics, P.K.Chakrabarty (New cen- tral book agency limited)
- ✓ Thermodynamics, Kinetic Theory and Statistical Thermodynamics- Sears and Salinger (Narosa)
- ✓ A Treatise on Heat- Meghnad Saha and B.N.Srivastava (The Indian Press) Heat, and thermodynamics and Statistical Physics, N.Subrahmanyam and Brij Lal (S.Chand Publishing)
- ✓ *Thermal and Statistical Physics M.Das, P.K. Jena, S. Mishra, R.N.Mishra (Shri Krishna Publication)*
- ✓ *Heat, Thermodynamics and statistical physics, Brijlal, Subhramanyam and Hemne, S.Chand Publication.*

LAB: Credit-1

(Minimum 5 experiments are to be done)

1. To determine Mechanical Equivalent of Heat, J, by Callender and Barnes constant flow method.
2. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charltons disc method.
3. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).
4. To study the variation of Thermo-Emf of a Thermocouple with Difference of Temperature of its Two Junctions.
5. To determine J by Caloriemeter.
6. To determine the specific heat of liquid by the method of cooling.
7. To determine the specific heat of solid by applying radiation of correction.

Reference Books:

- ✓ *Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House*
- ✓ *A Text Book of Practical Physics, I.Prakash and Ramakrishna, 11th Ed., 2011, Kitab Mahal*
- ✓ *Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers*
- ✓ *A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.*

Core VIII **Semester IV**

Analog Systems

Course Outcomes

- Basic understanding of semiconductor diodes, devices and their applications.
- To understand the basic concepts in transistors and amplifiers.
- To understand the concept of coupled amplifier and its application in feedback circuit.
- To understand the concepts of operational amplifier and its application.
- To apply the acquired knowledge of electronic circuits in Experiments.

Unit 1

- **Semiconductor Diodes:** P and N type semiconductors, energy level diagram, conductivity and Mobility, Concept of Drift velocity, PN junction fabrication (simple idea), Barrier formation in PN Junction Diode, Static and Dynamic Resistance, Current flow mechanism in Forward and Reverse Biased Diode, Drift velocity, derivation for Barrier Potential, Barrier Width and current Step Junction.
- **Two terminal device and their applications:** (1) Rectifier Diode: Half-wave Rectifiers. center- tapped and bridge type Full-wave Rectifiers, Calculation of Ripple Factor and Rectification Efficiency, L and C Filters (2) Zener Diode and Voltage Regulation, Principle and structure of LEDS, (2) Photo diode(3) Solar Cell.

Unit II

- **Bipolar Junction Transistors:** n-p-n and p-n-p transistors, Characteristics of CB, CE and CC Configurations, Current gains a and b, Relation between a and b, Load line analysis of Transistors, DC Load line and Q-point, Physical mechanism of current flow, Active, Cut-off and Saturation Regions.
- **Transistors Biasing:** Transistor Biasing and Stabilization circuits, Fixed Bias and Voltage Divider Bias.
- **Amplifiers:** Transistors as 2-port network h-parameter Equivalent Circuit, Analysis of a single stage CE amplifier using Hybrid Model, Input and Output impedance, Current, Voltage and Power Gains.

Unit III

- Classification of class A, B and C amplifiers, Push-pull amplifier (class B).
- **Coupled Amplifier:** RC-coupled amplifier and its frequency response.
- **Feedback in Amplifiers:** Effect of Positive and Negative Feedback on In- put Impedance, Output Impedance, Gain Stability, Distortion and Noise. Sinusoidal Oscillations: Barkhausens criterian for self- sustained oscillations. RC Phase shift oscillator, determination of Frequency, Hartley and Colpitts oscillators.

Unit IV

- **Operational Amplifiers (Black Box approach):** Characteristics of an Ideal and Practical OP-AMP (IC741). Open-loop and Closed loop Gain. Frequency Response. CMRR, Slew Rate and concept of virtual ground.
- **Applications of Op-Amps:** (1) Inverting and non-inverting amplifiers (2) Adder(3) Subtractor (4) Differentiator, (5) Integrator (6) Log amplifier, (7) Zero crossing detector (8) Wein bridgeoscillator.

Text Books

- ✓ *Foundations of Electronics-Raskhit and Chattopadhyay (New age International Publication)*
- ✓ *Concept of Electronics- D.C.Tayal (HimalayPublication)*

Reference Books:

- ✓ *Electronic devices and circuits R.L.Boylstad(PearsonIndia)*
- ✓ *Electronic Principles- A.P.Malvino (Tata McGrawHill)*
- ✓ *Principles of Electronics- V. K. Mehta and Rohit Mehta (S. Chand Pub- lication)*
- ✓ *OP-Amps and Linear Integrated Circuit-R. A. Gayakwad (PrenticeHall)*
- ✓ *Physics of Semiconductor devices, DonaldANeamen(PrenticeHall)*
- ✓ Analog System and Application: Gupta Kumar, Pragati Prakashan

LAB: Credit-1

(Minimum 5 experiments are to be done)

1. To study the V-I characteristics of a Zener diode and its use as voltage regulator.
2. Study of V-I and power curves of solar cells, and find maximum power point and efficiency.
3. To study the characteristics of a Bipolar Junction Transistor in CE configuration.
4. To study the various biasing configurations of BJT for normal class A operation.
5. To study the frequency response of voltage gain of a RC-coupled transistor amplifier.
6. To design a Wien bridge oscillator for given frequency using a non-amp.
7. To design a phase shift oscillator of given specifications using BJT.
8. To study the Colpitt's oscillator.

Reference Books:

- ✓ *Modern Digital Electronics, R.P. Jain, 4th Edition, 2010, Tata McGraw Hill.*
- ✓ *Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc Graw Hill.*
- ✓ *Microprocessor Architecture Programming and applications with 8085, R.S. Goankar, 2002, Prentice Hall.*
- ✓ *Microprocessor 8085: Architecture, Programming and interfacing, A. Wadhwa, 2010, PHI Learning.*

Core IX

Basic Instrumentation

Course Outcomes

- Conceptual understanding of different measurement of electronic circuit with measuring devices. CO-2: Basic understanding of CRO and its applications.
- Basic understanding of signal generators and its analysis
- Basic understanding of digital instruments and their applications.
- To Apply the acquired knowledge of different electronic measurement-based instruments in Experiments

Unit I

- **Basic of Measurement:** Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects.
- **Multimeter:** Principles of measurement of dc voltage and dc current, ac volt- age, ac current and resistance. Specifications of a multimeter and their significance.
- **Electronic Voltmeter:** Advantage over conventional multi meter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance.
- **AC milli voltmeter:** Type of AC milli voltmeters: Amplifier- rectifier, and rectifier-amplifier. Block diagram ac milli voltmeter, specifications and their significance.

Unit II

- **Cathode Ray Oscilloscope**: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only no mathematical treatment), brief discussion on screen phosphor, visual persistence and chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.
- **Applications of CRO:** (1) Study of Wave Form, (2) Measurement of Volt- age, Current, Frequency and Phase Difference.
- Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

Unit III

Signal Generators and Analysis Instruments: Block diagram, explanation and specifications of low frequency signal generators, pulse generator, and function generator, Brief idea for testing, specifications, Distortion factor meter, wave analysis.

Unit IV

- **Digital Instruments:** Principle and working of digital meters, Comparison of analog and digital instruments, Characteristics of a digital meter,Working principles of digital voltmeter.
- **Digital Multimeter:** Block diagram and working of a digital multimeter, Working principle of time interval, frequency and period measurement using universal counter/frequency counter, time-base stability, accuracy and resolution.

LAB: Credit-1

The test of lab skills will be of the following test items:

1. Use of an oscilloscope.
2. CRO as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment.
4. Use of Digital multimeter/VTVM for measuring voltages.
5. Circuit tracing of Laboratory electronic equipment.
6. Winding a coil /transformer.
7. Study the layout of receiver circuit.
8. Trouble shooting a circuit.
9. Balancing of bridges.

Laboratory Exercises:

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.

2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
3. To measure Q of a coil and its dependence on frequency, using a Q-meter.
4. Measurement of voltage, frequency, time period and phase angle using CRO.
5. Measurement of time period, frequency, average period using universal counter/ frequency counter.
6. Measurement of rise, fall and delay times using a CRO.
7. MeasurementofdistortionofaRFsignalgeneratorusingdistortionfactor meter.
8. Measurement of R, L and C using a LCR bridge/universal bridge.

Open Ended Experiments:

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter, ammeter) More emphasis should be given on hands-on experiments.

Text Books:

- ✓ *A Text Books book of electrical technology- B.L.Theraja (S.ChandPublishing)*
- ✓ *Digital circuits and systems Venugopal (Tata McGraw Hill)*

Reference Books :

- ✓ *Digital Electronics-Subrata Ghoshal (CengageLearning)*
- ✓ *Electronic Devices and circuits - S. Salivahanan and N. S.Kumar (Tata Mc- GrawHill)*
- ✓ *Electronic Devices-Thomas L. Floyd (Pearson)*

Additional Reference Books for Practical papers :

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop (Asia PublishingHouse)
2. Practical Physics-B.B.Swain (KitabMahal)
3. Practical Physics-B.Ghosh (Vol. I andII)
4. A Laboratory Manual of Physics for Undergraduate Classes,D.P.Khandelwal (VaniPublication)
5. B.Sc. Practical Physics- C.L.Arora (S.ChandPublishing)
6. B.Sc. Practical Physics H. Singh and P.S. Hemne (S. ChandPublishing)

Core X

Nuclear and Particle Physics

Course Outcomes

- Understanding the properties of atoms in electric and magnetic field.
- Understanding the concept Nuclear physics.
- Conceptual understanding nuclear models and nuclear reactions.
- Conceptual understanding of particle physics.
- To Apply the acquired knowledge in conducting the experiments.

Unit I

Atoms in Electric and Magnetic Fields: Electron angular momentum. Space quantization, Electron Spin and Spin Angular Momentum, Larmor's Theorem, Spin Magnetic Moment, Stern Gerlach Experiment, Vector Atom Model, L-S and J-J coupling, Zeeman Effect, Electron Magnetic Moment and Magnetic Energy, Gyromagnetic Ratio and Bohr Magnetron. Atoms in External Magnetic Fields: Normal and Anomalous Zeeman Effect, Paschen back and Stark-Effect (qualitative Discussion only).

Unit II

Nuclear Physics- : Nuclear composition, charge, size, shape, mass and density of the nucleus; Nuclear angular momentum; Nuclear magnetic dipole moment; Electric quadrupole moment; Mass defect; Packing fraction and Binding energy; Stability of nuclei (N vs Z curve), Binding energy curve. semi empirical mass formula; Nuclear Forces: General concept of nuclear force; Yukawa Meson field theory of nuclear forces; Properties of Nuclear forces.

Radioactive disintegration; Properties of alpha, beta, gamma rays; law of radioactive decay; successive radioactive decay; radioactive equilibrium; Radioisotopes; application of radioactivity (Agriculture, Medicinal, Industrial and Archaeological).

Unit III

- **Nuclear models:** Liquid Drop model; Shell model; magic number in the nucleus; Alpha decay: Alpha particles spectra; Gamow's theory of Alpha decay; Beta decay: Shape of Beta ray spectrum; Explanation of Beta decay on the basis of Neutrino and Antineutrino hypothesis; Fermi theory of Beta decay; Selection rules; Gamma ray emission,

- **Nuclear reactions:** Kinds of Nuclear reactions; Nuclear reaction kinematics; Q-value; Compound Nucleus and concept of direct reactions; Conservation laws; Nuclear reaction cross- sections. Nuclear energy: Nuclear Fission; Chain reaction and Critical Mass; Nuclear Reactors and its basic components; Nuclear Fusion; Condition for the maintained Fusion reactions; Energy production in stars; Fusion reaction in Sun, Principle of atomic bomb and hydrogen bomb.

Unit IV

Particle Physics

Classification of particles-antiparticles and their interactions; Conservation laws; Charges; Isospin; Baryon number; Lepton number; Strangeness; Hyper charge; Parity; Charge conjugation; CPT theorem; Conservation laws; Quark as the building blocks of Hadrons; Quark Model; Colour degree of freedom, Symmetry Classification of elementary particles; Higgs Boson Particle (God particle), elementary idea on Large Hadron collider (LHC), The future of universe, Dark matter and dark energy.

Text Books

- ✓ *Concepts of Modern Physics Arthur Beiser (McGrawHill)*
- ✓ *Modern Physics Murugeshan and Sivaprasad(S.Chand)*
- ✓ *Cohen B. L., "Concepts of Nuclear Physics", McGraw Hill Education.*
- ✓ *Tayal D. C., "Nuclear Physics", Himalaya Publishing House.*
- ✓ *Patel S. B., "Nuclear Physics: An Introduction", New Age International Publishers.*
- ✓ *Singh Jahan, "Fundamental of Nuclear Physics", Pragati Publications*

Reference Books

- ✓ *Quantum Mechanics: Theory and Applications,A.K.GhatakandS.Lokanathan, (Macmillan)*
- ✓ *Introduction to Quantum Theory, David Park (DoverPublications)*
- ✓ *Theory and Problems of Modern Physics ,Schaum's outline, R.Gautreau and W.Savin- (Tata McGraw-Hill)*
- ✓ *Modern Physics-Serway (CENGAGELearnings)*
- ✓ *Physics of Atoms and Molecules Bransden and Joachim (PearsonIndia)*
- ✓ *Atomic and Nuclear Physics-A.B.Gupta (NewCentral)*
- ✓ *Theoretical Nuclear Physics , J.M.Blatt and V.F. Weisskopf(Springer)*

LAB: Credit-1

(Minimum 4 experiments are to be done)

1. Study of photoelectric effect.
2. Basics of GM counter characteristics and counting statistics.
3. Study of Gamma ray spectroscopy by SCA and MCA.
4. To determine the Planck's constant using LEDs of at least 4 different colours.
5. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
6. To setup the Millikan oil drop apparatus and determine the charge of an electron.

Reference Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Books Book of Practical Physics, I.Prakashand Ramakrishna, 11th Edn, 2011, Kitab Mahal

Core XI **Semester V**

Digital Systems

Course Outcomes

- To Understand IC's and scales of Integration, Digital Circuits and their realization, Applications
- Build strong knowledge about Boolean Algebra, Truth tables, Equivalent Circuits, Theory and application of CRO.
- Gain a clear understanding of Data processing circuits, Arithmetic Circuits, different types of Timers: IC 555
- To Explain the knowledge of computer organization, Shift registers and counters.
- To Apply the acquired knowledge to realize various types of circuits in experiment

Unit 1

- **Integrated Circuits (Qualitative treatment only):** Active and Passive Components, Discrete components, Wafer Chip, Advantages and Drawbacks of ICs, Scale of Integration: SSI, MSI, LSI and VLSI (basic idea and definitions only), Classification of ICs, Examples of Linear and Digital ICs.

- **Digital Circuits:** Difference between Analog and Digital Circuits, Binary Numbers, Decimal to Binary and Binary to Decimal Conversation, BCD, Octal and Hexadecimal numbers, AND, OR and NOT. Gates (realization using Diodes and Transistor), NAND and NOR Gates as Universal Gates, XOR and XNOR Gates and application as Parity Checkers.

Unit II

Boolean algebra: De Morgan's Theorems: Boolean Laws, Simplification of Logic Circuit using Boolean Algebra, Fundamental Products, Idea of Minterms and Maxterms, Conversion of truth table into Karnaugh Map and SOP and POS simplification. Universal logic implementation (NAND & NOR).

Unit III

- **Data Processing Circuits:** Basic Idea of Multiplexers, De-multiplexers, Decoders, Encoders.
- **Arithmetic Circuits:** Binary Addition. Binary Subtraction using 2s complement. Half and Full Adders. Half and Full Subtractors, 4 bit binary Adder/Subtractor.

- **Timers: IC 555:** block diagram and application is Astable multivibrator and Monostable multivibrator.

Unit IV

- **Introduction to Computer Organization:** Input/output Devices, Data storage (idea of RAM and ROM), Computer memory, Memory organization and addressing, Memory Interfacing, Memory Map.

- **Shift registers:** Serial-in-serial-out, Serial-in-Parallel-out, Parallel-in-Serial- out and Parallel-in- Parallel-out. Shift Registers (only up to 4 bits)

- **Counters (4 bits):** Ring Counter, Asynchronous counters, Decade Counter. Synchronous Counter.

Text Books

- ✓ *Digital Circuits and Logic design: SamuelC. Lee(PrinticeHall)*
- ✓ *Digital Principles and Applications - A.P. Malvino, D.P. Leach and Saha (Tata Mc Graw*)

Reference Books:

- ✓ *The Art of Electronics by Paul Horowitz and Wilfield Hill ,Cambridge University*
- ✓ *Electronics by Allan R. Hambley ,Prentice Hall 3. Principles of Electronics V.K.Mehta and Rohit Mehta (S.Chand Publishing)*
- ✓ *Digital Logic and Computer design M. Morris Mano (Pearson) 5. Concepts of Electronics D.C.Tayal (Himalaya Publishing house)*
- ✓ *Digital System and Application, Gupta Kumar, Pragati Prakashan*

LAB: Credit-1

(Minimum 6 experiments are to be done)

1. To measure (a) Voltage, and (b) Time period of a periodic waveform using CRO
2. and to test a Diode and Transistor using a Millimeter.
3. To design a switch (NOT gate) using a transistor.
4. To verify and design AND, OR, NOT and XOR gates using NAN Dgates.
5. Half Adder, Full Adder and 4-bit binary Adder.
6. Half Subtractor, Full Subtractor, Adder-Subtractor using Full AdderI.C.
7. To build Flip-Flop (RS, Clocked-RS, D-type and JK) circuits using NAND gates.
8. To design an astable multivibrator of given specifications using 555Timer.
9. To design a monostable multivibrator of given specifications using 555 Timer.

Reference Books:

- ✓ *Basic Electronics: A Text Books lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-GrawHill.*
- ✓ *OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall.*
- ✓ *Electronic Principle, Albert Malvino, 2008, Tata Mc-Graw Hill. Electronic Devices and circuit Theory, R.L.Boylestad and L.D.Nashelsky,2009, Pearson.*

Core XII

Quantum Mechanics and Applications

Course Outcomes

- To understand Properties and physical interpretation of wave function and its application, knowledge in probability current density, significance of momentum space transformation and time dependent Schrödinger equation.
- To explain Time independent Schrödinger equation, Eigen value, Eigen function, generalized solution of stationary states, knowledge in wave function and discrete energy level.
- Basic knowledge in quantum mechanical operators, Eigen value and Eigen function, Uncertainty relation and Gaussian wave packet.
- Acquire the knowledge in application of Schrödinger equation in different potential barriers, concept of simple harmonic oscillator.
- Apply the acquired knowledge to solve various numerical problems .

Unit I

Schrodinger equation: Time dependent Schrodinger equation, Properties of Wave Function, Physical interpretation of wave function, Wave function of a free particle, Normalization, Probability current and probability current densities in three dimensions, Linearity and Superposition Principle, Wave Packet, Fourier Transform Theorem , Momentum space wave function and its significance, Representation of position vector in momentum space. Schrodinger equation in momentum space.

Unit II

Time Independent Schrodinger equation in 1-D, 2-D and 3-D, Hamiltonian, stationary states and energy Eigen values, expansion of an arbitrary wave function as a linear combination of energy Eigen functions, General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states. General Discussion of Bound states in an arbitrary potential: Continuity of wave function, Boundary condition and emergence of discrete energy levels.

Unit III

Operators: Operators, Commutator Algebra, Position, Momentum, Angular Momentum and Energy operators, Hermitian Operators, Expectation Value, Expectation values of position and momentum, Ehrenfest Theorem, Eigenvalues and Eigenfunctions of Hermitian Operator, Energy Eigen Spectrum, Degeneracy, Orthonormality of Eigen functions, Linear Dependance, Orthogonalisation, Uncertainty Relation- Uncertainty product, minimum uncertainty wave packet- Gaussian Wave Packet.

Unit IV

Application to one dimensional problem- One dimensional infinitely rigid Box- Energy Eigen values and Eigen functions, normalization, quantum dot as an example, Quantum mechanical scattering and tunneling in one dimension across a Potential Step and Rectangular Potential Barrier, Finite Square well potential, Quantum mechanics of simple Harmonic Oscillator-Energy Levels and Energy Eigen functions, ground state, zero point energy.

Text Books:

- ✓ *Introduction to Quantum Theory David Park (DoverPublications)*
- ✓ *Introduction to Quantum Theory, D. J. Griffiths(Pearson)*
- ✓ *Quantum Mechanics: Concepts and applications, N.Zettili, Wiley*

Reference Books :

- ✓ *Quantum Mechanics, Theory and applications A.Ghatak and S.Lokanathan (McMillanIndia)*
- ✓ *Quantum Mechanics- G.Aruldhas (PrinticeHallofIndia)*
- ✓ *Quantum Physics–S. Gasiorowicz (Wiley)*
- ✓ *Quantum Mechanics- G.R.Chatwal and S.K.Anand*
- ✓ *Quantum Mechanics -J.L. Powell and B. Craseman(Narosa)*
- ✓ *Introduction to Quantum Mechanics M.Das and P.K.Jena (Shri Krishna Publication).*

LAB: Credit-1

Use C/C++/Scilab for solving the following problems based on Quantum mechanics like (Use finite difference method, matrix method, ODE Solver method in all cases)

1. Solve the s-wave Schrodinger equation for the ground state and the first excited state of the Hydrogen atom:

$$\frac{d^2y}{dr^2} = A(r)\,u(r), A(r) = \frac{2m}{\hbar^2}\,[V(r) - E], V(r) = -\frac{e^2}{r}$$

   Where, 'm' is the reduced mass of the electron. Obtain the energy eigenvalues and plot the corresponding wave functions. Remember that the ground state energy of the hydrogen atom is ~ -13.6ev. Take e= 3.795 $\sqrt{(eV\text{Å})}$, ħc= 1973(eVÅ) and m=0.511 × 10^6 eV/c^2.

2. Solve the S-Wave radial Schrodinger equation for an atom:

$$\frac{d^2y}{dr^2} = A(r)\,u(r), A(r) = \frac{2m}{\hbar^2}\,[V(r) - E],$$

   Where, 'm' is the reduced mass of the system (Which can be chosen to be the mass of an electron), for the screened coulomb potential: $v(r) = -\frac{e^2}{r}e^{-r/a}$

Find the energy (in eV) of the ground state of the atom to an accuracy of the significant digits. Also; plot the corresponding wave function. Take e= 3.795 (evÅ) , ħc= 1973(eVÅ) and m=0.511 × 10^6 eV/c^2, and α =3Å, 5Å, 7Å. The ground state energy is expected to be above -12eV in all three cases.

3. Solve the S-Wave radial Schrodinger equation for a particle of mass m:

$$\frac{d^2y}{dr^2} = A(r)\,u(r), A(r) = \frac{2m}{\hbar^2}\,[V(r) - E]$$

For the anharmonic Oscillator potential: $V(r) = \frac{kr^2}{2} + \frac{br^3}{3}$.

Find the ground state energy (in MeV) of the particle to an accuracy of three significant digits. Also, plot the corresponding wave function. Choose m=940MeV/C^2, k= 100MeV/fm^2, b= (0, 10, 30) MeV/fm^3. In these units, c =197.3 MeV fm. [The ground state energy is expected to lie between 90 and 110 MeV for all three cases].

4. Solve the S-Wave radial Schrodinger equation for the vibrations of hydrogen molecule:

$$\frac{d^2y}{dr^2} = A(r)\,u(r), A(r) = \frac{2m}{\hbar^2}\,[V(r) - E]$$

Where, 'm' is the reduced mas of the two-atom system for the Morse potential

$$v(r) = D(e^{-2\alpha r} - e^{-\alpha r}),$$

Where $r = r-r_0$.

Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave functions for the choices given below:

$m = 940x10^6 ev/c^2, D = 0.755501ev, \alpha = 1.44, r_0 = 0.131349Å$

$m = 940x106ev/c^2, D = 0.755501ev, \alpha = 1.44, r_0 = 0.131349Å$

Laboratory based experiments:

1. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency.
2. Study of Zeeman effect: with external magnetic field; Hyperfine splitting
3. To show the tunneling effect in tunnel diode using I-V characteristics.
4. Quantum efficiency of CCDs

Reference Books:

- ✓ *Schaum's outline of Programming with C++.J. Hubbard, 2000, McGraw–Hill Publication*
- ✓ *Numerical Recipes in C: The Art of Scientific Computing, W.H. Press etal., 3rd Edn., 2007, Cambridge University Press.*
- ✓ *An introduction to computational Physics, T.Pang, 2nd Edn.,2006,Cam- bridge Univ. Press*
- ✓ *Simulation of ODE/PDE Models with MATLAB, OCTAVE and SCILAB: Scientific and Engineering Applications: A. Vande Wouwer, P. Saucez, C.V. Fernndez.2014 Springer.*
- ✓ *Scilab (A Free Software to Matlab): H. Ramchandran, A.S. Nair. 2011S. Chand and Co.*
- ✓ *Scilab Image Processing: L.M.Surhone.2010 Betascript Publishing ISBN:9786133459274*

Core XIII

Solid State Physics

Course Outcomes

- To understand the Concept of crystal structure and properties, X-ray Diffraction, Bragg's and
- Laue's condition.
- Conceptual understanding of Lattice vibration, Einstein and Debye specific heat theories of solids, knowledge in Band theory, Kroning-Penny model and Hall Effect.
- Understanding the Concept in magnetic and dielectric properties of materials.
- Basic knowledge on LASER and its generation, types. Conceptual understanding of superconductivity and its type, London's Equation, Penetration Depth and BCS theory.
- To Apply the acquired knowledge in experiments.

Unit I

Crystal Structure: Solids, Amorphous and Crystalline Materials, Lattice translation Vectors, Lattice with a Basis. Central and Non-Central Elements. Unit Cell, Miller Indices, Types of Lattices, Reciprocal Lattice, Brillouin zones, Diffraction of X- rays by crystals, Bragg's Law, Laue's Condition, Atomic and Geometrical Factor.

Unit II

- **Elementary Lattice Dynamics:** Lattice Vibrations and Phonons: Linear, Monoatomic and Diatomic Chains, Acoustical and Optical Phonons, Qualitative Description of the phonon spectrum in solids, Dulong and Petits Law, Einstein and Debye theories of specific heat of solids, r^3 Law.
- **Elementary band theory:** Kroning-Penny model of band Gap, Conductor, Semiconductor (P and N type) and insulator, Conductivity of Semiconductor, mobility, Hall Effect, Measurement of conductivity (four probe method) and Hall Co- efficient.

Unit III

- **Magnetic Properties of Matter:** Dia-, Para-, Ferri- and Ferro- magnetic Materials, Classical Langevins theory of dia and Paramagnetic Domains, Curies law, Weiss Theory of Ferromagnetism and Ferromagnetic Domains, Discussion of B- H Curve, Hysteresis and Energy Loss.
- **Dielectric Properties of Materials:** Polarization Local Electrical Field at an Atom, Depolarization Field, Electric Susceptibility, Polarizability, Clausius Mosotti Equation, Classical theory of Electronic Polarizability.

Unit IV

- **Lasers:** Einsteins A and B co-efficientnts, Metastable States, Spontaneous and Stimulated emissions, Optical Pumping and population Inversion, Three Level and Four Level Lasers, Ruby Laser and He-Ne Laser.
- **Superconductivity:** ExperimentalResults, CriticalTemperature, Critical magnetic field, Meissner effect, Type-I and Type-II Superconductors, London's Equation and Penetration Depth, Isotope effect, Idea of BCS theory (No derivation).

Text Books:

- ✓ *Introduction to Solid State Physics- Charles Kittel (WileyIndia)*
- ✓ *LASERS: Fundamentals and Applications- Thyagarajan and Ghatak (McMillan India)*

Reference Books:

- ✓ *Solid State Physics-N.W.Ashcroft and N.D.Mermin (Cengage)*
- ✓ *Solid State Physics- R.K.Puri and V.K. Babbar (S.Chand Publication)*
- ✓ *Solid State Physics S. O. Pillai (New Age Publication)*
- ✓ *Lasers and Non-linear Optics B.B.Laud (Wile yEastern)*
- ✓ *Elements of Solid State Physics-J.P. Srivastava (Prentice Hall of India)*
- ✓ *Elementary Solid State Physic s-Ali Omar (Addison Wiley)*
- ✓ *Solid State Physics, Gupta and Kumar, Pragati Prakashan.*

LAB: Credit-1

(Minimum 4 experiments are to be done)

1. Measurement of susceptibility of paramagnetic solution (Quinck's Tube- Method)
2. To measure the Magnetic susceptibility of Solids.
3. To measure the Dielectric Constant of a dielectric Materials with frequency
4. To determine the Hall coefficient of a semiconductor sample.
5. To draw the BH curve of Fe using solenoid and to determine the energy loss from Hysteresis
6. To measure the band gap of a given semiconductor by four-probe method.

Reference Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
3. A Text Books Book of Practical Physics, I.Prakashand Ramakrishna, 11 Ed., 2011, Kitab Mahal
4. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice- Hall of India.

Core XIV **Semester VI**

Electromagnetic Theory

Course Outcomes

- Physical significance of Maxwell Equation and its application to free space, Lorentz and Coulomb gauge transformation, poynting theorem, concept of energy density.
- Analysis of Maxwell's equations in different media and Physical significance of relaxation time, skin depth, Electrical conductivity of ionized gases, plasma frequency.
- Basic understanding of polarization of EM wave, and different types of crystals, Phase
- Retardation Plates and Rotatory Polarization.
- Conceptual understanding of EMW application in bounded media, plane interface, dielectric media, Brewster's law, TIR, Evanescent wave, metallic reflection.
- To Apply the acquired knowledge for visualize basic concept of phenomenon of light in various experiments

Unit I

Maxwell Equations: Maxwells equations, Displacement Current, Vector and Scalar Potentials, Gauge Transformations: Lorentz and Coulomb Gauge, Wave Equations, Plane Waves in free space and characteristics, Poynting Theorem and Poynting Vector, Electromagnetic (EM) Energy Density, Physical Concept of Electromagnetic Field Energy Density.

Unit II

EM Wave Propagation in Unbounded Media: Plane EM waves through vacuum and isotropic dielectric medium, transverse nature of plane EM waves, refractive index and dielectric constant, wave impedance, Propagation through conducting media, relaxation time, skin depth, Electrical conductivity of ionized gases, plasma frequency, refractive index, skin depth, application to propagation through ionosphere.

Unit III

- **Polarization of Electromagnetic Waves:** Description of Linear, Circular and Elliptical Polarization, uniaxial and biaxial crystals, light propagation in uniaxial crystal, double refraction, polarization by double refraction, Nicol Prism, Ordinary and extraordinary refractive indices, Production and detection of Plane, Circularly and Elliptically polarized light,

- **Phase Retardation Plates:** Quarter-Wave and Half- Wave Plates. Babinets Compensator and its Uses, Analysis of Polarized Light.

- **Rotatory Polarization:** Optical Rotation, Biots Laws for Rotatory Polarization, Fresnels Theory of optical rotation, Calculation of angle of rotation, Experimental verification of Fresnels theory, Specific rotation, Laurents half- shade polarimeter.

Unit IV

EM Wave in Bounded Media: Boundary conditions at a plane interface between two media, Reflection and Refraction of plane waves at plane interface between two dielectric media, Laws of Reflection and Refraction, Fresnel's Formulae for perpendicular and parallel polarization cases, Brewster'slaw, Reflection and Transmission coefficients, Total internal reflection, evanescent waves, Metallic reflection (normal Incidence)

Text Books:

- ✓ *Introduction to Electrodynamics, D.J. Griffiths (Pearson)*
- ✓ *Principles of Optics-Max Born and E.Wolf.*

Reference Books :

1. Classical Electrodynamics by J.D.Jackson.
2. Foundation of electromagnetic theory: Ritz and Milford(Pearson).
3. Electricity and Magnetism : D C Tayal (Himalaya Publication)
4. Optics: A.K.Ghatak
5. Electricity and Magnetism : Chattopadhyaya, Rakhit (NewCentral)
6. Electromagnetic Theory, Gupta and Kumar, Pragati Prakashan

LAB: Credit-1

(Minimum 4 experiments are to be done)

1. To verify the law of Malus for plane polarized light.
2. To determine the specific rotation of sugar solution using Polarimeter.
3. To analyze elliptically polarized Light by using a Babinets compensator.
4. To determine the refractive index of liquid by total internal reflection using Wollastons air-film.
5. To determine the refractive Index of (1) glass and (2) a liquid by total internal reflection using a Gaussian eyepiece.
6. To study the polarization of light by reflection and determine the polarizing angle for air-glass interface.
7. To verify the Stefan's law of radiation and to determine Stefan's constant.
8. To determine the Boltzmann constant using V-I characteristics of PN junction Diode.

Reference Books:

- ✓ *Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971,Asia Publishing House.*
- ✓ *Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4Th Edition, reprinted 1985, Heinemann Educational Publishers*
- ✓ *A Text Books Book of Practical Physics, I.Prakashand Ramakrishna, 11 Ed., 2011, Kitab Mahal Electromagnetic Field Theory for Engineers and Physicists, G. Lehner, 2010,Springer*

Core XV

Statistical Mechanics

Course Outcomes

- Understanding the concept of ensembles and its partition function, phase space and thermodynamic relations, MB distribution law.
- Conceptual understanding of addition of entropy, Sackur Tetrode equation, Law of equipartition of Energy and its application.
- Basic postulates and different distribution of Fermi and Dirac particles and B-E condensation.
- Basic knowledge in thermal and Black body radiation, Concept of different laws of radiation and their experimental verification.
- Apply the acquired knowledge for analyze the laws radiation and different distribution functions using computational analysis.

Unit I

Classical Statistics-I: Macro state and Microstate, Elementary Concept of Ensemble, Micro canonical, Canonical and Grand Canonical ensemble, Phase Space, Entropy and Thermodynamic Probability, Maxwell-Boltzmann Distribution Law, Partition Function.

Unit II

Classical Statistics-II : Thermodynamic Functions of an Ideal Gas, classical Entropy Expression, Gibbs Paradox, Sackur Tetrode equation, Law of equipartition of Energy (with proof)- Applications to Specific Heat and its Limitations, Thermodynamic Functions of a two energy levels system, Negative Temperature.

Unit III

Quantum Statistics: Identical particles, macro states and microstates, Fermions and Bosons, Bose Einstein distribution function and Fermi- Dirac distribution function. Bose- Einstein Condensation, Bose deviation from Planck's law, Effect of temperature on Fermi-Dirac distribution function, degenerate Fermi gas, Density of States Fermi energy.

Unit IV

- **Radiation:** Properties of Thermal Radiation, Blackbody Radiation, Pure Temperature dependence , Kirchhoff's law, Stefan Boltzmann law: Thermodynamic proof, Radiation Pressure, Wein's Displacement law, Wien's distribution Law, Saha's Ionization Formula, Rayleigh Jeans Law, Ultra Violet catastrophe.
- **Planck's Law of Black body Radiation:** Experimental verification, Deduction of

  Wien's Distribution Law, (2) Rayleigh Jean's Law, (3) Stefan Boltzmann Law, (4) Wein's Displacement Law from Planck's Law.

Text Books*:*

- ✓ *Introduction to Statistical Physics by Kerson Huang(Wiley).*
- ✓ *Statistical Physics, Berkeley Physics Course, F.Reif (TataMcGraw-Hill)*

Reference Books:

- ✓ *Statistical Mechanics, B.K. Agarwal and Melvin Eisner (New Age Inter- national)*
- ✓ *Thermodynamics, Kinetic Theory and Statistical Thermodynamics: Francis W.Sears and Gerhard L.Salinger (Narosa)*
- ✓ *Statistical Mechanics: R.K. Pathria and Paul D. Beale (AcademicP ress)*
- ✓ *Statistical Mechanics: Sharma and Satyal, Kalyani Publishing*
- ✓ *Basic Statistical Mechanics, Gupta and Kumar, Pragati Prakashan*

LAB: Credit-1

Use C/C++/Scilab for solving the problems based on Statistical Mechanics like

1. Plot Planck's law for Black Body radiation and compare it with Wein's.
2. Law and Raleigh-Jeans Law at high temperature (room temperature) and low
3. temperature.
4. Plot Specific Heat of Solids by comparing (a) Dulong-Petit law, (b) Einstein distribution function, (c)Debye distribution function for high temperature (room temperature) and low temperature and compare them for these two cases
5. Plot Maxwell-Boltzmann distribution function versus temperature.
6. Plot Fermi-Dirac distribution function versus temperature.
7. Plot Bose-Einstein distribution function versus temperature.

Reference Books:

- ✓ *Elementary Numerical Analysis, K.E. Atkinson, 3rdEdn. 2007, Wiley India Edition*
- ✓ *Statistical Mechanics, R.K. Pathria, Butterworth Heinemann: 2nd Ed., 1996, Oxford UniversityPress.*
- ✓ *Thermodynamic, Kinetic Theory and Statistical Thermodynamics, Fran- cis W.Searsand GerhardL. Salinger, 1986, Narosa.*
- ✓ *Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer*
- ✓ *Simulation of ODE/PDE Models with MATLAB, OCTAVE and SCILAB: Scientific and Engineering Applications: A. VandeWouwer, P. Saucez, C.V. Fernndez. 2014 Springer ISBN: 978-3319067896*
- ✓ *Scilab by example: M. Affouf, 2012. ISBN: 978-1479203444*
- ✓ *Scilab Image Processing: L.M.Surhone. 2010, Betascript Pub., ISBN: 978613345927*

Core XVI **Semester VII**

Mathematical Methods in Physics

Course Outcomes (Cos)

- Understanding of Complex Variables and Contour Integration: Gain a comprehensive understanding of complex variables and contour integration techniques, including their applications in mathematical analysis and physics.
- Learning Tensors for Physics: Acquire knowledge and proficiency in working with tensors, a fundamental mathematical tool in physics used to describe physical quantities and their transformations.
- Understanding Group Theory: Develop a deep understanding of group theory and its role in physics, including applications in symmetry analysis and quantum mechanics.
- Learning Special Functions for Applications in Physical Problems: Master specialized functions commonly used in physics to solve complex problems, enhancing problem-solving skills and expanding mathematical techniques.

Unit-1

Complex Variables: Analytic functions, Contour integrals, Cauchy's integral theorem, Laurent's series,singular points, residues and the Residue Theorem, Evaluation of real definite and indefinite integrals by contour integration, indented semi-circular contour, evaluation of single and multi- valued functions, branch points and branch cuts, Contour integration involving branch point.

Unit -2 Tensors:

Introduction, Types of tensor, Invariant tensor, epsilon tensor, Pseudo tensor, the algebra of tensor, Quotient law, Metric Tensor, Covariant derivative of tensor, Fundamental Tensor, Cartesian tensor, Christoffel symbol.

Unit -3

Group Theory: Definitions of groups, subgroups and classes, Isomorphism, Homomorphism, Cayley's theorem, Group representations, Orthogonality theorem, characters, Orthogonality relation for group character, Character table, Preliminary idea about infinite group, calculation of generator, Calculation of generator associated with S.U. (2) and SO(3) group,

Unit -4

Special Functions: Legendre Polynomials, generating functions, Recurrence formulae, Orthogonality properties of Legendre's polynomial of 1st kind, Bessel generating function, Bessel function of 1st and 2nd Kind, Recurrence formulae, Orthogonality properties of Bessel's polynomials, Spherical Bessel functions, Fourier and Laplace transformation.

Text books:

- ✓ *Mathematical Methods of Physics by Mathews and Walker (W. A. Benjamin Inc.)*
- ✓ *Matrices and Tensors in physics by A. W. Joshi (New Age International Publisher)*
- ✓ *Mathematical Methods in the physical Science by Mary L. Boas (Wiley- India)*

Reference Books:

- ✓ *Mathematical Methods for Physicist by G. Arfken and H. Weber, Academic Press (Elsevier)*
- ✓ *Elements of Group Theory by A. W. Joshi (New Age International Publisher)*
- ✓ *Mathematical Physics by H. K.Das and Dr. R. Verma (S. Chand & Company L.T.D.)*
- ✓ *Mathematical Physics by P. K. Chattopadhyaya (New Age International)*

Core XVII

Classical Mechanics

Unit-1

KINEMATICS OF RIGID BODY MOTION

Independent coordinates of a rigid body, Orthogonal transformations, Eulerian angles, infinitesimal rotations, rate of change of vector, Coriolis force, angular momentum and kinetic energy of motion about a point, inertial tensor and the moment of inertia, Eigen values of Inertial tensor and the principal axis transformation, methods of solving rigid body problems and Euler's equations of motion, torque free motion of a rigid body. Heavy symmetrical top with one point fixed.

Unit-2

HAMILTONIAN FORMULATION: Calculus of Variations and Euler-Lagrange's Equation, Brachistochrone Problem, Hamilton's Principle, Extension of Hamilton's Principle to Nonholonomic Systems, Legendre Transformation and the Hamilton Equations of Motion, Physical Significance of

Hamiltonian, Derivation of Hamilton's Equations of Motion from a Variational Principle, Routh's Procedure, Principle of Least Action

Unit-3

CANONICAL TRANSFORMATIONS:

Canonical Transformation, Types of Generating Function, conditions for canonical transformation, Integral Invariance of Poincare, Poisson Bracket, Poisson's Theorem, Lagrange Bracket, Poisson and Lagrange Brackets as Canonical Invariant, Infinitesimal Canonical transformation and Conservation Theorems, Liouville's Theorem Hamilton Jacobi Theory: Hamilton-Jacobi Equation for Hamilton's Principal Function, Harmonic Oscillator and Kepler problem by Hamilton-Jacobi Method, Action-Angle Variables for completely Separable System, Kepler Problem in Action-Angle Variables

Unit-4

SMALL OSCILLATION: Problem of Small Oscillations, Example of linear triatomic molecule and two coupled Oscillator, General Theory of Small Oscillations, Normal Coordinates and Normal Modes of Vibration.

Test Books:

- ✓ *Classical Mechanics- by H. Goldstein (Addison-Wesley)*

Reference books:

- ✓ *Classical Mechanics by S. N. Biswas, Books and Allied Publisher Ltd.*
- ✓ *Classical Mechanics by J.C. Upadhay, Himalaya Publishing House.*
- ✓ *Classical Mechanics by Landau and Liftshitz (Butter Worth)*

Core XVIII **QUANTUM MECHANICS**

Unit I

- **GENERAL PRINCIPLES OF QUANTUM MECHANICS:**

  A-Postulates of Quantum Mechanics and meaning of measurement, Operators and their expectation values, Schrodinger equation, Particle in a box, Orthogonality of eigenfunctions.Dirac Notations, Linear vector space, Ket and Bra vectors, , Dirac delta function, linear operators, Adjoint operators, Unitary Operators, Hermitian operators, Eigen values and eigen vectors, orthonormality of eigen vectors, probability interpretation, Degeneracy,.

- **B-QUANTUM DYNAMICS:**

  Time evolution of quantum states, Time evolution operator and its properties, Schrödinger, Heisenberg and Interaction picture, Equations of motion, Operator method solution of Harmonic oscillator problem, Matrix representation and time evolution of creation and annihilation operators.

Unit II

- **ROTATION AND ORBITAL ANGULAR MOMENTUM:**

  A-Orbital angular momentum operators as generators of rotation, Lx, Ly, Lz and L^2 and their Commutation relations, Raising and Lowering operators (L+ and L-), Lx, Ly, Lz and L^2 in spherical Polar coordinates, Eigen values and Eigen functions of Lz and L^2 (operator method), Matrix representation of Lx, Ly, Lz and L^2.

- **B-SPIN ANGULAR MOMENTUM:**

  Spin ½ particles, Pauli spin matrices and their properties, Eigen values and Eigen functions, Spin and rotations. Total angular momentum: Total angular momentum J, Eigen value problem of Jz and J^2 , Angular momentum matrices, Addition of angular momentum and C. G. coefficients for the states with (i) $j_1 = ½$ and $j_2 = ½$ (ii) $j_1 = 1$ and $j_2 = ½$.

Unit-III

A-Motion in a spherically symmetric field: The hydrogen atom, **Approximate methods:** Stationary perturbation theory, Rayleigh Schrodinger method for non-degenerate case, first and second order perturbation, **Variationalmethod**: Ground State, H -atom One-Dimensional Harmonic Oscillator, **W. K. B. method**: Connection formulas, Bohr-Sommerfeld quantization rule, **Time-dependent perturbation theory:** Transition probability, constant and harmonic perturbation, Fermi Golden rule.

Unit IV

Scattering amplitude and scattering cross section:

Born approximation, application to Coulomb and screened Coulomb, potentials. Partial wave analysis for scattering, optical theorem, scattering from a hard sphere, resonantscattering from a square well potential.Elementary idia on identical particles.

Text books:

- ✓ *" Quantum Mechanics:Concepts and Applications" by NouredineZettile John Wiley and sons.*

Reference Books:

- ✓ *"Quantum Mechanics",L.I. Schiff L.I 3rd Ed, McGraw Hill Book Co.*
- ✓ *"Quantum Mechanics"E. Merzbacher , 2ndEd., John Wiley &Sons.*
- ✓ *"Quantum Physics", S.Gasiorowicz John Wiley.*
- ✓ *"A Text Book of Quantum Mechanics" by P.M.Mathews . and Venkatesan , Tata McGraw Hill.*
- ✓ *Introduction to Quantum Mechanics, by D.J.Griffiths ,2nd edition ,Pearson Publications*

Core XIX

LABORATORY: COMPUTATIONAL PHYSICS: 4 CREDITS

1. Introduction to the programming language (e.g. C /C++/ Fortran/ Matlab/Scilab) . The introduction is accompanied by examples in thefollowing general areas.
   (a) Sorting Algorithms -- selection sort, Quick sort etc.
   (b) Solution of equation -- Newton's method, Secant method etc.
   (c) Simplenumerical integratons -- Trapezoidal rule, simpson 1/3 rule .
2. Classical mechanics (2nd order ODE, initial value problems). Euler mthod, Modified-Euler (predictor-corrector) method, Runge-Kutta method, Leapfrog method,Verlet method, Velocity Verlet method, each with and without velocity dependentdrag terms, harmonic oscillator with damping,forced one, realistic projectile motion with air drag,realistic planetary orbit calculation.
3. Quantum Mechanics (2nd order ODE, boundary value and eigenvalue problems).Shooting method and Numerov's method, examples of bound states calculation for 1D wells ,quantum harmonic oscillators. Eigenvalue problem in matrix form (finitedimensional basis), and exact (Lanczos) diagonalization, Variational calculationwith orthogonal basis states. Time-dependent Schrodinger equation, wave equation.
4. Statistical Mechanics (Stochastic and Monte Carlo Methods). Uniform random number generation, Randon walk and diffusion, Monte Carlo Integration -- advantagein higher dimension, error analysis. Importance sampling and detailed balance.Generation of random numbers from a Gaussian distribution-- Box Miller method,using central limit theorem, Sampling points from arbitrary distributions -- Metropolis sampling and examples.

References:

- ✓ *Computational Physics, N. J. Giordano and H. Nakanishi, Pearson Prentice Hall (2006)*
- ✓ *Introduction to Computational Physics, Pao Tang, Cambridge University Press*
- ✓ *Computational Physics, S. E. Koonin and D. C. Meredith, Addison-Wesley Publishing Company*
- ✓ *Computational Physics, J. M. Thijssen, Cambridge University Press*

Core XX **Semester VIII**

Classical Electrodynamics

Unit –I

- **Covariant formulation of electrodynamics:**

  Lorentz transformation; Scalars, vectors and Tensors; Maxwells equations and equations of continuity in terms of Aμ and Jμ; Electromagnetic field tensor and its dual; Covariant form of Maxwell‟s equations; Lagrangian for a charged particle in presence of external electromagnetic field and Maxwell's equation as Euler-Lagrange equations.

- **The Inhomogeneous Wave equation:**
  Wave equations for potentials, solution by Fourier analysis, Radiation field, Radiation energy, Hertz potential, Computation of radiation fields by Hertz method, electric dipole radiation, multipole- radiation.

Unit –II

- **Lienard-Wiechart potential and Field of a uniformly moving electron:** Lienard-Wiechart potential, Fields of a charge in uniform motion, Direct solution of the wave equation, Convectionpotential, Virtual photon concept.
- Wave guides, Propagation of electromagnetic waves in rectangular wave guides**.**

Unit–III Radiation from Accelerated Charges

Radiation from an accelerated charge, Fields of an accelerated charge radiation at low velocity, Case of velocity parallel to acceleration, radiation from circular orbits, Radiation with no restrictions on the acceleration or velocity, Classical cross section for bremsstrahlung in a Coulomb field, Cherenkov radiation.

Unit–IV Radiation, scattering and dispersion

Radiative damping of a charged harmonic oscillator, forced vibrations, scattering by an individual free electron, scattering by a bound electron, absorption of radiation by an oscillator, equilibrium between an oscillator and a radiation field, effect of a volume distribution of scatters, scattering from a volume distribution, Rayleigh scattering, the dispersion relation.

Text Book:

- ✓ *"Classical Electricity and Magnetism" by Wolfgang K.H.Panofsky and Melba Philips,Second Edition.*

Reference books:

- ✓ *"Classical Electrodynamics", Jakson J D, John Wiley.*
- ✓ *'Introduction to Electrodynamics", Griffiths DJ, Prentice Hall*

Laboratory: Optics and Modern Physics Lab (4 credit)

M.B: Following is the list of some experiments however, the college can add any other experiments as per the convince.

Optics &Modern Physics:

1. Determination of Boltzmann constant using V-I characteristics of PN diode.
2. Determination of Planck's constant using LEDs at least four colors.
3. Determination of e/m by Bar magnet/magnetic focus sung
4. Study of photo-electric effect.
5. Study of diffraction pattern of single and double slits using laser source and determination of its wavelength.
6. Study the electrical resistance as a function of temperature. Experiments with Michelson interferometer: Determination of A and α Thickness of mica sheet
7. Fabry Perot interferometer Polarization Experiments Babinet compensator Edsar-Butlerbands Quarter wave plate Mallus Law Study of elliptical polarized light
8. Constant Deviation Spectrography Calibration Zeeman effect
9. Babinet Quartz Spectrography
10. Any other suitable experiments
11. Any other experiments that may be set up from time to time.

Reference Books:

- ✓ *Elements of Modern Physics: Laboratory (BPHEL-142,*
  Prepared by: Ignou: school of science (https://egyankosh.ac.in)
- ✓ *Modern Physics Lab (PHYS 340)*
  Prepared by: Purdue University, (https://www.physics.putrdue

Core XXI

QUANTUM MECHANICS-II

Course Outcomes

- Master the principles of solving motion in a spherically symmetric field.
- Acquire proficiency in utilizing approximate methods.
- Comprehend advanced techniques like the Variational method, W. K. B. method, and Time- dependent perturbation theory.
- Gain insight into Time-dependent perturbation theory and the scattering of identical particles.

Unit I Motion in a spherically symmetric field:

The hydrogen atom, Reduction to equivalent one body problem, radial equation, Energy eigenvalues and eigen functions, Degeneracy, Radial probability distribution, free-particle problem, Expression of plane waves in terms of spherical waves. Bound states of a 3-D square well.

Unit II Approximate methods:

stationary perturbation theory, Rayleigh Schrodinger method for non-degenerate case, first and second order perturbation, an harmonic oscillator, general theory for the degenerate case, removalof degeneracy, linear Stark effect, normal Zeeman effect**.**

Unit III

- **Variational method**: Ground State, First Excited State and Second Excited State of H- atom One-Dimensional Harmonic Oscillator, and He-atom.
- **W. K. B. method**: Connection formulas, Bohr-Sommer feld quantization rule, Harmonic oscillator and cold emission**.**
- **Time-dependent perturbation theory:** Transition probability, constant and harmonic perturbation, Fermi Golden rule

Unit IV

Scattering amplitude and scattering cross section:

Born approximation, application to Coulomb and screened Coulomb potentials. Partial wave analysis for scattering, optical theorem, scattering from a hard sphere, resonant scattering from a square well potential. Identical particles, Symmetric and anti-symmetric wave function, Scattering of identical particles.

Text Book: *" Quantum Mechanics:Concepts and Applications" by NouredineZettile John Wiley and sons.*

Reference Books:

- ✓ *"Quantum Mechanics",L.I. Schiff 3rdEd, McGraw Hill Book Co.*
- ✓ *"Quantum Mechanics"E. Merzbacher , 2ndEd., John Wiley &Sons.*
- ✓ *"Quantum Physics", S.Gasiorowicz John Wiley.*
- ✓ *"A TextBook of Quantum Mechanics" by P.M. Mathews . andVenkatesan , Tata McGraw Hill.*
- ✓ *Introduction to Quantum Mechanics, by D.J.Griffiths ,2nd edition ,Pearson Publications.*

Core XXII **Electronics**

Course Outcomes (Cos)

- Enhance understanding of Network Analysis, Bipolar Junction Transistors, and Operational Amplifiers.
- Acquire knowledge of Oscillator circuits and their functionality.
- Master the concepts of Digital Circuits and their applications.
- Comprehend the operation and usage of Optoelectronic Devices in electronic systems.

Unit I

- **Network Analysis:** Superposition principle Thevenin and Norton Theorems, BJT, FET, MOSFET: characteristic, biasing-parameter analysis Feedback Circuits. Operational
- **Amplifiers:** The differential amplifier, D.C. and A.C. signal analysis, integral amplifier, rejection of common mode signals, CMMR, The operational amplifier, input and output impedances, Application of operational Amplifiers unit gain buffer, summing, integrating amplifier, Comparator, Operational amplifier as a differentiato**r.**

Unit II

Oscillator circuits: Feedback criteria for oscillation, Nyquist criterion, Phase shift, Wien-Bridge oscillator, Crystal controlled oscillator

Unit III

Digital Circuits: Logic fundamentals, Booleantheorem, logicgates: AND, OR, NOT, NOR,NAND XOR, and EXNOR.RTL, DTL and TTL logic, Flip-flop, RS-and JK-Flip flop, A/D and D/A Convertors 79

Unit IV Optoelectrics Device:

Principle of optical sources, Source material, Choice of materials, Internal and external quantum efficiency of L.E.D., Structures, Types of L.E.D.: Surface emitting L.E.D., Edge emitting L.E.D., Modulation capability, emission pattern, power bandwidth product, laser Diode Modes, Threshold condition, resonant frequency, Laser Diode Structure, Brief description of principle of optical detectors, Photomultipliers P.I.N. and A.P.D. configuration, Solar Cell.

Textbooks and Reading materials

- ✓ *Electronic fundamental and application by J.D. Ryder, PHI, Learning Pvt Ltd.*
- ✓ *Electronics: Circuits and Analysis, D.C.Dubey, Alpha Science*
- ✓ *R.P.Khare, Fiber Optics and Optoelectronics, Oxford University Press*

Reference Books:

- ✓ *Foundation of electronics – Chattopadhyay, Rakshit, Saha and Purkait , New age International publisher*
- ✓ *Electronics principles-Albert Malvino, Tata Mc Graw-Hill Edition*
- ✓ *Modern Digital Electronics-R.P Jain, Tata Mc Graw-Hill Edition*

Core XXIII

Laboratory: Optics and Modern Physics Lab (4 credit)

The main objectives of this laboratory course are:

1. To apply the principles of optics, electronics, and modern physics in conducting experiments.
2. To gain a better understanding of theoretical principles through hands-on experimentation.

N.B: *Following is the list of some experiment however, the college can add any other experiments as per the convince.*

Optics &Modern Physics:

1. Determination of Boltzmann constant using V-I characteristics of PN diode.
2. Determination of Planck's constant using LEDs at least four colors.
3. Determination of e/m by Bar magnet/magnetic focus sung
4. Study of photo-electric effect.
5. Study of diffraction pattern of single and double slits using laser source and determination of its wavelength.
6. Study the electrical resistance as a function of temperature.
7. Fabry Perot interferometer Polarization Experiments Babinet compensator Edsar-Butlerbands Quarter wave plate Mallus Law Study of elliptical polarized light
8. Constant Deviation Spectrography Calibration Zeeman effect
9. Babinet Quartz Spectrography
10. Any other suitable experiments
11. Any other experiments that may be set up from time to time.

Reference Books:

- ✓ Elements of Modern Physics: Laboratory (BPHEL-142,
  Prepared by: Ignou: school of science (https://egyankosh.ac.in)
- ✓ Modern Physics Lab (PHYS 340)
  Prepared by: Purdue University, (https://www.physics.putrdue.edu)

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

Political Science

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - Fundamentals of Political Science
	Core II- Introduction to the Constitution Of India
II	Core III- Introduction to Political Theory
	Core IV - Comparative Governments
III	Core V- Colonialism and Nationalism in India
	Core VI- International Relations
	Core VII- Western Political Thought-I
IV	Core VIII- Indian Politics
	Core IX- Western Political Thought-II
	Core X- Public Administration
V	Core XI- Global Politics
	Core XII- Comparative Politics
	Core XIII- Indian Political Ideas-I
VI	Core XIV- India's Foreign Policy
	Core XV- Government and Politics in Odisha
VII	Core XVI- Contemporary Political Theory
	Core XVII- Research Methodology
	Core XVIII- Public Policy and Governance in India
	Core XIX- Indian Political Ideas-II
VIII	Core XX- Social and Political Movements in Contemporary India
	Core XXI- Climate Change And Politics
	Core XXII- Social Exclusion and Inclusive Policies in India
	Core XXIII- Democratic Decentralization in India

Programme Objectives & Outcomes

ABOUT THE PROGRAMME OBJECTIVES AND OUTCOMES

We as human beings are all political. In recent past, the understanding of Political Science has changed. There was a time, when Political Science used to be understood in terms of State and Government. The definition of Political Science has changed with the gradual progress of society. The purpose of the course in Political Science at B.A. level is to make the students aware about the importance of their association with the state and also to expose them to the global political affairs in order to make them best suitable for various competitive examinations. Political Science explores the concerns and issues that animate public life. Using both humanistic and scientific approaches, it studies how political communities attempt to reconcile the conflicting claims of justice, power, liberty, and authority. Drawing on history, law, economics, psychology, sociology, and philosophy, Political Science is a broadly based social science that shares the traditional aims of liberal arts and education while attempting to come to grips with the major public issues of our time.

B.A. in Political Science with Learning Outcomes aims at offering a general framework within which Political Science teaching may be organized. It serves the twin goals of responding to the needs of students to grow as competent, self-reflective learners with relevant academic and professional skills while at the same time prepare them as contributors to the growing discipline. This framework is intended to help maintaining the standards of teaching, its periodic review against graduate attributes, qualification descriptors, program learning outcomes and course level learning outcomes. It is viewed in the spirit of innovation in teaching-learning process and adopted according to local conditions, regional priorities, national and global needs along with the availability of the expertise.

Looking at the diversity and complexity of the subject and diversified students' background along with subject dynamism, the curriculum is developed considering various aspects such as: -

- Entry level expectations of students coming from various Board of examination (CBSE/ICSE/CHSE/State Boards) and their socio-economic background
- General expectations from a three-year undergraduate honours training.
- The changing profile of undergraduate students

Keeping the above aspect in mind the learning objectives and outcomes have been adapted to the local, regional and linguistic diversities with the changing academic scenario and conditions. Further, the learning objectives and outcomes have been framed with a projected scope on the basis of the extent of academic facilities available (e.g. availability of faculty and their expertise, resources and opportunities for field training).

Nature and Extent of the Programme:

The programme is designed in such a way that students have the option to exit even after one year completion of the course. If a student completes one year, she is entitled to get a certificate; after completion of two years, she is entitled for a diploma certificate. Similarly, in case of three year and four year course, the students have multiple choices. We have explained the structure of the syllabus in detail in the following pages. Each semester is for 16 weeks. There are two reading lists. First one contains most important essential reading list, while a relatively long list of reference books for additional information is included in the second list. We have also tried to provide links of E

resources particularly from reliable Government sources. At the end of the syllabus, we have suggested activities to be done while reading any particular paper.

Programme Objectives (PO: Four Year Course):

PO-1: The four-year Political Science syllabus at Higher Education of Odisha aims to instructs the students to demonstrate a systematic, extensive and coherent knowledge and understanding of Political Science as a subject as a whole and its applications and links to disciplinary areas of the study; including critical understanding of the established theories, principles and concepts of a number of advanced and emerging issues in the field of Political Science.

PO-2: Develop knowledge of theories, concepts, and research methods in humanities and social sciences and apply them in the subject of Political Science

PO-3: To assess how global, national and regional developments affect society and to theorize these experiences

PO-4: To train the students with a unique multidisciplinary approach in social sciences and prepares them for further academic study and for careers in the public and the private sector.

PO 5: To train the students applying subject knowledge for sustainable development practices and other areas where the knowledge of Political Science is used in the field.

Programme Outcomes (PSO):

The student graduating with the Degree in B.A (Honours) in Political Science should be able to acquire

PSO1: **Core competency:** Students will acquire core competency in the subject Political Science, and in allied subject areas with a systematic and coherent understanding of the fundamental concepts in Political Science and all other related arts and humanities. Students will be able to demonstrate the new techniques and methods of their area of specialization in Political Science.

PSO2: **Interdisciplinary knowledge and skill:** A graduate student is expected to be capable of demonstrating comprehensive knowledge and understanding of in various fields of Political Science.

PSO3: **Skilled Communicator:** The course curriculum incorporates basics and advanced training in order to make a graduate student capable of expressing the subject through technical writing as well as through oral presentation.

PSO4: **Critical Thinker and Problem Solver:** The course curriculum also includes components that can be helpful to graduate students to develop critical thinking ability by way of solving problems/numerical using basic Political Science knowledge and concepts.

PSO5: **Sense of inquiry:** The course curriculum will develop an inquisitive characteristic among the students to write clearly and with purpose on issues of international and domestic politics and public policy; participate as a engaged member of society with a civic sense; Analyse political and policy problems and formulate policy options.

PSO6: **Team player:** The course curriculum has been designed to provide opportunity to act as team player by contributing in field-based research. Apply quantitative problem-solving skills to social questions in a scientific way.

PSO7: **Skilled Project Manager:** The course curriculum has been designed in such a manner as to enable a graduate student to become a skilled project manager by acquiring knowledge about modern social science research including competency in statistics and qualitative analysis.

PSO8: **Digital literacy:** The course curriculum has been so designed to impart a good working knowledge in understanding and carrying out data analysis, use of library search tools, and use of Statistical software's like SPSS, R and related computational work.

GRADUATE ATTRIBUTES IN POLITICAL SCIENCE

Attributes of Political Science graduates under the outcome-based teaching-learning framework may encompass the following:

- **Core Competency:** Political Science graduates are expected to know the fundamental concepts of Political Science. These fundamental concepts would reflect the latest understanding of the field, and therefore, are dynamic in nature and require frequent and time-bound revisions.
- **Communication Skills:** Political Science graduates are expected to possess minimum standards of communication skills expected of a graduate in the country. They are expected to read and understand documents with in-depth analyses and logical arguments. Graduates are expected to be well-versed in speaking and communicating their ideas/findings/concepts to a wider audience.
- **Critical Thinking:** Political Science graduates are expected to know the basics of cognitive biases, mental models, logical fallacies, scientific methodology and constructing cogent scientific arguments.
- **Psychological Skills:** Political Science Graduates are expected to possess basic psychological skills required to face the world at large, as well as the skills to deal with individuals and students of various socio cultural, economic and educational levels. Psychological skills may include feedback loops, self-compassion, self-reflection, goal-setting, interpersonal relationships, and emotional management.
- **Problem-solving:** Political Science Graduates are expected to be equipped with problem-solving philosophical approaches that are pertinent across the disciplines.
- **Analytical reasoning:** Political Science Graduates are expected to acquire formulate persuasive arguments and spot logical flaws, inconsistencies, circular reasoning etc.
- **Research Skills:** Political Science Graduates are expected to be keenly observant about what is going on in the natural surroundings to awake their curiosity. Political Science Graduates are expected to carryout research in contemporary issues of global and national politics.
- **Teamwork:** Political Science Graduates are expected to be team players, with productive cooperations involving members from diverse socio-cultural backgrounds.
- **Digital Literacy:** Political Science Graduates are expected to be digitally literate and increase their core competency via e-learning resources such as MOOC and other digital tools for lifelong learning. Political Science Graduates should be able to spot data fabrication and fake news by applying rational scepticism and analytical reasoning.
- **Moral and Ethical Awareness:** Political Science Graduates are expected to be responsible citizen of India and be aware of moral and ethical baseline of the country and the world. They are expected to define their core ethical virtues good enough to distinguish what construes as illegal and crime as per the laws of the country. Emphasis be given on academic and research ethics, including fair Benefit Sharing, Plagiarism, Scientific Misconduct and so on.

- **Leadership Readiness:** Political Science Graduates are expected to be familiar with decision making process and basic managerial skills to become a better leader. Skills may include defining objectives, vision and mission and how to become charismatic inspiring leader and so on.

Core I **Semester-I**

Fundamentals of Political Science

Course Objectives

This course will familiarize students with the basic normative concepts in political theory and encourage them to understand how these concepts manifest in social practices. The course will also help students learn how we make use of these concepts in organizing our social living. The main objective is to project the plural, interdisciplinary orientation of political theory and to emphasise its deep engagement with the political process.

Expected Learning Outcomes

The course would provide students with a rudimentary understanding of political concepts, theories, and their application in contemporary society and their interplay with societal and economic factors. The unit-wise outcomes are given below.

Unit-I: Upon completion of this Unit, students will have acquired a comprehensive understanding of the multifaceted nature of politics, its theoretical underpinnings across disciplines, and its intricate interplay with societal and economic spheres.

Unit-II: After completing this Unit, student's understanding on the state as a political entity will be deepened and students would be able to critically examine its relationship with sovereignty, governing structures, and the multifaceted challenges posed by globalization.

Unit-III: Upon completion of Unit III, students will be able to critically analyse and synthesize the intricate concepts of power, authority, and legitimacy, as well as the interrelated notions of rights, freedoms, equality, and justice, thereby enabling them to comprehend the theoretical underpinnings that shape socio political constructs and inform discourse on contemporary issues.

Unit-IV: Upon completion of this Unit, students would have developed a nuanced and multidimensional understanding of democracy along with its models, and the critical roles played by pluralism and diversity in shaping democratic ideals, practices, and discourse. This will deepen democratic values among students.

Unit-I: Introduction

a) What is Political?
b) Political Philosophy, Political Theory, Political Science
c) Politics and Society, Politics and Economy

Unit-II: State

a) State: Meaning, Origin and Development
b) State and Sovereignty
c) State and Government
d) State and Globalization

Unit-III: Concepts

a) Power, Authority, and Legitimacy
b) Rights and Freedom
c) Equality and Justice

Unit-IV: Democracy

a) Meaning of Democracy
b) Models of Democracy: Representative, Participatory, Deliberative
c) Pluralism, Diversity, and Democracy

Essential Readings:

1. *Bhargava, R. (2008). 'What is Political Theory', in Bhargava, R. and Acharya, A. (eds), Political Theory: An Introduction. Pearson Longman. pp. 2-16*
2. *Heywood, A. (2022). Political Theory: An Introduction. Bloomsbury Publishing.*
3. *McKinnon, C. (2019). Introduction: Issues in Political Theory. Oxford University Press.*
4. *Menon, K. (2008). 'Justice', in Bhargava, R. and Acharya, A. (eds), Political Theory: An Introduction. Pearson Longman. pp. 74-86.*
5. *Srinivasan, J. (2008). 'Democracy', in Bhargava, R. and Acharya, A. (eds), Political Theory: An Introduction. Pearson Longman. pp. 106-128.*
6. *Talukdar, P.S. (2008) 'Rights', in Bhargava, R. and Acharya, A. (eds), Political Theory: An Introduction. Pearson Longman. pp. 88-104.*
7. *Vinod, M. J. and Deshpande Meena. (2013). Contemporary Political Theory. PHI Learning Pvt Ltd, Delhi*

Additional Readings:

- ✓ *Bhargava, R. (2008). 'Why do we need Political Theory', in Bhargava, R. and Acharya, A. (eds), Political Theory: An Introduction. Pearson Longman, pp. 17-36*
- ✓ *Dahl, R. A. (2000). On Democracy. Yale University Press.*
- ✓ *Gauba, O. P. (2023). An Introduction to Political Theory. National Publication.*
- ✓ *Mookherjee, M. (2008) 'Multiculturalism', in McKinnon, C. (ed), Issues in Political Theory. Oxford University Press. pp. 218-240.*
- ✓ *Seglow, J. (2003) 'Multiculturalism', in Bellamy, Richard and Mason, Andrew (eds), Political Concepts. Manchester University Press. pp. 156-168.*
- ✓ *Wolf, J. (2021) 'Social Justice', in McKin*non, C. (ed). *Issues in Political Theory. Oxford University Press. pp. 172-193.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, scholarly journals, digital repositories, and Audio- Visual content.

1. CEC. (2015). *What is Political Theory*?. YouTube. https://www.youtube.com/watch?v=fdTNlx52Weg
2. Jha, Mithilesh Kumar. (2018). Introduction to Political Theory. NPTEL. https://archive.nptel.ac.in/courses/109/103/109103141/
3. Basu, Sibaji Pratim. (2020). *MOOC on Introduction to Political Theory*. SWAYAM. https://onlinecourses.SWAYAM2.ac.in/cec20_hs28/preview

Activities to do:

1. Students can participate in a debate on a philosophical or theoretical concept related to politics, such as the nature of power, the principles of equality and justice, which will encourage critical thinking, argumentation skills, and the ability to analyze complex concepts from multiple perspectives.
2. Organize a simulation exercise where students assume different roles in a hypothetical political system or scenario and could simulate the functioning of a democratic government, with students taking on roles like legislators, activists, lobbyists, or

members of the media. This activity will allow students to experience and understand the dynamics of political processes and decision-making.

3. Students can conduct literature review, prepare a draft and analyse primary sources on any topic mentioned in this course.

Core II

Introduction to the Constitution Of India

Course Objectives:

This course introduces students to the Constitution of India – the supreme law of the land. The primary objective of this course is to provide students with a comprehensive understanding of the constitutional framework and political institutions in India. Through a critical examination of the constitutional design, the learners will explore the foundational principles of the Indian Constitution. By tracing the historical contestations surrounding the incorporation of these values into the Constitution and their practical manifestations, learners will develop an appreciation for the intricate interplay between institutional practices and political contexts. Furthermore, the course aims to cultivate an understanding of the institutional dynamics within the Indian governance matrix, characterized by both conflict and cooperation, asymmetrical federal arrangements, and mechanisms for safeguarding vulnerable populations against discrimination. Additionally, students will gain insight into the powers and functions of key governmental figures such as the President, Prime Minister, and Chief Minister and other constitutional and non-constitutional bodies, while also delving into the intricacies of Union-State relations.

Expected Learning Outcomes:

This course endeavours to equip students with the necessary knowledge and analytical tools to engage critically with the constitutional structures and processes that underpin Indian democracy. The unit-wise outcomes are given below.

Unit-I: The learners would gain basic understanding of Indian Constitution and its underlying values. This would enable them to analyse the operation of the Constitution of India from a policy perspective, and in the context of social and cultural diversity. This would strengthen the foundation of constitutional ethics among the learners.

Unit-II: The learners would develop awareness regarding the basic structures and processes of government at both union and state levels with a specific focus on power and responsibilities of highest constitutional dignitaries. This will help them to acquire administrative skills and political insights for engaging in various institutions.

Unit-III: The learners would be familiar with the judicial structures and procedures in India. Further, the awareness about Writs, Judicial Review, PIL, Basic Structure Doctrine would enable them to develop an understanding about their rights and entitlements as citizens and methods to secure these within the legal framework, in case of violation.

Unit-IV: The learners would understand the division of power between Union and States with focus on different constitutional bodies. This would enable them to understand and analyse the manner in which the Indian federal system functions.

Course Content:

Unit-I: Basic Structure of the Indian Constitution

a) Making of the Indian Constitution: Formation and Working of Constituent Assembly
b) Preamble: Nature of State and Constitutional Values
c) Fundamental Rights, Directive Principles of State Policy, Fundamental Duties

Unit-II: Legislature and Executive in Union and State

a) Structure of the Parliament and Legislative procedures; State Legislatures
b) President; Governor
c) Prime Minister and Council of Ministers; Chief Minister

Unit-III: Judiciary

a) Supreme Court of India: Structure and Functions
b) High Courts: Structure and Functions
c) Judicial Review and Basic Structure Doctrine, Public Interest Litigation (PIL)

Unit-IV: Union-State Relationship

a) Division of Power: Administrative, Legislative and Financial
b) Election Commission, Finance Commission, CAG
c) NITI Ayog, Inter-State Council, GST Council

Essential Readings:

- ✓ *Austin, Granville (1999). The Constitution of India: Cornerstone of a Nation. Oxford University Press.*
- ✓ *Bakshi, P.M. (2023). The Constitution of India. Universal Law Publishing.*

- ✓ *Basu, D. D. (2022). Introduction to the Constitution of India. Educational Printed;26th Edition, Lexis Nexis.*
- ✓ *Chakrabarty, Bidyut (2017). Indian Constitution: Text, Context and Interpretation. Sage Publication India Private Limited.*
- ✓ *Kashyap, Subhash (2021). Our Constitution. National Book Trust.*
- ✓ *Khosla, Madhav, Mehta, Pratap Bhanu and Choudhry, Sujit (Eds). (2016). The Oxford Handbook of the Indian Constitution. Oxford University Press.*
- ✓ *Pai, Sudha (2020). Constitutional and Democratic Institutions in India: A Critical Analysis. Orient Blackswan.*

Additional Readings:

1. *Bhargava, Rajeev (2009). Politics and Ethics of the Indian Constitution. Oxford University Press.*
2. *Chandra, Bipan, Mukherjee, Aditya and Mukherjee, Mridula. (2008). India Since Independence. Penguin Books.*
3. *Ghosh, Peu (2021). Indian Government and Politics, PHI Learning.*
4. *Gupta, D.C. (2023). Indian government and Politics. Vikas Publishing House Pvt. Ltd.*
5. *Jain, M.P. (2018), Indian Constitutional Law, LexisNexis.*
6. *Jayal, Niraja Gopal and Mehta, Pratap Bhanu (2011). The Oxford Companion to Politics in India. Oxford University Press.*
7. *Kumar, Avinash and Pai, Sudha (2017). The Indian Parliament: A Critical Appraisal. Orient Blackswan Pvt Limited.*
8. *Pylee, M.V. (2023). India's Constitution. S. Chand Publishing.*
9. *Shivhare, Nitin (2023). Indian Polity and Governance. S. Chand Publishing.*
10. *Shukla, V.N. (2019). Constitution of India. Eastern Book Company.*
11. *Subramanian, S.G. (2022). Indian Constitution and Polity. Pearson Education.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Digital Sansad. *Historical Debates: Constituent Assembly Draft Making Debates*. https://sansad.in/ls/debates/historical?1
2. Ghosh, Sujit. (2018). *Indian Judiciary: Organizational structure and Jurisdiction*. National Judicial Academy. https://nja.gov.in/Concluded_Programmes/2017-18/SE-13_PPTs/6.Judiciary%20organization%20HC%20and%20SC.pdf
3. Goel, Anupama. *Advanced Constitutional Law*. SWAYAM. https://onlinecourses.SWAYAM2.ac.in/cec20_hs22/preview
4. NIOS. *Political Science*: *Aspects of the Constitution of India*. National Institute of Open Schooling. https://nios.ac.in/online-course-material/sr-secondary-courses/political-science-(317).aspx
5. NITI Aayog. https://www.niti.gov.in/. National Institution for Transforming India

Activities to do:

1. Watch ***Constitution Assembly Speeches*** from News on Official YouTube [https://www.youtube.com/watch?v=0W9L6rFljF0] and organize a discussion on various themes with two groups of learners debating on issues discussed by the Constituent Assembly.
2. Watch ***Constitution of India – A Journey*** from Prasar Bharati Archives on YouTube[https://www.youtube.com/playlist?list=PLqtVCj5iilH4hOskMihD3woXA5C_58B0y] and stage a short play depicting the essence of this journey.
3. Read the biographies of freedom fighters and founding fathers of Indian Constitution.
4. Study important judgements passed by Supreme Court of India on Basic Structure Doctrine and assess its impact on the functioning of the Constitution.
5. Study a Report prepared by NITI Ayog and evaluate its significance.
6. Organize community outreach programme to aware people about their rights and duties as citizens.

Core III **SEMESTER II**

Introduction to Political Theory

Course Objectives:

The course seeks to foster a comprehensive and nuanced understanding of political theory, its significance within the discipline of Political Science, and its profound influence on conceptualizing and interpreting various facets of social life. Through a critical examination of influential traditions and perspectives, students will gain insights into how theoretical frameworks shape debates and discourses on socio political issues. Furthermore, the course aims to equip learners with the ability to critically analyse and deconstruct contemporary theories and perspectives that delve into the intricate interplay between politics and social constructs. It begins with an overview of why we study political theory and what are the approaches and forms of political theory. It then proceeds to elaborate in a detailed manner on the key concepts in political theory such as 'Liberty', 'Equality', 'Rights' 'Justice', 'Democracy'. It will also focus on recent trends of Political Theory. Each concept is explained through the thoughts and writings of noted theorists who have deliberated at length on that particular issue with emphasis given on readings of original writings.

Expected Learning Outcomes:

This course aims to cultivate a sophisticated understanding of the theoretical foundations that inform and shape the ever-evolving political landscape. The unit-wise outcomes are given below.

Unit-I: This unit familiarises the students with the basic concepts of political theory, how political theory has evolved as well as the nature of political theory. It also introduces the students to the normative and empirical dimensions of political theory. The necessity of values and the importance of empirical investigation in the theory building exercise is the primary objective of this unit. This unit also makes an attempt to explain how modernity influenced the theory building exercise and how it reshaped some of the important debates on politics and society.

Unit-II: This unit makes an attempt to study important traditions in political theory. These traditions influence our political decisions. Even since the evolution of industrial revolution, nation state, political questions and debates have revolved round the concepts of liberalism

and Marxism. Students will be exposed to various debates in each of these traditions and their importance in the present-day context.

Unit-III: Political theory, fifty years back, was only concerned about liberalism and Marxism. Of late, with the advancement of society and our understanding of society, new ideas have emerged. They have expanded the horizon of political theory. New theories have evolved and they have thrown new challenges to the society. Modernity encouraged societies to engage in theory building exercise. The emergence of post modernity challenged the grand narratives and encouraged all of us to have micro perspective and challenge everything as modern. Similarly, new theories emerged challenging the existing power structure of the state and society. The understanding of a monocultural society has also changed with people shifting their choice of living from one country to another country. This unit promises to throw many interesting ideas to the students of political science.

Unit-IV: This unit makes an attempt to understand some of the important political ideas within the nation state framework. Once nation state is strongly established, it is important to understand the political concepts in detail. Even though concepts like citizenship and civil society are old yet these concepts need some sort of redefinition in the modern context. Similarly, the emergence of welfare state in a political system also has reinforced its presence in the modern context. A student of Political Science needs to take concepts like welfare state and swaraj seriously as it throws many new challenges to the already existing political ideas.

Course Content:

Unit-I: Introduction

a) What is Political Theory? Why do we need Political Theory?
b) Approaches to Political Theory: Normative and Empirical
c) Modernity and Political Theory

Unit-II: Traditions

a) Liberalism
b) Neo-Liberalism
c) Marxism
d) Neo-Marxism

Unit-III: Recent Trends

a) Feminism
b) Post-Modernism
c) Green Political Theory
d) Multiculturalism

Unit-IV: Concepts

a) Citizenship
b) Civil Society
c) Welfare State
d) Idea of Swaraj

Essential Readings:

- ✓ *Adams, I. (2001). Political Ideology Today. United Kingdom: Manchester University Press.*
- ✓ *Bhargava, Rajeev, and Acharya, Ashok (2008). Political Theory: An Introduction, New Delhi: Pearson Longman.*
- ✓ *Farrelly, Colin, (2003). Contemporary Political Theory, A Reader, Sage Publications*
- ✓ *Goodin, Robert E. and Philip Pettit edited (1997). Contemporary Political Philosophy, Oxford, Blackwell Publishers.*
- ✓ *Kymilika, Will. (2014). Contemporary Political Philosophy. New Delhi, Oxford*
- ✓ *Miller, David and Larry Siedentop (edited). (1983). The Nature of Political Theory, Oxford, Clarendon Press.*
- ✓ *Ramaswamy, Sushila. (2014). Political Theory: Ideas and Concepts. PHI Learning Pvt Ltd.*
- ✓ *Rawls, John, (1971). A Theory of Justice. Oxford, Oxford University Press.*
- ✓ *Sandel, Michael, (2002). Liberalism and The Limits of Justice. Cambridge University Press.*
- ✓ *Vinod, M.J. and Deshpande, Meena. (2013). Contemporary Political Theory. PHI Learning Private Limited, Delhi.*

Additional Readings:

- ✓ *Arblaster, A. (3rd Edition). (2002). Democracy. Open University Press.*
- ✓ *Bakshi, Om (1988). The Crisis of Political Theory, Oxford University Press.*
- ✓ *Bellamy, Richards (1993). Theories and Concepts of Politics, Manchester University Press, New York.*
- ✓ *Heywood, Andrew (2022). Political Theory: An Introduction.* Bloomsbury Publication.
- ✓ *Kukathas, Ch. and Gaus, G. F. (2004) (eds.). Handbook of Political Theory. Sage.*
- ✓ *Mckinnon, C. (ed.) (2008). Issues in Political Theory. Oxford University Press.*
- ✓ *Parekh, B. (2005). Rethinking Multiculturalism: Cultural Diversity and Political Theory. Macmillan Press.*
- ✓ *Ramaswamy, Sushila. (2014). Political Theory: Ideas and Concepts. PHI Learning Pvt Ltd.*
- ✓ *Sen Amartya (2000). Development as Freedom. Oxford University Press.*
- ✓ *Vincent, A. (2004). The Nature of Political Theory. Oxford University Press.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. eGyankosh. *What is Political Theory*. IGNOU. https://egyankosh.ac.in/bitstream/123456789/57829/1/Unit1.pdf
2. O'Connor, J. (2010). Marxism and the Three Movements of Neoliberalism. *Critical Sociology. 36*(5) 691-715. https://journals.sagepub.com/doi/pdf/10.1177/0896920510371389
3. University of Mumbai. *Political Theory*. University of Mumbai. https://archive.mu.ac.in/myweb_test/M.A.(Part%20-%20I)%20Political%20Science%20Paper%20-%20I%20-%20Political%20Theory%20(Eng)%20-%20Rev.pdf
4. Veeravalli, A. (2011). Swaraj and Sovereignty. *Economic and Political Weekly. 46*(5). 65-69. https://www.jstor.org/stable/27918091

Activities to do:

1. Identify some of the political activities with an explanation. Please exclude voting-related activities.
2. Identify the liberal/Marxist elements of the Indian state
3. Try to analyse some major policies of your locality putting it in a liberal and Marxist or any other theoretical framework.
4. Identity some of the major religious communities in your locality and try to build a theory based on their living experience.

Core IV

Comparative Governments

Course Objectives:

This course will familiarize the students with the basic concepts and approaches to the study of comparative governments. It enables the students to critically examine politics in historical and contemporary perspectives while engaging with various themes of comparative analysis in developed and developing countries. This course is designed to address the various elements of constitutional systems in the world including political parties, interest groups, election process, in addition to an analysis of the dominant executive, legislature and judicial systems all over the world.

Expected Learning Outcomes:

This course would enable the students to understand concepts and various approaches relevant to the study of comparative politics. The students would familiarise with a vast range of relevant political concepts and processes supposed to train their critical thinking to understand comparative politics and government. The unit-wise outcomes are given below.

Unit-I: This will help students to engage with the topics of comparative government, institutionalism, neo-institutionalism, and the comparison of democratic and authoritarian regimes in a comprehensive and critical manner.

Unit-II: This unit will aware students about a structured framework for engaging with the concepts, theories, and empirical research associated with comparative government, institutionalism, neo-institutionalism, and the comparison of democratic and authoritarian regimes.

Unit-III: This unit will help students in developing a comprehending skill on the working of legislatures, the executive branch, and bureaucracies in political systems, including their structures, functions, and dynamics in both democratic and authoritarian states.

Unit-IV: This unit will enhance the analogical capacities and critical thinking about elections, political parties, and interest groups in political systems, including their roles, dynamics, and implications for democratic governance in both democratic and authoritarian contexts.

Course Content:

Unit-I: Introduction

a) Comparative Government: Meaning and Evolution
b) Institutionalism and Neo-Institutionalism
c) Comparing Democratic and Authoritarian Regimes

Unit-II: Legislature, Executive and Bureaucracy

a) Legislatures: Concept, Functions, Structures, Legislature in Democratic and Authoritarian states
b) Executive: Concept, Presidential and Parliamentary Forms, Executive in Democratic and Authoritarian states
c) Bureaucracy: Concept, Organisation, New Public Management, Bureaucracy in Democratic and Authoritarian states

Unit-III: Constitution, Judiciary and Multi-level Governments

a) Constitutionalism and New-Constitutionalism; Constitution in Democratic and Authoritarian states
b) Judiciary: Concepts, Judicial Review, Judicial Activism, Judicial Independence, Judiciary in Democratic and Authoritarian states
c) Multi-level Governments: Unitary and Federal, Local Government

Unit-IV: Elections, Political Parties and Interest Groups

a) Elections: Role and Importance, Types; First-Past-the-Post System and Proportional Representation, Elections in Democratic and Authoritarian states
b) Political Parties: Concept, Origin and Role, Party System, Parties in Democratic and Authoritarian states
c) Interest Groups: Concept, Role of Interest Groups in Democratic and Authoritarian states

Essential Readings:

- ✓ *Alford, R. R., Friedland, R. (1985). Powers of Theory: Capitalism, the State, and Democracy. Cambridge University Press.*
- ✓ *Allbrow, Martin. (1996). The Global Age: State and Society: Beyond Modernity. Cambridge.*

- ✓ *Cantori, L.J and A. H. Ziegler. (edited). (1988). Comparative Politics in the Post-Behaviouralist Era. Lynne Rienner.*
- ✓ *Chilcote, Ronald. (1994). Theories of Comparative Politics: The Search for a Paradigm Reconsidered. Westview Press.*
- ✓ *Hardt, Michael and Antonio, Negri. (2001). Empire. Harvard University Press.*
- ✓ *Manor, James. (edited). (1991). Rethinking Third World Politics. Longman.*
- ✓ *Sartori, G., (2016). Parties and Party Systems: A Framework for Analysis. Cambridge University Press.*

Additional Reading:

- ✓ *Ellwood, W. (2010). The No-nonsense Guide to Globalization. New Internationalist.*
- ✓ *Heywood, A. (2002) 'Representation, Electoral and Voting', in Politics. Palgrave.*
- ✓ *Rahnema, Majid (ed). (1997). The Post-Development Reader. The University Press.*
- ✓ *Rutland, P. (2014) 'Britain', in J. Kopstein and M. Lichbach. (eds.) Comparative Politics: Interest, Identities and Institutions in a Changing Global Order. Cambridge University Press*
- ✓ *Stephan, Alfred. (2001). Arguing Comparative Politics. Oxford University Press.*
- ✓ *Tornquist, O. (1999). Politics and development. A Critical Introduction. Sage Tor*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. **Encyclopaedia Britannica**: Website: https://www.britannica.com/
2. **The United Nations Development Programme (UNDP)**: Website: https://www.undp.org/
3. **The Parliament of the United Kingdom**: Website: https://www.parliament.uk/
4. **The United States House of Representatives**: Website: https://www.house.gov/
5. **The World Bank**: Website: https://www.worldbank.org/
6. **The International Monetary Fund (IMF)**: Website: https://www.imf.org/
7. **The Constitution Center**: Website: https://constitutioncenter.org/
8. **The International Court of Justice (ICJ)**: Website: https://www.icj-cij.org/en
9. **The Federalism Project**: Website: https://federalism.org/

10. **The American Political Science Association (APSA)**: Website: https://www.apsanet.org/

Activities to do:

1. **Case Study Analysis**: Divide the students into groups and assign each group a case study of a democratic and authoritarian regime. Ask them to analyze the structure and functioning of legislatures, executives, and bureaucracies in each regime, considering factors such as power distribution, accountability mechanisms, and institutional constraints.
2. **Debate**: Organize a debate on the merits of democratic and authoritarian regimes, with students taking on different roles representing each perspective. Encourage the students to present arguments based on theories of institutionalism and neo-institutionalism, discussing the strengths and weaknesses of each regime type.
3. **Case Analysis**: Provide case studies of legislatures, executives, and bureaucracies in democratic and authoritarian states. Ask the students to analyze the functions, structures, and roles of each institution, comparing how they operate in different political contexts and identifying patterns of institutional behavior.
4. **Mock Trial**: Encourage students to organize a mock trial activity where students role-play as lawyers, judges, and witnesses in a legal case. Students can explore concepts of judicial review, judicial activism, and judicial independence, analyzing how the judiciary operates in democratic and authoritarian states.
5. **Campaign Simulation**: Organize a campaign simulation where students role-play as candidates, campaign managers, and voters in a mock election. Students can explore different electoral systems, campaign strategies, and the role of political parties and interest groups in shaping electoral outcomes.

Core V **Semester-III**

Colonialism and Nationalism in India

Course Objectives:

The purpose of this course is to help the students understand India's colonial past, the shaping of the nationalist ideology and the unfolding of the national movement. Integral to the course is understanding the ideas of democracy and freedom along with corresponding social relations as well as political and institutional practices that took shape in the context of the anti-colonial struggles. The institutions of the state, its policies, and the social and economic structures that exist today, reflect the imprint of the colonial experience and the manner in which they have been transformed in the course of social struggles and the national movement.

Expected Learning Outcomes:

This course will enable the learners to understand India's colonial history and shaping of its identity as a nation. The students would be well versed with the major streams of socio-political thought as well as socio-political and religious reform movements which contributed to our nation building. The unit-wise outcomes are given below.

Unit-I: This unit will give the students a conceptual understanding of colonialism from different perspectives as well as an analysis of Indian nationalism through various approaches.

Unit-II: This unit help the students to develop a critical understanding of colonial ideology and its civilizing mission based on an assertion of cultural superiority. It will also help the students to assess the various impacts of colonialism on society, economy, polity and agrarian structure.

Unit-III: This unit will give an understanding about various reform movements as well as various types of resistance during the first century of British rule in India.

Unit-IV: This unit will help the students will learn about the historical context in which the nationalist movement emerged in India and took different forms in subsequent periods. It will also provide a broad understanding about the role, ideologies and contributions of great nationalist leaders and organisations in nationalist struggle till the achievement of independence.

Course Content:

Unit-I: Colonialism and Nationalism

a) Main Perspectives on Colonialism: Liberalism, Marxism, Post-colonialism
b) Approaches to the study of Nationalism in India: Liberal Nationalist, Religious Nationalist, Marxist and Subaltern

Unit-II: Colonial Rule in India and Impact

a) Colonial Ideology and Civilizing Mission: Assertion of Cultural and Racial Superiority
b) Impact on Forest, Agriculture, Land relations, Industry and Ecology
c) Constitutional Development and the Colonial State

Unit-III: Reform and Resistance

a) Religious Reform Movements
b) Other Social Reform Movements: Anti-Caste Movements and Women Emancipation Initiatives
c) Tribal, Peasants and Working-Class Resistance
d) Education and the rise of the New-middle Class

Unit-IV: Nationalist Politics and Expansion of its Social Base

a) Nationalist Movement: Formation of Indian National Congress, Liberal Constitutionalist, Swadeshi and the Radicals, Muslim League and Hindu Mahasabha
b) M.K. Gandhi and Mass Mobilisation, Non-cooperation, Civil Disobedience and Quit India Movement
c) Revolutionaries: Communists, Socialists and INA
d) Two-Nation Theory, Partitions and India's Independence

Essential Readings:

1. Treanor, P. (1997). Structures of Nationalism. *Sociological Research Online, 2*(1), 60–72. https://doi.org/10.5153/sro.70
2. Alter, P. (1994). *Nationalism* (2nd ed.). Edward Arnold.
3. Chakrabarty, D. (2002). A small history of subaltern studies. In D. Chakrabarty, *Habitations of modernity: Essays in the wake of subaltern studies* (pp. 3-19). Permanent Black.

4. Chandra, B. (1999). *Essays on colonialism*. Orient Longman Ltd. [Chapter 1: Colonialism: Some basic aspects, pp. 1-22].
5. Islam, S. (2006). The origins of Indian nationalism. In *Religious dimensions of Indian nationalism* (pp. 71-103). Media House.
6. Thapar, R. (2000). Interpretations of colonial history: Colonial, nationalist, post-colonial. In P. R. de Souza (Ed.), *Contemporary India: Transitions* (pp. 25-36). Sage Publications.

Additional Readings:

- ✓ *Bandyopadhyay, S. (2016).* From Plassey to Partition and after: A history of modern India. *Orient Blackswan Private Limited.*
- ✓ *Bose, S., & Jalal, A. (2011).* Modern South Asia: History, culture, political economy. *Routledge.*
- ✓ *Chandra, B. (2019).* History of modern India. *Orient Blackswan.*
- ✓ *Chandra, B., Mukherjee, M., Mukherjee, A., Panikkar, K. N., & Mahajan, S. (1989).* India's struggle for independence. *Penguin Books India.*
- ✓ *Desai, A. R. (1959).* Social background of Indian nationalism *(3rd ed.). Popular Book Depot.*
- ✓ *Sarkar, S. (2014).* Modern India. *Pearson Education India.*
- ✓ *Sharma, S. L., & Oomm*en, T. K. (Eds.). (2001). *Nation and national identity in South Asia*. Orient Longman.

Internet Sources:

1. Thapar, Romila. *Shaping Identity: Nationalism, Secularism and Democracy*. Ajim Premji University lecture. https://youtu.be/-LxPzkeLBOo?si=QjLM7DHUilLCexGN
2. eGyanKosh. *Imperialism, Colonialism and Nationalism*. IGNOU. https://egyankosh.ac.in/handle/123456789/17829
3. OSOU. *Social and political thought in modern India*. OSOU https://drive.google.com/file/d/1c9yHWd2SXFmqV3TwqB2wS7v1nllFqB3e/view
4. BBC. *India's partition: The Forgotten History*. BBC. https://www.bbcselect.com/watch/indias-partition-the-forgotten-story/

Activities to do:

1. Organize Special Talks/Lectures on the occasions of birth anniversary of great Leaders of Indian National Movement.
2. Visit to the nearby places related to Indian National Movement or read about these places and submit a report about the significance of the place.
3. Write a short report on the life and contribution of the Nationalist Leaders of your District/Region/nearby locality and submit to the course instructor.

Core VI

International Relations

Course Objectives:

This paper seeks to equip students with the basic intellectual tools for understanding International Relations and its major theories. The course begins by historically contextualizing the evolution of the international state system before discussing the agency-structure problem through the levels-of- analysis approach. After having set the parameters of the debate, students are introduced to different theories in International Relations. It provides a fairly comprehensive overview of the major political developments and events

starting from the twentieth century. Students are expected to learn the economic relation between developed and under developed nations and emerging world order after globalization.

Expected Learning Outcome:

This course would enable the learners to understand the international relations and major theories. Also, this course would make students aware about major political and historical phenomenon occurred in 20th century which have shaped the International Relations. The unit-wise outcomes are given below.

Unit-I: This unit would provide fundamental ideas to the students about International Relations & evolution of state system with reference to pre- Westphalia, Westphalia& post-Westphalia.

Unit-II: This unit would help the students to familiarise with the basic theoretical perspectives of International Relations.

Unit-III: This unit would make students understand about the causes & consequence of World War I & II. It also makes the students understand about the creation of League of Nation and UNO and the formation of former USSR, Fascism & Nazism.

Unit-IV: This unit would familiarise the students with different dimensions of Cold War & the contemporary ideas like the third world, new economic world order, north- south co-operation, development & under-development, globalisation & emerging world order.

Course Content:

Unit-I: Study of International Relations

a) Meaning, Nature & Scope
b) Evolution of state system: pre-Westphalia, Westphalia & post-Westphalia

Unit-II: Theoretical Perspectives

a) Classical Realism, Idealism, Realism and Neo- Realism
b) Liberalism and Neo- Liberalism
c) Marxist and Feminist perspectives

Unit-III: An Overview of 20th Century International History-I

a) World War- I: Causes & Consequences, League of Nations
b) Bolshevik Revolution and the formation of USSR
c) Rise of Fascism and Nazism
d) World War- II: Causes & Consequences, United Nations

Unit-III: An Overview of 20th Century International History-II

a) Cold War: Phases, End of Cold War & post-Cold War world order.
b) Emergence of Third World, New Economic World Order, North- South Cooperation, Theories of Development and Under-Development
c) Globalisation and Emerging World Order

Essential Readings:

- ✓ *Basu, R. (Ed.). (2017).* International politics: Concepts, theories and issues. *Sage.*
- ✓ *Baylis, J., & Smith, S. (Eds.). (2002).* The globalization of world politics *(4th ed.). Oxford University Press.*
- ✓ *Bello, W. (2008).* Deglobalization. *Zed Books.*
- ✓ *Heywood, A. (2023).* Global politics. *Bloomsbury Publishing.*
- ✓ *Ghosh, P. (2020).* International relations *(5th ed.). New Delhi.*
- ✓ *Goldstein, S. J., & Pevehouse, J. (2007).* International relations. *Pearson Longman.*

Additional Readings:

- ✓ *Behera, N. C. (Ed.). (2008). International relations in South Asia: Search for an alternative paradigm. Sage.*
- ✓ *Burchill, S., et al. (2009). Theories of international relations (3rd ed.). Palgrave Macmillan.*
- ✓ *Carr, E. H. (1981). The twenty years' crisis: 1919-1939. Macmillan.*
- ✓ *Chilcote, R. H. (1984). Theories of development and underdevelopment. Westview Press.*
- ✓ *Brown, C., & Ainley, K. (2005). Understanding international relations (3rd ed.). Palgrave Macmillan.*
- ✓ *Cox, R., & Sinclair, T. (1996). Approaches to world order. Cambridge University Press.*

- ✓ *Morgenthau, H. (Revised by Kenneth W. Thompson). (2007). Politics among nations. (6th Edition). Kalyani Publishers*
- ✓ *Smith, S., Booth, K., & Zalewski, M. (Eds.). (1996). International theory: Positivism and beyond. Cambridge University Press.*
- ✓ *Waltz, K. (1979). Theory of international politics. Addison-Wesley Publishing.*

Internet sources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

- eGyanKosh. *Development of State System*. IGNOU https://egyankosh.ac.in/handle/123456789/24796
- The Hindu. (2023, July 6). *Feminist approaches to international relations*. The Hindu. https://www.thehindu.com/specials/text-and-context/feminist-approaches-to-international-relations/article67016933.ece
- History.com (Editors). *Russian Revolution.* History. https://www.history.com/topics/european-history/russian-revolution
- Sharma, A. (2018). Globalisation and the new world order. *ResearchGate*. https://www.researchgate.net/publication/323812397_GLOBALISATION_AND_THE_NEW_WORLD_ORDER

Activities to do:

1. The students should present a paper on different themes of international relations.
2. Workshop and Seminar for students so that they will get more insights on the different issues of international relations.
3. Debates on current international events or topics such as financial institutions, role of united nation and international world order.

Core VII

Western Political Thought-I

Course Objectives:

This course deals with the classical thinkers and themes of western political philosophy. It will probe the key concerns of political thought such as the good ideal and possible regimes; citizenship and civil virtues; contract, consent and trust as the alternative bases of political

obligation; the relative autonomy of politics vis-à-vis philosophy or economy; and concepts such as justice, liberty, and rights. There will be an attempt to understand thinkers and texts both from philosophical and historical perspectives. The main objective is to train students in the foundational texts and thinkers of Political Science.

Expected Learning Outcomes:

The course will familiarize students with the questions, ideas and values of political philosophy addressed by political thinkers and contextualize the same to contemporary political thinking. This will enhance their comprehending and analytical capacities to read and decode the classics and use them to engage contemporary socio-political issues and clearly present their own arguments and thoughts about contemporary issues and develop ideas to engage with the latter. The unit-wise outcomes are given below.

Unit-I: Students would gain comprehensive understanding of the foundational ideas and frameworks proposed by the seminal thinkers of ancient Greece. Thus, students could make an appraisal of the enduring influence of these pioneering thinkers on subsequent political discourse and the evolution of socio -political ideologies.

Unit-II: Upon completion of this Unit, students will be able to critically examine the transformative ideas that emerged during this pivotal period in intellectual history. Through the exploration of Renaissance and early modern political thought, students will gain insights into the paradigm shifts that reshaped the understanding of power, authority, and the role of the state, laying the foundations for subsequent political philosophies and ideologies. This will enable them to connect with historically written texts and their interpretations.

Unit-III: Through this Unit students will gain a nuanced understanding of the tension between individualistic and collectivist ideologies, and would develop a critical thinking in assessing the impact of social contract theories on shaping subsequent political discourse, governance structures, and societal norms.

Unit-IV: Through this exploration of utilitarian thought, students will gain a comprehensive understanding of the principles underlying this utilitarianism, its potential applications in governance and policymaking, as well as its limitations and criticisms.

Course Content:

Unit-I: Greek Political Thought

a) **Plato:** Concept of Ideal State, Theory of Justice, Philosopher King, Concept of Communism, Concept of Education
b) **Aristotle:** State and Its Classification, Theory of Revolution, Concept of Law and Justice, Citizenship

Unit-II: Renaissance and the Rise of Modernism

a) **Machiavelli:** Politics and State Craft, Views on ends and means, Separation Morality and Politics
b) **Hobbes:** State of Nature and Contract; Theory of Absolute Sovereignty

Unit-III: Individualism and Collectivism

a) **Locke:** State of Nature and Contract; Theory of Natural Rights: Life, Liberty and Property, Concept of Limited Government,
b) **Rousseau:** State of Nature and Contract; General Will, Concept of Popular Sovereignty

Unit-IV: Utilitarianism

a) **Bentham:** Theory of Utilitarianism as the basis of moral and jurisprudence
b) **J.S. Mill:** Revision of Utilitarianism, Views on Liberty, Representative Government, Subjugation of Women

Essential Readings:

- ✓ *Boucher, D. & Kelly, P. (2017).* Political Thinkers: From Socrates to the Present. *Oxford University Press.*
- ✓ *Jha, Shefali. (2018).* Western political thought: From the ancient Greeks to modern times *(2nd ed.). Pearson.*
- ✓ *Mishra, R. K. (1957). Political Legacy of Plato and Aristotle. Kitab Mahal Publication.*

- ✓ *Mukherjee, S., & Ramaswamy, S. (2004).* Western political thought. *PHI Learning.*
- ✓ *Nelson, B. R. (2006).* Western political thought. *Pearson Education India.*
- ✓ *Russel, B. (2005).* History of Western Philosophy. *Routledge.*
- ✓ *Sabine, G. H. (2018).* History of political theory. *Oxford and IBH Publishers.*
- ✓ *Skinner, Q. (2002).* The foundations of modern political thought (Vol. 1, The Renaissance). *Cambridge University Press.*
- ✓ *Wayper, C. L. (2007).* Teach yourself political thought. *Surjeet Publication.*

Additional Readings:

- ✓ *Brett, A. and Tully, J. (Eds.). (2006). Rethinking the foundations of modern political thought. Cambridge University Press.*
- ✓ *Browning, G. (2016). A history of modern political thought: The question of interpretation. Oxford University Press.*
- ✓ *Gingell, J., Little, A. and Winch, C. (Eds.). (2000). Modern political thought: A reader. Routledge.*
- ✓ *Hampsher-Monk, I. (2008). A history of modern political thought: Major political thinkers from Hobbes to Marx. Blackwell Publ.*
- ✓ *Heywood, A. (2004). Political theory: An introduction. Palgrave Macmillan.*
- ✓ *McLellan, D. (1979). Marxism after Marx. Palgrave Macmillan.*
- ✓ *Rawls, J. (2009). A theory of justice. Harvard University Press.*
- ✓ *Wootton, D. (1996). Modern political thought: Readings from Machiavelli to Nietzsche. Hackett Publishing Company Inc.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Stanford Encyclopedia of Philosophy (For different political thinkers and their philosphy). https://plato.stanford.edu/
2. Prof. Mithilesh Kumar Jha.(2021). *Introduction to Western Political Thought* [Online course]. SWAYAM. https://onlinecourses.nptel.ac.in/noc21_hs101/preview

3. eGyanKosh. *Western Political Thought: Plato to Marx* (MPSE-003). IGNOU https://egyankosh.ac.in/handle/123456789/24354

Activities to do:

1. Read original books and biographies of the author of your choice.
2. Make a list of Western Political Thinkers along with their affiliation to different strings of political thought.
3. Make group discussions on concepts like state, justice, equality from the perspective of different thinkers mentioned in this course.
4. Collect the portraits of different thinkers , make a photographic diary and write down their important concepts.

Core VIII **Semester-IV**

Indian Politics

Course Objectives:

The course adopts a historical-analytical framework to foster a critical understanding of the Constitutional design and governmental institutional framework in India, along with the insight on the changing nature of state, situating them within historical political processes. It seeks to acquaint students with the multifaceted manifestations of politics in India, examining the diverse mechanisms through which power is wielded and distributed across societal

dimensions of caste, class, ethnicity, gender, region, language, and religion. It aims at elucidating how social power shapes and mediates the political processes. Learners would explore the interplay between caste, religion, and politics, as well as constitutional provisions for self-governance, autonomy, and development, particularly for tribal communities under the Fifth and Sixth Schedules. The course also elucidates the legal and constitutional mechanisms aimed at empowering the marginalized groups. Further, the course delves into the complex interplay between political parties, electoral systems, and governance structures in India's democratic landscape to render useful insights on the dynamics of Indian Politics.

Expected Learning Outcomes:

The course would develop among students a critical and comprehensive understanding of India's nation-building process, identity politics, political parties, and electoral process. This would enable them to analyse state policies, socio-political contexts, and democratic participation across diverse segments of Indian society. The unit-wise course outcome is given below.

Unit-I: The learners would be familiarised with the process of nation building and the changing dynamics of state in terms of policy intervention for vulnerable groups. Further, the complex understanding of the social cleavages would enable them to critically assess state's response within the broader socio-political context of India.

Unit-II: The learners would develop awareness on different social groups like caste, tribe, gender, their sense of self, persistence, and demand for recognition in the broader socio-political and historical contexts in India. Further, the complex understanding of identity politics, constitutional safeguards, issues of privileges, discrimination, mobilisation, and politicization in the context of these sections of the society would enable them to develop insights for policy formulation and identify gaps in effective policy making.

Unit-III: The learners would gain comprehensive understanding of the debates surrounding secularism, communalism, minority rights, regionalism, language diversity and demand for separate statehood. This will enable them to critically analyse the dynamics of Indian politics and the interplay of these identities in shaping the political process in India. This will harness their domain skills for future engagement in the public sector.

Unit-IV: The learners would demonstrate knowledge of political parties and party system in India. The awareness of the manner in which representation and electoral competition play

out in Indian politics will enable them to evolve critical insights on voting behaviour and democratic participation of different segments of the population.

Course Content:

Unit-I: Major Contestations in Indian Politics

a) Nation Building: Processes & Challenges
b) Changing Nature of Indian State: Social Base of Power- Class, Caste, Ethnicity, & Gender; Welfare State & Neo-liberal State
c) Social Justice and Affirmative Action Policies

Unit-II: Identity Politics – I

a) Caste in Politics and Politicization of Caste, Dalits, and Backward Castes
b) Tribe: Constitutional Provisions- Fifth & Sixth Schedules, Development and Displacement, Forest Rights Act& Challenges
c) Gender: Participation and Representation of women in democratic institutions

Unit-III: Identity Politics - II

a) Religion: Debates on Secularism and Communalism, Minority Rights
b) Region and Regionalism: Autonomy and Statehood movements
c) Language: Linguistic Diversity and Constitutional Provisions, Linguistic Reorganization of states

Unit-III: Party System and Electoral Process

a) Indian party system: National and State parties, Trends in party system, Politics of Defection, Coalition Politics
b) Electoral Process in India: Electoral reforms, Trends in voting behaviour
c) Electoral Politics: Participation, Representation, and Mobilisation of different sections.

Essential Readings:

- ✓ *Chandhoke, Neera and Priyadarshi, Praveen (2009). Contemporary India: Economy, Society, Politics. Pearson.*
- ✓ *Chandra, Bipan, Mukherjee, Mridula, & Mukherjee, Aditya. (2000). India After Independence, 1947-2000. Penguin. (Chapter 6: The Initial Years, pp. 68-82, Chapter 7: Consolidation of India as a Nation, pp. 83-97).*

- ✓ *Jayal, Niraja Gopal and Mehta, Pratap Bhanu (2011). The Oxford Companion to Politics in India. Oxford University Press.*
- ✓ *Pai, Sudha (ed.) (2013). Handbook of Politics in Indian States: Region, Parties, and Economic Reforms. Oxford University Press, India.*
- ✓ *Pai, Sudha (2000). State Politics: New Dimensions (Party System, Liberalisation and Politics of Identity). Shipra.*
- ✓ *Singh, M. P. (2008). Reorganization of States in India. Economic and Political Weekly. 43(11), 70-75.*
- ✓ *Yadav, Yogendra & Palshikar, Suhas (2006). Party System and Electoral Politics in the Indian States, 1952-2002: From Hegemony to Convergence in P. R. DeSouza & E. Sridharan (Eds.), India's Political Parties. Sage.*

Additional Readings:

- ✓ *Chaube, S. K. (1973). Constituent Assembly of India. People's Publishing House. (Chapter 1: The Indian Problem, pp. 5-16, Chapter 2: Constituent Assembly as the Answer, pp. 17-29, Chapter 3: Birth of the Constituent Assembly, pp. 30-45, Chapter 17: Conclusions, pp. 270-281, Epilogue, 283-285)*
- ✓ *Jayal, Niraja Gopal. (2019). Re-forming India: The Nation Today. Penguin Random House India Private Limited.*
- ✓ *Kothari, Ashish & Pathak Broome, Neema & Bose, Arshiya. (2011). 'Forests, Rights and Conservation: FRA Act 2006, India', in Henry Scheyvens (Ed.) Critical Review of Selected Forest-Related Regulatory Initiatives. Institute for Global Environmental Strategies.*
- ✓ *Kothari, Rajni. (1970). Caste in Indian Politics. Orient Longman.*
- ✓ *Kumar, Avinash and Pai, Sudha. (2017). The Indian Parliament: A Critical Appraisal. Orient Blackswan Pvt Limited.*
- ✓ *Majeed, Akhtar. (2005). Working of the Indian Federal System. Federal Studies Orientation Series, Centre for Federal Studies, Hamdard University, New Delhi.*
- ✓ *Menon, Nivedita. (1999). Gender and Politics in India. Oxford University Press.*
- ✓ *Sarangi, Asha. (2010). Language and Politics in India. Oxford University Press.*
- ✓ *Sarkar, Sumit. (2017). Modern India. Pearson India.*

Internet Resources

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Aijaz Ashraf Wani. Indian Government and Politics. SWAYAM. https://onlinecourses.SWAYAM2.ac.in/cec20_hs38/preview
2. eGyankosh. Political Process in India (BPSC- 104). IGNOU. https://egyankosh.ac.in/bitstream/123456789/66623/1/Block-1.pdf
3. Institute For Rural Development & Panchayati Raj (2018). Gender & Development: Perspective to Practice. PR & DW Department, Govt. of Odisha. https://sirdodisha.nic.in/download/Genderdevelopment.pdf
4. Jhumpa Mukherjee. Political Process in India. SWAYAM. https://onlinecourses.SWAYAM2.ac.in/cec24_hs33/preview
5. Virtual Tutorial Project. Political Process in India (Core-IV). https://vtputkal.odisha.gov.in/subjectwise/political-process-in-india-core-iv/

Activities to do:

1. Go through the manifesto of different political parties and form several groups and organise debates on contemporary issues among these group representing these parties.
2. Make posters on conduct of free and fair elections and aware the local people regarding judicious use of their voting rights.
3. Go through the twitter and media campaigns of different political parties and make a comparative analysis together with your friends.
4. Make a field visit to any Court nearby your locality and write a report on the proceeding of a court.
5. Stage a short play on communal harmony depicting the essence of unity in diversity in India.

Core IX

Western Political Thought-II

Course Objectives: In continuation with the first course of Western Political Thought the structure of this course is designed in such a way as to enable the students to understand the continuity in Western Political Thought. This paper focuses on thinkers and themes of western political philosophy of the medieval and modern periods. An attempt has been made to understand thinkers and texts both from philosophical and historical perspective. The main objective is to train students in the foundational texts and thinkers of western political philosophy. Taking forward from the earlier thinkers belonging to Western Political Thought,

this course highlights the modern advances in political philosophies ranging from socialism, critical theory, feminism, and so on.

Expected Learning Outcome: After going through the seminal and perennial ideas of the political thinkers, the learners would be able to understand various political ideas and constructs influencing and shaping the society. They would be informed about the key debates across different streams of political thought. The unit-wise outcomes are given below.

Unit-I: This unit analyses the contribution of Hegel and Karl Marx to ideas related to state, dialectic process, freedom, history, class, exploitation, and revolution.

Unit - II: This unit explains about the critical theory with the contributions of Gramsci and Jurgen Habermas.

Unit-III: This unit broadly discusses about the role of Marry Wollstonecraft and Carole Pateman in the development of Feminism.

Unit-IV: This unit will give an understanding related to the concepts of John Rawls and Michel Foucault

Course Content:

Unit- I: Idealism and Socialism

a) **Hegel:** Dialectical Idealism; Concept of State; Theory of Freedom
b) **Karl Marx:** Dialectical Materialism; Historical Materialism; Concept of Class; Capitalist exploitation, State; and Revolution

Unit-II: Critical Theories

a) **Gramsci:** Power, Hegemony and Civil Society, Role of Intellectuals, Types of War

b) **Jurgen Habermas:** Legitimation Crisis, Theory of Communicative Action

Unit- III: Feminist Thinkers

a) **Marry Wollstonecraft**: Men's right and women's freedom, Idea of Women Education
b) **Carole Pateman:** The Sexual Contract; Democracy, Participation and Obligation; Patriarchy, Contract and Property

Unit- IV: Contemporary Liberalism & Its Critics

a) **John Rawls:** Justice as Fairness, Original Position, Veil of Ignorance
b) **Michel Foucault:** Power and Freedom, Governmentality and Ethics

Essential Readings:

- ✓ *Heywood, A. (2004).* Political Theory: An Introduction. *Palgrave Macmillan.*
- ✓ *Mukherjee, S., & Ramaswamy, S. (2004).* A History of Political Thought: Plato to Marx. *PHI Learning.*
- ✓ *Nelson, B. R. (2006).* Western political thought. *Pearson Education India.*
- ✓ *Russell, B. (2005).* History of Western philosophy. *Routledge.*
- ✓ *Sabine, G. H. (2018).* History of Political Theory. *Oxford and IBH Publishers.*
- ✓ *Skinner, Q. (2002).* The Foundations of Modern Political Thought (Vol. 1, The Renaissance). *Cambridge University Press.*
- ✓ *Wayper, C. L. (2007).* Teach Yourself Political Thought. *Surjeet Publication.*

Additional Reading:

- ✓ *Hampsher-Monk, I. W. (1981).* Modern political thought from Hobbes to Marx. *Basil Blackwell.*
- ✓ *McLellan, D. (1979).* Marxism after Marx. *Palgrave Macmillan.*
- ✓ *Mehta, V. R. (1968).* Hegel and the modern state: An introduction to Hegel's Political Thought. *Associated Publishing House.*
- ✓ *Rawls, J. (1993). Political Liberalism. Columbia University Press.*

Internet Resources

1. Collin McLear. (2021). *Thought's Dialectic- PHIL 4/880*. Collin McLear. https://phil880.colinmclear.net/materials/handouts/week-13-hegel-dialectic.pdf
2. Rosen, Michael. *Marx, Karl.* Harvard University. https://scholar.harvard.edu/files/michaelrosen/files/karl_marx.pdf
3. eGyanKosh. *Mary Wollstonecraft's 'A Vindication of the Rights of Woman': With Strictures on Political and Moral Subject*. IGNOU https://www.egyankosh.ac.in/bitstream/123456789/83771/1/Unit-2.pdf
4. Phillips, Anne & Medearis, John & O'Neill, Daniel. (2010). Profile: The Political Theory of Carole Pateman. *Political Science & Politics*. DOI: 10.1017/S1049096510001629. https://www.researchgate.net/publication/259403214_Profile_The_Political_Theory_of_Carole_Pateman
5. Ukanga, Lambert. (2018). A Study of John Rawls' Political Morality. *ResearchGate*. https://www.researchgate.net/publication/327871226_A_STUDY_OF_JOHN_RAWLS'_POLITICAL_MORALITY
6. eGyanKosh. *Michel Foucault*. IGNOU https://egyankosh.ac.in/bitstream/123456789/5004/1/MWG-007B2E-U4.pdf

Activities to do:

1. Ask the students to pick ideas of the thinkers which they find relevant in contemporary world and give a presentation on it. For instance: Karl Marx and technology as a tool for alienation.
2. Arrange a movie session on biopics made on these above thinkers and ask the students to write summaries on the same.
3. Refer to the original writings of these thinkers and read a book review and share your thoughts among other students and teachers.

Core X

Public Administration

Course Objectives:

This course aims at familiarizing the learners with the foundation of Public Administration as a discipline and identifying its core concepts and theories. In addition to a conceptual understanding of public administration, this course will enable the learners to analyze various administrative theories and identify the key principles of organization. Highlighting the advantages and disadvantages of these principles may help the learners to contextualize

the administrative system in the present system of governance and note the changes in application of such principles in Indian administrative system. The learners will also be introduced to the concepts of Good Governance, New Public Management, and New Public Administration as the developments in the discipline to meet the changing demands of society. Through the study of traditional binaries- such as politics-administration dichotomy, public-private administration, along with the emerging issues of public-private partnership, the ideas of e-Governance, and changing role of state and market will enable the students to note the changes in objectives and processes of administration. Further, the students will have an understanding of the structure and processes of civil service system in India.

Expected Learning Outcomes:

The course will equip the students with theoretical understanding of the core principles of public administration as well as enable them in examining the practical functioning of the administrative system in India. The topics are divided into four units with each unit dealing with a unique aspect of the discipline of public administration.

Unit-I: The learners will be introduced to the origin and evolution of the discipline of public administration. This unit will discuss the debates over politics-administration dichotomy and help the learners identify the different characteristics of public and private administration. By noting the various interventions in the discipline, the learners will be able to reflect on the changing goals of administration through different periods.

Unit-II: This unit is designed to familiarize the learners with the core principles of organization and enable them to differentiate between different types of organization. The learners will be able to understand the significance of principles like hierarchy, unity of command, delegation, etc. while noting their advantages and disadvantages.

Unit-III: This unit will offer alternative models of organizational management through analysis of dominant organizational theories. An understanding of these theories will enable the learners to evaluate the effectiveness of current structural and procedural principles and deliberate on alternative solutions to meet the contemporary challenges.

Unit-IV: After going through this unit, the learners will have a basic understanding of the prevailing administrative system in India. By studying the recruitment and training

procedures of civil servants, and steps to incorporate ethics in Indian administrative system, the learners will gain insights into the working of bureaucratic system in India. The learners will also be encouraged to deliberate on the emerging issues and challenges in governance in India.

Course Content:

Unit-I: Introduction to Public Administration

a) Public Administration as a Discipline: Meaning, Nature & Scope, Evolution
b) Politics-Administration Dichotomy, Public vs. Private Administration
c) New Public Administration, New Public Management & Good Governance

Unit-II: Principles of Administration

a) Organizations: Formal & Informal, Line and staff organizations
b) Principles of Organization: Hierarchy, Span of Control, Unity of Command, Delegation, Decentralization, Coordination

Unit-III: Administrative Theories

a) Administrative Management theory, Bureaucratic Theory
b) Scientific Management Theory, Human Relations Theory

Unit-IV: Public Administration in India

a) Bureaucracy: Structure& Processes; Recruitment, Training, Ethics in Administration
b) Contemporary challenges & Perspectives: e-Governance, Public-Private Partnership, State vs Market Debate

Essential Readings:

- ✓ *Arora, R.K., & Goyal, R. (1995). Indian Public Administration. New Age International.*
- ✓ *Avasthi, A., & Maheshwari, S. (2020). Public Administration. L.N. Agarwal Books.*
- ✓ *Basu, Rumki. (1990). Introduction to public administration. Sterling Publishers Private.*
- ✓ *Bhattacharya, Mohit. (2011). New horizons of public administration. Jawahar Publishers & Distributors.*
- ✓ *Chakrabarty, Bidyut & Chand, Prakash. (2020). Public administration in a globalizing world: Theories and practices. Sage Publications.*

Additional Readings:

- ✓ *Arora, Ramesh K. (Ed). (2004). Public administration: Fresh perspectives, Aalekh Publishers.*
- ✓ *Basu, Rumki (2019). Public administration in the 21st century. Taylor & Francis.*
- ✓ *Chakrabarty, B., & Bhattacharya, M. (2006). Public administration: A reader. Oxford University Press.*
- ✓ *Dunsire, A. (1999). Then and Now Public Administration, 1953–1999. Political Studies, 47(2), 360-378. https://doi.org/10.1111/1467-9248.00205*
- ✓ *Fadia B.L., & Fadia, Kuldeep (2009). Public administration: Administrative Theories. Sahitya Bhawan.*
- ✓ *Henry, N. (1975). Paradigms of Public Administration. Public Administration Review, 35(4), 378–386. https://doi.org/10.2307/974540*
- ✓ *Henry, Nicholas (2007). Public administration and public affairs. Pearson/Prentice Hall.*
- ✓ *Jayal, N.G., & Mehta, P.B. (2011). The Oxford companion to politics in India. Oxford University Press.*
- ✓ *Prasad, D.R., Prasad, V.S., & Satyanarāyaṇa, P. (1991). Administrative thinkers. Sterling Publishers Private Ltd.*
- ✓ *Singh, Hoshiar. (2005). Expanding horizons of public administration. Aalekh Publishers.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. egyankosh: https://egyankosh.ac.in/handle/123456789/25205
2. epgpathshala on Public Administration: Modules with e-Text, Self-Learning Material: https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=88V8C8jJgAPSNBjF8NZMRA==
   For Videos only:
   https://www.youtube.com/playlist?list=PLnl4bzqH5QqLj2Q1RIgmX66fJiLLVFE8H
3. United Nations Public Administration Network (UNPAN) E-Learning Resources: https://sdghelpdesk.unescap.org/e-learning

4. Virtual Tutorial Project, Govt. of Odisha: Lecture Series on Public Administration https://vtputkal.odisha.gov.in/subjectwise/introduction-to-public-administrationcore-06-2/

Activities to do:

1. Carry out a community outreach programme to aware people about the Government's initiatives on e-Governance.
2. Make an assessment report on the performance/achievement of any scheme or project or organization working in public-private partnership.
3. Develop a set of Good Governance indicators, following international standards and make an assessment of your educational institution on its basis through feedback from employees and students.
4. Conduct a study on any government department or organization examining the applications of the principles of organizations. Discuss your findings with your class.

Core XI **Semester-V**

Global Politics

Course Objectives: This course introduces students to the key debates on the meaning and nature of globalization by addressing its political, economic, social, cultural and technological dimensions. In keeping with the most important debates within the globalization discourse, it imparts an understanding of the working of the world economy, its anchors and resistances offered by global social movements while analysing the changing nature of relationship between the state and trans- national actors and networks. The course also offers insights into key contemporary global issues such as the proliferation of nuclear

weapons, ecological issues, international terrorism, and human security before concluding with a debate on the phenomenon of global governance.

Expected Learning Outcomes:

The course intends to equip students with a comprehensive understanding of contemporary global issues, fostering critical thinking skills and analytical capabilities essential for engaging with complex international dynamics and contributing to informed decision-making in global contexts.

Unit -I: Learners would gain a comprehensive understanding of international relations, global power dynamics, and the political debates surrounding sovereignty and territoriality and the various factors influencing global political processes.

Unit-II: Learners would develop insights on cultural diversity and its impact on global interactions and conflicts and how technological advancements influence political, economic, and social structures globally.

Unit-III: This unit will aware learners about the objectives and provisions of the NPT (Non-Proliferation Treaty) and CTBT (Comprehensive Nuclear-Test-Ban Treaty) and the impact of these treaties on global security and nuclear disarmament. This would also enable learners to understand the causes, types, and impacts of international terrorism.

Unit- IV: This unit would expand learners' knowledge about the goals related to food security and poverty alleviation within the SDG framework and the objectives and outcomes of major climate summits (e.g., COP meetings) and principles and practices of managing epidemics and natural disasters as well as strategies for preparedness, response, and recovery in the face of epidemics and natural disasters.

Course Content:

UNIT-I: Globalisation: Perspectives

a) Understanding Globalisation and its alternative perspectives
b) Global Economy: its significance & anchors of global political economy; IMF, World Bank, WTO, TNCs
c) Political Debates on Sovereignty & Territoriality

UNIT-II: Globalisation: Issues & Dimensions

a) Cultural &Technological Dimensions
b) Gender and Human Rights
c) Ecological Issues

UNIT-III: Issues of Global Commons

a) Proliferation of Nuclear Weapons: NPT, CTBT
b) International Terrorism& Counter Terrorism Measures
c) Crisis of Human Security: Refugee & Migration

UNIT-IV: Global Multilateral Governance

a) Sustainable Development Goals (SDGs): Food Security & Poverty Alleviation
b) Climate Summit, Energy Security& Solar Alliance
c) Management of Epidemic &Natural Disaster

Essential Readings:

- ✓ *Carter, N. (2007).* The politics of environment: Ideas, activism, policy. *Cambridge University Press.*
- ✓ *Dicken, P. (2007).* Global shift: Mapping the changing contours of the world economy. *The Guilford Press.*
- ✓ *Goldstein, J. (2006).* International relations. *Pearson.*
- ✓ *Heywood, A. (2011).* Global politics. *Palgrave-Macmillan.*
- ✓ *Kumar, A., & Messner, D. (Eds.). (2010).* Power shifts and global governance: Challenges from South and North. *Anthem Press.*
- ✓ *Narlikar, A. (2005).* The World Trade Organization: A very short introduction. *Cambridge University Press.*
- ✓ *O'Brien, R., Williams, M., Cottle, D., & Erskine, T. (2000).* Contesting global governance: Multilateral economic institutions and global social movements. *Cambridge University Press.*
- ✓ *Ritzer, G. (2010).* Globalization: A basic text. *Wiley-Blackwell.*
- ✓ *Steger, M. B. (2009).* Globalization: A very short introduction. *Oxford University Press.*
- ✓ *Viotti, P., & Kauppi, M. (2007).* International relations. *Pearson.*

Additional Readings:

- ✓ *Baylis, J., Smith, S., & Owens, P. (Eds.). (2011).* Globalization of World Politics: An Introduction to International Relations. *Oxford University Press.*
- ✓ *Beynon, J., & Dunkerley, D. (Eds.). (2012).* Globalisation: The Reader. *Rawat Publications.*
- ✓ *Cohn, T. H. (2009).* Global Political Economy. *Pearson.*
- ✓ *Ellwood, W. (2005).* The No-nonsense Guide to Globalization. *NI-Rawat Publications.*
- ✓ *Held, D., McGrew, A., Goldblatt, D., & Perraton, J. (1999).* Global Transformations: Politics, Economics and Culture. *Stanford University Press. (Original work published 1999).*
- ✓ *Lechner, F., & Boli, J. (Eds.). (2004).* The globalization reader. *Blackwell.*
- ✓ *Shimko, K. (2005).* International Relations: Perspectives and Controversies. *Houghton Mifflin.*
- ✓ *Vanaik, A. (Ed.). (2004).* Globalization and South Asia: Multidimensional Perspectives. *Manohar Publications.*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Global Policy Forum. https://www.globalpolicy.org/globalization.html
2. International Monetary Fund. (2002). Globalization: Threat or Opportunity?. IMF. https://www.imf.org/external/np/exr/ib/2000/041200to.htm
3. World Bank Group. World Bank. https://www.worldbank.org/en/region/globaloverview
4. WTO. Documents and Resources. https://www.wto.org/english/res_e/res_e.htm
5. United Nations Educational, Scientific and Cultural Organization (UNESCO). https://en.unesco.org/
6. United Nations Environment Programme (UNEP). https://www.unep.org/
7. Human Rights Watch. https://www.hrw.org/

Activities to do:

1. **Debate**: Divide students into groups and assign them different perspectives on globalization (e.g., neoliberal, anti-globalization, Marxist) and make them present their arguments in a debate format.
2. **Case Study Analysis**: Provide students with case studies of globalization's impact on different regions or industries. Ask them to analyse the positive and negative effects from various perspectives.
3. **Guest Speaker**: Invite a guest speaker who can provide firsthand insights into the effects of globalization on a specific community or industry.
4. **Multimedia Project:** Ask students to create multimedia presentations (videos, podcasts, infographics) highlighting the interconnectedness of globalization with cultural diversity, technological innovation, gender equality, and environmental sustainability.
5. **Field Trip or Virtual Tour:** Arrange a field trip or virtual tour to a local cultural centre, technology hub, gender rights organization, or environmental conservation site. Allow students to observe real-world examples and interact with practitioners in these fields.

Core XII

Comparative Politics

Course Objectives:

This course aims to familiarise students with basic concepts, methods and scope of comparative politics, different approaches with their strengths and weaknesses. The objective is to provide a deeper understanding of structures and functions of institutions in a comparative perspective. The course will examine politics in a historical framework while engaging with various themes of comparative analysis in developed and developing countries. The historical context of modern state, constitutional development and their political economy could be understood through an analysis of modern state and its processes of communication and culture.

Expected Learning Outcomes:

After the completion of the course, the learners will be able to understand the concept of comparative politics, different methods and approaches used to study comparative politics and also to evaluate some of the major policies in India. They would be aware about different development approaches and political regimes which distinguishes the political culture of developing countries from that of the developed countries. The unit-wise outcomes are given below.

Unit-I: This unit will aware the students about political systems, institutions, and their influence on behaviour, governance, and policy outcomes. It covers voting, public opinion, decision-making processes, rational choice theory, and the Interpretative Approach in comparative politics. Students will also learn about colonialism and decolonization, their historical, political, social, and cultural dynamics, and their significance in comparative politics.

Unit-II: The students can develop a comprehensive understanding of the modern nation-state in the Western context and its significance in comparative politics, including its political, economic, social, and cultural dimensions. Pupils can gain a thorough grasp of the Welfare State and its relevance in comparative politics, covering its evolution, challenges in the modern world, ideological underpinnings, historical antecedents, and policy implications. It helps the students to develop a comprehensive understanding of the state, ethnicity, nationalism, and nation-building in the developing world, including their historical roots, contemporary dynamics, and implications for governance, stability, and development.

Unit-III: The students may gain a comprehensive understanding of political culture, civic culture, political trust, social capital, post-materialism, and thesis of Huntington's clash of civilizations. This unit may enable the students to understand political communication, mass media's role in democratic societies, and media's influence on political attitudes and outcomes.

Unit-IV: This unit explores democratization, a process of regime transformation from authoritarian to democratic systems, analysing key features, drivers, and challenges, and identifying factors facilitating or hindering democratization. The students can develop a comprehensive understanding of the theoretical frameworks and debates surrounding

development and under-development, and their implications for policies and practices aimed at promoting global development and social justice.

Course Content:

Unit: I: Introduction

a) Approaches: Institutional and Neo-Institutional Approaches
   Behavioural Approach: Systems Theory and Structural Functionalism
   Rational Choice Approach, Interpretative Approach
b) Colonialism in Comparative Perspective, Decolonization

Unit: II: States and Nations

a) Modern Nation State in the West
   State Theories: Constitutional, Ethical and Moral, Conflict and Pluralist
b) The Welfare State: Emergence, Development and Challenges
c) The State in the Developing World; Ethnicity and Nationalism, Nation building in the developing world

Unit: III: Culture and Communication

a) Political Culture: Overview
   The Civic Culture, Political Trust and Social Capital
   Post Materialism, Huntington's Clash of Civilization
b) Political Communication, Mass Media and Democracy: Media influence, Social Media, impact of new technology

Unit- IV: Democratization and Development

a) Democratization: Regime Transformation, Democracy and Democratization, Waves of Democratization, Democratic consolidation, Role of Civil society in democracy
b) Theories of Development and Under-development: Political Development, Modernization, Under-development and Dependency, Globalization and Development

Essential Readings:

- ✓ *Howard, R. M. (2009). Culture in comparative political analysis. In M. Lichbach & A. Zuckerman (Eds.),* Comparative politics: Rationality, culture, and structure *(pp. 134-161). Cambridge University Press.*

- ✓ *Kopstein, J., & Lichbach, M. (Eds.). (2005).* Comparative politics: Interests, identities, and Institutions in a Changing Global Order. *Cambridge University Press.*
- ✓ *Landman, T. (2008).* Issues and methods in Comparative Politics: An Introduction. *Routledge.*
- ✓ *Mohanty, M. (1975). Comparative Political Theory and Third World Sensitivity. In* Teaching Politics. *pp. 22-38.*
- ✓ *Pennington, M. (2009). Theory, institutional and comparative politics. In J. Bara & M. Pennington (Eds.).* Comparative politics: Explaining democratic systems. *(pp. 13-40). Sage Publications.*
- ✓ *Rosamond, B. (2005). Political culture. In B. Axford, et al. (Eds.),* Politics. *(pp. 57-81). Routledge.*

Additional Readings:

- ✓ *Almond, G. A., Bingham Powell, G., Dalton, R. J., & Strom, K. (2009).* Comparative Politics Today: A World View *(9th ed.). Pearson India. ISBN: 978-0205585960.*
- ✓ *Andrews, W. G. (1961).* Constitutions & Constitutionalism. *D. Van Nostrand Company Inc.*
- ✓ *Bara, J. (2000). Methodologies for comparative analysis. In J. Bara, M. Pennington, D. S. Bell, J. A. J. Evans, C. Needham, B. O'Duffy, & D. Robertson (Eds.),* Comparative Politics: Explaining Democratic Systems. *SAGE Publications India Pvt Ltd.*
- ✓ *Bhambhri, C. P. (1975). Contemporary frameworks of comparative politics: A critique.* The Indian Journal of Political Science. 36*(4). 414-430.*
- ✓ *Burney, S. (2012). Chapter Two: Edward Said and postcolonial theory: Disjunctured identities and the subaltern voice.* Counterpoints. 417. *41-60. http://www.jstor.org/stable/42981699*
- ✓ *Caramani, D. (Ed.). (2023).* Comparative Politics *(6th ed.). Oxford University Press. ISBN: 978-0192846051.*
- ✓ *Carnes, M. E., & Mares, I. (2007). The welfare state in global perspective. In C. Boix & S. C. Stokes (Eds.),* The Oxford Handbook of Comparative Politics. *Oxford University Press.*
- ✓ *Hislope, R., & Mughan, A. (2012).* Introduction to Comparative Politics: The State and Its Challenges. *Cambridge University Press.*

- ✓ *Kamrava, M. (2008).* Understanding comparative politics: A framework for analysis. *Routledge. ISBN: 978-0415773041.*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Dr. Raghu B T. *Introduction to Comparative Government and Politics*. SWAYAM. https://onlinecourses.swayam2.ac.in/cec24_hs50/preview
2. Dr. Aijaz Ashraf Wani. *Political Processes and Institutions in Comparative Perspective.* SWAYAM. https://onlinecourses.swayam2.ac.in/cec24_hs98/preview
3. Kim, Y. C. (1964). The Concept of Political Culture in Comparative Politics. *The Journal of Politics. 26*(2). 313–336. https://doi.org/10.2307/2127599
4. eGyanKosh. *Comparative Politics: Issues and Trends*. *(MPS-004).* IGNOU. https://egyankosh.ac.in/handle/123456789/43906

Activities to do:

1. Ask the students to give summary or book reviews on any topic from this course.
2. Conduct Seminars/workshops on the topics mentioned in the course.
3. The students could be asked to give comparative essays or Multimedia presentation on different countries or different aspects of countries.

Core XIII

Indian Political Ideas-I

Course objective:

This course introduces the specific elements of Indian Political Thought spanning over two millennia. The basic focus of the study is on individual thinkers whose ideas are however framed by specific themes and within specific contexts. The course as a whole is meant to provide a sense of the broad streams of Indian thought while giving an understanding about specific knowledge of individual thinkers and texts. Selected extracts from some original texts are also given to discuss in class.

Expected Learning Outcome:

This course will enable students to gain a comprehensive understanding of the evolution of Indian political thought, its historical and contemporary relevance, and its role in shaping the socio-political landscape of the nation. This knowledge will enable them to critically engage

with the complex and dynamic nature of Indian politics and contribute to the ongoing discourse on the country's democratic and developmental trajectories.

Unit-I: The students will be able to understand and evaluate the political ideas and theories of Manu including his social laws and Kautilya with a focus on his theory of the state and foreign policy

Unit-II: This unit would familiarize the students about the political ideas of Barani, particularly theory of kingship and Abul Fazal's ideas on monarchy, and will enable them to evaluate their contributions to the Indian political thought.

Unit-III: This unit will enhance the understanding of students on political and social ideas of Ram Mohan Roy and Pandita Ramabai and their contributions in the field of social reforms.

Unit-IV: This unit will enable students to critically analyse the ideas of spiritual nationalism and universalism of Vivekananda, and Savarkar's concept of Hindutva.

Course Content:

Unit-I

a) Manu: Social Laws and Dharmic Government

b) Kautilya: Theory of State; Statecraft and Government

Unit-II

a) Barani: Theory of Kingship, Ideal Polity

b) Abul Fazl: Monarchy, Views on Administration

Unit-III

a) Ram Mohan Roy: Liberalism and Social Reforms

b) Pandita Ramabai: Gender and Social Reforms

Unit-IV

a) Swami Vivekananda: Ideal Society, Ideas on Hinduism

b) V. D. Savarkar: Hindutva, Nationalism

Essential Readings:

- ✓ *Altekar, A. S. (2002).* State and Government in Ancient India. *(3rd ed.). Motilal Banarsidass.*
- ✓ *Bayly, C. (2010). Rammohan and the advent of constitutional liberalism in India 1800-1830. In S. Kapila (Ed.),* An Intellectual History for India. *Cambridge University Press.*
- ✓ *Chakrabarty,Bidyut and Pandey, Rajendra K. (2009). Modern Indian Political Thought: Text and Context. SAGE Publications.*
- ✓ *Deutsch, Kenneth L. and Pantham, Thomas. (1986). Political Thought in Modern India. SAGE Publications.*
- ✓ *Guha, Ramachandra.(2013). Makers of Modern India. Harvard University Press.*
- ✓ *Habib, I. (1998). Ziya Barni's vision of the state.* The Medieval History Journal, 2*(1).*
- ✓ *Kangle, R. P. (1997).* Arthashastra of Kautilya-Part-III: A study. *Motilal Banarsidass.*
- ✓ *Mehta, V. R. (1996). Foundations of Indian Political Thought: An Interpretation from Manu to the Present Day. Manohar Publishers.*
- ✓ *Olivelle, P. (2006). Introduction. In* Manu's code of law: A critical edition and translation of the Manava-Dharmasastra. *Oxford University Press.*
- ✓ *Pantham, Thomas and Mehta, V.R. (2006). Political Ideas in Modern India: Thematic Explorations. SAGE Publications.*
- ✓ *Roy, Himanshu and Singh, M.P. (2017). Indian Political Thought. Pearson India.*
- ✓ *Sharma, R. S. (1991).* Aspects of Political Ideas and Institutions in Ancient *India*. *Motilal Banarsidass.*

Additional Readings:

- ✓ *Chakravarti, U. (2007).* Pandita Ramabai – a Life and a Time. *Critical Quest.*
- ✓ *Hess, L., & Singh, S. (Eds.). (2002).* The Bijak of Kabir *(pp. 3-35). Oxford University Press.*
- ✓ *Ramabai, P. (2000). Woman's place in religion and society. In M. Kosambi (Ed.),* Pandita Ramabai through her own words: Selected works. *Oxford University Press.*
- ✓ *Sarkar, S. (Ed.). (1985).* A critique on colonial India. *Papyrus.*

- ✓ *Spellman, J. (1964). Principle of statecraft. In J. Spellman (Ed.),* Political theory of ancient India: A study of kingship from the earliest time to circa AD 300 *(pp. 132-170). Clarendon Press.*
- ✓ *Vivekananda. (2007). The real and the apparent man. In S. Bodhasarananda (Ed.),* Selections from the complete works of Swami Vivekananda. *Kolkata: Advaita Ashrama.*

Internet Resources:

1. Yadav, N. Ziauddin Barani's Ideal Sultan and Ideal Polity. *Academia.edu.* http://www.academia.edu/37809718/Ziauddin-Baranis_Ideal-Sultan-and-Ideal-Polity
2. Savarkar, V.D. *Essentials of Hindutva*. Savarkar.org. https://savarkar.org/en/encyc/2017/5/23/2_12_12_04_essentials_of_hindutva.v001.pdf_1.pdf
3. Prof. Jha, Mithilesh Kumar. *Introduction to Modern Indian Political Thought.* SWAYAM. https://onlinecourses.nptel.ac.in/noc22_hs15/preview
4. Mukherjee, Jhumpa. (2021). *Indian Political Thought*. SWAYAM. https://onlinecourses.swayam2.ac.in/cec21_hs41/preview
5. eGyanKosh. *Indian Political Thought- I (BPSC- 112).* IGNOU. https://egyankosh.ac.in/handle/123456789/84756
6. eGyanKosh. *Indian Political Thought- II (BPSC- 114).* IGNOU.https://egyankosh.ac.in/handle/123456789/89372

Activities to do:

1. Conduct seminars and lectures on seminal ideas propagated by the thinkers mentioned.
2. Arrange movie session to show biopics on the above thinkers and ask students to write a summary of that.
3. Conduct group discussions on relevance of ideas of the above-mentioned thinkers in the present days. For instance, "Manu's ideas are regressive and outdated for the present-day India society".

Core XIV **Semester-VI**

India's Foreign Policy

Course Objectives:

This course has been designed to provide the students with critical insights into the different Determinants, the fundamental goals, and numerous dimensions of India's foreign policy. It engages in the areas of economic, political, diplomatic, and strategic relations with major powers like the USA, Russia, and China. It aims to highlight the need for promoting peace and stability in the South Asian countries. The ambition to become a global power can never be accomplished without having strong ties with the regional organizations. Further, India's presence in different regional organizations has not only strengthened its global presence, it has also enhanced diplomatic possibilities. To further enhance India's aim to pursue strategic

autonomy, this course attempts to study India's foreign policy like SAARC, BIMSTEC, G20+, QUAD, SCO.

Expected Learning Outcomes: After completion of the course, students will be able to understand the foreign policy of India in the changing time, its relationship with major powers as well as its engagement with the neighbours and regional powers. The unit-wise outcomes are given below.

Unit-I: This unit would benefit the students by providing a background understanding about evolution of India's foreign policy & also about some pivotal factors that play a very significant role in formulation of India's foreign policy.

Unit-II: This unit would make the students understand about different dimension of India's relationship with the major powers.

Unit-III: This unit is meant to provide broad ideas to the students about India's relationship with prominent South Asian nations in the field of culture, trade & politics.

Unit-IV: This unit, with an emphasis on existence and relevance of important regional organisations, will help the students to understand the significant role of India in the global context in coordinating the member states.

Course Content:

Unit-I: India's Foreign Policy in a Changing World

a) Evolution of India's Foreign Policy
b) Major Bases & Determinants
c) Idealism, Realism, and pragmatism in India's Foreign Policy

Unit-II: Relationship with Major Powers: Political, Economic, Strategic

a) India's relationship with USSR/Russia
b) India's relationship with USA
c) India's relationship with China

Unit-III: Relationship with South Asian Countries

a) Relationship with Pakistan
b) Relationship with Nepal & Bangladesh
c) Relationship with Sri Lanka & Afghanistan

Unit-IV: India and Regional Organisations

a) SAARC, BIMSTEC
b) BRICS, SCO
c) QUAD, G20+

Essential Readings:

- ✓ Bishwakarma, J. K., & Hu, Z. (2022). Problems and prospects for the South Asian Association for Regional Cooperation (SAARC). *Politics & Policy*, *50*(1), 154-179.
- ✓ Dutt, V. P. (2009). *India's Foreign Policy in a Changing World*. Vikas Publishing House.
- ✓ Ganguli, S. (2019) *India's Foreign Policy*. Oxford University Press.
- ✓ Ghosh, P. (2020). *International Relations*. PHI learning pvt. Ltd.
- ✓ Jaishankar, S. (2020). *The India way: Strategies for an uncertain world*. HarperCollins Publishers, India.
- ✓ Khana V. N. (2018). *Foreign policy of India*. Vikas Publishing House.
- ✓ Khurshid, I. (2023). Modi's US foreign policy: Strategic autonomy redefined. *Journal of Asian and African Studies.* https://doi.org/10.1177/00219096231173395
- ✓ Malone, D. M. (2011). *Does the Elephant Dance? Contemporary Indian Foreign Policy*. Oxford University Press.
- ✓ Melone, D.M., Mohan, C.R., Raghavan, S. (2017). *The Oxford Handbook of India's Foreign policy.* OUP Oxford.
- ✓ *Muni, S. D. (2020). India's "Neighbourhood First" Policy and the Chinese Challenge: The cases of Bangladesh, Nepal, and Sri Lanka. In India's Great Power Politics (pp. 103-121). Routledge India.*
- ✓ *Nehru, J. (1963). Changing India. Foreign Affairs, 41(3), 453-465.*
- ✓ *Sikri, R. (2014). Challenge and strategy: rethinking India's foreign policy. Indian Foreign Affairs Journal, 9(1), 56-69.*

- ✓ *Singh, P. (2022). International Relations. McGraw Hill.*
- ✓ *Stuenkel, O. (2020). The BRICS and the future of global order. Rowman & Littlefield.*
- ✓ *Tharoor, S. (2013). Pax Indica: India and the world of the twenty-first century. Penguin UK.*

Additional Readings:

- ✓ *Gupta, S., Mullen, R. D., Basrur, R., Hall, I., Blarel, N., Pardesi, M. S., & Ganguly, S. (2019). Indian foreign policy under Modi: a new brand or just repackaging? International Studies Perspectives, 20(1), 1-45.*
- ✓ *Jaishankar, D. (2020). The Australia-India Strategic Partnership: Accelerating Security Cooperation in the Indo-Pacific. Lowy Institute.*
- ✓ *Mukherjee, R., & Malone, D. M. (2011). Indian foreign policy and contemporary security challenges. International Affairs, 87(1), 87-104.*
- ✓ *Nayak, S. (2024). A Sub-Regional Resuscitation in South Asia: Enlivening the BIMSTEC. In The Routledge Handbook of South Asia (pp. 311-325). Routledge India.*
- ✓ *O'Donnell, F., & Papa, M. (2021). India's Multi-Alignment Management and The Russia–India–China (RIC) Triangle. International Affairs, 97(3), 801-822.*
- ✓ *Pardesi, M. S., & Ganguly, S. (2020). India and energy security: A foreign policy priority. In Indian Foreign Policy in a Unipolar World (pp. 99-127). Routledge India.*
- ✓ *Sajjanhar, A. (2022). India and Shanghai Cooperation Organization. Indian Foreign Affairs Journal, 17(3/4), 190-204.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. For distinguished lectures, visit by diplomats and foreign policy experts, policy documents and documentaries, visit https://www.mea.gov.in/
2. India's relationship with Pakistan. https://www.britannica.com/place/Kashmir-region-Indian-subcontinent/The-Kashmir-problem
3. G20. https://www.g20.org/en/about-the-g20
4. Ignososs. (2021, August 11). *Approaches to the Study of India's Foreign Policy* [Video]. YouTube. https://www.youtube.com/watch?v=tXfIF2unIvM

5. CEC. (2015a, January 7). *Determinants, Principles & Objectives of India's Foreign Policy* [Video]. YouTube. https://www.youtube.com/watch?v=czhhd4uUxfc

Activities to do:

1. Seminar & workshop- Organise different seminars and workshops on different dimensions of India's Foreign Policy.
2. Debate on current development- Conduct debate among the students on current development issues relating to India's foreign policy.
3. Project work –Ask the students to gather information from different sources for the preparation and presentation of project paper.
4. Enlist the foreign policy thinktanks active in India.

Core XV

Government and Politics in Odisha

Course Objectives:

This course aims to provide students with a comprehensive understanding of the political landscape at the provincial level, focusing on the state of Odisha. By delving into the socio-political history of the region, including resistance movements for provincial autonomy, learners will grasp the contextual background shaping contemporary politics. The course attempts to study the political structure and process in Odisha, while reflecting on the role of CM in Odisha politics. Additionally, it seeks to analyze the growth and development of political parties, coalition politics, electoral trends in Odisha. The course investigates the intricate interplay of caste, class, gender, and tribe in Odisha's political arena to sharpen the understanding on inclusive development in the context of Odisha. Further, the course critically examines grassroot movements led by marginalized communities, offering insights into their agency within the political landscape of Odisha.

Expected Learning Outcomes:

The course intends to develop a nuanced understanding of political dynamics and political leadership in Odisha, fostering critical insights into its socio-economic fabric and governance paradigms which shape the discourse of development in Odisha. The unit-wise outcomes are given below.

Unit-I: This unit would help in developing a basic understanding of the demographic and economic profile of the state. Further, the awareness about the creation of Odisha as a separate province and other political movements in the pre-independence period would enable the learners to gain critical insights on political developments in Odisha in the post-independence period.

Unit-II: The understanding of political leadership along with the political parties, electoral trends and patterns, regionalism, coalition politics etc. would enable learners to critically analyze the political dynamics and political culture in Odisha.

Unit-III: The knowledge of social cleavages e.g., Class, Caste, Tribe and Gender and their role in shaping the larger spectrum of politics as well as state's response to the aspirations of people through various interventions and policy initiatives would develop learners' capacity to analyze socio-political factors and government's role on the path of inclusive development.

Unit-IV: This unit would enable the learners to understand the significance of people's movement in shaping the state politics. This will enable them to appreciate the engagement of people in the democratic framework and the role of dissent in preserving the voices from the margins. Further, it will equip them with insights to formulate policies catering to the needs and aspirations of every section of the society.

Unit-I: Background of Odisha Politics

a) Land and the People: Demography and Economy
b) Odia Nationalism and Emergence of Odisha as a separate province
c) Odisha in Nationalist movement, Praja Mandal movement, Communist and Socialist movements

Unit-II: Political Structure and Process in Odisha

a) Role of Chief Minister in Odisha Politics

b) Growth and development of political parties: National and Regional parties, Pattern of Coalition politics in Odisha, Regionalism in Odisha Politics
c) Electoral Trends and patterns of electoral behaviour in Odisha

Unit-III: Social Structure, Development and Politics

a) Role of Class, Caste, Tribe, and Gender in Politics
b) Role of State in Development: Industrial and Mining Policies
c) Social Welfare policies in Odisha: Poverty alleviation programmes, Self-Help Groups

Unit IV: Dynamics of People's Movements in Odisha

a) Tribal Development: Tribal Advisory Council, Integrated Tribal Development Agency, Implementation of Forest Right Act, 2006
b) Development and Dispossession: Anti-displacement movements, Naxalite movement
c) Women's Movement, Dalit Movement and Tribal Movement

Essential Readings:

- ✓ *Das, B. (2022). Political history of Modern Odisha. BK publication,*
- ✓ *Ghosh, S. (1979). Odisha in Turmoil: A Study of Political Developments. Book land International, Bhubaneswar.*
- ✓ *Jena, B. B. and Baral, J.K. (1988). Government and politics in Odisha. Print House (India).*
- ✓ *Mohanty, M. (2004). Caste, Class and Gender. SAGE Publications.*
- ✓ *Nanda, S. (1979). Coalition Politics in Odisha. Sterling Publishers.*
- ✓ *Padhi, A.P. (1985). Indian State politics: A case study of Odisha. B.R. Publishing Corporation.*
- ✓ *Rout, B.C. (2006). The State govt and administration in Odisha. Panchashila publication.*

Additional Readings:

- ✓ *Bhuyan, D. (2010). Orissa Politics from 1936 to Contemporary Politics. Mangalam Publications.*
- ✓ *Das, H. and Choudhury, B.C. (1990). Federal and State Politics in India. Discovery Publication.*
- ✓ *De Haan, A. & Dubey, A. (2005). Poverty, disparities or the development of underdevelopment in Orissa. Economic & Political Weekly,40(22–23), 2321–2329.*
- ✓ *Mishra, P. (2020). Language and the Making of Modern India: Nationalism and the Vernacular in Colonial Odisha. Cambridge University Press.*
- ✓ *Narain, I. (ed.) (1967). State Politics in India. Meenakshi Prakashan.*
- ✓ *Pai, S. (2000). State Politics: New Dimensions. Shipra Publishers.*
- ✓ *Pai, S. (Ed.) (2013). Handbook of Politics in Indian states regions, Parties and Economic Reform. Oxford University Press.*

Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Behera, M., & Padhi, S. R. (2022). Tribal Movements against Mining-induced Displacement in Odisha: The Case of Dongria Kondh's Niyamgiri Movement. *The Oriental Anthropologist*. https://doi.org/10.1177/0972558X221096265
2. Das, B. C. (1978). Government and Politics in Orissa Since Independence- An Overview. *The Indian Journal of Political Science*, *39*(3), 438–457. http://www.jstor.org/stable/41854862
3. Dash, S. C. (1965). Government and Politics in Orissa. *The Indian Journal of Political Science*, *26*(4), 83-100. http://www.jstor.org/stable/41854126
4. Government of Odisha. *Brief History of Odisha Assembly*. Government of Odisha.https://cms.neva.gov.in/FileStructure_OR/FooterCommonContent/77d847da-136e-4a65-a0cf-a281e154ac84.pdf
5. Jena, B. B. (1994). Orissa Politics. *The Indian Journal of Political Science*, *55*(3), 285–298. http://www.jstor.org/stable/41855700

Activities to do:

1. Explore the assembly debates, questions asked, various committee reports on Odisha E-Vidhan Application available at https://odisha.neva.gov.in/Home/DigitalLibrary
2. Conduct ground-level interviews to learn about the consciousness of people about various welfare policies and programmes.
3. Conduct Model assembly in your classrooms to understand the working of the state legislative assembly and working of the government.
4. Conduct story/documentaries sessions on the Founding Fathers of Odisha, People's movements, success of women Self Help Groups in Odisha.

Core XVI **Semester -VII**

Contemporary Political Theory

Course Objectives:

The time we live in is truly fascinating. Political theory is what we turn to in order to make sense of and possibly even alter our times. The ideas and guidelines we employ to analyse, interpret, and assess political events are laid forth in political theory. This course attempts to construct those political ideas which explain the problems of contemporary times and address those problems. First, it intends to make students aware of the political issues which emerge from the interaction between individual and community. Community and identity politics are two important aspects of political life. This course familiarizes students with political ideas in a community context. New forms of political communication have significantly affected societies. For example, impact of AI on political decisions, impact of technology in election management are something that traditional political actors like state and individual just

cannot imagine. The course then proceeds to analyse the changing dimensions of freedom and justice in the context of a new technocratic society. Further, the issues of climate change and how it needs to be part of any theory building exercise is something that a student of political science should be aware of. Traditionally justice was seen as one of the most important aspects of any political study. However, justice was always understood in the context of the state. With large scale migration and the evolution of a global society, the traditional justice framework needs to change.

Expected Learning Outcome:

The course would enable students to clearly present their own arguments and thoughts about contemporary issues and develop ideas to engage with the latter. The unit-wise outcomes are given below.

Unit-I: The students will be able to understand, explain and analyse the dynamic interaction between individual and community and how different contesting political ideas are settled in a political system

Unit-II: This will cultivate analytical skills among students on new forms of communication and technological development affect the issues of freedom and justice.

Unit-III: The students will be able to explain emerging political issues like citizenship, pandemics in a global context

Unit-IV: The students will develop understanding on the framework of justice in a global perspective.

Course Content:

Unit-I: Individual and Community

a) Individualism and Claims of Community
b) Politics of Identity
c) Demands for Equality, Recognition and Group Rights
d) Politics of Difference

Unit-II: Emerging Issues in Freedom and Justice

a) AI and its impact on Political Community
b) Technology and its impact on Election and Democratic Process

c) Digital Technologies and its control over individual's freedom and justice

Unit-III: Global Challenges

a) Anthropomorphism and the politics of Global Climate Change
b) Citizenship and State Boundaries
c) The Politics of Global pandemics

Unit-IV: Global Justice

a) Cosmopolitanism and Justice
b) Distributive Justice at Home and Abroad

Essential Readings:

- ✓ *Bhargava, R., & Acharya, A. (Eds.). (2008).* Political theory: An introduction. *New Delhi: Pearson Longman.*
- ✓ *Casal, P., & William, A. (2008). Equality. In C. McKinnon (Ed.),* Issues in Political Theory *(pp. 149-165). Oxford University Press.*
- ✓ *Jha, M. (2001). Ramabai: Gender and caste. In M. P. Singh & H. Roy (Eds.),* Indian Political Thought: Themes and Thinkers. *Pearson.*
- ✓ *Menon, N. (2008). Gender. In R. Bhargava & A. Acharya (Eds.),* Political theory: An introduction *(pp. 224-235). New Delhi: Pearson Longman.*
- ✓ *Riley, J. (2008). Liberty. In C. McKinnon (Ed.),* Issues in political theory *(pp. 103-125). New York: Oxford University Press*

Additional Readings:

- ✓ *Isin, F. E., & Turner, B. S. (Eds.). (2002).* Handbook of citizenship studies. *Sage Publications.*
- ✓ *Rawls, J. (1971).* A Theory of Justice. *Oxford University Press.*
- ✓ *Sandel, M. (1982).* Liberalism and the Limits of Justice. *Cambridge University Press.*
- ✓ *Sen, A. (1999).* Development as freedom. *New Delhi: Oxford University Press.*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Sicakkan, Hakan. (2005). Politics of Identity and Modes of Belonging. An Overview of the Conceptual and Theoretical Challenges. *ResearchGate*. https://www.researchgate.net/publication/273316580_Politics_of_Identity_and_Modes_of_Belonging_An_Overview_of_the_Conceptual_and_Theoretical_Challenges
2. Wirtschafter, Valerie. (2024, January 30). The impact of generative AI in a global election year. *Brookings*. https://www.brookings.edu/articles/the-impact-of-generative-ai-in-a-global-election-year/
3. PhilArchive Articles on Philosophy. https://philarchive.org/

Activities to do:

1. Students are encouraged to visit any tribal village to know how they understand their rights. They are expected to write their opinion on questions like, “Is there any difference between our understanding and their understanding of rights?”
2. Let the students explore new ideas and present those through multimedia presentations. For instance: Identifying the technologies affecting the election process in India; Studying how technology has compromised privacy and permeated their individual space; Mentioning the changes witnessed in the society and politics because of the multinational companies; Whether the state control has increased in the private spheres of individuals and if yes, let them explain how it is evident in different aspects of life.
3. Let the students conduct surveys on how the COVID-19 pandemic has changed their lives, livelihoods, and the state’s response to it. Let them identify the gaps between poor and rich households as well as rural and urban households in accessing education, health, and other amenities during the COVID-19 lockdown.

Core XVII

Research Methodology

Course Objectives:

This course establishes a foundational understanding of the fundamental concepts and methodologies integral to the study of research methodology. It helps to acquaint students with the basics of research methods, techniques, and approaches and to assist in the accomplishment of exploratory as well as result-oriented research studies. The students will be able to identify the research problem and start asking the right questions with the aim of improving their ability to make logical arguments. In addition to familiarizing the students to learn various research techniques (qualitative and quantitative), the course will also train the students in the process of writing various academic and popular writings.

Expected Learning Outcomes: This course would train the students in shaping and developing their research skills through a systematic learning framework. The unit-wise outcomes are given below.

Unit-I: This unit will give the students a basic understanding about research, its nature and characteristics, types as well as the relevance of research in general and social science research in particular.

Unit-II: After reading this unit, the students will learn about the basic components of a research such as identification of research area, Review of Literature, formulation of Hypothesis, variables etc. which are minimum requirement of any research.

Unit-III: This unit will introduce the students to the practical aspect of the research by making them familiar with sampling and its various types as well as various techniques of data collection.

Unit-IV: The students will develop their analytical skill when they engage in analysis of different types of data collected from both primary and secondary sources by using different tools like tabulation, graph charts etc. The students will also learn about Report Writing, Referencing Style and Citation Style that will be helpful during their higher studies.

Course Content:

Unit-I: Understanding Research

a) Philosophy of Social Science Research
b) Characteristics of Scientific Research
c) Types of Research: Quantitative and Qualitative, Content Analysis

Unit-II: Research Design

a) Identification of Research Problem
b) Review of Literature
c) Formulation of Hypothesis
d) Variables, Types of Variables

Unit-III: Sampling and Data Collection

a) Probability Sampling: Simple Random Sampling, Stratified Random Sampling, Cluster Sampling
b) Non-probability Sampling: Quota Sampling, Accidental Sampling, Judgmental Sampling or Purposive Sampling, Expert Sampling, Snowball Sampling
c) Data Collection Methods: Observation, Questionnaire, Interview and Focus Group Discussion

Unit-IV: Data Analysis and Report Writing

a) Quantitative and Qualitative Data analysis
b) Tabulation and Co-relation
c) Report Writing, Citation Style

Essential Readings:

- ✓ *Ahuja, R. (2001). Research Method. Rawat Publication.*
- ✓ *Dhiman, A. K., & Dhiman, S. C. (2002). Research Methodology. Ess Ess Publication.*
- ✓ *Goode, W. J., & Hatt, P. K. (1952). Methods in Social Research. McGraw-Hill.*
- ✓ *Kothari, C. R., & Garg, G. (2019). Research Methodology: Methods and Techniques (4th ed.). New Age International Publisher.*

- ✓ *Kumar, R. (2023). Research Methodology: A Step-by-Step Guide for Beginners (4th ed.). Sage Publications.*

Additional Readings:

- ✓ *Babu, G. R. (2008) Research Methodology in Social Sciences. Concept Publishing Company Pvt. Ltd.*
- ✓ *Gerring, J. (2004). What is a case study and what is it good for? American Political Science Review, 98(2), 341-352.*
- ✓ *Gupta, M., & Gupta, D. (2011). Research Methodology. PHI Publications.*
- ✓ *Kuhn, T. (2012). The Structure of Scientific Revolutions (50th ed.). University of Chicago Press.*
- ✓ *Mishra, S. B., & Alok, S. (2011). Handbook of Research Methodology: A Compendium for Scholars & Researchers. Educreation Publishing.*
- ✓ *Patil, S. A. (2016). Research Methodology in Social Sciences. New India Publishing Agency.*
- ✓ *Priya, L. S., & Easwari, S. R. (n.d.). Research Methodology. Charulatha Publications.*
- ✓ *Ramachandra, P. (1971). Training in Research Methodology in Social Sciences in India. Tata Institute of Social Sciences.*
- ✓ *Thakur, H. K. (n.d.). Research Methodology in Social Sciences (A Short Manual). Covette Press.*

Activities to do:

1. Assign different topics to the students and ask to do Review of Literature by identifying relevant literature from their Text Books.
2. Students can be asked to collect data about observation of socio-cultural/political events by local communities in their locality using observation method.
3. Ask the students to write a report on any major problem of your locality and submit an assessment report on the same.

Core XVIII

Public Policy and Governance in India

Course Objectives:

This course aims at providing a basic understanding of public policy, policy making process and institutions involved in public policy making in India. Public Policies reflect the objectives and directions of the government. An organized and integrated policy structure symbolizes an efficient and effective governance system. The learners will gain insights into the development of public policy as a major determinant of Governance, understand various theories and approaches towards policy making, identify different types and stages of public policy, and note the emerging trends and goals in public policy in current times. The course is designed to offer theoretical knowledge of policy process as well as a practical opportunity to apply the tools and models in analysis of a prevailing public policy.

Expected Learning Outcomes:

This course will enable the learners to analyse various approaches to policy making, examine the policy processes and also evaluate some of the major policies in India. The unit-wise outcomes are given below.

Unit-I: This unit dealing with an introduction to public policy, different approaches and theories in policy making will enable the learners to have a theoretical understanding of what and how of public policy. The learners will be able to locate the public policy mechanism within the overall governance system.

Unit-II: After going through this unit, the learners will have a comprehensive idea on policy cycle and various types of public policy. Identifying the processes involved at each stage, the

learners should be able to examine the current policy structure and analyse different policies against an ideal policy making model.

Unit-III: This unit will highlight the agencies involved in process of policy formulation and implementation in India. The learners will assess the roles of various governmental and non-governmental agencies in public policy in India and identify the strengths and gaps in Indian governance system. Analytical tools like Cost-Benefit Analysis, SWOT analysis will strengthen critical and objective insights towards policy analysis.

Unit-IV: This unit is designed to offer the learners a practical experience in policy analysis. By the completion of the earlier units, the learners are expected to have sufficient theoretical knowledge to attempt analysis of a selected policy from given sectors. Through this unit, the learners will have the opportunity to apply the analytical tools and models in evaluating a policy under the guidance of a teacher. It will polish their analytical skills and prepare them for opportunities in industry and research organizations involving similar activities.

Course Content:

Unit-I: Introducing Public Policy

a) Public Policy: Meaning, Definitions, and Significance
b) Approaches to Public Policy: Lasswell's Policy Science, Lindblom's Incrementalism, Dror's Normative-Optimum Approach
c) Public Policy Theories: Elite Theory, Systems Theory, Rational-Choice Theory

Unit-II: Policy Cycle and Analysis

a) Types of Public Policy: Regulatory, Distributive, Redistributive, Constitutional, and Substantial Public Policies
b) Stages of Public Policy: Agenda Setting, Formulation, Adoption, Implementation, and Evaluation
c) Policy Analysis: Cost-Benefit, SWOT, Stakeholder Analysis

Unit-III: Public Policy in India

a) Institutions for Policy Formulation: Legislature, Executive and Judiciary
   Agenda Setters: Corporate Sector, Civil Society Organizations, International Agencies
b) Policy Implementation: Bureaucracy, Local Bodies, Non-Governmental Organisations
c) Impact of Global Goals on Public Policy: MDGs, SDGs, HDI, GDI

Unit-IV: Experiential Learning in Public Policy

a) Poverty Alleviation Programmes: MGNREGA
b) Citizen-centric Accountability: RTI, Citizens' Charter, ORTPS
c) E-Governance Initiatives: Jana Seva Kendra
d) Public Health: ASHA
e) Promoting Civil Society Initiatives: Mission Shakti

Essential Readings:

- ✓ *Arora, R. K. (2006). Public Administration in India: Continuity and Change. Rajat Publications.*
- ✓ *Chakrabarti, R., & Sanyal, K. (2016). Public policy in India. Oxford India.*
- ✓ *Chakrabarty, B., & Chand, P. (2015). Public policy: Concept, Theory and practice. SAGE.*
- ✓ *Mathur, K. (2015). Public policy and Politics in India: How Institutions Matter. Oxford University Press.*
- ✓ *Sapru, R. K., & Sapru, Y. (2019). Public policy: Formulation, Implementation and Evaluation. Sterling Publications.*

Additional Readings:

- ✓ *Anderson, J. E. (2006). Public Policy-making: An introduction. Houghton.*
- ✓ *Dahl, R., & Lindblom, C. (1976). Politics, Economics and Welfare. Harper.*
- ✓ *Drèze, J. (Ed.). (2016). Social policy. Orient Blackswan.*
- ✓ *Drèze, J., & Sen, A. (2013). An Uncertain Glory: India and Its Contradictions. Penguin Books Limited.*
- ✓ *Ganapathy, R. S. (Ed.). (1985). Public Policy and Policy Analysis in India. Sage Publications.*
- ✓ *Kapur, D., Mehta, P. B., & Vaishnav, M. (2017). Rethinking public institutions in India. Oxford University Press.*
- ✓ *Malhotra, R. (2014). India public policy report 2014: Tackling Poverty, Hunger and Malnutrition. Oxford University Press.*
- ✓ *Mathur, K. (2019). Recasting Public Administration in India: Reform, Rhetoric and Neo-Liberalism. Oxford University Press.*

- ✓ *Moran, M., Rein, M., & Goodin, R. E. (Eds.). (2008). The Oxford Handbook of Public Policy. Oxford University Press.*
- ✓ *Stone, D. (2012). Policy paradox: The Art of Political Decision Making. WW Norton.*
- ✓ *Waterman, R., & Wood, B. (1993). Policy Monitoring and Policy Analysis. Journal of Policy Analysis and Management, 12(4), 685-699.*

Internet Resources:

1. NITI. Best practices in social sector. A Compendium 2023. https://www.niti.gov.in/sites/default/files/2023-05/Best-Practices.pdf
2. Curriculum on Governance for the Sustainable Development Goals-UNPAN: https://unpan.un.org/capacity-development/curriculum-on-governance-for-the-SDGs
3. IGNOU session on Introduction to Public Policy: https://www.youtube.com/watch?v=GM0S1dGD3JY&ab_channel=IGNOUHelp
4. Self-Learning Material, Distance Education, University of Jammu: https://www.distanceeducationju.in/pdf/405%20PUBLIC%20POLICY.pdf
5. MOOCs on Public Policy offered through SWAYAM
   Public Policy-An Introduction.
   https://onlinecourses.SWAYAM2.ac.in/ugc19_hs45/preview
6. Public Policy & Governance. SWAYAM
   https://onlinecourses.SWAYAM2.ac.in/cec23_hs02/preview

Activities to do:

1. Choose a specific scheme/ project of the government and prepare a report assessing its success in your locality.
2. Organize a community outreach programme collaborating with a local NGO and sensitize people on RTI Act.
3. Make an assessment of any policy/project of the government through policy analysis models you learned in this course.
4. Conduct an interview of an ASHA from your locality and write a note on the interview specifying experiences, challenges, and significance of the activists.

Core XIX

Indian Political Ideas-II

Course Objective:

This section of the Indian Political Traditions course aims to provide students with a comprehensive understanding of the dynamics and contemporary relevance of political thought and practices in India. This course aims to examine the evolution of Indian political thought in the modern era, focusing on key thinkers who have contributed to shaping India's political landscape. Through critical analysis of their ideas, students will gain insights into contemporary political debates and challenges facing Indian society.

Expected Learning Outcome:

This course will help the learners explore the ideas of the modern political thinkers whose ideas have shaped the modern India. They would also get insights on Odia nationalism, reforms in Odia society and socio-economic ideas propagated by eminent Odia political thinkers. The unit-wise outcomes are given below.

Unit-I: This unit evaluates and critically analyzes the political ideas and perspectives of Rabindranath Tagore's views on education, nationalism and Internationalism vis-à-vis Sri Aurobindo's concept of nationalism.

Unit-II: This unit analyzes and evaluate the political ideas of Mohandas Karamchand Gandhi, Bhim Rao Ambedkar

Unit-III: This Unit throws light on the political ideas of Jawaharlal Nehru and on modern education and social reforms, democratic socialism, and socialism & M.N. Roy's Marxism and new humanism.

Unit-IV: This unit dives into the Odia nationalism and socio-economic ideas depicted in the work s of Madhusudan Das and Gopabandhu Das.

Course Content:

Unit -I:

a) **R N Tagore:** Education, Views on Nationalism and Internationalism

b) **Sri Aurobindo:** Spiritual Nationalism, Political Goal and Techniques

Unit -II:

a) **M.K. Gandhi:** Nonviolence, Swaraj, Satyagraha, Trusteeship

b) **B.R. Ambedkar:** Annihilation of Caste, Social Justice and Social Democracy

Unit -III:

a) **M.N. Roy**: Marxism and New-Humanism

b) **J.L. Nehru:** Socialism, Secularism, Internationalism

Unit -IV:

a) **Madhusudan Das:** Odia Nationalism, Socio-economic Ideas

b) **Gopabandhu Das:** Nationalism, Reforms and Education

Essential Readings:

- ✓ ***Ambedkar, B.*** *(1991). 'Constituent Assembly Debates', in S. Hay (Ed.).* Sources of Indian Tradition, Vol. 2. (Second Edition). *Penguin, pp. 342-347.*
- ✓ ***Dalton, D.*** *(1982)* Indian Idea of Freedom: Political Thought of Swami Vivekananda, Aurobindo Ghose, Mahatma Gandhi and Rabindranath Tagore. *The Academic Press, pp. 154-190.*
- ✓ ***Gandhi, M.*** *(1991) 'Satyagraha: Transforming Unjust Relationships through the Power of the Soul', in S. Hay (ed.),* Sources of Indian Tradition, Vol. 2. Second Edition. *Penguin, pp. 265-270.*
- ✓ ***Mungekar, B.*** *(2007). 'Quest for Democratic Socialism', in S. Thorat and Aryana (eds.),* Ambedkar in Retrospect - Essays on Economics, Politics and Society. *IIDS and Rawat Publications, pp. 121-142.*
- ✓ ***Nehru, J.*** *(1991). 'Selected Works', in S. Hay (ed.),* Sources of Indian Tradition, Vol. 2. (Second Edition). *Penguin, pp. 317-319.*

- ✓ ***Parel, A.*** *(ed.) (2002). 'Introduction', in* Gandhi, Freedom and Self Rule, *Delhi: Vistaar Publication.*
- ✓ ***Radhakrishnan, M., and Debasmita*** *(2003) 'Nationalism is a Great Menace: Tagore and Nationalism', in P. Hogan, Colm and L. Pandit (eds.),* Rabindranath Tagore: Universality and Tradition. *Rosemont Publishing and Printing Corporation, pp. 29-39.*
- ✓ ***Rodrigues, V.*** *(2007). 'Good society, Rights, Democracy Socialism', in S. Thorat and Aryama (eds.),* Ambedkar in Retrospect - Essays on Economics, Politics and Society. *IIDS and Rawat Publications.*
- ✓ ***Sharma, J.*** *(2003).* Hindutva: Exploring the Idea of Hindu Nationalism. *Penguin, pp. 124-172.*
- ✓ ***Tagore, R.*** *(1994). 'The Nation,' in S. Das (ed.),* The English Writings of Rabindranath Tagore, Vol. 3. *Sahitya Akademi, pp. 548-551*.

Additional Readings:

- ✓ ***Keer, D. H.*** *(1966).* Veer Savarkar. *Popular Prakashan, pp. 223-250.*
- ✓ ***Mehta, V., and Pantham, T.*** *(eds.) (2006).* Political ideas in modern India: Thematic Explorations. *Sage, pp. 73-92.*
- ✓ ***Nandy, A.*** *(1994). 'Rabindranath Tagore & Politics of Self', in* Illegitimacy of Nationalism. *Oxford University Press, pp. 1-50.*
- ✓ ***Panthams, T., and Deutsch****, K. (eds.) (1986).* Political Thought in Modern India. *Sage Publications.*
- ✓ ***Terchek, R.*** *(2002). 'Gandhian Autonomy in Late Modern World', in A. Parel (ed.),* Gandhi, Freedom and Self Rule, *Delhi: Sage, pp. Pages.*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. The Politics of Oriya Nationalism, 1866-1936, available at: http://www.academia.edu/45089284/The-Politics-of-Oriya Nationalism-1866-1936
2. Selected works of Jawaharlal Nehru. https://nehruselectedworks.com/

3. Collected Works of Mahatma Gandhi. https://www.mkgandhi.org/cwmg.htm ;
4. Complete works of Rabindranath Tagore. https://www.rljdmcdavpselibrary.com/books/rabindranath.pdf
5. Works of Baba Saheb Ambedkar. http://gbl.bbau.ac.in/index.php/our-services/collected-works-of-dr-ambedkar

Activities to do:

1. Let the students read the original writings of the above-mentioned thinkers on various issue and give a presentation on the same.
2. Conduct Seminars and lectures on the seminal ideas of the above mentioned thinkers.
3. Arrange movie sessions to show them the biopics made on the above thinkers and ask them to write the summaries.
4. Students should be encouraged to visit museums/Ashrams portraying the ideas and life of these thinkers.

Core XX **Semester VIII**

Social and Political Movements in Contemporary India

Course Objectives:

Under the influence of globalization, developmental processes in India have produced spaces of advantage and disadvantage and new geographies of power. A variety of protest movements emerged to interrogate and challenge this development paradigm that evidently also weakens the democratic space vital to the formulation of a critical consensus. This course proposes to introduce students to the conditions, contexts and forms of political contestation over development paradigms and examine their bearings on the retrieval of democratic voice of citizens. It introduces the Social and Political movements in the Post-independent India with special reference to mobilization politics like movements for the formation of separate states, agrarian movements, tribal movements, anti-caste movements and movements related to development projects. It will help the students develop an understanding of the perspectives on three ideological strands represented by agrarian movements, anti-caste movements, and women's movement.

Expected Learning Outcomes:

This course will enable the learners to understand the issues of socio-political conflicts in India and locate these conflicts in broader theories of social movements. After completion of this course, the learners will be able to trace the origin and types of various socio-political movements in India, examine the issues of leadership, organization, and mobilization through selected movements in India. The unit-wise outcomes are given below.

Unit-I: This unit deals with a conceptual explanation of social movements, various theories related to the movements, along with an analysis of socio-political movements in India. Laying the foundation of these movements, this unit explores the diverse social and political issues in India and enables the learners to acquaint with the historical and emerging debates.

Unit-II: This unit will help the learners to identify various peasant movements and tribal movements in Indian history. In addition to understand the genesis and growth of such movements, the learners will be able to understand the dynamics and socio-political implications for Indian society. Dealing with two of the major social groups in India, i.e. peasants and tribal, the unit will also highlight the issues and challenges faced by them.

Unit-III: The learners will be able to familiarize themselves with the issues related to caste and gender in Indian society through this unit. Emergence of gender and caste movements from discriminations to political mobilization through leadership and participation of various social groups will shape the understanding of Indian society for the learners. Identifying the challenges to these movements, the learners are expected to investigate the various socio-political developments in India.

Unit-IV: This unit, discussing the environmental movements in India, will help the learners to familiarize themselves with the influence of rising global concerns over ecological movements in India. It further helps the learners to understand the changing role of state and civil society in relation to the social movements in India.

Course Content:

Unit-I

a) Social and Political Movements: Concepts, Theories and Types
b) Social and Political Movements in India: Background, History and Debates

Unit-II

a) Peasants' Movements: Genesis and Growth
b) Tribal Movements: Issues and Dynamics

Unit-III

a) Dalit and Backward Caste Movements: Issues, Leadership and organizations.

b) Women's Movement: Gender Justice and Empowerment
c) Challenges to Women's Movement- Fundamentalism, Caste, Violence, and Moral Policing

Unit-IV

a) Environmental Movements: Chipko Movement, Silent Valley Movement & Narmada Bachao Andolan.
b) State, Civil Society, and Social Movements in India

Essential Readings:

- ✓ *Basu, A. (ed). (2018). The Challenge of Local Feminism: Women's Movements in Global Perspective. Taylor & Francis.*
- ✓ *Gail, O. (1993). Reinventing Revolution: New Social Movements and the Socialist. Routledge Publications.*
- ✓ *Mohanty, M. (ed) (2004). Caste, Class and Gender. Sage Publications.*
- ✓ *Oommen, T.K. (ed). (2010). Social Movements (Vol I and Vol II). OUP.*
- ✓ *Shah, G (2002). Social Movements and the State. Sage Publications.*

Additional Readings:

- ✓ *Ghosh, A. (ed.) (1999). Dalits and Peasants: The Emerging Caste-Class Dynamics. Gyan Sagar Publication.*
- ✓ *Jaffrelot, C. (2011). India's Silent Revolution: The Rise of the Low Castes in North Indian Politics. Permanent Black.*
- ✓ *Oommen, T.K. (2004). Nation, Civil Society and Social Movements. Sage Publications.*
- ✓ *Shah, G. (2008). Caste and Democratic Politics in India. Permanent Black.*
- ✓ *Singh, R. (ed.) (2001). Social Movement, Old and New: A Post-Modern Critique. Sage Publishers.*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. NCERT Textbook on Social Movements: https://ncert.nic.in/textbook/pdf/lesy208.pdf
2. Reading Material of Directorate of Distance Education, Tripura University https://www.tripurauniv.ac.in/Content/pdf/Distance%20Education%20Notice/Social_Movements_and_Politics_in_India_MA_CRC_18092017.pdf
3. IGNOU Study Material available at: https://www.egyankosh.ac.in/bitstream/123456789/19361/1/Unit-17.pdf

Activities to do:

1. Identify the issues of conflicts among various social groups in your surroundings and examine the causes and implications.
2. Explore the issues taken up by CSOs in your area with regard to gender and caste discriminations.
3. Assess the political and social awareness among people with regard to major movements in post-independent India.

Core XXI

CLIMATE CHANGE AND POLITICS

Course Objectives:

This course aims to provide a comprehensive understanding of the intricate relationship between climate change and politics, both globally and within India. By exploring the political dimensions of climate change, the course seeks to equip learners with knowledge about the key drivers and impacts of climate change, the global and national political responses, and the strategies for adaptation and mitigation. Students will gain insights into the theoretical frameworks, policy debates, and practical challenges in addressing climate change through a political lens. Further, the sensitization regarding climate change and policy action will enable the learners to deliver their future roles in public policy making and finding innovative ways to address climate change.

Expected Learning Outcomes:

This course will enable the learners to comprehensively understand the issue of climate change, analyse the politics of climate change and various debates on this issue both at the global and national level and examine various policy initiatives for addressing this issue. The unit-wise learning outcomes are given below.

Unit-I: By the end of this unit, learners will be able to explain the phenomena of climate change and its causes, assess its impacts, and analyse the politics surrounding it, including political ecology and climate justice.

Unit-II: Upon concluding this unit, learners will be able to comprehend the concepts of climate diplomacy, climate justice, and the geopolitical dynamics of climate change. They will be able to assess the importance of global climate negotiations and agreements and their agenda as well as debates surrounding them. Furthermore, they will be able to critically examine the emergence of climate capitalism, alongside the operational aspects of carbon markets, carbon footprints, and carbon trading.

Unit-III: Upon completion of this unit, learners will proficiently recognize climate-induced challenges, assess adaptation and mitigation strategies, and evaluate the role of various stakeholders in climate action.

Unit-IV: Upon completion of this unit, learners will be able to analyse climate change politics in India, critically assess its international stance and leadership, and comprehend its institutional frameworks and policy initiatives. This will harness their analytical skills in observing the climate change phenomenon in their locality and suggest measures through appropriate climate action.

Course Content:

Unit I: Understanding the Politics of Climate Change

a) Climate change: Meaning, Relevance; Factors influencing climate change: Natural and Anthropogenic

b) Impacts of climate change: Environmental and Socio-economic

c) Ecologism vs Environmentalism, Forms of Ecologism and its Critics; 'Climate Change and Politics' to 'Politics of Climate Change'

Unit II: Climate Change and Global Politics

a) Climate diplomacy and Climate Justice; Global commons and differentiated responsibilities, Geopolitics of climate change
b) Climate change negotiation at the Global forums: IPCC, Earth Summit, North-South Divide, Climate Change and Sustainable development; Issues of scarcity and carrying capacity, Intragenerational and inter-generational equity and justice
c) Climate Capitalism: Rise of Carbon Markets, Carbon Footprints and Carbon Trading.

Unit III: Climate Change: Issues and Adaptation strategies

a) Climate induced disasters, Forced Migration, Food security, Poverty, and Inequality; Relational vulnerability of women, children, poor and indigenous community
b) Adaptation and Mitigation Strategy: Green economy, Energy efficiency, Indigenous Knowledge System, Sustainable consumption Practices, Climate resilient agriculture, Technology, and Innovation for climate change
c) Stakeholders Engagement for Climate Action: Community, Political parties, Private sector, Non-Governmental Organisations

UNIT IV: Climate Change and Politics in India

a) Politics of Climate change in India: Climate change and Environmental movements of India; Climate induced poverty and inequality in India. Difficulties in Combating Climate Change
b) India and Global Politics of Climate Change: India's stance and leadership in international climate change negotiations; India's climate change targets.
c) Institutional framework and policy initiatives to address climate Change: Formulation of Climate Policy; the National Environmental Policy, 2006; PM's Council on Climate Change; National Action Plan on Climate Change (NAPCC); National Missions on Climate Change; Indian knowledge system.

Essential Readings

- ✓ *Barnett, J. (2007). The geopolitics of climate change. Geography compass, 1(6), 1361-1375.*
- ✓ *Dietz, M., & Garrelts, H. (2014). Routledge Handbook of the Climate Change Movement. Routledge.*
- ✓ *Dubash, N. K. (Ed). (2012). Handbook of Climate Change and India: Development, Politics and Governance. Earthscan.*
- ✓ *Giddens, A. (2009). Politics of Climate Change. Polity.*
- ✓ *Gupta, J. (2000). North-South aspects of the climate change issue: Towards a negotiating theory and strategy for developing countries. International Journal of Sustainable Development, 3(2), 115-135.*
- ✓ *Heywood, A. (2022) Political Ideologies. 7th Edition. Bloomsbury Publication.*
- ✓ *Keohane R.O. (2015) The Global Politics of Climate Change: Challenge for Political Science. PS: Political Science & Politics.48(1),19-26.*

- ✓ *Lever-Tracy, C. (2010). Routledge Handbook of Climate Change and Society. Routledge.*
- ✓ *Lovins, L. H., & Cohen, B. (2011). Climate Capitalism: Capitalism in the Age of Climate Change. Hill and Wang.*
- ✓ *Makondo, C. C., & Thomas, D. S. (2018). Climate change adaptation: Linking indigenous knowledge with western science for effective adaptation. Environmental Science & Policy, 88, 83-91.*
- ✓ *Michaelowa, K., &Michaelowa, A. (2012). India as an emerging power in international climate negotiations. Climate Policy. 12(5). 575-590*
- ✓ *Roberts, J. T., & Parks, B. (2006). A climate of injustice: Global inequality, north-south politics, and climate policy. MIT press.*
- ✓ *Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: climate change and the discourse of environmental justice. Wiley Interdisciplinary Reviews: Climate Change, 5(3), 359-374.*
- ✓ *Terry, G. (2009). No climate justice without gender justice: an overview of the issues. Gender & Development, 17(1), 5-18.*

Additional Readings:

- ✓ *Carter, A. (2013). A Radical Green Political Theory. Routledge*
- ✓ *Dalby, S. (2013). The Geopolitics of Climate Change. Political Geography, 37, 38-47.*
- ✓ *Dawson, A. (2010). Climate Justice: The Emerging Movement Against Green Capitalism. South Atlantic Quarterly, 109(2), 313-338.*
- ✓ *Eriksen, S. H., Nightingale, A. J., & Eakin, H. (2015). Reframing Adaptation: The Political Nature of Climate Change Adaptation. Global Environmental Change, 35, 523-533.*
- ✓ *Goodin, R. E. (2013). Green Political Theory. John Wiley & Sons.*
- ✓ *Klein, N. (2015). This Changes Everything: Capitalism Vs. The Climate. Simon and Schuster.*
- ✓ *Newell, P., & Paterson, M. (2011). Climate capitalism. In After Cancun: Climate Governance or Climate Conflicts (pp. 23-44). Wiesbaden: VS Verlag für Sozialwissenschaften.*
- ✓ *Shue, H. (2014). Climate justice: Vulnerability and protection. Oxford University Press.*

Internet Sources:

1. DW Documentary. (2023, July 13). "*Climate change - Averting catastrophe*". YouTube. https://youtu.be/pEt6-jA2UE4?si=9v56-TdG1OGW0SU6
2. Harvard Office of the VPAL. (2024, January 22). "*Climate Change: Climate Politics and the Energy Transition".* https://youtu.be/QGJ7LiZQYlQ?si=v4gMf2r2NANcRxzt
3. MoEFCC. *Climate Change*. Government of India. https://moef.gov.in/moef/division/environment-divisions/climate-changecc-2/documents-publications/index.html
4. PIB. *NAPCC*. Governemnt of India. https://moef.gov.in/wp-content/uploads/2018/04/Pg0152.pdf
5. University of California Television. (2017, April 13). "*Climate Change and Post Truth Politics"*. YouTube. https://youtu.be/Tiq_XcsikYE?si=LX2uaVXwVt-hMqyw

Activities to do:

1. Assign a Project/multimedia presentation to the students on the topics mentioned in the syllabus.
2. Arrange a movie session to watch movies on issues of climate. For example: Don't Look Up (2021), A Life on Our Planet (2020), Eating Our Way to Extinction (2021), Kadvi Hawa (2017), Kokoli: Fish out of water (2021), Kalira Atita (2020)
3. Do Street plays on climate change to sensitize people.
4. Do community outreach activities like plantation drives, cleaning etc.

Core XXII

Social Exclusion and Inclusive Policies in India

Course Objectives:

This course provides students with enhanced opportunities to delve into both theoretical principles and practical applications of social exclusion. It is structured to offer comprehensive exposure not only to various dimensions of social exclusion but also to a range of tools and mechanisms for inclusion. The specific objectives of this course include conceptualizing discrimination, exclusion, and inclusion based on caste/ethnicity, religion, gender, and disability; developing a thorough understanding of the dynamics of discrimination and exclusion; critically contextualizing issues related to discrimination, exclusion, and inclusion; gaining empirical insights into discrimination; and formulating policies aimed at protecting the rights of marginalized groups and addressing the challenges of exclusion and discrimination.

Expected Learning Outcome:

Unit-I: This would cultivate broad understanding of the concept and approaches of social inclusion and exclusion among students.

Unit-II: This unit will enable students to understand the framework of social exclusion and inclusion on from various perspectives.

Unit-III: This unit will enable students to identify various forms of social exclusion exist in Indian society like caste, class, migrant, ethnicity, and disability which will empower them to adopt stands against such marginalisation.

Unit-IV: This unit will harness the legal knowledge base of social inclusion in India among students.

Course Content:

Unit-I: Social Exclusion- Concept, Approaches and Forms

a) Understanding Social Exclusion & Inclusion from historical overview
b) Types of exclusion: social, economic and political, untouchability, humiliation,
c) Theoretical understanding of discrimination, deprivation and marginalization

Unit-II: Theories of Social Exclusion and Inclusive Polices

a) Emile Durkheim's notion of stigma, Mike Oliver's concept of social model of disability, Louis Dumont's concept of caste and its social implication
b) Gandhi's views on social justice, Ambedkar's views on untouchability, Buddhist philosophy on social inclusion
c) Amartya Sen's Capability based approaches, Rawls' theory of justice, Mary Wollstonecraft's concept of rights of women

Unit-III: Forms of Social Exclusion

a) Religion, Race, Caste, Class, Gender
b) Indigenous/Adivasi, Disability
c) Migrants and Refugees, Language and Ethnicity

Unit-IV: Institutional Framework for Inclusive Policies of Minorities

a) Minorities: Rights and Inclusive Policy; Scheduled Castes: Rights and Inclusive Policy; Scheduled Tribes: Rights and Inclusive Policy.
b) Disability: Rights and Inclusive Policy; Transgender: Rights and inclusive policy.
c) Women: Rights and Inclusive Policy; Gender beyond Binaries: Rights and Inclusive Policy.

Essential Readings:

- ✓ ***Atal, Y.*** *(2017).* Indian Tribes in Transition: The Need for Reorientation. *Routledge India.*
- ✓ ***Byrne, D.*** *(2005).* Social Exclusion. *New Delhi: Rawat Publications.*
- ✓ ***Chakravarti, U.*** *(2018).* Gendering Caste: Through a Feminist Lens (Theorizing Feminism). *Sage Publications.*
- ✓ ***Krishnan, P.S.*** *(2017).* Social Exclusion and Justice in India. *Routledge India.*

- ✓ ***Oliver, M.*** *(1996).* Understanding disability: From Theory to Practice. *Basingstoke, Hampshire: Macmillan.*
- ✓ ***Sen, A.*** *(2010).* The Idea of Justice. *Penguin Publications.*

Additional Reading:

- ✓ ***Basu, A. and Kohli, A. eds.*** *(1998).* Community Conflicts and the State in India. *Oxford University Press.*
- ✓ ***Brass, P. R.*** *(1991).* Ethnicity and Nationalism: Theory and Comparison. *Sage Publications.*
- ✓ ***Kabeer, N.*** *(2000). 'Social Exclusion, Poverty and Discrimination: Towards an Analytical Framework'.* IDS Bulletin, *31(4), Institute of Development Studies, Brighton.*
- ✓ ***Kahn, J. S.*** *(2001).* Modernity and Exclusion. *London: Sage.*
- ✓ *Oliver, M. (2018). Understanding disability: From Theory to Practice. Bloomsbury Publishing.*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Idea of justice https://www.adb.org/sites/default/files/publication/29778/social-exclusion.pdf
2. Reinterpreting Buddhism: Ambedkar on the politics of social action, EPW December 4, vol no-49. https://www.researchgate.net/publication/216828688_Buddhist_notion_of_social_justice
3. The Individual and Social Models of Disability by Mike Oliver available at: https://disability-studies.leeds.ac.uk/wp-content/uploads/sites/40/library/Oliver-in-soc-dis.pdf
4. Vindication of the Rights of Woman, merry Wollstonecraft https://core.ac.uk/download/pdf/36679668.pdf
5. The basis of Caste Hierarchy. https://egyankosh.ac.in/bitstream/123456789/21600/1/Unit-17.pdf

6. Homo Hierarchicus: The Caste System and its implications by Louis Dumont . http://www.faculty.fairfield.edu/dcrawford/dumont.pdf
7. Social Stigma. https://www.academia.edu/8000221/Social_stigma_Welcome_to.

Activities to do:

1. Conduct workshops on social exclusion and send students to nearby areas to get first-hand experience about social exclusion.
2. Ask the students to write a report on the basis of their practical experience.
3. Engage the students in community projects promoting diversity, such as awareness campaigns or collaborative events.

Core XXIII

Democratic Decentralization in India

Course Objectives:

The course aims to provide a comprehensive understanding of the principles, processes, and challenges associated with decentralized governance in the Indian context. To understand the nuances of democratic decentralisation and participation of the citizens at the grassroot level, it is essential for the learners to familiarise with the institutional and the constitutional framework of local governance. Through a scholarly lens, the course delves into the theoretical underpinnings of democratic decentralization and also provides a space for enquiry into the emerging developments e.g., glocalization and new localism. It seeks to examine the evolution and functioning of rural and urban local self-government in India, tracing its historical trajectory from pre-independence initiatives to contemporary constitutional provisions and legislative frameworks. Through using these concepts and analytical frameworks informed by the scholarly literature on the subject buttressed by empirical details, the course aims at providing learners with the requisite domain and functional skills to enable them to engage in employment in rural and urban governance sector as well as Non-Governmental Organisations. Further, to examine the actual functioning of the local governing bodies, effective implementation of the policies and programmes and emerging issues and challenges in the local governance, this course envisages active learning by the learners through conducting studies on various local governance practices at the ground level. Overall, the course endeavors to equip participants with the knowledge and analytical tools necessary to navigate the complexities of democratic decentralization in the Indian context and contribute effectively to decentralized governance processes.

Course Learning Outcomes:

On completion of the course, learners would attain the following competencies.

Unit-I: This unit would inculcate fundamental understanding about democratic decentralisation among the learners. It would familiarise them with different theoretical roots of civic engagements and its several dimensions.

Unit- II: This unit would enable the learners to understand the evolution of Panchayati raj institutions in India, the institutional frameworks of rural local governance, the constitutional provisions, and reflect on the emerging issues and challenges of rural local governance.

Unit-III: Engaging with this unit will facilitate a comprehensive understanding of the constitutional provisions and institutional frameworks underpinning urban local governance. This would enable learners with critical insights on contemporary urban issues and the formulation of informed strategies for effective municipal management.

Unit-IV: The learners would examine the working of the local government institutions, efficacy of various constitutional provisions, policies and programmes, and emerging issues and challenges of local governance, through engaging themselves at the ground level study in their preferred locality. The learners are expected to prepare a report individually, on their observation, analysis, or assessment of their study on any topic provided in this unit, for the purpose of internal evaluation.

Course Content:

Unit-I: Democratic Decentralization: A Conceptual Understanding

a) Meaning and Significance of Democratic Decentralization
b) Theoretical roots of Civic Engagement in Governance: Liberal and Gandhian
c) Dimensions of participation: Constitutional, Political and Administrative
d) Local Self Government in the Era of Globalisation: New Localism, Glocalization

Unit-II: Rural Local Self Government in India

a) Evolution of Panchayati Raj Institutions in India, Main Provisions and working of 73rd Constitutional Amendment Act, 1992.

b) Organization & Working of Panchayati Raj Institutions in Odisha, Legislations for PRIs in Odisha, State Election Commission
c) Issues and Challenges of Rural local governance: Autonomy and Financial devolution

Unit- III: Urban Local Self Government in India

a) Historical trajectories of Urban Local Governance in India, Main Provisions and working of 74th Constitutional Amendment Act, 1992; Urban local bodies in India: Municipal corporation, Municipalities, Notified Area Committee, Town Area Committee, Cantonment Board, Township, Port Trust, Special Purpose Agency
b) Organization & Working of Urbaan Local Government in Odisha, State Finance Commission
c) Issues and challenges in Urban local Governance: Urbanisation, structural, spatial, and administrative challenges, Financial devolution

Unit-IV: Local Governance in Practice

a) Functioning of Gram Sabha
b) Participation of Women in Gram Panchayat
c) Social Audit
d) Tribal Governance in 5^{th} Schedule Area
e) Panchayat and Forest Right Act
f) PESA

Essential Readings:

- ✓ *Chakraborty, B and Pandey, R.K. (2019). Local Governance in India. Sage Publications.*
- ✓ *Maheshwari, S. (2004). Local Government in India. Lakshmi Narain Agarwal Publications.*
- ✓ *Manor, J. (2010). Local Governance. In P.B. Mehta and N.G. Jayal (Eds.) The Oxford Companion to Politics in India, Oxford University Press, 61-79.*
- ✓ *Mathur, K. (2013). Panchayati Raj. Oxford India Short Introductions. Oxford University Press.*
- ✓ *Mohanty, B. (2012). Glimpses of Local Governance. Kunal Books*

- ✓ *Venkatesu, E. (Ed.) (2016). Democratic Decentralization in India: Experience, Issues and Challenges. Taylor and Francis.*

Additional Readings:

- ✓ *Ahluwalia, I.J. (2019).Urban governance in India, Journal of Urban Affairs, 41(1), 83-102. DOI: 10.1080/07352166.2016.1271614*
- ✓ *Baviskar, B.S. and Mathew, G. (Eds). (2009**).** Inclusion and Exclusion in Local Governance: Field Studies from Rural India. Sage Publications*
- ✓ *Chakrabarty, B. (2017). Localizing Governance in India. Routledge.*
- ✓ *DeSouza, P. (2002). Decentralization and Local Government**:** The Second Wind of Democracy in India.In Z. Hasan, E. Sridharan and R. Sudarshan (eds.) India's Living Constitution: Ideas,Practices and Controversies. Permanent Black. pp. 370-404.*
- ✓ *Dreze, J. and Sen, A. (2002). India: Development and Participation, Oxford University Press.*
- ✓ *Manor, J. (2002). Democratic Decentralisation in Two Indian States: Past and Present. The Indian Journal of Political Science, 63(1), 51–71. http://www.jstor.org/stable/42743574*
- ✓ *Mishra, S.N. & Mishra, S. (2002). Decentralised Governance. Shipra.*
- ✓ *Pal, M. (2004). Panchayati Raj and Rural Governance: Experiences of a Decade. Economic and Political Weekly, 39(2), 137–143. http://www.jstor.org/stable/4414491*

Internet Resources:

The internet resources include online articles and e-contents published onwebsites, blogs, e-Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. eGyanKosh. Democratic Decentralisation**,** IGNOU. https://egyankosh.ac.in/handle/123456789/53022
2. Malik, Ajmer Singh. State and Local Governance: Machinery & Processes. SWAYAM. https://onlinecourses.SWAYAM2.ac.in/cec20_hs20/preview
3. Ministry of Urban Affairs. **Capacity building scheme for urban local bodies**. Ministry of Urban Affairs, Government of India.

https://mohua.gov.in/upload/uploadfiles/files/CBULB17.pdf

4. National Institute of Rural Development & Panchayati Raj. Centre for Panchayati Raj, Decentralised Planning and Social Service Delivery. Government of India. http://nirdpr.org.in/cpr.aspx

Activities to do:

1. Observe a Gram Sabha meeting in your locality and write report on its proceedings.
2. Write a report on the schemes implemented by the Panchayats or Urban Local Bodies of your locality.
3. Watch movies and TV series on Local Governance and make a report assessing the depiction of local political leaders in media.
4. Make community outreach programme for effective participation of people in local governance.
5. Prepare a note on the engagements of NGOs situated in your locality working with PRIs.

Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry /Exit Option)

Based on NEP-2020

Zoology

Odisha State Higher Education Council, Bhubaneswar

Government of Odisha

Semester	Subjects
I	Core I - Invertebrates: Protista to Echinodermata
	Core II- Diversity of Chordates: Protochordates to Mammalia
II	Core III- Microbiology
	Core IV - Cell Biology
III	Core V- Principles of Ecology
	Core VI- Physiology: Controlling and Coordinating systems
	Core VII- Fundamentals of Biochemistry
IV	Core VIII- Endocrinology & Reproductive Biology
	Core IX- Comparative Anatomy of Vertebrates
	Core X- Physiology: Life Sustaining Systems
V	Core XI- Biochemistry of Metabolic Processes
	Core XII- Principles of Genetics
	Core XIII- Molecular Biology
VI	Core XIV- Developmental Biology
	Core XV- Taxonomy and Evolutionary Biology
VII	Core XVI- Instrumentation and Techniques
	Core XVII- Biostatistics and Bioinformatics
	Core XVIII- Animal Biotechnology
	Core XIX- Immunology
VIII	Core XX- Aquatic Biology and Toxicology
	Core XXI- Wildlife and Conservation Biology
	Core XXII- Chronobiology & Animal Behaviour
	Core XXIII- Research Project

Programme Outcomes

- To prepare the students for a career in Zoology.
- To prepare the students for Higher Education and Research in Zoology.
- To develop a conceptual understanding of the subject and to develop an inquisitiveness in the subject.
- To enable the student to acquire basic skills necessary to understand the subject and to master the skills to handle equipment's utilized to learn the subject.
- To generally promote wider reading on the subject and allied inter disciplinary subject.

Semester I

Core I Invertebrates: Protista to Echinodermata

Programme Outcome:

- Understand the general characteristics o f non-chordate groups of organisms.
- Acquire knowledge regarding classification of the taxa with examples.
- Develop an understanding of important phenomena associated with each taxon.
- Acquire skills in identifying representative species of groups studied.
- Illustrate phylogenic distribution of lower groups of Non-chordates.
- Understand elaboration of coelomic evolution and metamerism on Coelomates with their classification up to their class and excretion system in Annelidans.
- Recognize insect vision, respiration and metamorphosis in Arthropoda with reference to Termites and in evolutionary significance of Onychophora with general characteristics.
- Obtain an over view of the general features, respiration, Gastropodan evolution, mechanism of torsion, and significance of larval life stages.
- Acquire knowledge on general characters and classification of Echinoderms and their affinities with Chordates.

Course Outcome:

- Utilize information to understand the differences of the groups studied.
- Develop skills in examining diversity of the taxa.
- Develops skills in elaborating the general features and evolutionary significance of the coelomate from Annelida to Echinoderms.
- Impactful visual understanding and enables the students to correlate the evolutionary significance of each organism on the phylogenetic tree.
- Study on various general features and characteristics of body symmetry and arrangement with various vision types, excretory systems and developmental stage give a strong fundamental understanding on the subject on Coelomates.

Learning Outcome

- Systematically understand the diverse group of organisms from Protista to Cnidaria and Ctenophora
- Systematically understand the diverse group of organisms that make up Phyla Platyhelminthes and Nemathelminthes.
- Understand the diverse organisms that make up Phyla from Annelida, Arthropoda and Onychophora.
- Understand the diverse organisms that make up Phyla from Mollusca and Echinodermata and significant processes associated.

Unit 1: Protista to Cnidaria and Minor Phylum Ctenophora

General characteristics and Classification up to classes. Locomotion, Nutrition and Reproduction in Protista, Life cycle and pathogenicity of *Plasmodium vivax*, Canal system and spicules in sponges, Metagenesis in Obelia, Polymorphism in Cnidaria, Corals and coral reefs, Evolutionary significance of Ctenophora.

Unit 2: Platyhelminthes and Nemathelminthes

General characteristics and Classification up to classes. Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium*, Life cycle, and pathogenicity of *Ascaris lumbricoides* and *Wuchereria bancrofti*. Parasitic adaptations in helminthes

Unit 3: Annelida, Arthropoda and Onychophora

General characteristics and Classification up to classes. Evolution of coelom and metamerism. Excretion in Annelida, Vision and Respiration in Arthropoda. Metamorphosis in Insects. Social life in bees and termites. Onychophora: General characteristics and Evolutionary significance.

Unit 4: Mollusca and Echinodermata

General characteristics and Classification up to classes. Respiration in Mollusca. Torsion and detorsion in Gastropoda. Evolutionary significance of trochophore larva. Water-vascular system in Echinoderms, Larval forms in Echinodermata

TEXT BOOKS

- ✓ *Kotpal RL; Modern Textbook of Zoology – Invertebrates; Rastogi Publications - Meerut;2016 edition.*
- ✓ *Richard Brusca, W. Moore, Stephen M. Shuster. Invertebrates; OUP USA; 3 edition (19January 2016).*

SUGGESTED READINGS

- ✓ *Richard Fox, Robert D. Barnes, Edward E. Ruppert, Invertebrate Zoology: A Functional Evolutionary Approach, Brooks/Cole; 7th edition edition2003*
- ✓ *Barrington, E.J.W.Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson.*
- ✓ *Hyman, L.H. Invertebrate Series (Recent edition).*
- ✓ *Parker JJ and WA Haswel Textbook of Zoology. Vol I and II.*
- ✓ *Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S.and Nelson.*
- ✓ *Barnes, R.S.K., Calow, P., Olive, P. J. W., Golding, D.W. and Spicer, J.I. (2002). TheInvertebrates: A New Synthesis, III Edition, Blackwell Science.*

Invertebrates: Protista to Echinodermata

Practical

1. Study of whole mount of Euglena, Amoeba and Paramecium, Binary fission and Conjugation in Paramecium.
2. Study of *Sycon* (T.S. and L.S.), *Hyalonema, Euplectella, Spongilla,* Spicules and Spongin fibers.
3. Study of Cnidarians *Obelia, Physalia, Millepora, Aurelia, Tubipora, Corallium, Alcyonium, Gorgonia, Metridium, Pennatula, Fungia, Meandrina, Madrepora., Ctenophore.*
4. Study of Life cycle stages of *Fasciola hepatica, Taenia solium* and *Ascaris lumbricoides* (Slides/micro-photographs).
5. Study of Annelids - *Aphrodite, Nereis, Heteronereis, Sabella, Serpula, Chaetopterus, Pheretima, Hirudinaria.*
6. Study of Arthropods – Crab, *Limulus, Palamnaeus, Palaemon, Daphnia, Balanus, Sacculina, Eupagurus, Scolopendra, Julus, Bombyx mori, Periplaneta americana,* termites, honey bees and *Peripatus*
7. Study of Molluscs and Echinodermata- *Chiton, Dentalium, Pila, Doris, Helix, Unio, Ostrea, Pinctada, Sepia,Octopus, Nautilu.*

   Echinodermata - *Pentaceros/Asterias, Ophiura, Clypeaster, Echinus, Cucumaria and Antedon*
8. Study of digestive system, nephridia of earthworm (Virtual), T.S. through pharynx, gizzard, and typhlosolar region of earthworm, Mounting of mouth parts and dissection of digestive system and nervous system (Virtual) of *Periplaneta americana*.
9. To submit a Project Report on any related topic.

Suggested Reading

- ✓ *Verma PS and Srivastava PC. (2011) Advanced Practical Zoology. S Chand Publication.*
- ✓ *S.S Lal. (2019) Practical Zoology (Invertebrate) Rastogi Publications.*

Core II Diversity of Chordates: Protochordates to Mammalia

Programme Outcome:

- The students learn about the salient features, diversity and distribution of all Chordates.
- To know the evolution of aquatic, amphibious and terrestrial vertebrates.
- To understand the importance of distribution of vertebrates in different realms.

Course Outcome:

- Understanding the origin, larval forms, distribution and adaptation of different vertebrates.
- Accumulating the knowledge and understanding on the classification, affinities and comparative anatomy of different vertebrates and their evolutionary significance.
- Learning the mechanism of flight and aquatic adaptations in birds and mammals.
- Obtaining knowledge pertaining to the distribution of animals particularly vertebrate in different realms.

Learning Outcome:

- Gain understanding of Protochordates and origin of Chordates.
- Knowledge regarding characteristics and classification of Agnatha, Pisces, Amphibia, and evolution of tetrapoda.
- Understanding characteristics and classification of Reptiles and Aves and their connecting links.
- Comprehend characteristics and organization of mammals, in addition to their distribution in zoogeographical realms.

Unit 1: Protochordates and Origin of Chordates

General characteristics and outline classification Chordata (Protochordata: Hemichordata, Urochordata and Cephalochordata). Study of larval forms in protochordates; Retrogressive metamorphosis in Urochordat; Dipleurula concept and the Echinoderm theory of origin of chordates.

Unit 2: Agnatha, Pisces & Amphibia

General characteristics and classification up to order. Migration, Parental care in fishes, Accessory respiratory organs in Pisces, Evolutionary significance of Dipnoi.
Amphibia: Origin of Tetrapoda (Evolution of terrestrial ectotherms); Parental care.

Unit 3: Reptilia & Aves

General characteristics and classification up to order. Affinities of Sphenodon; Poison apparatus and Biting mechanism in snakes. Archaeopteryx- a connecting link; Flight adaptations and Migration in birds.

Unit 4: Mammals & Zoogeography

General characters and classification up to order; Affinities of Prototheria; Adaptive radiation with reference to locomotory appendages. Zoogeographical realms, Theories pertaining to distribution of animals, Plate tectonic and Continental drift theory, distribution of vertebrates in different realms.

PRACTICAL

1. Protochordata: *Balanoglossus, Herdmania, Branchiostoma,* Urochordata, Sections of Balanoglossus through proboscis and branchio-genital regions, Sections of *Amphioxus* through pharyngeal, intestinal and caudal regions. Permanent slides of *Herdmania* spicules, Doliolum, Salpa
2. Agnatha: *Petromyzon* and *Myxine*.
3. Fishes: *Scoliodon, Sphyrna, Pristis, Torpedo, Chimaera, Mystus, Heteropneustes, Labeo, Exocoetus, Echeneis, Anguilla, Hippocampus, Tetrodon/ Diodon, Anabas*, Flat fish.
4. Amphibia: Ichthyophis/Ureotyphlus, Necturus, Bufo, Hyla, Alytes, Salamander.
5. Reptilia: *Chelone, Trionyx, Hemidactylus, Varanus, Uromastix, Chamaeleon, Ophiosaurus, Draco, Bungarus, Vipera, Naja, Hydrophis, Zamenis, Crocodylus.* Key for Identification of poisonous and non-poisonous snakes
6. Aves: Study of six common birds from different orders. Types of beaks and claws. Study of feathers.
7. Mammalia: *Sorex,* Bat (Insectivorous and Frugivorous), *Funambulus, Loris, Herpestes, Erinaceous*.
8. Power point presentation on study of any two examples representing two different classes.. Submission of report on local species.

Text Books:

- ✓ *Kotpal RL; Modern Textbook of Zoology –Vertebrates; Rastogi Publications - Meerut; 2016 edition*
- ✓ *Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford University Press.*
- ✓ *Tiwari SK (2006) Fundamentals of World Zoogeography, Sarup & Sons.*

Suggested Readings:

- ✓ *Pough H. Vertebrate life, VIII Edition, 2007 Pearson International.*
- ✓ *Hall B.K. and Hallgrimsson B. (2008). Strickberger's Evolution. IV Edition. Jonesand Bartlett Publishers Inc.*

- ✓ *Hickman CP, Roberts LS, Keen S, Larson A, I'AnsonH, Isenhour DJ Integrated Principle of Zoology, 14th edition, 2008, McGrawHill publication.*

Semester II

Core III Microbiology

Programme Outcome:

- Knowledge of microbial diversity and classification.
- To understand microbial culture, growth and reproduction.
- To understand the importance of viral pathogenicity, nature of viral transmission.
- To comprehend the importance of Anti-viral drugs and vaccines.

Course Outcome:

- Obtaining knowledge pertaining to future scopes and modern trends of microbiology.
- Understanding the experimental approaches to explore the origin of microbes.
- Uunderstanding the morphology, classification and significance of host-vector relationship.
- Learning the mechanism of action of microbial toxins and pathogenicity.
- Obtaining knowledge on pathogenic manifestation of Oncoviruses & HIV.

Learning Outcome:

- Finding the historical background and modern experimental approaches to understand the origin and development of microbiology.
- Analysing the general features, classification and pathogenicity of Archea and Eubacteria.
- Deducing knowledge on role of microbes in agriculture and healthcare sector.
- Interpreting the mechanism of antibacterial and anti-viral their mode of action, and importance of vaccines.

Unit-1

History and development of microbiology: Biogenesis and abiogenesis, Contribution of Francesco Redi, Lazzaro Spallanzani, John Needham, Louis Pasteur, John Tyndall, Joseph Lister, Robert Koch (germ theory), Edward Jenner and Alexander Fleming`s experiments on discovery of Penicillin, Modern trends and future scope of Microbiology.

Unit-2

Microbial systems of classification: General features of Bergey's manual for classification of microbes, Whittakar's five kingdom concept, Carl Woese's 3 domain classification, Lynn Margulis theory of endosymbiotic theory. General features of Archaea: Structure, Nutrition.and Reproduction.

General features, pathogenicity of Mycoplasma, Rickettsia and Spirochaetes.

Unit-3

Isolation, culture and maintenance of microorganisms: Microbial growth, continuous culture (chemostat), Factors influencing growth of microbes, Role of microbes in agriculture

and healthcare industry. Reproduction of Eubacteria, Genetic recombination in bacteria (Transformation, Conjugation and Transduction).

Unit-4

Virion and viroids: General characteristics and classification of viruses, morphology, nature of viral transmission. Bacteriophage replication, Oncoviruses & HIV: structure, transmission, pathogenicity and replication. Microbial toxins: types, mode of actions and pathogenicity (Exo and Endo-toxin). Antibiotics and their mode of action, Anti-virals and vaccine.

PRACTICAL

1. Study on aseptic techniques in microbiology: various methods of sterilization process.
2. Preparation and formulation of microbial media and methods of inoculation.
3. Methods of isolation of bacteria: spread plate, streak plate, pour plate, serial dilution.
4. Sampling and quantification of microorganisms in air, water and soil.
5. Morphological identification of microorganisms from various habitats through simple staining, differential staining, acid fast staining, spore staining.
6. Methods of microscopic measurements, micrometer (ocular and stage), haemocytometer.
7. Preparation of bacterial growth curve.

Core-IV **Cell Biology**

Programme Outcome:

- Introducing prokaryotic and eukaryotic cells and their features, ultrastructure of plasma membrane and mechanism of transport of molecules across plasma membrane.
- To know the structure, function and properties of endomembrane & cytoskeletal network system and cell organelles.
- To understand the importance of mitochondria in aerobes, the role of mitochondrial electron transport chain, oxidative phosphorylation & mechanism of ATP synthesis.
- To study the structure and packaging of chromosome in nucleus, behaviour of chromosome during cell division, cell cycle and its regulation.

Course Outcome:

- Understanding the difference between prokaryotic and eukaryotic cells and the mechanism of transportation across their membrane system.
- Understanding the role of cytoskeleton in maintaining structural frame work, cell motility and cell organelles.
- Deciphering the role of mitochondria in cellular respiration and energy production.
- Obtaining knowledge on structure and function of nucleus, cell division and regulation of cell cycle.

Learning Outcome

Understanding Cell junctions and mechanism of transportation across membrane.

- Obtaining knowledge on structural and functional aspect of cytoskeleton and endomembrane system.
- Obtaining knowledge on nucleus, nucleosome and cell division and cell cycle regulation.
- Knowledge about mitochondrial respiratory chain, chemi-osmotic hypothesis and functions of peroxisome.

Unit 1: Overview of cells and plasma membrane

Prokaryotic and Eukaryotic cells, Virus, Viroids, Mycoplasma, Prions, Various models of plasma membrane structure. Transport across membranes: Active and Passive transport,

Facilitated transport. Cell junctions: Tight junctions, Desmosomes, Gap junctions.

Unit 2: Cytoskeleton & Endomembrane System

Structure and Functions: Microtubules, Microfilaments and Intermediate filaments; Structure and Functions: Endoplasmic Reticulum, Golgi apparatus, Lysosomes.

Unit 3: Mitochondria and Peroxisomes

Mitochondria: Structure, Semi-autonomous nature, Endosymbiotic hypothesis; Mitochondrial Respiratory Chain, Chemi-osmotic hypothesis. Peroxisomes.

Unit 4: Nucleus, Cell Division and Cell signalling

Structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleolus; Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome); Mitosis, Meiosis, Cell cycle and its regulation; GPCR and Role of second messenger (cAMP).

Text Books:

- ✓ *Karp, G. (2010). Cell and Molecular Biology: Concepts and Experiments. VI Edition.John Wiley and Sons. Inc.*
- ✓ *De Robertis, E.D.P. and De Robertis, E.M.F. (2006). Cell and Molecular Biology.VIII Edition. Lippincott Williams and Wilkins, Philadelphia.*

Suggested Readings:

- ✓ *Bruce Albert, Bray Dennis, Levis Julian, Raff Martin, Roberts Keith and Watson James (2008). Molecular Biology of the Cell, V Edition, Garland publishing Inc., New York and London.*
- ✓ *Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. (2009). The World ofthe Cell. VII Edition. Pearson Benjamin Cummings Publishing, San Francisco.*
- ✓ *Suvarna S, Lyton C, Bancroft JD (2013) Theory and practice of histological techniques, Churchill Livingstone, Elsevier, UK*
- ✓ *Cooper, G.M. and Hausman, R.E. (2009). The Cell: A Molecular Approach. V Edition. ASM Press and Sunderland, Washington, D.C.; Sinauer Associates, MA.*

PRACTICAL

1. Understanding of simple and compound microscopes.
2. To study different cell types such as buccal epithelial cells, striated muscle cells using Methylene blue/any suitable stain (virtual/ slide/slaughtered tissue).
3. Preparation of temporary stained squash of onion root tip to study various

stages of mitosis.

4. Study of various stages of meiosis in grasshopper testis
5. Preparation of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.
6. Preparation of permanent slide to demonstrate:
   i. DNA by Feulgen reaction
   ii. DNA and RNA by MGP
   iii. Mucopolysaccharides by PAS reaction
   iv. Proteins by Mercuric bromophenol blue/Fast Green
7. Demonstration of osmosis (RBC/ Egg etc.).

Suggested Reading:

1. Verma PS and Srivastava PC. (2011) Advanced Practical Zoology. S Chand Publication.
2. S.S Lal. (2019) Practical Zoology (Invertebrate) Rastogi Publications.

Semester-III

Core-V **Principles of Ecology**

Programme Outcome:

- Understand the concept of an ecosystem, its attributes, factors and functioning.
- Learn about population attributes, growth patterns, strategies; regulation and interactions.
- To appraise learners regarding various community characteristics.
- Comprehend biological data, learn graphical representation of data, sampling techniques, grasp basic statistics.
- Acquire skills on plotting survivorship curves, quadrate method of determining population density, diversity indices, techniques of preservation and mounting of plankton, determination of ecological parameters.

Course Outcome:

- Utilize information to understand interrelations and working of an ecosystem.
- Demonstrate the ability to comprehend data, plot graphs, present data and apply basic statistics.

Learning Outcome:

- Understand food chain dynamics and energy flow patterns.
- Gain knowledge about population dynamics.
- Understand community stratification and succession.
- Gain knowledge about representation of data, data processing and analysis.

Unit 1: Ecosystem and Applied Ecology

Ecology: Autecology and synecology, Types of ecosystems with one example in detail, Food chain: Detritus and grazing food chains, Linear and Y-shaped food chains, Food web, Energy flow through the ecosystem, Ecological pyramids Nutrient and biogeochemical cycle with one example of Nitrogen cycle. Laws of limiting factors, Study of physical factors- (Light, temperature).

Unit 2: Population

Attributes of population: Density, natality, mortality, life tables, fecundity tables, survivorship curves, age ratio, sex ratio, dispersal and dispersion Exponential and logistic growth, equation and patterns, r and K strategies. Population regulation - density-dependent and independent factors, Population interactions, Gause's Principle with

laboratory and field examples.

Unit 3: Community

Community characteristics: species richness, dominance, diversity, abundance,vertical stratification, Ecotone and edge effect; Ecological succession with one example. Theories pertaining to climax community.

Unit – 4: Biometry

Biological data, graphical representation of data (frequency polygon and histogram), sampling techniques, measures of central tendency (Mean, median and mode), Measures of dispersion (range, quartile deviation, mean deviation and standard deviation), Hypothesis and hypothesis testing (Chi-square test, t- test).

Text Book:

- ✓ *Odum, E.P. and Barrett, G.W., (2018). Fundamentals of Ecology, 5th Edition*
- ✓ *Smith and Smith, Elements of Ecology, Global Edition; Pearson Education India; ninth edition (14 May 2015).*
- ✓ *Myra Samuels, J. Witmer,A. Schaffner, Statistics for the life sciences, Prentice Halls, Boston, 4th edition, 2012.*

Suggested Readings:

- ✓ *Kormondy, (2017). Concepts of Ecology, Updated 4/e, Pearson.*
- ✓ *Colinvaux, P. A. (1993). Ecology. II Edition. Wiley, John and Sons, Inc. Krebs, C. J. (2001). Ecology. VI Edition. Benjamin Cummings.*
- ✓ *Ricklefs, R.E., (2000). Ecology. 5th Edition. Chiron Press.*
- ✓ *Dash M.C., Fundamentals of Ecology. Mc GrawHill*
- ✓ *Smith TM and Smith RL, Elements of Ecology, 8th Edition,Pearson education INC, USA*
- ✓ *Miller, G.T. and Spoolman, S.E. (2017) Environmental Science, 14th Edition. Cengage Publication, New Delhi.*
- ✓ *Odum, E.P. and Barrett, G.W., (2018). Fundamentals of Ecology, 5th Edition.*
- ✓ *Cengage Publication, New Delhi*
- ✓ *Web site: https://www.cbd.int/*
- ✓ *Baneerjee Pranab Kumar, Introduction to biostatistics, S Chand & Company; 3rd Rev. Edn. 2006 edition*
- ✓ *Chainy GBN, Mishra G, MohantyPK, 2004, Basic Biostatistics, Kalyani Publisher.*

PRACTICAL

1. Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided.
2. Determination of population density in a natural/hypothetical community by quadrate method and calculation of Shannon-Weiner diversity index for the same community.
3. Study of an aquatic ecosystem: Phytoplankton and zooplankton collection, preservation and mounting, Measurement of temperature, turbidity/penetration of light, determination of pH, Dissolved Oxygen content (Winkler's method), BOD, COD, Free CO_2, Hardness, TDS.
4. Report on a visit to National Park/Biodiversity Park/Wild life sanctuary.
5. Chi-square analysis using seeds/beads/Drosophila.
6. Problems on standard deviation.
7. Graphical representation of data (Frequency polygon and Histogram).

Suggested Reading:

- ✓ *Practical Ecology by David Slingsby, Ceridwen Cook, Red Globe Press London.*
- ✓ *Practical Methods in Ecology by Henderson Peter A. John Wiley and Sons Ltd.*
- ✓ *Practical Ecology by Rao K S, K.S. Rao. Anmol Publications.*

Core-VI Physiology: Controlling and Coordinating systems

Programme Outcome:

- Develop an understanding of tissues and tissue systems with clarity on types and functions of each.
- Acquire knowledge on the muscle and nervous system.
- Obtain information about various receptors, their functioning and understand the mechanism of action.

Course Outcome:

- Acquire skills in differentiating tissues based on their structure and functions.
- Gain insights on the controlling and coordinating systems of the body.

Learning Outcome:

- Gain knowledge about tissue composition and function.
- Understand muscle types and mechanism of action.
- Understand functioning of different type of receptors.
- Acquire knowledge on osmoregulation and thermoregulation.

Unit 1: Tissues & Tissue system

Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue. Structure and types of bones and cartilages, Ossification, bone growth and resorption.

Unit 2: Muscle & Nervous System

Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction. Introduction to CNS, PNS and ANS. Structure of neuron, Types of neurons, Action potential and its propagation, Synapse and synaptic transmission, Neuromuscular junction; Reflex action.

Unit 3: Physiology of Special senses

Sensory Neurons-types; Physiology and pathway- hearing and balance, Olfaction, Gustation and Vision. Interoception – Nociceptors, Baroreceptors, Chemoreceptors, Thermoreceptors, Osmoreceptors, Cutaneous Receptors.

Unit 4: Homeostasis

Homeostasis and body fluids, Sources of body water and loss, Control of homeostasis, Homeostatic imbalances. Osmoregulation in fish, thermoregulation in Poikilotherms, homeotherms and heterotherms.

Text Books:

- ✓ *Marieb EN and Hoehn K, Human Physiology, (2013), 9th edition, Pearson Education,USA.*
- ✓ *Endocrinology, Hadley ME and Levine JE (2009), Pearson Education India; 6 edition.*
- ✓ *Textbook of Medical Physiology, Guyton & Hall, Elsevier, 12th edition, 2016.*

Suggested Books:

- ✓ *Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functional correlations. XII Edition., Lippincott W. & Wilkins*
- ✓ *Martini F H, Nath J L and Bartholomew E F (2015) Fundamentals of Anatomy andPhysiology. Pearson Education Publication,*
- ✓ *Guyton, A.C. & Hall, J.E. (2006). Textbook of Medical Physiology. XI Edition. Hercourt Asia PTE Ltd. /W.B.Saunders Company.*
- ✓ *Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition John Wiley & sons.*

Practical

Physiology: Controlling and Coordinating systems

1. Demonstration of the unconditioned reflex action (Deep tendon reflex such as knee jerk reflex).
2. Study of permanent slides- Squamous epithelium, Striated muscle fibres, nerve cells and others relevant to the theory.
3. Microtomy: Preparation of permanent slides.
4. Models of mammalian tissues (Any five) /photographs.
5. Effect of salt concentration on cells.

Core VII **Fundamentals of Biochemistry**

Programme Outcome:

- To gain understanding of fundamentals of biochemistry and biological macromolecules.
- To understand structure, classification, properties and significance of biomolecules.
- Acquire knowledge on nomenclature, classification and mechanism of enzyme action, regulation and its kinetics.

Course Outcome:

- To understand the structure and biological importance of protein, carbohydrates, lipids, nucleic acids and enzymes.
- Providing knowledge on types of amino acids and its polymeric form.
- Learning the structure and pairing of nucleotides, denaturation and denaturation kinetics of DNA.
- Obtaining knowledge on enzymes and isoenzymes, specificity, inhibition, derivation of Michaelis-Menten equation.

Learning Outcome:

- Gaining knowledge on different classes of biological macromolecules such as carbohydrates, lipids and nucleic acids.
- Understanding the structure of proteins and its monomers.
- Learning the structure of nucleic acids, denaturation and renaturation kinetics of DNA.
- Interpret the activities of enzymes and isoenzymes.

Unit 1: Carbohydrates & Lipids

Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides and Glycoconjugates; Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Tri-acylglycerols, Phospholipids, Glycolipids, Steroids.

Unit 2: Proteins

Amino acids: Structure, Classification and General properties of α-amino acids; Physiological importance of essential and non-essential α-amino acids.

Proteins: Bonds stabilizing protein structure; Levels of organization in proteins; Renaturation, Denaturation; Introduction to simple and conjugate proteins

Immunoglobulins: Basic Structure, Classes and Function, Antigenic Determinants.

Unit 3: Nucleic Acids

Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids. Cot Curves, Base pairing, Denaturation and Renaturation of DNA, Types of DNA and RNA, Complementarity of DNA, Hypo and Hyperchromaticity of DNA.

Unit 4: Enzymes

Nomenclature and classification, Cofactors, Specificity of enzyme action, Isozymes, Mechanism of enzyme action, Enzyme kinetics, Factors affecting rate of enzyme-catalyzed reactions, Derivation of Michaelis-Menten equation, Concept of Km and Vmax, Lineweaver-Burk plot, Multi-substrate reactions, Enzyme inhibition, Allosteric enzymes and their kinetics, Regulation of enzyme action.

Text Books:

- ✓ *Satyanarayan and Chakrapani, (2017) Biochemistry, Elsevier; Fifth edition*
- ✓ *Cox, M.M and Nelson, D.L. (2008). Lehninger's Principles of Biochemistry, V Edition, W.H. Freeman and Co., New York.*
- ✓ *Jeremy M. Berg, Lubert Stryer, John L. Tymoczko, Gregory J. Gatto, Biochemistry, 8th edition, 2015.*
- ✓ *Victor W., Rodwell, David A., Bender, Kathleen M., Botham, Peter J., Kennelly, P.Anthony, Harper's Illustrated Biochemistry, 31st edition.*

Suggested Readings:

- ✓ *Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). Harper's Illustrated Biochemistry, XXVIII Edition, International Edition, The McGraw- Hill Companies Inc.*
- ✓ *Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M. and Losick, R. (2008). Molecular Biology of the Gene, VI Edition, Cold Spring Harbor Lab. Press, Pearson Publication.*
- ✓ *Hames, B.D. and Hooper, N.M. (2000). Instant Notes in Biochemistry, II Edition, BIOS Scientific Publishers Ltd., U.K.*
- ✓ *Devasena T. (2010). Enzymology Oxford University Press; 1 edition*
- ✓ *Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). Biochemistry, VI Edition, W.H. Freeman and Co., New York.*

Fundamentals of Biochemistry

Practical:

1. Qualitative tests of functional groups in carbohydrates, proteins and lipids.
2. Paper chromatography of amino acids.
3. Action of salivary amylase under optimum conditions.
4. Effect of pH, temperature and inhibitors on the action of salivary amylase/Urease/acid or alkaline phosphatase

5. Demonstration of proteins separation by SDS-PAGE.

Semester-IV

Core VIII **Endocrinology & Reproductive Biology**

Programme Outcome:

- Insights on the history of endocrinology, study endocrine glands, hormones, control and regulation
- Acquire knowledge on the various facets of the reproductive system and their endocrine aspects.

Course Outcome:

- Essential clarity on endocrine gland structures, hormones, functions and their regulation.
- Scientific knowledge base on reproductive health and endocrine control.

Learning Outcome:

- Acquire information on the history of endocrinology, endocrine glands, and hormones.
- Gain an understanding of the Hypothalamo-hypophysial axis and regulation of hormone action.
- Understand the endocrine aspects of reproductive system.
- Recognize different aspects of reproductive health and Assisted Reproductive Technology.

Unit 1: Introduction to Endocrinology

A brief history of endocrinology, Types of endocrine glands (Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas), their histology, hormones, functions and disorders; General characteristics of Hormones, Classification, Hormone receptors, Mechanism of hormone action (steroidal and non-steroidal hormones) and tansduction .

Unit 2: Hypothalamo-hypophysial Axis and Regulation of Hormone Action

Structure of hypothalamus, Hypothalamic nuclei, Neurosecretions, Neurohormones and their functions, Hypothalamo-hypophysial portal system, Hypothalamic-pituitary-gonadal axis,

Hormone action at cellular and molecular level, Genetic control of hormone action. Regulation-Feedback mechanisms.

Unit 3: Reproductive System-endocrine aspects

Testis: Histology; Spermatogenesis: kinetics and hormonal regulation; Androgen synthesis and metabolism; Epididymal function and sperm maturation; Sperm transportation in male tract; Ovary: Histology, folliculogenesis, ovulation, corpus luteum formation and regression; Steroidogenesis and secretion of ovarian hormones; Reproductive cycles and their regulation, Ovum transport in the fallopian tubes; Sperm transport in the female tract, fertilization, prevention of polyspermy; Hormonal control-implantation and gestation, foeto-maternal relationship; Parturition and Lactation.

Unit 4: Reproductive Health

Infertility in male and female: causes, diagnosis and management; Assisted Reproductive Technology: sex selection, sperm banks, frozen embryos, in vitro fertilization, ET, EFT, IUT, ZIFT, GIFT, ICSI, PROST; Modern contraceptive technologies; Demographic terminology used in family planning.

Text Books:

- ✓ *C. Donnell Turner (2012) General Endocrinology Pub- Affiliated East-West press Pvt. Ltd.-New Delhi; 6th Edition*
- ✓ *Hadley, M.E. and Levine J.E. (2007). Endocrinology, 6th Edition. Pearson Prentice-Hall, Pearson Education Inc., New Jersey*
- ✓ *Austin, C.R. and Short, R.V. (1982) Reproduction in Mammals. Cambridge University Press.*
- ✓ *C. Donnell Turner (2012) General Endocrinology Pub- Affiliated East-West pressPvt. Ltd.-New Delhi; 6th Edition*
- ✓ *Tandulwadkar Sunita R (2015) The Art & Science Of Assisted Reproductive Technology, Jaypee Brothers Medical Publishers*

Suggested Readings:

- ✓ *Stephen Nussey and Saffron Whitehead (2001). Endocrinology: An Integrated Approach; Oxford: BIOS Scientific Publishers*
- ✓ *Tony M. Plant and Anthony J. Zeleznik (2015) Knobil and Neill's Physiology of Reproduction, Academic Press*

Endocrinology & Reproductive Biology

Practical:

1. Dissect and display of Endocrine glands in laboratory bred rat*.
2. Study of the permanent slides of all the endocrine glands.
3. Study and identification of endocrine disorders through images.
4. Compensatory ovarian/ adrenal hypertrophy in vivo bioassay in laboratory bred rat*.
5. Demonstration of Castration/ ovariectomy in laboratory bred rat*.
6. Estimation of plasma level of any hormone using ELISA.
7. Designing of primers of any hormone.
8. Examination of vaginal smear from live animals and examination of Human vaginal exfoliate cytology.
9. Surgical techniques: principles of surgery in endocrinology. Ovarectomy, hysterectomy, castration and vasectomy in rats. (*Subject to UGC guidelines)

10. Sperm count and sperm motility in rat.
11. Study of modern contraceptive devices.
12. Report on endocrine disorders in human.
13. Paper chromatographic separation of hormones.
14. Hypophysectomy in fish (Tilapia/catfish/ locally available fish)

Core IX Comparative Anatomy of Vertebrates

Programme Outcome:

- Understand anatomical significance of organ system in vertebrates.
- Comprehend structure, function and various derivatives of Integumentary, Skeletal, digestive, respiratory, circulatory, urinogenital and nervous system.

Course Outcome:

- Learner gains detailed overview of the anatomical resemblance amongst vertebrates hierarchies.
- Acquires knowledge on cellular development of organ systems in the vertebrates and linear progression of cellular derivatives during organogenesis.
- Understand the process of linear and vertical cellular evolutionary processes.

Learning Outcome:

- Acquire knowledge of the integument, and skeleton systems.
- Gain knowledge on the Gastro intestinal canal, associated glands, and respiration system.
- Obtain knowledge of the Circulatory and Urinogenital systems and their evolution.
- Comparative study of mammalian nervous system & sense organs.

Unit 1: Integumentary & Skeletal System

Structure, functions and derivatives of integument (Scale, claw, nail, hair, feather and dentition). Axial and appendicular skeleton, Jaw suspensorium, Visceral arches.

Unit 2: Digestive & Respiratory System

Alimentary canal and associated glands; Respiration through Skin, gills, lungs and air sacs; Accessory respiratory organs.

Unit 3: Circulatory and Urinogenital system

General plan of circulation, evolution of heart and aortic arches; Succession of kidney, Evolution of urinogenital ducts, Types of mammalian uteri.

Unit 4: Nervous System & Sense Organs

Comparative account of brain; Nervous system, Spinal cord, Cranial nerves in mammals. Classification of receptors: Brief account of visual and auditory receptors in man. Chemo and mechano-receptors

Practical

1. Study of placoid, cycloid and ctenoid scales through permanent slides/photographs
2. Disarticulated skeleton of Frog, Varanus, Fowl, Rabbit.
3. Carapace and plastron of turtle /tortoise (Photographs, charts etc).
4. Mammalian skulls: One herbivorous and one carnivorous animal.
5. Study of structure of any two organs (heart, lung, kidney, eye and ear) through ICT tools.
6. Project report submission on Integumentary derivatives.

Text Books:

- ✓ Kardong, K.V. (2005) Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education
- ✓ Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IXEdition. The McGraw-Hill Companies
- ✓ R. K. Saxena and Sumitra Saxena (2016). Comparative Anatomy of Vertebrates 2nd edition.

Suggested Readings:

- ✓ *Hilderbrand, M and Gaslow G.E. Analysis of Vertebrate tructure, JohnWiley and Sons*
- ✓ *Walter, H.E. and Sayles, L.P; Biology of Vertebrates, Khosla Publishing House*

Core X Physiology: Life Sustaining Systems

Programme Outcome:

- Knowledge of critical physiological processes.
- Understand anatomical attributes of Digestive, Respiratory, Renal and Cardiovascular system.
- Learn and develop an understanding of vital life-sustaining physiological processes.

Course Outcome:

- Appraise the significance of anatomical structures and physiological events.
- Apply information to understand the functioning of organisms.
- Demonstrate the ability to appreciate the occurrence of physiological actions.
- Understand interrelationships of life processes.
- Acquire practical skills in identifying different organs, and perform laboratory work based on theoretical applications

Learning Outcome:

- Acquire knowledge on digestion, respiration, renal and heart physiology.
- Understand the composition of blood grouping, functions and Blood clotting.

Unit 1: Physiology of Digestion

Structural organization and functions of gastrointestinal tract and associated glands; Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; Hormonal control of secretion of enzymes in Gastrointestinal tract.

Unit 2: Physiology of Respiration

Histology of trachea and lung; Mechanism of respiration, Pulmonary ventilation; Respiratory volumes and capacities; Transport of oxygen and carbon dioxide in blood; Respiratory pigments, Dissociation curves and the factors influencing it; Carbon monoxide poisoning; Control of respiration.

Unit 3: Renal Physiology

Structure of kidney and its functional unit, Mechanism of urine formation, Regulation of water balance, Regulation of acid-base balance, Homeostatic regulation of tubular reabsorption and secretion.

Unit 4: Blood and Physiology of Heart

Haemopoiesis, Components of blood and their functions; Structure and functions of haemoglobin, Blood clotting system, Blood groups: Rh factor, ABO and MN.

Structure of mammalian heart, Coronary circulation, Origin and conduction of cardiac impulses Cardiac cycle; Cardiac output and its regulation, Frank-Starling Law of the heart, nervous and chemical regulation of heart rate. Electrocardiogram, Blood pressure.

Practical:

1. Determination of ABO Blood group.
2. Enumeration of red blood cells and white blood cells using haemocytometer.
3. Preparation of blood smear for differential count.
4. Estimation of haemoglobin using Sahli'shaemoglobinometer.
5. Preparation of haemin and haemochromogen crystals.
6. Recording of blood pressure using a sphygmomanometer.
7. Examination of sections of mammalian slides: oesophagus, stomach, duodenum, ileum, rectum liver, trachea, lung, kidney.

Text Books:

- ✓ Marieb E.N. and Hoehn K.N. (2009) Human Physiology. Pearson Education Publication , 9th edition
- ✓ Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition John Wiley & sons.
- ✓ Guyton & Hall, (2016) Textbook of Medical Physiology. Elsevier, 12th edition.

Suggested Readings:

- ✓ Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functional correlations. XII Edition. Lippincott W. & Wilkins.
- ✓ Vander A Sherman J. and Luciano D. (2014). Vander's Human Physiology: The Mechanism of Body Function. XIII Edition, McGraw Hills.
- ✓ Moyes C.D., Schulte PM (2016), Principles of physiology, 2nd edition, Pearson education, 3rd.
- ✓ Guyton, A.C. & Hall, J.E. (2006). Textbook of Medical Physiology. XI Edition. Hercourt Asia PTE Ltd. W.B. Saunders Company.

Semester-V

Core XI **Biochemistry of Metabolic Processes**

Programme Outcome

- Understanding of catabolism, anabolism and regulatory mechanism of intermediary metabolism.
- To learn the processes of carbohydrate, lipid and protein metabolism.
- To obtain knowledge on redox regulation and electron transport system.

Course Outcome:

- Gain overall knowledge and understanding on metabolic pathways and shuttle systems.
- Gain knowledge on carbohydrate metabolism related processes.
- Understanding of β-oxidation and catabolism of amino acids.
- Understanding on mitochondrial respiratory chain and oxidative phosphorylation.

Learning Outcome:

- Gain knowledge on the compartmentalization of metabolic pathways.
- Understand role of intermediate and carbohydrate regulatory metabolism.
- Gain knowledge on β and omega oxidation of saturated fatty acids.
- Understand the role of mitochondria in energy production during electron transport.

Unit 1: Overview of Metabolism

Catabolism vs Anabolism, Stages of catabolism, Compartmentalization of metabolic pathways, Shuttle systems and membrane transporters; ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms.

Unit 2: Carbohydrate Metabolism

Sequence of reactions and regulation of glycolysis, Citric acid cycle, Phosphate pentose pathway, Gluconeogenesis, Glycogenolysis and Glycogenesis.

Unit 3: Lipid and protein Metabolism

B-oxidation and omega -oxidation of saturated fatty acids with even and odd number of carbon atoms; Biosynthesis of palmitic acid; Ketogenesis

Catabolism of amino acids: Transamination, Deamination, Urea cycle; Fate of C-skeleton of Glucogenic and Ketogenic amino acids.

Unit 4: Oxidative Phosphorylation

Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System.

Practical

1. Estimation of total protein in given solutions
2. Measurement of SGOT and SGPT activity.
3. Determination of GSH level in serum/tissue.
4. Measurement of GST activity.
5. To study the enzymatic activity of Trypsin/ Lipase.
6. To perform the Acid and Alkaline phosphatase assay from serum/ tissue.
7. Dry Lab (Virtual): To trace the labelled C atoms of Acetyl-CoA till they evolve as CO_2 in the TCA cycle.

Text Books:

- ✓ *Satyanarayan and Chakrapani, (2017) Biochemistry, Elsevier; Fifth edition.*
- ✓ *Cox, M.M and Nelson, D.L. (2008). Lehninger Principles of Biochemistry, V Edition, W.H. Freeman and Co., New York.*

Suggested Readings:

- ✓ Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). Harper's Illustrated Biochemistry, XXVIII Edition, International Edition,The McGraw-Hill Companies Inc.
- ✓ Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007).Biochemistry, VI Edition, W.H.Freeman and Co., New York.
- ✓ Hames, B.D. and Hooper, N.M. (2000). Instant Notes in Biochemistry, II Edition,BIOS Scientific Publishers Ltd., U.K.

Core XII **Principles of Genetics**

Programme Outcome:

- Obtain knowledge on the basic principles of genetics.
- To provide knowledge on the mechanism of sex determination and extra-chromosomal inheritance.
- To learn the process of DNA recombination, transposons and transposable elements.

Course Outcome:

- Acquire knowledge on the fundamentals of Mendelian and non-Mendelian genetics, chromosomal mapping and interaction of genes.
- Providing the knowledge and understanding on linkage, crossing over, sex determination and role of extra-chromosomal inheritance.
- Obtaining knowledge on chromosomal aberration, cause and consequences of mutations.

Learning Outcome:

- **U**nderstand principles of Mendelian genetics.
- Discern types of gene mutations and chromosomal aberrations with detection methods..
- Gain an understanding of mechanisms of sex determination and extra chromosomal inheritance.
- Understand the process of recombination and transposable genetic elements.

Unit 1: Mendelian Genetics, Linkage, Crossing Over and Chromosomal Mapping

Principles of inheritance, Incomplete dominance and co-dominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Sex-linked, sex-influenced and sex-limited characters inheritance. Polygenic inheritance with suitable examples; simple numerical based on it.

Linkage and crossing over, Cytological basis of crossing over, Molecular mechanisms of crossing over including models of recombination, Recombination frequency as a measure of linkage intensity, Two factor and three factor crosses, Interference and coincidence, Somatic cell hybridization.

Unit 2: Mutations

Types of gene mutations (Classification), Types of chromosomal aberrations (Classification, figures and with one suitable example of each), Molecular basis of mutations in relation to UV light and chemical mutagens; Detection of mutations: CLB and sex- linked visible attached X method.

Unit 3: Sex Determination & Extra-chromosomal Inheritance

Chromosomal mechanisms of sex determination in Drosophila and Man; Criteria for extra-chromosomal inheritance, Antibiotic resistance in Chlamydomonas, Mitochondrial mutations in Saccharomyces, Cytoplasmic inheritance in Paramecium.

Unit 4: Recombination in Bacteria and Viruses & Transposable Genetic Elements Conjugation, Transformation, Transduction, Complementation test in Bacteriophage. Transposons in bacteria, Ac-Ds elements in maize and P elements in Drosophila, Transposons in human.

Practical

1. Study of Mendelian laws and gene interactions.
2. Linkage maps based on data from conjugation, transformation and transduction.
3. Linkage maps based on data from Drosophila crosses.
4. Study of human karyotype (normal and abnormal).
5. Pedigree analysis of some human inherited traits.
6. Experiments on epistatic interactions including test cross and back cross.
7. Experiments on probability and Chi-square test.
8. Study on sex linked inheritance in Drosophila.

Text Books:

- ✓ *Benjamin Pierce, (2015) Genetics- A Conceptual Approach, 5th edition, WH Freemanpublication*
- ✓ *Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition.*

Suggested Readings:

- ✓ *Benjamin Cummings. Russell, P. J. (2009). Genetics- A Molecular Approach.III Edition.*
- ✓ *Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. V Edition. John Wileyand Sons Inc.*
- ✓ *Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. Introduction to Genetic Analysis. IX Edition. W. H. Freeman and Co.*
- ✓ *Fletcher H. and Hickey I. (2015). Genetics. IV Edition. GS, Taylor and Francis Group, New York and London.*

Core XIII **Molecular Biology**

Programme Outcome:

- Detailed information on DNA structure, different forms, their properties and types of RNA.
- Understanding mechanism of DNA replication and repair in prokaryotes and eukaryotes.
- Gain knowledge on mechanism of transcription and translation in prokaryotic and eukaryotic cells.
- Acquire knowledge on post transcriptional modifications of RNA.

Course Outcome:

- Gain knowledge on details of Watson-Crick Model of DNA, RNA types .
- Understand the process of DNA replication, transcription, translation and their regulatory mechanisms.

- Gain knowledge on genetic code & regulatory machinery.
- Understand gene expression and role of RNA interference elements.

Learning Outcome:

- Gain knowledge on the fundamentals of double helical structure of DNA, denaturation and renaturation kinetics DNA, mechanism of replication and repair of DNA.
- Acquire knowledge on process of transcription, translation and post-processing regulatory mechanisms.
- Obtain knowledge on splicing mechanism, RNA editing, Processing of rRNA and tRNA.
- Understand operon concept and regulation.

Unit 1: Nucleic Acids, DNA Replication & Repair

Salient features of DNA: Watson and Crick model of DNA, DNA denaturation and renaturation kinetics, Cot curves, C-value paradox, Salient features of RNA

DNA Replication in prokaryotes and eukaryotes: Semi-conservative, bidirectional and semi-discontinuous replication, Replication of circular and linear ds-DNA and RNA priming, replication of telomeres.

DNA repair mechanism: Base and nucleotide excision repair in bacteria, Mismatch repair, SOS repair.

Unit 2: Transcription & Translation

Transcription: RNA polymerase and transcription Unit, mechanism of transcription in prokaryotes and eukaryotes, synthesis of rRNA and mRNA, transcription factors and regulation of transcription.

Translation: Genetic code, Degeneracy of the genetic code and Wobble Hypothesis, Process of protein synthesis in prokaryotes: Ribosome structure and assembly in prokaryotes, Fidelity of protein synthesis, Aminoacyl tRNA synthetase and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation.

Unit 3: Post Transcriptional Modifications and Processing of Eukaryotic RNA

Structure of globin mRNA; Split genes: concept of introns and exons, splicing mechanism, alternative splicing, exon shuffling, and RNA editing, Processing of rRNA and tRNA.

Unit 4: Gene Regulation &Regulatory RNAs

Transcription regulation in prokaryotes: Principles of transcriptional regulation with examples from Lac-operon and Trp-operon; Transcription regulation in eukaryotes: Activators, repressors, enhancers, silencer elements; Gene silencing, RNA interference, miRNA, si-RNA.

Text books:

- ✓ Karp G, Iwasa J, Marshall W. Karp's Cell and Molecular Biology, 9th Edition. John Wiley and Sons. Inc. ISBN: 978-1-119-59816-9
- ✓ Krebs JE, Goldstein ES, Kilpatrick ST. (2018) Lewin's Gene XII, Jones and Bartlett Publishers, Inc. ISBN: 9781284104493.
- ✓ DeRobertis E. D. P. (2017) Cell and Molecular Biology 8th Edition. ISBN: 10-8184734506, 13-978-8184734508
- ✓ Lodish H, Berk A, Kaiser CA, Kreiger M, Bretscher A, Ploegh H, Amon A, Martin KC. (2016) Molecular Cell Biology.8th Edition. WH Freeman. ISBN: 10-1464183392, 13-978-1464183393

Suggested Readings:

- ✓ *Becker W. M., Kleinsmith L.J., Hardin J, Bertoni G.P. (2009). The World of the Cell. VII Edition. Pearson Benjamin Cummings Publishing, San Francisco.*
- ✓ *Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P (2002) Molecular Biology of the Cell, 4th Edition. ISBN: 10-0815332181, 13-978-0815332183*
- ✓ *Cooper G.M. and Robert E. Hausman R.E. The Cell: A Molecular Approach**,** V Edition, ASM Press and Sinauer Associates.*
- ✓ *McLennan A., Bates A., Turner, P. and White M. (2015). Molecular Biology IV Edition. GS, Taylor and Francis Group, New York and London.*
- ✓ *Lewin's Genes XII- by Jocelyn E. Krebs , Elliott S. Goldstein , Stephen T. Kilpatrick*

Molecular Biology

1. Study of Polytene chromosomes from Chironomous / Drosophila larvae.

2. Preparation of liquid culture medium (LB) and raise culture of E.coli..

3. Estimation of the growth kinetics of *E. coli* by turbidity method.

4. Preparation of solid culture medium (LB) and growth of *E. coli* by spreading and streaking.

5. Quantitative estimation of calf thymus DNA using colorimeter (Diphenylamine reagent) or spectrophotometer (A 260 nm measurement).

6. Quantitative estimation of RNA using Orcinol reaction.

7. Study and interpretation of electron micrographs/photograph showing (a) DNA replication, (b) Transcription and (c) Split genes.

Semester-VI

Core XIV **Developmental Biology**

Programme Outcome:

- Understand the phases of development, changes, regulation and the concepts of ageing and teratogenesis.
- Gain knowledge on In- Vitro fertilization and amniocentesis.

Course Outcome:

- Understand the basic concepts of gametogenesis, fertilization and embryogenesis.
- Gain knowledge on interferences in developmental biology.

Learning Outcome:

- Apprise the historical perspectives of Developmental Biology with the basic concepts.
- Understanding of the phases and changes associated with early, late and post-embryonic development

Unit 1: Introduction to Developmental Biology, Gametogenesis & Fertilization

Historical perspective and basic concepts: Phases of development, Cell-Cell interaction, Pattern formation, Differentiation and growth, Differential gene expression, Cytoplasmic determinants and asymmetric cell division. Gametogenesis, Spermatogenesis, Oogenesis; Types of eggs, Egg membranes; Fertilization (External and Internal): Changes in gametes, Blocks to polyspermy.

Unit 2: Early Embryonic Development

Cleavage: Planes and patterns of cleavage, Types of Blastula, Fate maps (including Techniques); Early development of frog and chick up to gastrulation; Embryonic inductionand organizers.

Unit 3: Late Embryonic Development

Fate of Germ Layers; Extra-embryonic membranes in birds; Implantation of embryo in humans, Placenta (Structure, types and functions of placenta).

Unit 4: Post Embryonic Development & Interferences in Developmental Biology

Metamorphosis: Changes, hormonal regulations in amphibians and insects; Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (with one example each); Ageing: Concepts and Theories. Teratogenesis: Teratogenic agents and their effects on embryonic development; In vitro fertilization, Stem cell (ESC), Amniocentesis.

Text Books:

- ✓ *Lewis Wolpert (2010). Principles of Development. II Edition, Oxford University Press.*
- ✓ *Gilbert, S. F. (2017). Developmental Biology, XI Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.*

Suggested Readings:

- ✓ *Carlson, R. F. Patten's Foundations of Embryology.*
- ✓ *Kalthoff (2008). Analysis of Biological Development, II Edition, McGraw-Hill Publishers.*
- ✓ *Verma PS and Agrawal VK, Chordata Embryology (2010) (S Chand Publication).*

Developmental Biology

Practical:

1. Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula, neurula, tail-bud stage, tadpole (external and internal gill stages).
2. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages).
3. Study of the developmental stages and life cycle of Drosophila from stock culture.
4. Study of different sections of placenta (photomicropgraph/slides).
5. Project report on Drosophila culture/chick embryo development.
6. Study of developmental stages by raising chick embryo in the laboratory.
7. Estimation of calcium in egg shell.
8. Estimation of carbohydrates and proteins in egg.

Core XV **Taxonomy and Evolutionary Biology**

Programme Outcome:

- Familiarize learners with concepts of Taxonomy.
- Gain overview of the beginning of life and evolutionary theories.
- Understand various physical forces or stress pressures during evolution.
- Gain knowledge on correlates of epigenetic changes in the cellular footprints of animals and genetic lineages exerted through various physical forces.
- Comprehend the origin of evolution in Hominides with reference to Primates, validate evidence of human origin by molecular and phylogenetic sequence analysis.

Course Outcome:

- Understand concepts of taxonomy.
  Obtain knowledge of life initiation and its evolution through the chronological landscape.
- Know the evolutionary relationship of organisms with response to various physical forces leading to adaptive evolution.
- Strengthen student's analytical approach to evolutionary relationships.

Learning Outcome:

- Acquisition of knowledge on concepts of taxonomy and species.
- Acquaint learners with theories of evolution, evidences, and the process of changes over time.
- Gain knowledge on construction and interpretation of phylogenetic tree in relation to evolution.

Unit 1: Concepts of Taxonomy

Importance & Applications of biosystematics; taxonomic characters, Hierarchy categories; biological classification; Taxonomic procedures: collections, preservation, curetting, identification, Keys; International Code of Zoological Nomenclature (ICZN): operative principles, important rules; Zoological nomenclature; Chemo and sero taxonomy, Cytotaxonomy, Numerical taxonomy, and DNA barcoding. Taxonomic publications: Kinds, Major features of manuscript for publication.

Unit 2: Theories, Evidences of Evolution and Extinction

Life's Beginnings: Chemogeny, RNA world, Biogeny, Evolution of eukaryotes. Historical review of evolutionary concept: Lamarckism, Darwinism, Neo-Darwinism. Evidences of Evolution: Fossil record (types of fossils, transitional forms, geological time scale, evolution of horse), Sources of variations: Heritable variations and their role in evolution. Extinctions, Back ground and mass extinctions (causes and effects), detailed example of K-T extinction.

Unit 3: Process of Evolutionary changes

Population genetics: Hardy-Weinberg Law (statement and derivation of equation, application of law to human Population); Evolutionary forces upsetting H-W equilibrium; Natural selection (concept of fitness, selection coefficient, derivation of one unit of selection for a dominant allele, genetic load, mechanism of working, types of selection, density-dependent selection, heterozygous superiority, kin selection, adaptive resemblances, sexual selection). Genetic Drift (mechanism, founder's effect, bottleneck phenomenon); Role of Migration and Mutation in changing allele frequencies.

Unit 4: Products of evolution, Species concept, Origin and Evolution of man

Micro evolutionary changes (inter-population variations, clines, races, Species concept, Isolating mechanisms, modes of speciation-allopatric, sympatric, Parapatric. Adaptive radiation/ macroevolution (exemplified by Galapagos finches). Origin and evolution of man, Unique hominin characteristics contrasted with primate characteristics, primate phylogeny from *Dryopithecus* leading to *Homo sapiens*, molecular analysis of human origin. Phylogenetic trees, multiple sequence alignment, construction and interpretation of phylogenetic trees.

Text Books:

- ✓ *Principle of Animal Taxonomy; G.G. Simpson. Oxford IBH Publishing Company.*
- ✓ *Elements of Taxonomy. E. Mayer.*
- ✓ *The diversity of life (The College Edition), E.O.Wilson. W.W. Northern & co.*
- ✓ *Theory and Practice of Animal Taxonomy. V.C. Kapoor. Oxford & IBH Publishing Co. Pvt. LTD.*
- ✓ *Advancement in Invertebrate Taxonomy and Biodiversity. Rajeev Gupta. Agrobios International. Campbell, N.A. and Reece J.B (2011). Biology. IX Edition. Pearson, Benjamin,Cummings.*
- ✓ *Rastogi B.B., (2018). Organic Evolution, MedTech; 3rd edition*

Suggested Readings:

- ✓ *B.K. and Hallgrimson, B. (2008). Evolution IV Edition. Jones and Barlett Publishers.*
- ✓ *Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.*
- ✓ *Ridley, M (2004) Evolution III Edition Blackwell publishing Hall.*

Taxonomy and Evolutionary Biology

Practical

1. Study of equipment used in sample collection.
2. Use of taxonomic keys in identification.
3. Preservation and curation of specimens (Submission of 2 specimens collected and preserved).
4. Study of fossils from models/pictures
5. Study of homology and analogy from suitable specimens
6. Study and verification of Hardy-Weinberg Law by chi-square analysis
7. Demonstration of the role of natural selection and genetic drift in changing allele frequencies using simulation studies
8. Graphical representation and interpretation of data of height/weight of a sample of 100 humans in relation to their age and sex.
9. Construction of phylogenetic trees with the help of bioinformatics tools (Clustal X, Phylip, NJ) and its interpretation.

Text Books

- ✓ *Principles of Taxonomy by Ashok Verma.*
- ✓ *Evolutionary Biology with Practical by Tripurari Mishra.*

Semester VII

Core XVI **Instrumentation and Techniques**

Programme Outcome:

- The programme will impart the basic understanding on instrumentation and techniques.
- Students will gain knowledge on working principles of scientific equipment's.
- Programme strengthens student's skills in handling laboratory equipment's and performing experiments.

Course Outcome:

- Insights into basic understanding of instruments and their operational principles.
- Students will gain knowledge on principles of centrifugation, and chromatographic techniques like Paper chromatographic, TLC, Column chromatography (GC, GEC, Ion-exchange, affinity and HPLC).
- Course will strengthen the learners on basic techniques on gel electrophoresis and blotting.

Learning Outcome:

- Understand the basic principles of microscopy, spectrophotometer and radioisotope techniques.
- Gain knowledge on principle and techniques of centrifugation and chromatography.
- Knowledge in electrophoresis and blotting technique.

Unit I:

Instrumentation and operation: Principle of Light, Fluorescence and Electron Microscopes and their applications.

UV-Visible absorption Spectroscopy: Principle, instrumentation and application.

Principles of electrochemical techniques: Electrochemical cells and reactions, potentiometry and voltammetry, pH electrode.

Radioisotope techniques: Measurement of radioactivity in biological materials (carbon dating, Geiger-Muller counting and liquid scintillation counting).

Unit II:

Centrifugation techniques: Basic principles of sedimentation, Rotor types, Types of centrifugation.

Chromatographic techniques: Principles of chromatography (Adsorption and Partition chromatography), Planar chromatography (Paper and Thin-layer chromatography), Column chromatography (Gas chromatography, Gel exclusion/permeation chromatography, Ion exchange chromatography, Affinity chromatography, HPLC).

Unit III:

Electrophoretic techniques: Principle and applications of electrophoresis of proteins (SDS-PAGE, native gels, gradient gels, isoelectric focusing gels and two dimensional gels) and Nucleic acids (Agarose gel electrophoresis).

Unit IV:

Blotting techniques: Principle, Instrumentation and applications (Southern, Northern and Western blotting). Flow cytometry; Basic principle, Instrumentation and application.

Text Book Reading:

- ✓ *Principles and techniques of Biochemistry and Molecular biology- Wilson K and Walker J (Cambridge University press)*
- ✓ *Biophysical Chemistry: Principles and techniques – Upadhyay A, Upadhyay K and Nath N (Himalaya Publishing House).*
- ✓ *An Introduction to practical Biochemistry- David T. Plummer (Tata McGraw Hill).*
- ✓ *A Textbook of Biophysics- R N Roy (NCBA, New Central Book Agency)*

SUGGESTED READING

- ✓ *Mark F. Vitha. 2018. Spectroscopy: Principles and Instrumentation. Wiley, ISBN: 978-1-11943660-7.*
- ✓ *Kay Ohlendieck and Stephen E. Harding. 2017. Centrifugation and ultracentrifugation. Basic principles of sedimentation.*
- ✓ *Baraem Ismail and Suzanne Nielsen. 2010. Basic Principles of Chromatography. Food Science Texts Series, DOI 10.1007/978-1-4419-1478-1-27.*
- ✓ *Biochemistry Laboratory: Modern Theory and Techniques: United States Edition - Rodney Boyer.*

Practical

Instrumentation and Techniques

1. Calibration of pH meter using standards and determine the pH of water samples.
2. Isolation of genomic DNA from animal tissue/blood.
3. Quantification and purity check of isolated DNA.
4. Agarose gel electrophoresis of DNA.
5. SDS PAGE (Demonstration).
6. Isolation of Mitochondria.
7. Study of Microscopic methods.
8. Study of Microtomy and Histological techniques.
9. Blotting (Demonstration).

Core XVII Biostatistics and Bioinformatics

Programme Outcome:

- The programme gives the information to students on concepts of biostatistics and bioinformatics.
- The knowledge of biostatistics gives the dynamics application of population sampling methods and utilities through various methods and statistical tools.
- The study of bioinformatics will impart the deep knowledge on various informatics tools and web resources for analysis of cellular biomolecules.

Course Outcome:

- To understand the various methods of sampling towards qualitative and quantitative analysis of its distributions in population.
- Students will be acquainted with the measures of central tendency and dispersion through mean, median and mode.
- Learners will be able to understand the function and application of probability distribution, hypothesis testing and principal component analysis.
- This course will make the students understand the biological data bases through various web resources by studying bioinformatics.

Learning Outcome:

- Studying this course student will utilize their knowledge of statistical analysis while working with biological samples and applying its functional applicability through bioinformatics.
- Students will be able to disseminate the concept of central tendency and dispersion, measure of ranges, variance, and deviations.
- Learning outcome on probability theory and distribution will make the student understand the concept of dispersion and its distribution, hypothesis testing and principal component analysis.
- Students will gain the knowledge on utilizing bioinformatics web resources for structural and functional analysis of biological macromolecules.

Unit-I

Introduction: definition and scope of biostatistics. Concepts of population and methods of sampling. Simple random sampling, stratified sampling, systematic and clustered sampling. Types of biological data: Qualitative and quantitative, cross sectional and time series, discrete and continuous. Data Measurement scales: Nominal, ordinal, interval and ratio. Data presentation: Tabular and graphical. Histogram and Frequency distribution, cumulative frequency distributions and its graphical representation.

Unit-II

Basic concept of measures of Central tendency and Dispersion. Mean, Median and Mode. Arithmetic, Geometric and Harmonic means. Measure of Range, Variance (sample and population), Quartile deviation, Mean deviation, Standard deviation and their relative measures.

Unit-III

Probability distributions: Normal (Dispersion percentage & Z-score) and bionomial distribution. Inferential statistics: Hypothesis testing (Null hypothesis), p-value, X^2 test, t-test (one sample t-test and paired sample t-test). Principal component analysis.

Unit-IV

Introduction to bioinformatics and its web resources: NCBI, EMBL-EBI, ExPASy, etc. Biological data resources, access and management. Various genome across the tree of life and major sequencing projects. Data base to store and analyze DNA, RNA, protein sequences and 3-D structures (motifs and domians). Local and Global Sequence alignment programs. Genome and protein BLAST. Scoring matrices, E-value and Bit-score. OTUs and molecular phylogenetics.

Text Book Reading:

- ✓ *Basics Biostatistics- GBN Chainy (Kalyani publishers)*
- ✓ *Biostatical analysis- Jerrold H. Zar 5th Edition*
- ✓ *Introduction to Bioinformatics- Arthur M Lesk (Oxford University Press)*

Suggested Reading:

- ✓ *Welham, S. J, Gezan, S. A, Clark, S. J, Mead, A. 2014.Statistical Methods in Biology [electronic resource]. Design and Analysis of Experiments and Regression Hoboken: CRC Pres.*
- ✓ *Pavan Kumar Agrawal and Rahul Shrivastava. 2017. Bioinformatics Database Resources chapter – 4. DOI: 10.4018/978-1-5225-1871-6.ch004*
- ✓ *Basic Statistical analysis- Richard C. Sprinthall - 9th edition (Pearson)*
- ✓ *Fundamentals of Biostatistics- Bernard Rosner- 8th edition (Brooks/Cole)*

Practical

1. Data presentation by histogram and frequency tables (diagrams and graphs).
2. Determination of Arithmetic mean, geometric mean and harmonic mean.
3. Analysis of problems on Mean, Median and Modes.
4. Analysis of problems on X^2 test, t-test.
5. Analysis of problem on Assumption and validations of Hypothesis testing.
6. Use of bioinformatics tools (online) for analysis of sequence similarity of DNA, RNA and Proteins.

Core XVIII **Animal Biotechnology**

Programme Outcome:

- Acquires knowledge on animal biotechnology.
- Gain knowledge of techniques in molecular biology and genetic engineering.
- Skills learners on methods of animal cell culture, Recombinant DNA technology and gene therapy.

Course Outcome:

- Students gain understanding of cloning vectors, restriction enzymes, genomic and cDNA libraries.
- Understand the process and applications of genetically modified organisms/ animals.

Learning Outcome:

- The study outcome will help the students in applying their knowledge of animal biotechnology in biological research and pharmaceutics.
- Molecular techniques strengthen learners for extrapolating the functional relevance of nucleic acid.
- Gain knowledge on transgenics and knockout mice.
- Acquire skills in animal cell culture and cloning, expression of transgenes, recombinant protein production, and gene therapy.

Unit 1: Introduction to Animal Biotechnology

Concept and scope of biotechnology, cloning vectors: Plasmids, Cosmids, Phagemids, Lambda Bacteriophage, M13, BAC, YAC and Expression vectors (characteristics).

Restriction enzymes: Nomenclature, detailed study of Type II, Construction of genomic and cDNA libraries and screening by colony and plaque hybridization Transformation techniques: Calcium chloride method and electroporation

Unit 2: Molecular Techniques

Blotting: Southern, Northern and Western blotting, DNA sequencing: Sanger method Polymerase Chain Reaction, DNA Finger Printing and DNA microarray

Unit 3: Genetically Modified Organisms

Production of cloned and transgenic animals: Nuclear Transplantation, Retroviral Method, DNA microinjection, Applications of transgenic animals: Production of pharmaceuticals, production of donor organs, knock-out mice.

Unit 4: Culture Techniques and Applications

Animal cell culture, expressing cloned genes in mammalian cells, Molecular diagnosis of genetic diseases (Cystic fibrosis, Thalassemia, Haemophilia and Sickle cell anemia), Recombinant DNA in medicines: Recombinant insulin and human growth hormone, Gene therapy.

Text Books:

- ✓ *BD Singh, (2014) Biotechnology: Expanding Horizons, Kalyani Publishers*
- ✓ *U.Satyanarayana and U Chakrapani, (2014) Biotechnology, Books & Allied Ltd*
- ✓ *T.A. Brown. (2016) Gene Cloning and DNA Analysis: An Introduction. Wiley-Blackwell. ISBN-10-9781119072560*
- ✓ *S.B. Primrose and R.M. Twyman (2006) Principles of Gene Manipulation and Genomics. 7th Edition. Wiley-Blackwell. ISBN: 978-1-405-13544-3*
- ✓ *Richard J. Reece (2003) Analysis of Genes and Genomes. 8th Edition. ISBN: 978-0-470-84380-2*

Suggested Readings:

- ✓ Griffiths, A.J.F., J.H. Miller, Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2009). An Introduction to GeneticAnalysis. IX Edition. Freeman and Co., N.Y., USA.
- ✓ Watson, J.D., Myers, R.M., Caudy, A. and Witkowski, J.K. (2007). Recombinant DNA- Genes and Genomes- AShort Course. III Edition, Freeman and Co., N.Y., USA.
- ✓ Brown, T.A. (2015). Gene Cloning and DNA Analysis. 7th Edition, Academic Press, California, USA.

Practical

Animal Biotechnology

1. Genomic DNA isolation from E. coli / Animal tissue
2. Plasmid DNA isolation (pUC 18/19) from E. coli
3. Restriction digestion of plasmid DNA / Lambda Phage DNA
4. Construction of circular and linear restriction map from the data provided.
5. Calculation of transformation efficiency from the data provided.
6. To study following techniques through photographs
    a. Southern Blotting

b. Northern Blotting

c. Western Blotting

d. DNA Sequencing (Sanger's Method)

e. PCR

f. DNA fingerprinting.

Core XIX **Immunology**

Programme Outcome:

- Imparts the knowledge of immunological defense system of human body.
- Understand the type and functions of various immune cells.
- Learner gain knowledge on primary functions of immune system and role of vaccine in combating disease.

Course Outcome:

- Knowledge on types and cells of immune system and their functions in physiological defense against pathogens.
- Understand the functions of various antigens and immunoglobins in cellular response.
- Learners gain knowledge of structure and function of cell surface and secreted molecules.
- Understand naturally occurring allergens and their role in hypersensitive reactions.

Learning Outcome:

- Gain of knowledge and expertise in the field of immunology to cater to the functional applicability of immunological defence in health care management.
- Learner acquainted with structural components of immune cells with their functions like antigenicity, immunogenicity and antigen antibody interactions.
- Understand the role of MHC, Cytokines, and Complement system in immunological defence.
- Gain knowledge on immune cells eliciting hypersensitive reactions and types of vaccines and production.

Unit 1: Innate and Adaptive Immunity

Cells and organs of the Immune system. Anatomical barriers, Inflammation, Cell and molecules involved in innate immunity, Adaptive immunity (Cell mediated and humoral), passive: Artificial and natural Immunity, Active: Artificial and natural Immunity.

Unit 2: Antigens and Immunoglobulins

Antigenicity and immunogenicity, Immunogens, Adjuvants and haptens, Factors influencing immunogenicity, B and T-Cell epitopes, Immunoglobulins: Structure and functions of different classes of immunoglobulins, Antigen antibody interactions, Immunoassays (ELISA- Direct, Indirect, Competitive, Sandwich and RIA).

Unit 3: Major Histocompatibility Complex, Cytokines and Complement system

Structure and functions of MHC molecules. Endogenous and exogenous pathways of antigen processing and presentation; Cytokines – Types, properties and functions, Complement System -Components and pathways of complement activation.

Unit 4: Hypersensitivity and Vaccines

Gell and Coombs' causes of hypersensitive reactions, classification and brief description of various types of hypersensitivities.

Vaccines -**v**arious types of vaccines, Advances in vaccine production.

Text Books:

- ✓ *Abbas K. Abul and Lechtman H. Andrew (2017). Cellular and MolecularImmunology. V Edition. Saunders Publication.*
- ✓ *Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2017). Immunology, VIEdition. W.H. Freeman and Company.*
- ✓ *Fahim Halim Khan (2009). The Elements of Immunology. Pearson Education.*

Suggested Readings:

- ✓ *Peter J. Delves and Seamus J. Martin (2017) Roitt's Essential Immunology, Wiley-Blackwell; 13th edition.*
- ✓ *Immunology- Weir*
- ✓ *Lab manual in Biochemistry, Immunology and Biotechnology- Arti Nigam and Archana Ayyagari (McGraw-Hill Education (India).*

Practical

1. Study of lymphoid organs.
2. Histological study of spleen, thymus, skin and lymph nodes through slides/ photographs
3. Preparation of stained blood film to study various types of White blood cells.
4. ABO blood group determination.
5. Total WBC counting.
6. Differential count.
7. WIDAL Test.
8. Demonstration of ELISA.
9. Demonstration of Bone marrow smears to study Immune cells.

Semester VIII

Core XX **Aquatic Biology and Toxicology**

Programme Outcome:

- Acquire knowledge on aquatic biomes
- Gain understanding of the fresh water and marine realm and the factors influencing the systems.
- Obtain information on management of resources associated with such systems.

Course Outcome:

- Skills obtained in estimating environmental parameters in the laboratory.
- Taxonomic basis of identification established.
- Prepare the students for career in aquatic resources management and sustainable utilization

Learning Outcome:

- Acquire knowledge about Ocean, sea floor profile and mangroves.
- Gain knowledge about beneficial bioactive compounds from marine system.
- Understand relationship between toxicant dose concentration and response.
- Gain knowledge about POP's, contaminants and their mode of action.

Unit 1: Aquatic Biomes

Brief introduction of the aquatic biomes: Fresh water ecosystem (lakes, wetlands, streams and rivers); Marine ecosystem (Differences between Seas and oceans, profile of floor, zones (intertidal, oceanic, pelagic, benthic), estuaries- structure and types, coral reefs and mangroves.

Unit 2: Fresh water and Marine Biology

Lakes: Origin and classification, Lakes and Ecosystem, Lake morphometry, Physico–chemical Characteristics: Light, Temperature, Thermal stratification,

Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity; dissolved gases (Oxygen, Carbondioxide). Nutrient Cycles in Lakes-Nitrogen, Sulphur and Phosphorous **Streams:** Different stages of stream development, Physico-chemical, environment, Adaptation of hill-stream fishes.

Seas and Oceans: Physico-chemical environmental factors in a marine environment, Adaptations of deep-sea organisms. Plankton, nekton, and benthos; Animal associations in marine environment- Natural associations-community, commensalism, parasitism, symbiosis in different groups; Marine Resources-algal, animal, mineral and Drugs.

Unit 3: Toxicology

Introduction to Toxicology: Sub disciplines of Toxicology, Dose-Response graphs, acute and chronic toxicity, Measurement of LD50 and LC50 values, Bioassay with examples (Vertebrate and Invertebrate).

Unit 4: Mechanism of Toxicity

Mechanisms of Toxicity of OCIs, OPIs group of pesticides, Delivery, Absorption, Distribution, Excretion, Biotransformation, Bioaccumulation, Biomagnification, Risk Assessment, Hazard Identifications (Assessing Toxicity of Chemicals), POPs (Persistent organic pollutants),Metals (Arsenic, Lead, Mercury).

Text Books:

1. Pawlowski: Physicochemical Methods for Water and Wastewater Treatment, 1st Edition.
2. Trivedi and Goyal: Chemical and biological methods for water pollution studies Welch: Limnology, Vols. I-II.
3. Techniques in Aquatic Toxicology, Vol-II (Gary K. Ostrader Edn.), Routledge, Taylor & Francis Group, USA.
4. A textbook of Marine ecology – N B Nair and D M Thumpy

Suggested Readings:

1. Anathakrishnan: Bioresources Ecology 3rd Edition
2. Odum and Barrett: Fundamentals of Ecology, 5th Edition
3. Pawlowski: Physicochemical Methods for Water and Wastewater Treatment,1st Edition
4. Trivedi and Goyal:Chemical and biological methods for water pollution studies
5. Welch: Limnology, Vols. I-II
6. George Karleskint, James Small, Richard Turner: Introduction To Marine Biology
7. John H Duffs.; Howard G J Worth.; (Editors). (2015). “Fundamental Toxicology”. 2nd Edition Publisher: Royal Society of Chemistry; UK, 516 pages
8. Environmental toxicology; John H. Duffs, 1980, Edward Arnold Publishers, New Delhi.
9. Elements of toxicology; J. P Shukla and Pandey, Radha Publishers, New Delhi.
10. Fundamentals of Aquatic Toxicology; Rand, G.M and Petrocelli, S.R.(Eds), (1985), Hemisphere Publishing Corporation, Washington.

Practical

1. Determine the area of a lake using graphimetric and gravimetric method.
2. Identify the important macrophytes, phytoplankton, zooplankton and benthos.
3. Determine the amount of Turbidity/ transparency, Dissolved Oxygen, Free Carbon dioxide, Alkalinity (carbonates & bicarbonates) in water collected from a water body.
4. Instruments used in limnology/ marine Biology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, quadrat, grab sampler) and their significance.
5. A Project Report on a visit to a Sewage treatment plant/ Marine bioreserve/ Fisheries Institutes/ one time field study.

Core XXI **Wildlife and Conservation Biology**

Programme Outcome:

- Understand the significance of wild life conservation.
- Gain knowledge on wild life and the need of habitable environmental parameters.
- Acquire skills on conservation strategies and wild life management.

Course Outcome:

- Gains overview of wild life conservation strategies through various acts and regulatory agencies.
- Strengthens learner's towards understanding scientific approaches to evaluate health status of wild animals and focus man-animal conflicts.

Learning Outcome:

- Acquire knowledge about the importance of conservation.
- Gain knowledge about implementation of wildlife laws.
- Understand methods of estimating population.
- Understand major conservation projects and maintenance of sanctuaries.

Unit 1: Introduction to Wildlife

Values of wild life: Positive and negative; Conservation ethics; Importance of conservation; Causes of depletion; World conservation strategies, Conservation and protection Laws, Wild animal of India and Odisha. Habitat analysis, Physical parameters: Topography, Geology, Soil and water; Biological Parameters: food, cover, forage, browse and cover estimation; Standard evaluation procedures: remote sensing and GIS.

Unit 2: Management of Habitats

Setting back succession; Grazing logging; Mechanical treatment; Advancing the succession process; Cover construction; Preservation of general genetic diversity; Restoration of degraded habitats, *In-situ* and *Ex-situ* conservation, Wild life Protection acts, Wildlife trade and its related laws.

Unit 3 Population estimation

Attributes of population: Density, natality, mortality, sex ratio computation, Bayesian models in abundance estimation (Spatial and Non Spatial); Faecal analysis of ungulates and carnivores: Faecal samples, slide preparation, Hair identification, Census methods;

Bio- telemetry; Care of injured and diseased animal; Quarantine; Common diseases of wild animals.

Unit 4 Management planning of wildlife in protected areas

Estimation of carrying capacity; Ecotourism/ wildlife tourism in forests; Concept of climax persistence; Ecology of perturbence, National parks & sanctuaries, Community reserve; Important features of protected areas in India; Tiger conservation: Tiger reserves in India; Management challenges in Tiger reserve.

Text Books:

1. The diversity of life (The College Edition), E.O.Wilson. W.W. Northern & co.
2. Gopal Rajesh (2011) Fundamentals of Wildlife Management, Natraj Publishers.
3. Caughley G and Sinclair ARE. (1994). Wildlife Ecology and Management. Blackwell Science.

Suggested Readings:

1. Woodroffe R, Thirgood S and Rabinowitz A (2005) People and Wildlife, Conflictor Co-existence? Cambridge University.
2. Bookhout TA (1996). Research and Management Techniques for Wildlife and Habitats, 5th Edition. The Wildlife Society, Allen Press.
3. Sutherland WJ (2000). The Conservation Handbook: Research, Management and Policy. Blackwell Sciences.
4. Hunter ML, Gibbs JB and Sterling EJ (2008) Problem-Solving in Conservation Biology and Wildlife Management: Exercises for Class, Field, and Laboratory. Blackwell Publishing.

Wildlife and Conservation

1. Study of equipments used in sample collection (Compass, Binoculars, Spotting scope, Range Finders, Global Positioning System, Various types of Cameras and lenses).
2. Study of museum specimens/ pictures (relevant to Wild Life).
3. Preservation and curation of specimens (Submission of 2 specimens collected and preserved).

4. Determination of population density in a natural/ hypothetical community by quadrate method and calculation of Shannon-Weiner diversity index for the same community.
5. Identification and Demonstration of different field techniques of fauna (Odisha and India)
6. Familiarization and study of animal evidences in the field; Identification of animals through pug marks, hoof marks, scats, pellet groups, nest, antlers, animal sounds.
7. Trail / transect monitoring for abundance and diversity estimation of mammals and bird (direct and indirect evidences).
8. Submission of field study report (national park/ reserve forest/ sanctuary).
9. Visit to Forest/ Wildlife Sanctuary/ Biodiversity Park/ Zoological Park to study animals and prepare a short report.

Core XXII **Chronobiology & Animal Behaviour**

Programme Outcome:

- Trace the origin and history of Ethology; appreciate significant contributions of notable animal behavior researchers.
- Understand behavior patterns, comprehend the physiology underlying behavioural expressions, and acquire knowledge regarding field and laboratory study of animal behaviour.
- An understanding of social and sexual behavior.
- Relate cues to chronobiological events and understand biological rhythms and their significance.

Course Outcome:

- Demonstrate the ability to comprehend and gauge animal behavior in context.
- Be able to evaluate behavior with the tools and techniques learned.

Learning Outcome:

- Acquisition of knowledge on ethology and significant contributions of researchers in the field.
- Capability to effectively understand behavioral learning patterns
- A keen sense of observation, inquiry, and capability for understanding social behavior
- Understand chronobiological behavioral patterns.

Unit 1: Animal Behaviour

Origin and history of Ethology and Behavior as a discipline of science; Brief profiles of Karlvon Frisch, Ivan Pavlov, Konrad Lorenz, NikoTinbergen; Tools and techniques of behavioral studies; Proximate and ultimate behavior; Innate behavior, Instinct, Stimulus filtering, Sign stimuli, and Code breakers.

Unit 2: Patterns of Behaviour

Stereotyped Behaviours (Orientation, Reflexes); Individual behavioral patterns; Instinct vs Learnt Behaviour; Associative learning, classical and operant conditioning, Habituation, Imprinting; Reproductive behaviour patterns- Sexual dimorphism, Mate choice, Intra-sexual selection (male rivalry), Inter-sexual selection (female choice), courtship, mating systems, parental care (fish, amphibians, birds, and mammals).

Unit 3 Social Behaviour

Social Behaviour: Concept of Society; Communication and the senses; Pheromones; Altruism; Insects' society with Honey bee as an example; Foraging in honey bee and advantages of the waggle dance. Hormones, drugs and behaviour.

Unit 4: Chronobiology

Historical developments in chronobiology; Biological oscillation: the concept of Average, amplitude, phase and period. Adaptive significance of biological clocks, Relevance of biological clocks, Types and characteristics of biological rhythms: Short-and Long-term rhythms; Circadian rhythms; Tidal rhythms and Lunar rhythms; Concept of synchronization and masking; Photic- and non-photic zeitgebers; Circannual rhythms; Photoperiod and regulation of seasonal reproduction of vertebrates; Role of melatonin.

Text Books:

- ✓ *John A(2009) Animal Behaviour. 9thEdition, Sinauer Associate Inc., USA.*
- ✓ *Vinod Kumar (2002) Biological Rhythms: Narosa Publishing House, Delhi/ Springer-Verlag, Germany.*

Suggested Readings:

- ✓ *AK Pati. Chronobiology: The Dimension of Time in Biology and Medicine. PINSA (Biological Sciences). Part B67 (6) 323-372, Dec., 2001.*
- ✓ *David Mc F. Animal Behaviour. Pitman Publishing Limited, London, UK.*
- ✓ *Manning A and Dawkins MS. An Introduction to Animal Behaviour. Cambridge University Press, USA.*
- ✓ *Paul WS and John A (2013) Exploring Animal Behaviour. 6th Edition. Sinauer Associate Inc., Massachusetts, USA.*

1. Jay C. Dunlap, Jennifer J. Loros, Patricia J. DeCoursey (Ed). 2004, Chronobiology Biological Time Keeping: J, Sinauer Associates, Inc. Publishers, Sunderland, MA, USA.

Chronobiology and Animal Behavior

Practical

1. To study nests and nesting habits of the birds and social insects.
2. To study the behavioral responses of wood lice in dry and humid conditions.
3. To study geotaxis behavior in earthworms.
4. To study the phototaxis behavior in insect larvae.
5. Study and actogram construction of locomotor activity of suitable animal models.
6. Study of circadian functions in humans (daily eating, sleep and temperature patterns).
7. Statistical analysis of animal behaviours.
8. Visit to Forest/ Wildlife Sanctuary/ Biodiversity Park/ Zoological Park to study behavioural activities of animals and prepare a short report.

Core XXIII **Research Project**

Required List of equipments including software with appropriate cost and possible vendors can be provided.

1. UV Spectrophotometer Systronics approximate cost 2.5 Lakhs.
2. pH meter Systronics approximately cost 15 thousand.
3. Magnetic stirrer with hot plate with digital speed indicator Remi appropriate cost 15 thousand.
4. Hot Plate
5. Digital Balance 1 lakh INR
6. Centrifuge Remi
7. Laminar air flow
8. Deep Freezer -20
9. Students' microscopes, Dissecting Microscope, Binocular microscope, Trinocular microscope
10. Cyclomixers/Vortex Mixers
11. Water Distillation unit
12. Biological Incubator
13. Hot Air Oven
14. Micropipette/Autopipette set with variable volume (10 microlitres, 100 microlitres, and 1 microlitre)
15. Water Bath with shaker
16. Semi-automatic Microtome
17. Horizontal and vertical electrophoretic system with power pack
18. Autoclave
19. Fermenter of capacity 3 L to 5 L
20. Thermal Cycler (PCR)
21. Museum specimens representing all the taxa under study.
22. SPSS Software for statistics

APPENDIX-2

SAMPLE QUESTION SET

UG (NEP) C-I ZOOL -1.1.1 (Non-Chordates I: Protista to Pseudocoelomates)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Muscular swellings or lappets are typical of the larva stage……..of *Fasciola hepatica*.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Write the unique features of Class Phytomastogophorea?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What is the evolutionary significance of Ctenophora?

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) How are helminths adapted to a parasitic mode of life?

OR

b) What are the typical features of Nemathelminthes?

UG (NEP) C-I ZOOL -2.3.3 (Principles of Ecology)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) The process by which a plant or animal becomes established in a new habitat is known as_____.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) What are the difference between R and K strategies?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What do you understand by mode of a data series? State how is it calculated for ungrouped and grouped data? Give a practical situation where you will recommend the use of mode.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Why ecotone is known as the zone of stress? Explain with examples that why the productivity is higher in transitional zones of ecosystem

OR

b) Define survivorship curve. Describe the three general types of survivorship curves with examples. How is the survivorship curve used?

UG (NEP) C-I ZOOL -2.4.1 (Physiology I)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) G proteins are made up of ---------- subunits.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Differentiate between G-actin and F- actin.

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Why are skeletal muscle fibers fast contracting?

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain the four steps of cross-bridge cycle and add a note on ATP generation pathway in a skeletal muscle.

OR

b) How does the stimulus pass through synaptic cleft? List the main events.

UG (NEP) C-I ZOOL -2.3.2 (Cell Biology)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Microtubules are made up of long hollow cylinder of protein components known as _____.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) What do you mean by semi-autonomous nature of mitochondria?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Describe how GTP hydrolysis destabilizes microtubule polymerization.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Describe the structure of nuclear envelope proteins and its function in cell division.

OR

b) Describe the various models of plasma membrane structure in brief.

UG (NEP) C-I ZOOL -1.2.1 (Chordates)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) There are two main groups of fish, namely _____ and _____ based on the composition of the endoskeleton.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Specify the environmental factors might have led to the evolution of the tetrapod limb?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What is the difference between the continental drift hypothesis and the plate tectonics theory?

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Write in brief the significance of larval forms of protochordates in phylogenetic studies of Chordates ?

OR

b) What is retrogressive metamorphosis? Describe in detail retrogressive metamorphosis in Herdmania.

UG (NEP) C-I ZOOL -2.5.1 (Comparative anatomy of Vertebrates)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Surface of palm, soles, fingers and toes present with series of grooves and ridges for exhibiting friction, grips and traction are known as _____.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) How many air sacs are present in avian respiratory system?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Compare pronephrous and mesonephrous kidney system in vertebrates.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Give an elaborative description of epidermal derivatives of skin in vertebrates.

OR

b) Give a comparative account of general plan of brain development in vertebrates.

UG (NEP) C-I ZOOL -2.5.2 (Physiology-II)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) The fraction of blood composed of packed red blood cells achieved using centrifugation is known as _____.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Name the ions responsible for inhibition of trypsin secretion in pancreas.

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What is van`t Hoff`s law? Explain the osmolarity and osmotic pressure of a solution.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain in brief, the transport of oxygen and exchange of carbon dioxide in blood.

OR

b) State Frank- Starling law of heart and blood flow.

UG (NEP) C-I ZOOL -2.7.4 (Immunology)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Dendritic cells act as ----------.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Explain the biochemical mechanism of respiratory burst leading to intracellular killing of microbes within the neutrophils.

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Explain how neutrophils recognize pathogens and role of phagocytic cells in clearing apoptotic cells.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Briefly discuss the activation process of haptens and adjuvants.

OR

b) Write a short note on Type-III Immune complex reaction.

UG (NEP) C-I ZOOL -2.8.3 (Chronobiology and Animal Behaviour)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Skinner box was designed to study----------.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Explain the relation between circannual and circadian rhythm using the example of birds.

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Discuss the role of master genes (CLOCK and BMAL1) in regulating mammalian circadian clock.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) What are the characteristics of stereotype patterns of behavior? Explain spatial orientation with suitable examples?

OR

b) Give a brief on non-photic zeitgebers and their role in entraining circadian rhythm.

UG (NEP) C-I ZOOL -2.8.1 (Aquatic biology and Toxicology)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Largest coral reef is in ----------.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Name the three major ecological groups in aquatic biome.

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Explain biotransformation of xenobiotics.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain the collection and preservation mechanism of phytoplankton

OR

b) State the characteristic features of estuary.

UG (NEP) C-I ZOOL -2.8.2 (Wildlife and Conservation Biology)
END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Wildlife associated telemetry is also known as----------.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Discuss preservation of general genetic diversity methods.

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Describe grazing logging method for managing habitat.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain the applications of remote sensing and GIS in wildlife monitoring.

OR

b) Discuss In-situ conservations methods.

UG (NEP) C-I ZOOL -2.6.2 (Development Biology)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) What is the main enzyme that plays a major role in formation of thymine dimer?

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) The primitive groove in chick is analogous to the amphibian blastopore. Justify?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What is an embryonic inductor? Explain the role of the roof of the archenteron in embryonic induction.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Describe the structure of the placenta, and discuss its types and functions.

OR

a) Explain the changes that take place during the metamorphosis of frogs and the hormonal regulation of the same.

UG (NEP) C-I ZOOL -2.6.3 (Taxonomy and Evolutionary Biology)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Groups of morphologically identical but genetically different members are known as …… species.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) What factors cause a genetic drift?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What are the operative principles of the International Code of Zoological Nomenclature?

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) What are the different kinds of taxonomic publications. With suitable examples, bring out the salient features of each.

OR

a) Explain Darwinism versus Neo-Darwinism.

UG (NEP) C-I ZOOL -2.3.1 (Microbiology)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Entry of enveloped viruses into host cells is mediated by membrane fusion and …….

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) What are the major differences between transformation and transduction? **[5]**

PART-III

(At least two questions from any of the units)

Q 3. a) Explain the role of microbes in health care and agriculture with suitable examples.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain the different types of microbial toxins and their mode of action.

OR

a) Explain the significant features of Bergey's manual for the classification of microbes.

UG (NEP) C-I ZOOL -2.6.1 (Molecular Biology)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) What is the main enzyme that plays a major role in formation of thymine dimer?

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Differentiate between B DNA and Z DNA?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) With the help of suitable diagrams describe the mechanism of transcriptional termination in prokaryotes.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Discuss the mechanism of gene regulation in Tryptophan Operon.

OR

a) Explain the sequence of events during DNA replication in eukaryotes and explain the role of various enzymes.

UG (NEP) C-I ZOOL -2.4.3 (Endocrinology & Reproductive Biology)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Grave's disease is associated with …….

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) How is polyspermy prevented?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Discuss the techniques for assisted reproduction.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain the Hypothalamo-hypophysial Axis with reference to feedback regulation of hormones.

OR

a) Explain the molecular mechanism of hormone action with reference to non-steroidal hormones.

UG (NEP) C-I ZOOL -2.5.3 (Fundamentals of Biochemistry)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) What is the total number of ATP molecules produced from ADP by glycolysis of one glucose molecule?

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Differentiate between Glycogenolysis and Glycogenesis?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Explain the Inhibitors and un-couplers of the Electron Transport System.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Give an account of β – the oxidation of saturated, even carbon fatty acid, along with its energetics and regulation.

OR

a) Explain the process and purpose of ketogenesis.

UG (NEP) C-I ZOOL -2.4.2 (Fundamentals of Biochemistry)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) Individual monosaccharides are linked by ……..to form polysaccharides

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) What are nucleosides and nucleotides?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Explain the mechanism of enzyme action.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Explain the basic structure of Immunoglobulins. Discuss their classes and functions.

OR

a) Explain the structure and types of DNA.

UG (NEP) C-I ZOOL -2.5.4 (Principles of Genetics)

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) In case of two gene interaction, the gene which is masking the expression of another is called_____ and the gene whose expression is masked is called_____

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Differentiate between back cross and test cross?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) Explain the types of chromosomal aberrations.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) Give an account of Chromosomal mechanisms of sex determination in Drosophila.

OR

a) Explain the process Linkage and crossing over.

MODEL QUESTION PATTERN

FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) In liquid scintillation counter, …….is used to convert light into electrical signals.

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) How can we use Beer-Lambert's Law to determine the concentration of a solution?

PART-III

(At least two questions from any of the units) **[5]**

Q 3. a) What is the principle of Southern Blotting? Explain the technique and its applications.

PART-IV

(At least two questions from any of the units) **[8]**

Q 4. a) What is the principle of chromatography? Describe the types of chromatography.

OR

a) How is a Fluorescence microscope different from an electron microscope? Discuss their applications.

UG (NEP) C I (ZOOL-2.7.3) ANIMAL BIOTECHNOLOGY

END SEMESTER EXAMINATION (2024 BATCH ONWARDS)
MODEL QUESTION PATTERN

TIME: 3 hours FULL MARKS: 5**0**

The figures in the right-hand margin indicate Marks.

PART-I **Marks**

(One mark each in the form of fill in the blanks/one word answer covering all units) **[1]**

Q 1. a) The process by which a foreign DNA is introduced into bacteria is called _____?

PART-II

(At least two questions from any of the units) **[2]**

Q 2. a) Discuss Western blotting technique.

What is DNA microarray, and its applications? **[5]**

PART-III

(At least two questions from any of the units)

Q 3. a) What is Polymersae Chain Reaction? Describe the principle and applications of PCR.

OR

b) Describe the process of Sanger method of DNA sequencing. **[8]**

PART-IV

(At least two questions from any of the units)

Q 4. a) Give the features of cloning and expression vector. Describe the process of expressing of cloned genes in mammalian cells

OR

b) What is DNA Finger Printing? Give the process and applications of RFLP technique.

ଜାତୀୟ ଶିକ୍ଷାନୀତି -୨୦୨୦ ଅନୁଯାୟୀ

ଆଦର୍ଶ ଓଡ଼ିଆ ସ୍ନାତକ ପାଠ୍ୟକ୍ରମ

(ପ୍ରବେଶ ଓ ପ୍ରସ୍ଥାନର ବିବିଧ ବିକଳ୍ପ ସହିତ)

MODEL ODIA CURRICULUM FOR THREE/FOUR YEARS DEGREE COURSES

(With Multiple Entry and Exit Option)

Based on NEP – 2020

ODIA

ରାଜ୍ୟ ଉଚ୍ଚଶିକ୍ଷା ପରିଷଦ, ଓଡ଼ିଶା

ଉଚ୍ଚଶିକ୍ଷା ବିଭାଗ

ଓଡ଼ିଶା ସରକାର

ପାଠ୍ୟକ୍ରମ ପ୍ରସ୍ତୁତି ପରିଷଦର ସଭ୍ୟସଭ୍ୟା ବୃନ୍ଦ

ପ୍ରଫେସର ବବ୍ରୁବାହନ ମହାପାତ୍ର

ଡକ୍ଟର ଶିଶିର ବେହେରା

ଡକ୍ଟର ଦେବୀ ପ୍ରସାଦ ଶତପଥୀ

ଡକ୍ଟର ଦେବାଶିଷ ପାତ୍ର

ଡକ୍ଟର ମିଲନ ମହାନ୍ତ

ଡକ୍ଟର ଅର୍ଚ୍ଚନା ପ୍ରଧାନ

ପ୍ରଫେସର ସବିତା ପ୍ରଧାନ

ଶ୍ରୀ ନାରାୟଣ ପ୍ରସାଦ ବେହେରା

ଡକ୍ଟର ନରେନ୍ଦ୍ର କୁମାର ପାତ୍ର

Sl. No.	Core Course	Semester	Title of the Course	Credit
1	Core-I	1st	ଭାଷା ବିଜ୍ଞାନ	04 Credit for each Paper(1 Credit = 15 Classes)
2	Core-II		ସାହିତ୍ୟର ସ୍ୱରୂପ	
3	Core-III	2nd	ପ୍ରାଚୀନ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ	
4	Core-IV		ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ	
5	Core-V	3rd	ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ : ନବଜାଗରଣ ଯୁଗ ଓ ସତ୍ୟବାଦୀ ଧାରା	
6	Core-VI		ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ : ସବୁଜ, ପ୍ରଗତିବାଦୀ ଧାରା ଓ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳ	
7	Core-VII		ପ୍ରାଚୀନ ଓ ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ କବିତା	
8	Core-VIII	4th	ଆଧୁନିକ ଓଡ଼ିଆ କବିତା	
9	Core-IX		ଓଡ଼ିଆ ନାଟକ ଓ ଏକାଙ୍କିକା	
10	Core-X		ଓଡ଼ିଆ କଥାସାହିତ୍ୟ	
11	Core-XI	5th	ଆଧୁନିକ ଓଡ଼ିଆ ଗଦ୍ୟସାହିତ୍ୟ	
12	Core-XII		ଓଡ଼ିଆ ଲୋକସାହିତ୍ୟ	
13	Core-XIII		ଓଡ଼ିଆ ଭାଷା ଓ ଲିପିର ଐତିହାସିକ ବିବର୍ତ୍ତନ	
14	Core-XIV	6th	ଓଡ଼ିଆ ଭାଷା : ଧ୍ୱନିତତ୍ତ୍ୱ, ଶବ୍ଦ ସମ୍ଭାର, ଅନ୍ୟ ଭାଷାର ପ୍ରଭାବ ଓ ଶାସ୍ତ୍ରୀୟତା	
15	Core-XV		ଓଡ଼ିଆ ବ୍ୟାବହାରିକ ବ୍ୟାକରଣ	
16	Core-XVI	7th	ଓଡ଼ିଆ ଭାଷାର ବ୍ୟାବହାରିକ ପ୍ରୟୋଗ	
17	Core-XVII		ପ୍ରାଚ୍ୟ-ପାଶ୍ଚାତ୍ୟ କାବ୍ୟତତ୍ତ୍ୱ	
18	Core-XVIII		ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ଅନୁଶୀଳନ (୧୯୪୭- ୨୦୦୦)	
19	Core-XIX		ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କଥାସାହିତ୍ୟର ଅନୁଶୀଳନ (୧୯୪୭-୨୦୦୦)	
20	Core-XX	8th	ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ନାଟ୍ୟସାହିତ୍ୟର ଅନୁଶୀଳନ (୧୯୪୭-୨୦୦୦)	
21	Core-XXI		ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ଗଦ୍ୟସାହିତ୍ୟ ଓ ପତ୍ରପତ୍ରିକାର ଅନୁଶୀଳନ (୧୯୪୭-୨୦୦୦)	
22	Core-XXII		ଓଡ଼ିଆ ଶିଶୁ ସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ	
23	Core-XXIII		ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ଇତିହାସ	

Sl. No	Basket	Semester	Title of the Course	Credit
1	AEC (Ability Enhancement Course)	1st	ପରିଶୁଦ୍ଧ ଭାଷା ଓ ଲିଖନ ଧାରା	4
2	SEC (Skill Enhancement Course)	3rd	ଅନୁବାଦ ସାହିତ୍ୟ	2
		4th	ଗଣମାଧ୍ୟମ ଓ ଗଣଯୋଗାଯୋଗ	3
3	VAC (Value Added Course)	2nd	ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତି	2
		5th	ଆଦିବାସୀ ସଂସ୍କୃତି	1
		6th	ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ପରିଚୟ	3
4	SVC (Summer Vocational Course)		କବିତା: ପଠନ ଓ ଲିଖନ କଳା	
			ଗଳ୍ପ: ପଠନ ଓ ଲିଖନ କଳା	
			ପ୍ରବନ୍ଧ: ପଠନ ଓ ଲିଖନ କଳା	
			କ୍ଷୁଦ୍ର ନାଟକ: ପଠନ ଓ ଲିଖନ କଳା	
5	Multi-disciplinary Basket	1st	ତୁଳନାତ୍ମକ ସାହିତ୍ୟ	3
		2nd	ବିଜ୍ଞାନ ବିଷୟ ଓ ସାହିତ୍ୟ	3
		3rd	କଳା ବିଷୟ ଓ ସାହିତ୍ୟ	3

Programme Outcome (ପାଠ୍ୟଖସଡ଼ା ଫଳଶ୍ରୁତି)

ଭାରତର ଆଞ୍ଚଳିକ ଭାଷାମାନଙ୍କ ମଧ୍ୟରେ ଓଡ଼ିଆ ଭାଷାର ସ୍ଥିତି ଓ ଐତିହ୍ୟ ସ୍ୱତନ୍ତ୍ର । ଏହା ଓଡ଼ିଶା ପ୍ରଦେଶର ମାତୃଭାଷା, ମାନକଭାଷା ଓ ଭାରତର ଷଷ୍ଠ ଶାସ୍ତ୍ରୀୟ ଭାଷା ରୂପେ ଗୌରବାନ୍ୱିତ । ପ୍ରାକ୍- ସାରଳା ଯୁଗଠାରୁ ଆରମ୍ଭ କରି ଏଯାବତ୍ ଏହି ଭାଷାର ସାହିତ୍ୟିକ ବିକାଶ ଓ ବୈଭବ ମଧ୍ୟ ମର୍ଯ୍ୟାଦା ମଣ୍ଡିତ । ସୁତରାଂ ଓଡ଼ିଆ ଭାଷାକୁ ମାତୃଭାଷା ରୂପେ ବ୍ୟବହାର କରୁଥିବା ସ୍ନାତକ ଛାତ୍ରଛାତ୍ରୀ ତଥା ସମ୍ମାନ (Honours) ରୂପେ ନେଇ ଅଧ୍ୟୟନ କରୁଥିବା ବିଦ୍ୟାର୍ଥୀଙ୍କ ପାଇଁ ଏହି ପାଠ୍ୟଖସଡ଼ା ପ୍ରସ୍ତୁତ । ନୂତନ ଶିକ୍ଷାନୀତି-୨୦୨୦ ଅନୁଯାୟୀ ସବୁ ସ୍ତରର ସ୍ନାତକ ଅଧ୍ୟାୟୀଙ୍କ ନିମିତ୍ତ ଏହା ଉପଯୋଗୀ ହେବ । ଓଡ଼ିଆ ଭାଷା, ସାହିତ୍ୟ ଓ ସଂସ୍କୃତି ପ୍ରତି ଛାତ୍ରଛାତ୍ରୀ କିପରି ଅନୁରାଗୀ ହେବେ ଓ ଭାଷା ସାହିତ୍ୟର ଅଭିବୃଦ୍ଧି ପାଇଁ ନିଜକୁ ସଂଶ୍ଳିଷ୍ଟ କରିବେ, ସେହି ଦିଗକୁ ଧ୍ୟାନ ଦିଆଯାଇ ଶଂସିତ ପାଠ୍ୟପତ୍ର ଗୁଡ଼ିକରେ ଓଡ଼ିଆ ଭାଷାର ଉନ୍ମେଷ, ବିକାଶ ଓ ବୈଶିଷ୍ଟ୍ୟ, ଓଡ଼ିଆ ବ୍ୟାକରଣ, ଓଡ଼ିଆ ସାହିତ୍ୟର ଐତିହାସିକ ବିବର୍ତ୍ତନ ଧାରା, ପ୍ରାଚ୍ୟ-ପାଶ୍ଚାତ୍ୟ କାବ୍ୟ ତତ୍ତ୍ୱ, ଲୋକ ସାହିତ୍ୟ, କାବ୍ୟ ସାହିତ୍ୟ, କଥା ସାହିତ୍ୟ, ନାଟ୍ୟ ସାହିତ୍ୟ, ଗଦ୍ୟ ସାହିତ୍ୟ ଓ ପତ୍ର ପତ୍ରିକା ପ୍ରଭୃତି ବିଷୟ ଏଥିରେ ଗର୍ଭିତ । ପୁନଶ୍ଚ ଓଡ଼ିଆ ସାହିତ୍ୟର ବିଭିନ୍ନ ବିଭାଗର ପ୍ରତିନିଧିମୂଳକ ରଚନାକୁ ପାଠ୍ୟାନ୍ତର୍ଗତ କରାଯାଇଛି । ସାହିତ୍ୟର ବିବିଧ ଦିଗର ଅନୁଶୀଳନ ନିମିତ୍ତ ମଧ୍ୟ ପାଠ୍ୟପତ୍ରର ବ୍ୟବସ୍ଥା ରହିଛି । ତେଣୁ ଏହି ପାଠ୍ୟଖସଡ଼ା ନିମ୍ନମତେ ସ୍ନାତକ ଶିକ୍ଷାର୍ଥୀଙ୍କ ଭାଷା - ସାହିତ୍ୟ ଜ୍ଞାନର ଭୂୟୋବିକାଶରେ ଅବଶ୍ୟ ସହାୟକହେବ ।

- ଶୁଦ୍ଧ ଓଡ଼ିଆ ଲିଖନ, କଥନ ଓ ସର୍ଜନଶୀଳତାର ଅଭିବୃଦ୍ଧି
- ଓଡ଼ିଆ ସାହିତ୍ୟ ଓ ସଂସ୍କୃତି ବିଷୟକ ଜ୍ଞାନ ଆହରଣ ଓ ବିକାଶ
- ମୂଲ୍ୟବୋଧ ଯୁକ୍ତ ସମାଜ ଗଠନ ଓ ମାତୃଭୂମି, ମାତୃଭାଷା ପ୍ରତି ସଂପ୍ରୀତି ସୃଷ୍ଟି
- ପରମ୍ପରାର୍ଜିତ ଭାଷା, ସଂସ୍କୃତିର ସଂରକ୍ଷଣ ଓ ପୁନରୁଜ୍ଜୀବନ
- ସନ୍ତୁଳିତ ପରିବେଶ ଓ ଜୈବ ସୁରକ୍ଷା
- ନିର୍ଭୁଲ ଓଡ଼ିଆ ଭାଷା ଶିକ୍ଷଣ, କମ୍ପ୍ୟୁଟରୀକରଣ ଓ ବ୍ୟାବହାରିକ ପ୍ରୟୋଗ ଜ୍ଞାନ ଅର୍ଜନ
- ପ୍ରାଶାସନିକ, ବୃତ୍ତିଗତ ଜୀବନରେ ସ୍ୱାଚ୍ଛନ୍ଦ୍ୟ ଓ ସ୍ୱାବଲମ୍ବନଶୀଳତାର ଅଭିବୃଦ୍ଧି
- ତୁଳନାତ୍ମକ ସାହିତ୍ୟ ଅଧ୍ୟୟନ ଦ୍ୱାରା ରାଷ୍ଟ୍ରୀୟତାବୋଧ ଓ ବିଶ୍ୱଦୃଷ୍ଟି ନିର୍ମାଣ
- ସୌନ୍ଦର୍ଯ୍ୟ ଚେତନାର ବିକାଶ, ଆଧୁନିକ ଜୀବନଦୃଷ୍ଟି ଓ ପ୍ରଗତିଶୀଳ ମନୋଭାବ ସୃଷ୍ଟି

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Core I **ପ୍ରଥମ ପର୍ଯ୍ୟାୟ (Semester-I)**

ଭାଷାବିଜ୍ଞାନ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଭାଷା ଭାବ ବିନିମୟର ମାଧ୍ୟମ । ଭାଷା ବ୍ୟବହାର କରି ସର୍ଜନଶୀଳ ସ୍ରଷ୍ଟା ସାହିତ୍ୟସୃଷ୍ଟି କରିଥାଏ । ତେଣୁ ସାହିତ୍ୟ ବିଷୟକ ପାଠ୍ୟଖସଡ଼ାର ଆଦ୍ୟରେ ଭାଷା ସମ୍ପର୍କରେ ସାଧାରଣ ଉପଲବ୍ଧି ଆଣିବା ନିମିତ୍ତ ଏହି ପତ୍ରଟି ଉପଯୋଗୀ ହେବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଭାଷା କଣ, ତାହାର ପରିଚୟ, ଭାଷାର ସ୍ୱରୂପ ଓ ବିବିଧ ପ୍ରକାରଭେଦ ସମ୍ପର୍କରେ ଏହି ଏକକ ଉପଲବ୍ଧି ଆଣିବ ।

୨ୟ ଏକକ : ଭାଷା କିପରି ଉତ୍ପତ୍ତି ହେଲା, ସେ ସମ୍ପର୍କରେ ପ୍ରଚଳିତ ବିବିଧ ସିଦ୍ଧାନ୍ତର ପରିଚୟ ଲାଭକରି ଛାତ୍ରଛାତ୍ରୀ ଭାଷା ସୃଷ୍ଟିର ଦିଗଦିଗନ୍ତକୁ ଜାଣିପାରିବେ ।

୩ୟ ଏକକ : ବିଶ୍ୱରେ ବହୁଭାଷା ପ୍ରଚଳିତ । ଭାଷାତତ୍ତ୍ୱ ଦୃଷ୍ଟିରୁ ସେହି ସମୁଦାୟ ଭାଷାକୁ ନେଇ ପୃଥିବୀର ଭାଷା ପରିବାର ଗଠିତ। ସେହି ଭାଷା ପରିବାର ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଜାଣିବା ନିତାନ୍ତ ଆବଶ୍ୟକ । ଏହି ଏକକଟି ସେହି ଉଦ୍ଦେଶ୍ୟ ପୂରଣ କରିବ ।

୪ର୍ଥ ଏକକ : ଗୋଟିଏ ନିର୍ଦ୍ଦିଷ୍ଟ ପ୍ରଦେଶରେ ଯେଉଁ ମୁଖ୍ୟ ଭାଷା ପ୍ରଚଳିତ, ତାହା ସାଧାରଣତଃ ମାନକ ଭାଷା ରୂପେ ପରିଚିତ ହୁଏ। ମାତ୍ର ବିବିଧ ଅଞ୍ଚଳରେ ମାନକଭାଷା ବ୍ୟତିରେକ ଅନ୍ୟ କେତେକ ଆଞ୍ଚଳିକ ଭାଷାର ପ୍ରଚଳନ ପରିଲକ୍ଷିତ ହୋଇଥାଏ । ଏହି ଏକକରେ ମାନକଭାଷା ଓ ଉପଭାଷା ସମ୍ପର୍କରେ ଶିକ୍ଷାର୍ଥୀ ଜ୍ଞାନଲାଭ କରିପାରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଭାଷାର ସଂଜ୍ଞା, ସରୂପ ଓ ପ୍ରକାରଭେଦ

୨ୟ ଏକକ : ଭାଷା ଉତ୍ପତ୍ତି ସମ୍ପର୍କୀୟ ବିଭିନ୍ନ ସିଦ୍ଧାନ୍ତ

୩ୟ ଏକକ : ପୃଥିବୀର ଭାଷା ପରିବାର

୪ର୍ଥ ଏକକ : ମାନକଭାଷା ଓ ଉପଭାଷା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references) :

୧. ଭାଷା ବିଜ୍ଞାନର ରୂପରେଖ – ବାସୁଦେବ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୨. ଭାଷାଶାସ୍ତ୍ର ପରିଚୟ – ଗୋଲୋକ ବିହାରୀ ଧଳ, ଓ.ରାଜ୍ୟ ପା.ପୁ.ପ୍ର. ଓ ପ୍ର. ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର ।

୩. ଓଡ଼ିଆ ଭାଷାର ସୃଷ୍ଟି ଓ ବିକାଶ – ଉପେନ୍ଦ୍ର ପ୍ରସାଦ ଦଳାଇ, ଏ.କେ ମିଶ୍ର ପବ୍ଲିଶର୍ସ , କଟକ ।

୪. ଓଡ଼ିଆ ଭାଷାର ଉନ୍ମେଷ ଓ ବିକାଶ – ବାସୁଦେବ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୫. ଭାଷା ଭାବନା - ସଂ. ବିଜୟଲକ୍ଷ୍ମୀ ମହାନ୍ତି, ବିଦ୍ୟା ପ୍ରକାଶନୀ, ଭୁବନେଶ୍ୱର ।

୬. ଓଡ଼ିଆ ଭାଷା ଓ ଭାଷା ବିଜ୍ଞାନ – ଦେବୀ ପ୍ରସନ୍ନ ପଟ୍ଟନାୟକ, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

୭. ଓଡ଼ିଆ ଭାଷାର ଉପଭାଷା-ସତ୍ୟନାରାୟଣ ରାଜଗୁରୁ, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର ।

୮. ମଣିଷର ଭାଷା- ଗୋଲୋକ ବିହାରୀ ଧଳ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୯. ଭାଷା ଚର୍ଚ୍ଚା ପରଂପରା-ଗଗନେନ୍ଦ୍ରନାଥ ଦାଶ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

Sample Questions (ନମୁନା ପ୍ରଶ୍ନ):

୧. ଭାଷାର ଏକ ସାର୍ଥକ ସଂଜ୍ଞା ପ୍ରଦାନକର । (୧ ମାର୍କ ପ୍ରଶ୍ନ)

୨. ଭାଷା ଉତ୍ପତ୍ତି ସମ୍ପର୍କୀୟ ଧ୍ୱନି ଅନୁରଣନ ସିଦ୍ଧାନ୍ତର ଟିପ୍ପଣୀ ଲେଖ । (୨ମାର୍କ ପ୍ରଶ୍ନ)

୩. ମାନକଭାଷା ଓ ଉପଭାଷା ମଧ୍ୟରେ ତାରତମ୍ୟ ଦର୍ଶାଅ । (୫ମାର୍କ ପ୍ରଶ୍ନ)

୪.ପୃଥିବୀର ଭାଷା ପରିବାର ସମ୍ପର୍କରେ ଆଲୋକପାତ କର । (୮ମାର୍କ ପ୍ରଶ୍ନ)

Core II ପ୍ରଥମ ପର୍ଯ୍ୟାୟ (Semester-I)

ସାହିତ୍ୟର ସ୍ୱରୂପ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ସାହିତ୍ୟ ବିବିଧ ରୂପର ସମାହାର । କାବ୍ୟ କବିତା, ଗଳ୍ପ ଉପନ୍ୟାସ, ନାଟକ ,ଏକାଙ୍କିକା ଏବଂ ଗଦ୍ୟ ସାହିତ୍ୟର ଭିନ୍ନଭିନ୍ନ ରୂପ ସାହିତ୍ୟକୁ କରିଛି ପରିପୁଷ୍ଟ । ଛାତ୍ରଛାତ୍ରୀମାନେ ସାହିତ୍ୟର ସେହି ରୂପଗତ ବୈଚିତ୍ର୍ୟ ଓ ତାର ତାତ୍ତ୍ୱିକ ଦିଗ ଉପରେ ଅବଗତ ହେବା ଆବଶ୍ୟକ । ଏହି ପତ୍ରଟି ଶିକ୍ଷାର୍ଥୀମାନଙ୍କୁ ସେ ସମ୍ପର୍କରେ ଧାରଣା ପ୍ରଦାନ କରିବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : କାବ୍ୟ, ମହାକାବ୍ୟ ଓ କବିତାର ସଂଜ୍ଞା ସ୍ୱରୂପ ଓ ବିବିଧତା ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଏଥିରେ ଜ୍ଞାନ ଲାଭ କରିବେ ।

୨ୟ ଏକକ : କଥାସାହିତ୍ୟର ଜଗତ ମଧ୍ୟ ବର୍ତ୍ତିଳ, ବିଶେଷତଃ ଗଳ୍ପ ଓ ଉପନ୍ୟାସର ତାତ୍ତ୍ୱିକ ଦିଗ ସହ ତାହାର ବିଶେଷତ୍ୱ ଓ ପ୍ରକାରଭେଦ ଏହି ଏକକରୁ ଜାଣି ହେବ ।

୩ୟ ଏକକ : ନାଟକ ଓ ଏକାଙ୍କିକା ସାହିତ୍ୟର ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଅଙ୍ଗ । ଏହା ଏକାଧାରରେ ପାଠକ ଓ ଦର୍ଶକଙ୍କୁ ଆକୃଷ୍ଟ କରିଥାଏ । ତେଣୁ ଏ ଉଭୟର ସଂଜ୍ଞା, ସ୍ୱରୂପ, ରୂପଭେଦ ଉପରେ ଏହି ଏକକ ଅବଗତ କରାଇବ ।

୪ର୍ଥ ଏକକ : ଗଦ୍ୟ ରଚନାର ବିଭିନ୍ନତା ମଧ୍ୟରୁ ପ୍ରବନ୍ଧ, ରମ୍ୟ ରଚନା, ଭ୍ରମଣ କାହାଣୀ ତଥା ଜୀବନୀ ଓ ଆତ୍ମଜୀବନୀ ଆଧୁନିକ ସାହିତ୍ୟକୁ କରିଛି ସମୃଦ୍ଧ। ଏହି ରଚନାମାନଙ୍କର ତାତ୍ତ୍ୱିକ ଓ ଗୁଣାତ୍ମକ ବୈଶିଷ୍ଟ୍ୟ ଜାଣିବା ପାଇଁ ଏହି ଏକକ ଉଦ୍ଦିଷ୍ଟ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : କାବ୍ୟକବିତା - କ) କାବ୍ୟ, ମହାକାବ୍ୟର ସଂଜ୍ଞା, ସରୂପ ଓ ପ୍ରକାର ଭେଦ

ଖ) ଗୀତି କବିତା, ଗାଥାକବିତା, ସନେଟ୍, ସମ୍ବୋଧନଗୀତିକାର ସଂଜ୍ଞା ଓ ସରୂପ

୨ୟ ଏକକ : ଗଳ୍ପ ଓ ଉପନ୍ୟାସ – (କ) ଗଳ୍ପର ସଂଜ୍ଞା, ସରୂପ ଓ ପ୍ରକାରଭେଦ

(ଖ) ଉପନ୍ୟାସର ସଂଜ୍ଞା, ସରୂପ, ଓ ପ୍ରକାରଭେଦ

୩ୟ ଏକକ : ନାଟକ ଓ ଏକାଂକିକା - (କ) ନାଟକର ସଂଜ୍ଞା, ସରୂପ ଓ ପ୍ରକାରଭେଦ

(ଖ) ଏକାଂକିକାର ସଂଜ୍ଞା, ସରୂପ ଓ ପ୍ରକାରଭେଦ

୪ର୍ଥ ଏକକ : ଗଦ୍ୟ ସାହିତ୍ୟ – (ପ୍ରବନ୍ଧ, ରମ୍ୟରଚନା, ଭ୍ରମଣ କାହାଣୀ, ଜୀବନୀ-ଆତ୍ମଜୀବନୀର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧. ସାହିତ୍ୟର ସନ୍ଧିଧାନ - ପୂର୍ଣ୍ଣଚନ୍ଦ୍ର ମହାନ୍ତି, ୱାର୍ଡ ୱାଲଡ୍, ଏ-୨, ସେକ୍ଟର-୭, ମର୍କତ ନଗର, କଟକ-୨୦୧୬

୨. ସାହିତ୍ୟର ସୂଚୀପତ୍ର- ବିଭୂତି ପଟ୍ଟନାୟକ, ନାଳନ୍ଦା, ବିନୋଦବିହାରୀ, କଟକ - ୨୦୧୦

୩. ସାହିତ୍ୟର ରୂପରେଖ - ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ବାଳକୃଷ୍ଣ ବେହେରା, ବିଦ୍ୟାପୁରୀ, ବାଲୁବଜାର, କଟକ-୨୦୧୭

୪. ସାହିତ୍ୟର ଡାଳପତ୍ର - ସୁରେନ୍ଦ୍ର କୁମାର ମହାରଣା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ୨୦୧୮

୫. ସାହିତ୍ୟ ତତ୍ତ୍ୱ : ପ୍ରାଚ୍ୟ ଓ ପାଶ୍ଚାତ୍ୟ - ଜ୍ୟୋସ୍ନାମୟୀ ପ୍ରଧାନ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ-୨୦୧୯

୬. ସାହିତ୍ୟର ଗଠନ ରୀତି - ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୭. ସାହିତ୍ୟ ତତ୍ତ୍ୱ - ଧନେଶ୍ୱର ମହାପାତ୍ର, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ,

୮. ସାହିତ୍ୟର ସାମାନ୍ୟ କଥନ- କ୍ଷେତ୍ରବାସୀ ନାୟକ, ସାଥୀ ମହଲ, କଟକ

୯. ସମ୍ବାଦ-ଆମ ଓଡ଼ିଶା : ସାହିତ୍ୟକୋଷ- ସଂ.ଦାଶରଥି ଦାସ, ସୁଦର୍ଶନ ଆଚାର୍ଯ୍ୟ, ଦେବେନ୍ଦ୍ର କୁମାର ଦାଶ, ଗୌରାଙ୍ଗ ଚରଣ ଦାଶ, ଆମ ଓଡ଼ିଶା, ୪ ଆର୍ ୧/୨, ଇଉନିଟ୍-୩, ଭୁବନେଶ୍ୱର

ନମୁନା ପ୍ରଶ୍ନ(Sample Questions):

୧. ସନେଟ୍‌ରେ କେତେଗୋଟି ପାଦ ରହିଥାଏ ? (୧ମାର୍କ ପ୍ରଶ୍ନ)

୨.ଗଳ୍ପ ଓ ଉପନ୍ୟାସ ମଧ୍ୟରେ ଦୁଇଗୋଟି ପାର୍ଥକ୍ୟ ଲେଖ । (୨ମାର୍କ ପ୍ରଶ୍ନ)

୩. ଏକାଙ୍କିକା ନାଟକର ବାମନରୂପ ନୁହେଁ, କାହିଁକି? ଦର୍ଶାଅ। (୫ମାର୍କ ପ୍ରଶ୍ନ)

୪.ଭ୍ରମଣ କାହାଣୀର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ବୈଶିଷ୍ଟ୍ୟ ପ୍ରଦର୍ଶନ କର । (୮ମାର୍କ ପ୍ରଶ୍ନ)

Core III ଦ୍ୱିତୀୟ ପର୍ଯ୍ୟାୟ (Semester - II)

ପ୍ରାଚୀନ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଓଡ଼ିଆ ସାହିତ୍ୟର ପ୍ରାଚୀନ ଐତିହ୍ୟ ଗୌରବାବହ । ବିଶେଷତଃ ବୌଦ୍ଧ ସିଦ୍ଧାଚାର୍ଯ୍ୟମାନଙ୍କ ଚର୍ଯ୍ୟାଗୀତିକାଠାରୁ ପଞ୍ଚସଖା ପର୍ଯ୍ୟନ୍ତ ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଓଡ଼ିଶାର ଧର୍ମଧାରା, ସାମାଜିକ ଓ ସାଂସ୍କୃତିକ ପ୍ରାଣପ୍ରବାହ ତଥା ଓଡ଼ିଆ ଜାତିର ଅସ୍ମିତା ପ୍ରସ୍ଫୁଟିତ । ଏହି ପତ୍ରଟିର ଅଧ୍ୟୟନ ମାଧ୍ୟମରେ ଶିକ୍ଷାର୍ଥୀମାନେ ପ୍ରାକ୍-ସାରଳା, ସାରଳା ଓ ପଞ୍ଚସଖା ସାହିତ୍ୟର ଐତିହାସିକ ବିକାଶ ଓ ବିଶେଷତ୍ୱକୁ ଉପଲବ୍ଧି କରିପାରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ପ୍ରାକ୍-ସାରଳା ଯୁଗର ସାହିତ୍ୟ ମୁଖ୍ୟତଃ ଧର୍ମକୈନ୍ଦ୍ରିକ, ତନ୍ମଧ୍ୟରୁ ବୌଦ୍ଧଧର୍ମ ଓ ନାଥଧର୍ମ ସମ୍ପର୍କରେ ରଚିତ ସାହିତ୍ୟ ଉପରେ ଏହି ଏକକ ଧାରଣା ପ୍ରଦାନ କରିବ । ପ୍ରସଙ୍ଗକ୍ରମେ ଛାତ୍ରଛାତ୍ରୀ ତତ୍‌କାଳୀନ ସାମାଜିକ ଓ ସାହିତ୍ୟିକ ପରିଚୟ ସମ୍ପର୍କରେ ମଧ୍ୟ ଅବଗତ ହୋଇପାରିବେ ।

୨ୟ ଏକକ : ମହାକବି ସାରଳା ଦାସଙ୍କ ସାହିତ୍ୟ ଓଡ଼ିଶାର ସାମାଜିକ ଓ ସାଂସ୍କୃତିକ ଜୀବନର ବୈଶିଷ୍ଟ୍ୟ ବହନ କରେ । ଶଂସିତ ଏକକରେ ତାହା ଉପଲବ୍ଧ ହେବ ।

୩ୟ ଏକକ : ପଞ୍ଚସଖା ସାହିତ୍ୟିକଙ୍କ ମଧ୍ୟରୁ ବଳରାମ ଦାସ ଓ ଜଗନ୍ନାଥ ଦାସଙ୍କ ଭୂମିକା ଅଗ୍ରଗଣ୍ୟ । ଏହି ଦୁଇ ସାହିତ୍ୟ ସାଧକଙ୍କ ସମ୍ପର୍କରେ ଏହି ଏକକର ଅଧ୍ୟୟନ ଉପାଦେୟ ହେବ ।

୪ର୍ଥ ଏକକ : ଅଚ୍ୟୁତାନନ୍ଦ, ଯଶୋବନ୍ତ ଓ ଶିଶୁ ଅନନ୍ତଙ୍କ ସାରସ୍ୱତ ସୃଷ୍ଟିର ମହତ୍ତ୍ୱ ଏହି ଏକକରୁ ମିଳି ପାରିବ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ପ୍ରାକ୍‌ସାରଳା ସାହିତ୍ୟ : ଚର୍ଯ୍ୟାଗୀତିକା ଓ ନାଥ ସାହିତ୍ୟ
(ସାମାଜିକ, ସାହିତ୍ୟିକ, ଧାର୍ମିକ ମୂଲ୍ୟାୟନ)

୨ୟ ଏକକ : ସାରଳା ସାହିତ୍ୟ
(ସାମାଜିକ, ଐତିହାସିକ, ସାଂସ୍କୃତିକ ଓ ସାହିତ୍ୟିକ ମୂଲ୍ୟ)

୩ୟ ଏକକ : ପଂଚସଖା ସାହିତ୍ୟ : ବଳରାମ ଦାସ ଓ ଜଗନ୍ନାଥ ଦାସ (ବିଶେଷ ଅଧ୍ୟୟନ)

୪ର୍ଥ ଏକକ : ଫଚସଖା ସାହିତ୍ୟ : ଅନନ୍ତ ଦାସ, ଯଶୋବନ୍ତ ଦାସ ଓ ଅଚ୍ୟୁତାନନ୍ଦ ଦାସ (ବିଶେଷ ଅଧ୍ୟୟନ)

ସହାୟକ ଗ୍ରନ୍ଥ ସୂଚୀ (Book of references):

୧. ଚର୍ଯ୍ୟାଗୀତିକା- ଖଗେଶ୍ୱର ମହାପାତ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୨. ଓଡ଼ିଶାର ନାଥ ସଂପ୍ରଦାୟ ଓ ନାଥ ସାହିତ୍ୟ – ବଂଶୀଧର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ . କଟକ ।

୩. ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ- ସୂର୍ଯ୍ୟ ନାରାୟଣ ଦାଶ (୧ମ, ୨ୟ ଭାଗ) ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ ।

୪.ଓଡ଼ିଆ ସାହିତ୍ୟର ଆଦିପର୍ବ – ସୁରେନ୍ଦ୍ର ମହାନ୍ତି, କଟକ ଷ୍ଟୁଡେଣ୍ଟ୍ ଷ୍ଟୋର, କଟକ ।

୫. ଓଡ଼ିଆ ସାହିତ୍ୟର ସଂକ୍ଷିପ୍ତ ପରିଚୟ – ବୃନ୍ଦାବନ ଚନ୍ଦ୍ର ଆଚାର୍ଯ୍ୟ, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ ।

୬ .ଓଡ଼ିଆ ସାହିତ୍ୟର ମଧ୍ୟପର୍ବ ଓ ଉତ୍ତର ମଧ୍ୟପର୍ବ– ସୁରେନ୍ଦ୍ର ମହାନ୍ତି, କଟକ ଷ୍ଟୁଡେଣ୍ଟ୍ ଷ୍ଟୋର, କଟକ ।

୭.ପଂଚସଖା ଓଡ଼ିଆ ସାହିତ୍ୟ- ଦେବେନ୍ଦ୍ର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ . କଟକ ।

୮.ଓଡ଼ିଆ ସାହିତ୍ୟର ଉନ୍ମେଷ ଓ ଉତ୍ତରଣ, ତୃତୀୟ ଭାଗ-ଦେବେନ୍ଦ୍ର ମହାନ୍ତି,ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୯. ଆଶ୍ଚର୍ଯ୍ୟ ଚର୍ଯ୍ୟାଚୟ – କରୁଣାକର କର, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକଡ଼େମୀ, ଭୁବନେଶ୍ୱର ।

୧୦.ସାରଳା ମହାଭାରତର ଭୂମିପର୍ବ- ଉଦୟନାଥ ସାହୁ, ଚିନ୍ମୟ ପ୍ରକାଶନ, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ଚର୍ଯାଗୀତିକାରେ କେଉଁ ଓଡ଼ିଆ କବିଙ୍କର ସର୍ବାଧିକ ଗୀତିକା ରହିଛି ? (୧ମାର୍କ ପ୍ରଶ୍ନ)

୨. ଲୁଇପାଙ୍କର ଦୁଇଗୋଟି ଗୀତିକାର ନାମ ଲେଖ । (୨ମାର୍କ ପ୍ରଶ୍ନ)

୩. ନାଥସାହିତ୍ୟକୁ ଗୋରେଖନାଥଙ୍କ ଅବଦାନ ଉଲ୍ଲେଖ କର । (୫ମାର୍କ ପ୍ରଶ୍ନ)

୪. ବଳରାମ ଦାସଙ୍କ 'ଦାଣ୍ଡି ରାମାୟଣ'ର ସାମାଜିକ ମୂଲ୍ୟ ନିର୍ଦ୍ଧାରଣ କର । (୮ ମାର୍କ ପ୍ରଶ୍ନ)

Core IV **ଦ୍ୱିତୀୟ ପର୍ଯ୍ୟାୟ (Semester - II)**

ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ସାହିତ୍ୟ ଆଙ୍ଗିକ ଓ ଆତ୍ମିକ ଦୃଷ୍ଟିରୁ ବେଶ୍ ବିଭବଶାଳୀ । ଏହାର ପୃଷ୍ଠଭୂମି ସମକାଳୀନ ସାହିତ୍ୟର ଆଳଙ୍କାରିକ ବୈଚିତ୍ର୍ୟ, ରସଚେତନା, ଛନ୍ଦବିଭବ, ସୌନ୍ଦର୍ଯ୍ୟ ଚେତନା ଆଦି ବିଶେଷ ପ୍ରଣିଧାନ ଯୋଗ୍ୟ । ପ୍ରସ୍ତୁତ ପତ୍ରର ପାଠ୍ୟଖସଡ଼ାରୁ ଶିକ୍ଷାର୍ଥୀମାନେ ମଧକାଳୀନ ଓଡ଼ିଆ ସାହିତ୍ୟର ରୂପଗତ ଓ ଗୁଣଗତ ବିଶେଷତ୍ୱ ଜାଣିପାରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଧର୍ମଧାରା, ରାଜନୀତି, ସାମାଜିକତା ତଥା ସାଂସ୍କୃତିକ ପୃଷ୍ଠଭୂମି ଉପରେ ଏହି ଏକକଟି ପର୍ଯ୍ୟବସିତ ହୋଇଥିବାରୁ ଏହି ସମୟର ସାହିତ୍ୟର ସୃଷ୍ଟି ପୃଷ୍ଠପଟ୍ଟରେ ରହିଥିବା ଦିଗଗୁଡ଼ିକ ବିଷୟରେ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହେବେ ।

୨ୟ ଏକକ : ଆଙ୍ଗିକ ଦୃଷ୍ଟିରୁ ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ କାବ୍ୟ ସାହିତ୍ୟ କିପରି ବହୁ ବିବିଧତାପୂର୍ଣ୍ଣ ତାହାର ଧାରଣା ଏଠାରେ ମିଳିପାରିବ।

୩ୟ ଏକକ : ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ସାହିତ୍ୟର ଭାବାଦର୍ଶ, ରସଚେତନା ଓ ସୌନ୍ଦର୍ଯ୍ୟବୋଧ ସାହିତ୍ୟର ଆତ୍ମିକ ଦିଗକୁ କିପରି ବିମଣ୍ଡିତ କରିଛି, ତାହା ଏହି ଏକକରୁ ଉପଲବ୍ଧ ହେବ ।

୪ର୍ଥ ଏକକ : ମଧ୍ୟଯୁଗୀୟ ସାହିତ୍ୟର ଗୋଟିଏ ଜନପ୍ରିୟ ବିଭାଗ ହେଉଛି ଗୀତିକବିତା । କ୍ଷୁଦ୍ରକ୍ଷୁଦ୍ର ଗୀତିରଚନା ମାଧ୍ୟମରେ ତଥା ଚମ୍ପୂ, ଚଉପଦୀ, ଭଜନ, ଜଣାଣ ଓ ମୁଷ୍ଟିମେୟ ଗଦ୍ୟ ରଚନା ଦ୍ୱାରା ଏ ଯୁଗର ସାହିତ୍ୟ କିପରି ପରିପୁଷ୍ଟ , ତାହାର ଧାରଣାଦେବ ଏହି ଏକକ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ସାହିତ୍ୟର ପୃଷ୍ଠଭୂମି (ସାମାଜିକ, ସାଂସ୍କୃତିକ, ରାଜନୀତିକ ଓ ଧର୍ମୀୟ)

୨ୟଏକକ : ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟର ଆଂଗିକ ବୈଚିତ୍ର୍ୟ (ବିଷୟବିନ୍ୟାସ, ଭାଷା ,ଛନ୍ଦ, ଆଳଂକାରିକତା ଓ ବର୍ଣ୍ଣନା ବୈଚିତ୍ର୍ୟ)

୩ୟ ଏକକ : ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟର ଆତ୍ମିକ ବିଭବ (ରସ, ସୌନ୍ଦର୍ଯ୍ୟ ଚେତନା ଓ ଭାବାଦର୍ଶ)

୪ର୍ଥ ଏକକ : ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ଗୀତିକାବ୍ୟ ଓ ଗଦ୍ୟଧାରା -

(କ) ଚମ୍ପୂ, ଚଉପଦୀ, କୋଇଲି, ଚଉତିଶା, ଭଜନ, ଜଣାଣ

(ଖ) ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ ଗଦ୍ୟର ପରିଚୟ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references) :

୧ – ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ (୪ର୍ଥ ଭାଗ) – ପଣ୍ଡିତ ସୂର୍ଯ୍ୟ ନାରାୟଣ ଦାଶ, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

୨ – ଭଞ୍ଜୀୟ କାବ୍ୟଭାବନା – ବେଣୀମାଧବ ପାଢୀ, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

୩ – ମଧକାଳୀନ ଓଡ଼ିଆ ସାହିତ୍ୟ – କୃଷ୍ଣଚରଣ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ . କଟକ ।

୪ - ଓଡ଼ିଆ ଗୀତିକାବ୍ୟ – ଜାନକୀ ବଲ୍ଲଭ ମହାନ୍ତି, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

୫ – ଓଡ଼ିଆ କାବ୍ୟକୌଶଳ – ସୁଦର୍ଶନ ଆଚାର୍ଯ୍ୟ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୬- ଗୋପାଳକୃଷ୍ଣ ପଦାବଳୀ ଓ ପରିକ୍ରମା - କୃଷ୍ଣଚରଣ ବେହେରା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୭ – ରୀତି କାବ୍ୟର ଭିତ୍ତି ଓ ଭୂତି – ସୁରେନ୍ଦ୍ର କୁମାର ନାୟକ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୮ – ପ୍ରାଚୀନ ମଧ୍ୟଯୁଗ ସାହିତ୍ୟ : ନୂତନ ପ୍ରେକ୍ଷାପଟ –ନୀଳାଦ୍ରିଭୂଷଣ ହରିଚନ୍ଦନ, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ,କଟକ ।

୯- ଓଡ଼ିଆ କବିତାର ଛନ୍ଦ- ଗୌରୀକୁମାର ବ୍ରହ୍ମା, କଟକ ଷ୍ଟୁଡେଣ୍ଟସ୍ ଷ୍ଟୋର, କଟକ ।

୧୦- ଓଡ଼ିଆ ଛନ୍ଦର ବିକାଶଧାରା- ଜ୍ଞାନକୀ ବଲ୍ଲଭ ମହାନ୍ତି, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର ।

୧୧- ରୀତି କାବ୍ୟ ସଂପର୍କରେ- ଗଙ୍ଗାଧର ବଳ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ମନବୋଧ ଚଉତିଶାର ରଚୟିତା କିଏ ? (୧ ମାର୍କ)

୨. ଚମ୍ପୂ କାବ୍ୟର ଦୁଇଟି ଲକ୍ଷଣ ଲେଖ । (୨ମାର୍କ)

୩. ମଧ୍ୟ ଯୁଗୀୟ ଓଡ଼ିଆ ସାହିତ୍ୟରେ ରଚିତ ଗଦ୍ୟ ରଚନାର ପରିଚୟ ଦିଅ । (୫ ମାର୍କ)

୪. ରୀତି ଯୁଗର ସାହିତ୍ୟ ଶୃଙ୍ଗାର ରସ ପ୍ରଧାନ- ଏହାର ଯଥାର୍ଥତା ବିଚାର କର । (୮ ମାର୍କ)

Core V ତୃତୀୟ ପର୍ଯ୍ୟାୟ (Semester-III)

ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ : ନବଜାଗରଣ ଯୁଗ ଓ ସତ୍ୟବାଦୀ ଧାରା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି): ଆଧୁନିକ ଯୁଗରେ ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଆସିଛି ବ୍ୟାପକ ପରିବର୍ତ୍ତନ। ବିଭିନ୍ନ ପତ୍ରପତ୍ରିକା ପ୍ରକାଶନ ସହିତ କାବ୍ୟ ସାହିତ୍ୟ ଓ ଗଦ୍ୟ ସାହିତ୍ୟର ଘଟିଛି ଅଭିନବ ଉନ୍ମେଷ । ଶଂସିତ ପାଠ୍ୟପତ୍ରରେ ଆଧୁନିକ ଯୁଗର ନବଜାଗରଣ ଓ ସତ୍ୟବାଦୀ ପର୍ଯ୍ୟାୟ ସମ୍ପର୍କରେ ଅବଗତ ହେବାର ସୁଯୋଗ ରହିଛି ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ସାହିତ୍ୟରେ ନବ ଜାଗରଣର ପୃଷ୍ଠଭୂମିରେ ଇଂରାଜୀ ଶିକ୍ଷା, ପାଠ୍ୟପୁସ୍ତକ, ମୁଦ୍ରଣଯନ୍ତ୍ର, ପତ୍ରପତ୍ରିକା ତଥା ଭାଷା ଆନ୍ଦୋଳନ କିପରି ମୁଣ୍ଡ ଟେକିଥିଲା, ତାହାର ସୂଚନା ଉପଲବ୍ଧ ହେବ ଏହି ଏକକରେ।

୨ୟ ଏକକ : ନବଜାଗରଣର ରୂପରେଖ ସହିତ ସତ୍ୟବାଦୀ ସାହିତ୍ୟ ଧାରାର ଆଭାସ ଏହି ଏକକଟିରେ ଛାତ୍ରଛାତ୍ରୀ ପାଇପାରିବେ।

୩ୟ ଏକକ: ନବଜାଗରଣ ସମୟର ବିଶିଷ୍ଟ କବି ଓ କଥାକାର ରାଧାନାଥ, ଫକୀରମୋହନ, ଗଙ୍ଗାଧର, ଗୋପବନ୍ଧୁ ଓ ଗୋଦାବରୀଶଙ୍କ ସମ୍ପର୍କରେ ଏହି ଏକକରେ ଚର୍ଚ୍ଚା କରାଯିବ। ଫଳରେ ଶିକ୍ଷାର୍ଥୀମାନେ ଏହି ସମୟର ବିଶିଷ୍ଟ ସାହିତ୍ୟସ୍ରଷ୍ଟାଙ୍କ କୃତିତ୍ୱ ଜାଣିପାରିବେ।

୪ର୍ଥ ଏକକ : ସମକାଳୀନ ପ୍ରାବନ୍ଧିକ ଓ ନାଟ୍ୟକାର ଭାବେ ଖ୍ୟାତିସିଦ୍ଧ ଜଗନ୍ମୋହନ ଲାଲ, ରାମଶଙ୍କର ରାୟ, କାମପାଳ ମିଶ୍ର, ମଧୁସୂଦନ ରାଓ, ବିଶ୍ୱନାଥ କର ଓ ନୀଳକଣ୍ଠ ଦାସଙ୍କ ସମ୍ପର୍କରେ ଏହି ଏକକ ଧାରଣା ପ୍ରଦାନ କରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟର ପୃଷ୍ଠଭୂମି ଓ ନବଜାଗରଣ

(ଇଂରାଜୀଶିକ୍ଷା ବିସ୍ତାର, ପାଠ୍ୟପୁସ୍ତକ ଓ ପତ୍ରପତ୍ରିକା ପ୍ରକାଶନ, ମୁଦ୍ରଣଯନ୍ତ୍ର ପ୍ରତିଷ୍ଠା ଓ ଭାଷାସୁରକ୍ଷା ଆନ୍ଦୋଳନ)

୨ୟ ଏକକ : ନବଜାଗରଣ ଓ ସତ୍ୟବାଦୀ ସାହିତ୍ୟ ଧାରାର ବୈଶିଷ୍ଟ୍ୟ

୩ୟ ଏକକ : ସମକାଳୀନ ପ୍ରମୁଖ କବି ଓ କଥାକାର

(ରାଧାନାଥ ରାୟ, ଫକୀରମୋହନ, ଗଂଗାଧର ମେହେର, ଗୋପବନ୍ଧୁ ଓ ଗୋଦାବରୀଶ)

୪ର୍ଥ ଏକକ : ସମକାଳୀନ ପ୍ରମୁଖ ପ୍ରାବନ୍ଧିକ ଓ ନାଟ୍ୟକାର

(ଜଗନ୍ମୋହନ ଲାଲ, ରାମଶଙ୍କର ରାୟ, କାମପାଳ ମିଶ୍ର, ମଧୁସୂଦନ ରାଓ, ବିଶ୍ୱନାଥ କର, ନୀଳକଂଠ ଦାସ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

(୧) ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ (୧୮୦୩ ରୁ ୧୯୨୦)- ନଟବର ସାମନ୍ତରାୟ, , ଭୁବନେଶ୍ୱର

(୨) ଉନବିଂଶ ଶତାବ୍ଦୀର ଓଡ଼ିଆ ପତ୍ରପତ୍ରିକା - ଅରବିନ୍ଦ ଦାସ, ତିହିଡ଼ି, ଭଦ୍ରକ

(୩) କାବ୍ୟଶିଳ୍ପୀ ଗଂଗାଧର – ଗୋବିନ୍ଦ ଚନ୍ଦ୍ର ଉଦଗାତା ,

(୪) ଗଂଗାଧର ସାହିତ୍ୟ ଜିଜ୍ଞାସା –ବବ୍ରୁବାହନ ମହାପାତ୍ର – ବିଜୟିନୀ ପବ୍ଲି କେଶନସ୍ ,କଟକ

(୫) ଯୁଗଜ୍ୟୋତି ରାଧାନାଥ – ଦେବେନ୍ଦ୍ର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

(୬) କାବ୍ୟ ଓ କଳାକାର – ଚିନ୍ତାମଣି ବେହେରା, ଜଗନ୍ନାଥ ରଥ, କଟକ

(୭) ନବ ଯୁଗର କବି ଓ କାବ୍ୟଧାରା – ଜାନକୀବଲ୍ଲଭ ମହାନ୍ତି, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ

(୮) ଆଧୁନିକ ଓଡ଼ିଆ କାବ୍ୟଧାରା(ଆଦିଯୁଗ)-ନରେନ୍ଦ୍ର ନାଥ ମିଶ୍ର, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର

(୯) ଓଡ଼ିଆ ସାହିତ୍ୟରେ ରାଧାନାଥ ଓ ସତ୍ୟବାଦୀ ଯୁଗ- ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ ,କଟକ

(୧୦) ଓଡ଼ିଆ ସାହିତ୍ୟରେ ସତ୍ୟବାଦୀ ଯୁଗ – ବୃନ୍ଦାବନ ଚନ୍ଦ୍ର ଆଚାର୍ଯ୍ୟ , ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ ,କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧.ଗୌରୀଶଙ୍କର ରାୟଙ୍କ ' ଉତ୍କଳ ଦୀପିକା ' ପ୍ରଥମେ କେଉଁ ମସିହାରୁ ଆତ୍ମପ୍ରକାଶ କରିଥିଲା ? (୧ ମାର୍କ)

୨.ଗୋପବନ୍ଧୁଙ୍କ ରଚିତ ଦୁଇଗୋଟି କବିତା ଗ୍ରନ୍ଥର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ପ୍ରାବନ୍ଧିକ ମଧୁସୂଦନଙ୍କ ପ୍ରବନ୍ଧକଳାର ବିଶେଷତ୍ୱ ଦର୍ଶାଅ । (୫ ମାର୍କ)

୪. ଫକୀରମୋହନଙ୍କ କଥାସାହିତ୍ୟରୁ ସମକାଳୀନ ସମାଜର ଚିତ୍ର ପ୍ରଦର୍ଶନ କର । (୮ ମାର୍କ)

Core VI **ତୃତୀୟ ପର୍ଯ୍ୟାୟ (Semester-III)**

ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ : ସବୁଜ, ପ୍ରଗତିବାଦୀ ଧାରା ଓ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀକାଳ(୨୦୦୦ ପର୍ଯ୍ୟନ୍ତ)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଆଧୁନିକ ଯୁଗର ସବୁଜ ଧାରାଠାରୁ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀକାଳ(୨୦୦୦ ପର୍ଯ୍ୟନ୍ତ) ଓଡ଼ିଆ ସାହିତ୍ୟ ରୂପରେଖ ଉପରେ ଏହି ପତ୍ରଟି ଧାରଣା ଦେବ। ବିଶେଷତଃ ସବୁଜ କାବ୍ୟଧାରା, ପ୍ରଗତିବାଦୀ ସାହିତ୍ୟ ଓ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ସାହିତ୍ୟର ବିବିଧ ରଚନା ସମ୍ପର୍କରେ ପରିଚୟାତ୍ମକ ଜ୍ଞାନ ଛାତ୍ରଛାତ୍ରୀ ଲାଭକରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ସତ୍ୟବାଦୀ ଯୁଗ ପରେ ବିଶ୍ୱକବି ରବୀନ୍ଦ୍ରନାଥ ଓ ଇଂରାଜୀ ରୋମାଣ୍ଟିକ କବିମାନଙ୍କ ଅନୁପ୍ରେରଣାରେ ଓଡ଼ିଆ ସାହିତ୍ୟରେ କିପରି ସବୁଜ କାବ୍ୟଧାରାର ସୂତ୍ରପାତ ଘଟିଥିଲା ଏବଂ ଏକାଳର ତରୁଣ କବି ଲେଖକମାନେ ସାହିତ୍ୟକୁ କିପରି ଶ୍ୟାମଳିମାମୟ କରିଥିଲେ, ତାହା ଶିକ୍ଷାର୍ଥୀମାନେ ଏହି ଏକକରେ ଉପଲବ୍ଧି କରିବେ ।

୨ୟ ଏକକ : ସବୁଜଗୋଷ୍ଠୀଙ୍କ ପରେ ମାର୍କ୍ସବାଦର ପ୍ରଭାବରେ ଓଡ଼ିଶାରେ ନିପୀଡ଼ିତ ସର୍ବହରା ମଣିଷର ଜୀବନ କଥାକୁ ନେଇ ପ୍ରଗତିବାଦୀ କାବ୍ୟଧାରା କିପରି ପ୍ରସାରଲାଭ କରିଥିଲା, ତାହା ଶିକ୍ଷାର୍ଥୀମାନଙ୍କୁ ଉପଲବ୍ଧ କରାଇବ ଏହି ଏକକର ପାଠ୍ୟକ୍ରମ ।

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପ୍ରାପ୍ତି ପରେ ଓଡ଼ିଆ କବିତା ଓ ନାଟକ କ୍ଷେତ୍ରରେ କିପରି ପରିବର୍ତ୍ତନ ଆସିଥିଲା, ସେ ସମ୍ପର୍କୀୟ ତଥ୍ୟମୂଳକ ଜ୍ଞାନ ଏହି ଏକକରେ ହାସଲକରିବେ ଛାତ୍ରଛାତ୍ରୀ ।

୪ର୍ଥ ଏକକ : ଏହି ଏକକରେ ସ୍ୱାଧୀନତା ପରକାଳର କଥାସାହିତ୍ୟ ଓ ଗଦ୍ୟସାହିତ୍ୟ ଉପରେ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହେବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଓଡ଼ିଆ ସାହିତ୍ୟରେ ସବୁଜ କାବ୍ୟଧାରା

୨ୟ ଏକକ : ପ୍ରଗତିବାଦୀ କାବ୍ୟଧାରା

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ସାହିତ୍ୟ (କବିତା ଓ ନାଟକ)

୪ର୍ଥ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ସାହିତ୍ୟ (କଥାସାହିତ୍ୟ ଓ ଗଦ୍ୟସାହିତ୍ୟ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

(୧) ଓଡ଼ିଆ ସାହିତ୍ୟରେ ସବୁଜଧାରା (ସଂ) – ରାଘବାନନ୍ଦ ନାୟକ ।

(୨) ଓଡ଼ିଆ ସାହିତ୍ୟରେ ପ୍ରଗତିବାଦୀ ଧାରା - ବିଜୟ କୁମାର ଶତପଥୀ, ଓଡ଼ିଶା ବୁକ୍ସ ଷ୍ଟୋର, କଟକ ।

(୩) ସବୁଜରୁ ସାମ୍ପ୍ରତିକ – ନିତ୍ୟାନନ୍ଦ ଶତପଥୀ , ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

(୪) ଆଧୁନିକ ଓଡ଼ିଆ କବିତାର ଭାବଭୂମି - ବବ୍ରୁବାହନ ମହାପାତ୍ର, ବିଜୟିନୀ ପବ୍ଲିକେଶନସ୍ କଟକ ।

(୫) ଆଧୁନିକ ଓଡ଼ିଆ କାବ୍ୟସାହିତ୍ୟରେ ପାଶ୍ଚାତ୍ୟ ପ୍ରଭାବ - କ୍ଷେତ୍ରବାସୀ ନାୟକ, ଅକ୍ଷର, କଟକ ।

(୬) ସବୁଜ କବିତାର ରୂପବିଭବ - ପ୍ରମୋଦ କୁମାର ପାଢୀ, ଶ୍ୟାମା ପ୍ରକାଶନୀ, ପଦ୍ମପୁର, ବରଗଡ଼ ।

(୭) ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟ - ଜାନକୀ ବଲ୍ଲଭ ମହାନ୍ତି, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ ।

(୮) ନବଯୁଗର କବି ଓ କାବ୍ୟଧାରା- ଜାନକୀବଲ୍ଲଭ ମହାନ୍ତି, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

(୯) ସବୁଜ ଅକ୍ଷର- ଅନ୍ନଦାଶଙ୍କର ରାୟ, ଦାସ ବ୍ରଦର୍ସ, ବ୍ରହ୍ମପୁର ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ସବୁଜ କାବ୍ୟଧାରାର ଲେଖକମାନଙ୍କ ସମ୍ମିଳିତ ଉଦ୍ୟମରେ ଯେଉଁ ଉପନ୍ୟାସ ପ୍ରକାଶିତ ହୋଇଥିଲା, ତାହାର ନାମ ଲେଖ । (୧ ମାର୍କ)

୨. ସବୁଜ କାବ୍ୟଶିଳ୍ପୀ ବୈକୁଣ୍ଠନାଥଙ୍କ ଦୁଇଗୋଟି କବିତା ଗ୍ରନ୍ଥର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ସ୍ୱାଧୀନତା ପରକାଳର ଓଡ଼ିଆ କାବ୍ୟଶିଳ୍ପୀଙ୍କ ମଧ୍ୟରୁ ବେଣୁଧର ରାଉତଙ୍କ କବିତାର ବିଶେଷତ୍ୱ ପ୍ରଦର୍ଶନ କର । (୫ ମାର୍କ)

୪. କଥାଶିଳ୍ପୀ ସୁରେନ୍ଦ୍ର ମହାନ୍ତି କିମ୍ବା ଗୋପୀନାଥ ମହାନ୍ତିଙ୍କ ଉପନ୍ୟାସର ମହତ୍ତ୍ୱ ବିଚାର କର । (୮ ମାର୍କ)

Core VII ତୃତୀୟ ପର୍ଯ୍ୟାୟ (Semester-III)

ପ୍ରାଚୀନ ଓ ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ କବିତା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଓଡ଼ିଆ ସାହିତ୍ୟର ଐତିହାସିକ ବିବର୍ତ୍ତନ ଧାରା ଅବଗତ ହେବାପରେ ଏହି ପାଠ୍ୟପତ୍ରରେ ଛାତ୍ରଛାତ୍ରୀ ପ୍ରାଚୀନ ଓ ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ କବିତାର ପ୍ରାସଙ୍ଗିକ ଦିଗଗୁଡ଼ିକ ନିର୍ଦ୍ଧାରିତ ପାଠ୍ୟବିଷୟ ମାଧ୍ୟମରେ ଜାଣିବାର ସୁଯୋଗ ଲାଭ କରିବେ । ବିଶେଷତଃ ଚର୍ଯ୍ୟାଗୀତିକାଠାରୁ ଆରମ୍ଭକରି ସାରଳା ମହାଭାରତ, ଜଗନ୍ନାଥ ଦାସଙ୍କ ଭାଗବତ ଓ ରୀତିକବି ଦୀନକୃଷ୍ଣ, ଉପେନ୍ଦ୍ର ଭଞ୍ଜ, ଭକ୍ତଚରଣ, ବଳଦେବ ପ୍ରମୁଖଙ୍କ ରଚନାର କିୟଦଂଶ ପାଠକରି କବିତାର କ୍ରମିକ ବିକାଶଧାରା ଉପଲବ୍ଧି କରିପାରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : କାହ୍ନୁପାଦ ଓ ଲୁଇପାଦ ଚର୍ଯ୍ୟାଗୀତିକାର ଦୁଇ ପ୍ରମୁଖ କବିଙ୍କ ଗୀତିକାମାଧ୍ୟମରେ ଚର୍ଯାପଦର ଗୁଣାତ୍ମକ ବୈଶିଷ୍ଟ୍ୟ ଚିହ୍ନିତ ହୋଇପାରିବ ।

୨ୟ ଏକକ : ସାରଳା ଦାସଙ୍କ ମହାଭାରତ ଓ ଜଗନ୍ନାଥ ଦାସଙ୍କ ଭାଗବତ ଶଂସିତ ସମୟଖଣ୍ଡର କାଳଜୟୀ ରଚନା । ଏହି ଉଭୟ ରଚନାରୁ ଏକ ଏକ ଅଂଶ ଅଧ୍ୟୟନ କରି ଛାତ୍ରଛାତ୍ରୀ ଦୁଇ ମହାନ୍ ସ୍ରଷ୍ଟାଙ୍କ କବି ପ୍ରତିଭାର ଅବଧାରଣା କରିପାରିବେ।

୩ୟ ଏକକ : ଭଞ୍ଜ ଓ ଦୀନକୃଷ୍ଣ ରୀତିଯୁଗୀୟ କାବ୍ୟ ସାହିତ୍ୟର ପ୍ରମୁଖ ସ୍ରଷ୍ଟା। ଦୀନକୃଷ୍ଣଙ୍କ ରସକଲ୍ଲୋଳ ଓ ଭଞ୍ଜଙ୍କ କୋଟିବ୍ରହ୍ମାଣ୍ଡ ସୁନ୍ଦରୀର ଗୋଟିଏ ଗୋଟିଏ ଛାନ୍ଦ ଆଧାରରେ ରୀତିଯୁଗର ପୌରାଣିକ ଓ କାଳ୍ପନିକ କାବ୍ୟଧାରାର ଧାରଣା ମିଳିପାରିବ।

୪ର୍ଥ ଏକକ : କାବ୍ୟ ବ୍ୟତିରେକ କୋଇଲି, ଚଉତିଶା ଓ ଚମ୍ପୂରଚନା ରୀତି ଯୁଗୀୟ ସାହିତ୍ୟକୁ ସମୃଦ୍ଧ କରିଛି । ତାହାର ଝଲକ ଏହି ଏକକର ପାଠ୍ୟ ଖସଡ଼ାରୁ ମିଳିପାରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : କ) ଲୁଇପାଦ – କାୟାତରୁ ଚର୍ଯ୍ୟା

ଖ) କାହ୍ନୁପାଦ – ବାଟଓଗାଳ ଚର୍ଯ୍ୟା (ଚର୍ଯ୍ୟା ନଂ – ୭)

୨ୟ ଏକକ : କ) ଦୁର୍ଯ୍ୟୋଧନଙ୍କ ରକ୍ତନଦୀ ସନ୍ତରଣ – ସାରଳା ଦାସ (ସାରଳା ମହାଭାରତ – ଆର୍ତ୍ତବଲ୍ଲଭ ମହାନ୍ତି ସମ୍ପାଦିତ)

ଖ) ଭାଗବତ (ଚବିଶ ଗୁରୁ ପ୍ରସଙ୍ଗ) – ଜଗନ୍ନାଥ ଦାସ

୩ୟ ଏକକ : କ) ରସକଲ୍ଲୋଳ (୩୪ଶ ଛାନ୍ଦ) – ଦୀନକୃଷ୍ଣ ଦାସ

ଖ) କୋଟିବ୍ରହ୍ମାଣ୍ଡ ସୁନ୍ଦରୀ (ପ୍ରଥମ ଛାନ୍ଦ) – ଉପେନ୍ଦ୍ର ଭଞ୍ଜ ।

୪ର୍ଥ ଏକକ : କ) କେଶବ କୋଇଲି – ମାର୍କଣ୍ଡ ଦାସ

ଖ) କଳାକଳେବର ଚଉତିଶା – ଭକ୍ତଚରଣ ଦାସ

ଗ) କିଶୋର ଚନ୍ଦ୍ରାନନ୍ଦ ଚମ୍ପୂ – ('ଘ' ଗୀତ) – କବିସୂର୍ଯ୍ୟ ବଳଦେବ ରଥ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

୧. ଚର୍ଯ୍ୟାଗୀତିକା – ଖଗେଶ୍ୱର ମହାପାତ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୨. ସାରଳା ଦାସଙ୍କ ଶ୍ରେଷ୍ଠ ରଚନା - ସଂ. ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ ନେସନାଲ ବୁକ ଟ୍ରଷ୍ଟ୍ ଅଫ୍ ଇଣ୍ଡିଆ

୩. ସାରଳା ମହାଭାରତ ଚରିତ୍ରର ଚିତ୍ରଶାଳା – ସାରଳା ସାହିତ୍ୟ ସଂସଦ, କଟକ

୪. ଓଡ଼ିଆ ଭାଗବତ : ଜଗନ୍ନାଥ ଦାସ, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର

୫. ଜଗନ୍ନାଥ ଦାସଙ୍କ ଶ୍ରେଷ୍ଠ କାବ୍ୟକୃତି – ସଂ. ଦାଶରଥି ଦାସ, ନ୍ୟାସନାଲ ବୁକ୍ ଟ୍ରଷ୍ଟ, ଇଣ୍ଡିଆ

୬. ବଳରାମ ଦାସଙ୍କ ଶ୍ରେଷ୍ଠ କାବ୍ୟକୃତି- ସଂ. ପ୍ରଦୀପ୍ତ କୁମାର ପଣ୍ଡା, ନ୍ୟାସନାଲ ବୁକ୍ ଟ୍ରଷ୍ଟ, ଇଣ୍ଡିଆ

୭. ରସକଲ୍ଲୋଳ - ଦୀନକୃଷ୍ଣ ଦାସ, ସଂ. ଆର୍ତ୍ତବଲ୍ଲଭ ମହାନ୍ତି – ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୮. କୋଟିବ୍ରହ୍ମାଣ୍ଡ ସୁନ୍ଦରୀ- ସଂ. କୃଷ୍ଣଚରଣ ବେହେରା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୯. ଉପେନ୍ଦ୍ର ଭଞ୍ଜଙ୍କ ଶ୍ରେଷ୍ଠ କାବ୍ୟକୃତି- ସଂ. ଦାଶରଥି ଦାସ, ନ୍ୟାସନାଲ ବୁକ୍ ଟ୍ରଷ୍ଟ, ଇଣ୍ଡିଆ

୧୦. କିଶୋର ଚନ୍ଦ୍ରାନନ୍ଦ ଚମ୍ପୂ – ସଂ. କୃଷ୍ଣଚରଣ ବେହେରା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ଲୁଇପାଦଙ୍କ ଗୀତିକାରେ ଶରୀରକୁ କାହା ସହିତ ତୁଳନା କରାଯାଇଛି ? (୧ ମାର୍କ)

୨. ଅବଧୂତଙ୍କ ଗୁରୁମାନଙ୍କ ମଧ୍ୟରୁ ଯେକୌଣସି ଦୁଇଟି ଗୁରୁଙ୍କ ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ରସକଲ୍ଲୋଳର ୩୪ ଛାନ୍ଦରୁ ଗୋପୀଙ୍କ ବିରହଦଶାର ଚିତ୍ର ପ୍ରଦାନକର । (୫ ମାର୍କ)

୪. ମାର୍କଣ୍ଡ ଦାସଙ୍କ କେଶବ କୋଇଲିରୁ ଯଶୋଦାଙ୍କ ମାତୃ ହୃଦୟର ପରିଚୟ ଦିଅ । (୮ ମାର୍କ)

Core VIII ଚତୁର୍ଥ ପର୍ଯ୍ୟାୟ (Semester-IV)

ଆଧୁନିକ ଓଡ଼ିଆ କବିତା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ରାଧାନାଥଙ୍କ ସମୟରୁ ସାମ୍ପ୍ରତିକ କାଳ ପର୍ଯ୍ୟନ୍ତ ଆଧୁନିକ ଓଡ଼ିଆ କବିତାର ଉତ୍ତରଣଧାରା ଅବଗତ ହେବା ନିମିତ୍ତ ଏହି ପାଠ୍ୟପତ୍ରଟି ଉଦ୍ଦିଷ୍ଟ । ଏହି ସମୟଖଣ୍ଡର ପ୍ରତିନିଧି ଶ୍ରେଣୀୟ କବିମାନଙ୍କର କାବ୍ୟାଂଶ ବା କବିତାପଠନ ମାଧ୍ୟମରେ ଛାତ୍ରଛାତ୍ରୀ ଏ ଦିଗରେ ଜ୍ଞାନ ଆହରଣ କରିବେ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଏହି ଏକକରେ ରାଧାନାଥଙ୍କ ମହାଯାତ୍ରା, ଗଙ୍ଗାଧରଙ୍କ ତପସ୍ୱିନୀ ଓ ଭୀମ ଭୋଇଙ୍କ ସ୍ତୁତି ଚିନ୍ତାମଣିର ଗୋଟିଏ ଗୋଟିଏ ଅଂଶ ଅଧ୍ୟୟନଦ୍ୱାରା ଛାତ୍ରଛାତ୍ରୀ ପ୍ରାରମ୍ଭିକ ପର୍ଯ୍ୟାୟର ଆଧୁନିକ କାବ୍ୟଧାରା ବିଷୟରେ ଜାଣିପାରିବେ।

୨ୟ ଏକକ : ମଧୁସୂଦନ, ଗୋଦାବରୀଶ ଓ କୁନ୍ତଳା କୁମାରୀଙ୍କ ଗୋଟିଏ ଗୋଟିଏ କବିତା ଏହି ଏକକରେ ସ୍ଥାନିତ। ଏଥିରୁ ଆଧୁନିକ ଓଡ଼ିଆ ଗୀତିକବିତାର ବୈଚିତ୍ର୍ୟ ଓ ବିଶେଷତ୍ୱ ସାଙ୍କେତିକରୂପେ ଉପଲବ୍ଧ ହେବ ।

୩ୟ ଏକକ : ରାଧାମୋହନ ଗଡ଼ନାୟକ, ମାୟାଧର ମାନସିଂହ ଓ ସଚ୍ଚିଦାନନ୍ଦ ରାଉତରାୟ ପ୍ରମୁଖ ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟର ସୁପ୍ରତିଷ୍ଠିତ କବିଙ୍କ କବିତାଗୁଡ଼ିକ ଅଧ୍ୟୟନକରି ଛାତ୍ରଛାତ୍ରୀ ଉପକୃତ ହୋଇପାରିବେ।

୪ର୍ଥ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳର ବିଶିଷ୍ଟ କବିତାମାନଙ୍କ ମଧ୍ୟରେ ବିନୋଦ ଚନ୍ଦ୍ର ନାୟକଙ୍କ 'ଗ୍ରାମପଥ', ସୌରୀନ୍ଦ୍ର ବାରିକଙ୍କ 'କର୍ଣ୍ଣ ' ଓ ବ୍ରହ୍ମୋତ୍ରୀ ମହାନ୍ତିଙ୍କ 'ମୃତ୍ୟୁ ସମ୍ପର୍କରେ' କବିତାତ୍ରୟ ଏକଏକ ବିଶେଷ ଦିଗର ପ୍ରତିନିଧିତ୍ୱ କରେ । ତେଣୁ ଏହାର ଅଧ୍ୟୟନଦ୍ୱାରା ଅତ୍ୟାଧୁନିକ କବିତାର ମହତ୍ତ୍ୱ ବୁଝାପଡ଼ିବ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : କ) ମହାଯାତ୍ରା – ୧ମ ସର୍ଗ – ରାଧାନାଥ ରାୟ
ଖ) ତପସ୍ୱିନୀ–୩ୟ ସର୍ଗ – ଗଙ୍ଗାଧର ମେହେର
ଗ) ସ୍ତୁତି ଚିନ୍ତାମଣି–୩୭ଶ ବୋଲି – ଭୀମ ଭୋଇ

୨ୟ ଏକକ : କ) ବିଚ୍ଛେଦେ (ବସନ୍ତ ଗାଥା) – ମଧୁସୂଦନ ରାଓ
ଖ) ନିମିଷକ ଦେଖା – ଗୋଦାବରୀଶ ମିଶ୍ର
ଗ) ଶେଫାଳି ପ୍ରତି – କୁନ୍ତଳା କୁମାରୀ ସାବତ

୩ୟ ଏକକ : କ) ବୀରରାଣୀ ଶୁକଦେଇ (ଉତ୍କଳିକା) – ରାଧାମୋହନ ଗଡ଼ନାୟକ
ଖ) ବିରହୀ ଘନ – ମାୟାଧର ମାନସିଂହ
ଗ) ପ୍ରତିମା ନାୟକ – ସଚ୍ଚିଦାନନ୍ଦ ରାଉତରାୟ

୪ର୍ଥ ଏକକ : କ) ଗ୍ରାମପଥ – ବିନୋଦ ଚନ୍ଦ୍ର ନାୟକ
ଖ) କର୍ଣ୍ଣ – ସୌରୀନ୍ଦ୍ର ବାରିକ
ଗ) ମୃତ୍ୟୁ ସମ୍ପର୍କରେ – ବ୍ରହ୍ମୋତ୍ରୀ ମହାନ୍ତି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Book of reference) :

୧. ମହାଯାତ୍ରା ଓ ରାଧାନାଥ–ସଂ. ବେଣୁଧର ରାଉତ, ପ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ
୨. ମାନସିଂହ ମାନସ– ଶ୍ରୀଚରଣ ମହାନ୍ତି, ପ୍ରଗତି ଉତ୍କଳ ସଂଘ, ରାଉରକେଲା
୩. ଗୋଦାବରୀଶ ମହାପାତ୍ର ପରିକ୍ରମା – ବୃନ୍ଦାବନ ଚନ୍ଦ୍ର ଆଚାର୍ଯ୍ୟ
୪. ସବୁଜ କବିତାର ରୂପ ବିଭବ –ପ୍ରମୋଦ କୁମାର ପାଢୀ, ଶ୍ୟାମା ପ୍ରକାଶନୀ, ଭୁବନେଶ୍ୱର
୫. ଆଧୁନିକ ଓଡ଼ିଆ କବିତାରେ ନାରୀ – ବବ୍ରୁବାହନ ମହାପାତ୍ର, ବିଜୟିନୀ ପବ୍ଲିକେଶନ୍ସ, କଟକ

୬. ସଚ୍ଚକବି ଭୀମ ଭୋଇ– ସାରଳା ସାହିତ୍ୟ ସଂସଦ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

ପାଠ୍ୟପୁସ୍ତକ(Text Books):

୧. ବସନ୍ତ ଗାଥା–ମଧୁସୂଦନ ରାଓ, ଓଡ଼ିଶା ମିଶନ୍ ପ୍ରେସ୍, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ତପସ୍ୱିନୀ କାବ୍ୟର କେତେ ଗୋଟି ସର୍ଗ ରହିଛି ? (୧ ମାର୍କ)

୨. ମଧୁସୂଦନଙ୍କ ଦୁଇ ଗୋଟି ସମ୍ବୋଧନ ଗୀତିକାର ନାମୋଲ୍ଲେଖ କର । (୨ ମାର୍କ)

୩. ପଠିତ କବିତା ଅବଲମ୍ବନରେ ପ୍ରତିମା ନାୟକର ଜୀବନବସ୍ଥା ସୂଚାଇ ଦିଅ । (୫ ମାର୍କ)

୪. ଏକ ମିଥ୍‌ଧର୍ମୀ କବିତା ଭାବେ କର୍ଣ୍ଣ କବିତାର ମୂଲ୍ୟାୟନ କର । (୮ ମାର୍କ)

Core IX ଚତୁର୍ଥ ପର୍ଯ୍ୟାୟ (Semester-IV)

ଓଡ଼ିଆ ନାଟକ ଓ ଏକାଂକିକା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଓଡ଼ିଶାର ନାଟ୍ୟ ପରମ୍ପରା ସୁପ୍ରାଚୀନ ହେଲେ ହେଁ, ଆଧୁନିକ ଯୁଗରେ ହିଁ ଲିଖିତ ନାଟକ ଓ ଏକାଙ୍କିକାର ପରିପ୍ରକାଶ ଘଟିଛି । ଜଗନ୍ମୋହନ ଲାଲଙ୍କ ବାବାଜୀଠାରୁ ଏଯାବତ୍ ଆମର ନାଟ୍ୟସାହିତ୍ୟ ଆଙ୍ଗିକ ଓ ଆତ୍ମିକ ଦୃଷ୍ଟିରୁ ପରିବର୍ତ୍ତିତ ହୋଇଆସିଛି । ସଂସ୍କାରବୋଧ, ଭକ୍ତିଚେତନା, ଜାତୀୟ ଜାଗରଣ ଓ ରାଜନୀତି କ୍ଷେତ୍ରରେ ପଟ୍ଟ ପରିବର୍ତ୍ତନ ତଥା ସାମାଜିକ ଜୀବନର ବିବିଧରୂପ ଓ ସମସ୍ୟାକୁ ନାଟକ ଅଙ୍ଗୀଭୂତ କରିଛି । ଓଡ଼ିଆ ନାଟକର ଏହି ବିବର୍ତ୍ତନଧାରା ଶଂସିତ ପାଠ୍ୟପତ୍ରରେ ଛାତ୍ରଛାତ୍ରୀ ଉପଲବ୍ଧି କରିପାରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଏହି ଏକକର ପ୍ରଥମ ଓଡ଼ିଆ ନାଟକ ବାବାଜୀ ସମ୍ପର୍କରେ ଅଥବା ଗୋପାଳ ଛୋଟରାୟଙ୍କ ବିଶିଷ୍ଟ ରାଜନୀତିକ ନାଟକ ପରକଲମର ବାର୍ତ୍ତା ଉପରେ ଅବଗତ ହୋଇପାରିବେ ।

୨ୟ ଏକକ : ମନୋରଞ୍ଜନଙ୍କ ଅପରାଧପ୍ରବଣ ନାଟକ ସାଗରମନ୍ଥନ ଅଥବା କାର୍ତ୍ତିକ ରଥଙ୍କ ଈଶ୍ୱର ଜଣେ ଯୁବକ ପରି ପ୍ରଭାବଶାଳୀ କଥାବସ୍ତୁ ଓ ଆଭିମୁଖ୍ୟ ସମ୍ପର୍କରେ ଏହି ଏକକରେ ଜାଣିବାର ସୁଯୋଗ ରହିଛି ।

୩ୟ ଏକକ : ଆମ ସମୟର ଦୁଇଜଣ ବିଶିଷ୍ଟ ନାଟ୍ୟକାର ନାରାୟଣ ସାହୁ ଓ ବିଜୟ ଶତପଥୀଙ୍କ ଯଥାକ୍ରମେ ରାଜରାଣୀ ଉପାଖ୍ୟାନ ଓ କୋକୁଆ ନାଟକ ସାମ୍ପ୍ରତିକ ଓଡ଼ିଆ ନାଟକର ଗୁଣାତ୍ମକ ମୂଲ୍ୟ ଓ ଉପସ୍ଥାପନ କୌଶଳକୁ ଚିହ୍ନଟ କରିବ ।

୪ର୍ଥ ଏକକ : ଛାତ୍ରଛାତ୍ରୀମାନେ ରତ୍ନାକର ଚଇନି ଓ ସୁରେନ୍ ମହାନ୍ତିଙ୍କ ଦୁଇଟି ବଳିଷ୍ଠ ଏକାଙ୍କିକା ଅଥବା ମଙ୍ଗଳୁ ଚରଣ ବିଶ୍ୱାଳଙ୍କ ପ୍ରସିଦ୍ଧ ଭୁଖା ନାଟକର ମର୍ମବାଣୀ ଜାଣିବାର ସୁଯୋଗ ଏହି ଏକକରେ ରହିଛି ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ବାବାଜୀ -ଜଗନ୍ମୋହନ ଲାଲ୍ **କିମ୍ବା** ପରକଲମ – ଗୋପାଳ ଛୋଟରାୟ

୨ୟ ଏକକ : ସାଗରମନ୍ଥନ - ମନୋରଞ୍ଜନ ଦାସ **କିମ୍ବା** ଈଶ୍ୱର ଜଣେ ଯୁବକ – କାର୍ତ୍ତିକ ଚନ୍ଦ୍ର ରଥ

୩ୟ ଏକକ : ରାଜରାଣୀ ଉପାଖ୍ୟାନ – ନାରାୟଣ ସାହୁ **କିମ୍ବା** କୋକୁଆ – ବିଜୟ ଶତପଥୀ

୪ର୍ଥ ଏକକ : ଏକାଂକିକା-

ପାହାଡ଼ର ଆତ୍ମକଥା- ସୁରେନ୍ ମହାନ୍ତି ଏବଂ ଅନ୍ୟ ଏକ ଶ୍ରବଣକୁମାର - ରତ୍ନାକର ଚଇନି

କିମ୍ବା

ଭୁଖା - ମଙ୍ଗଳୁଚରଣ ବିଶ୍ୱାଳ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Books of references):

୧. ଓଡ଼ିଆ ନାଟକର ଇତିହାସ – ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୨. ଓଡ଼ିଆ ନାଟକର ଉଦ୍ଭବ ଓ ବିକାଶ – ରତ୍ନାକର ଚଇନି, ବୁକ୍ସ ଏଣ୍ଡ୍ ବୁକ୍ସ, କଟକ

୩. ଓଡ଼ିଆ ନାଟକର ବିକାଶଧାରା (୧ମ,୨ୟ.୩ୟ ଓ ୪ର୍ଥ ଖଣ୍ଡ) - ହେମନ୍ତ କୁମାର ଦାସ, ସାଥୀ ମହଲ, କଟକ

୪. ବିବର୍ତ୍ତିତ ଓଡ଼ିଆ ନାଟ୍ୟଧାରା ଓ ନାଟ୍ୟକାର ରତ୍ନାକର ଚଇନି – ରଶ୍ମିତା ତ୍ରିପାଠୀ, ସୃଜନ ଚକାଡୋଳା ଧାମ, ଭୁବନେଶ୍ୱର

୫. ମନୋରଞ୍ଜନ ଦାସଙ୍କ ନାଟ୍ୟ ଦିଗନ୍ତ – ସଂ. ନାରାୟଣ ସାହୁ, ନାଳନ୍ଦା, କଟକ-୧୯୯୨

ପାଠ୍ୟପୁସ୍ତକ(Text Books) :

୧. ବାବାଜୀ- ଜଗନ୍ମୋହନ ଲାଲ

୨. ସାଗରମନ୍ଥନ – ମନୋରଂଜନ ଦାସ

୩. ଭୁଖା- ମଙ୍ଗଳୁଚରଣ ବିଶ୍ୱାଳ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୪. ଈଶ୍ୱର ଜଣେ ଯୁବକ- କାର୍ତିକଚନ୍ଦ୍ର ରଥ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

୫. ପରକଲମ- ଗୋପାଳ ଛୋଟରାୟ

୬. କୋକୁଆ- ବିଜୟ କୁମାର ଶତପଥୀ, ଅଗ୍ରଦୂତ, କଟକ

୭. ରାଜରାଣୀ ଉପାଖ୍ୟାନ- ନାରାୟଣ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୮. ପାହାଡର ଆତ୍ମକଥା - ସୁରେନ୍ ମହାନ୍ତି

୯. ଅନ୍ୟ ଏକ ଶ୍ରବଣ କୁମାର – ରତ୍ନାକର ଚଇନି

ନମୂନା ପ୍ରଶ୍ନ (sample Questions):

୧.ସାଗର ମନ୍ଥନ ନାଟକଟି କେଉଁ ବିଶିଷ୍ଟ ଇଂରାଜୀ ନାଟକର ଛାୟାରେ ଲିଖିତ ? (୧ ମାର୍କ)

୨.ନାରାୟଣ ସାହୁଙ୍କ ଦୁଇଟି ବେତାର ନାଟକର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ଜଗନ୍ମୋହନ ଲାଲଙ୍କ ପଠିତ ନାଟକରୁ ବାବାଜୀ ଚରିତ୍ରର ବିଶେଷତ୍ୱ ଦର୍ଶାଅ । (୫ ମାର୍କ)

୪. ପରକଲମ ଏକ ବଳିଷ୍ଠ ରାଜନୀତିକ ନାଟକ – ଆଲୋଚନା କର । (୮ ମାର୍କ)

Core X **ଚତୁର୍ଥ ପର୍ଯ୍ୟାୟ (Semester-IV)**

ଓଡ଼ିଆ କଥାସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

କଥାସମ୍ରାଟ ଫକୀରମୋହନଙ୍କଠାରୁ ଆରମ୍ଭକରି ରାମଚନ୍ଦ୍ର ବେହେରାଙ୍କ ପର୍ଯ୍ୟନ୍ତ ଓଡ଼ିଆ କଥାସାହିତ୍ୟର ବୈଭବମୟ ବିକାଶ ସହିତ ବିଭିନ୍ନ ମୋଡ଼ଦେଇ ଆମର ଗଳ୍ପ ଓ ଉପନ୍ୟାସ କିପରି ଗତିକରି ଆସିଛି, ତାହା ଏହି ପାଠ୍ୟପତ୍ରରୁ ଉପଲବ୍ଧ ହେବ । କେତେଜଣ ପ୍ରତିନିଧିସ୍ଥାନୀୟ ଲେଖକଙ୍କ ରଚନାକୁ ଏହି ପତ୍ରରେ ଅଧ୍ୟୟନ କରି ଛାତ୍ରଛାତ୍ରୀ ଓଡ଼ିଆ ଗଳ୍ପ ଓ ଉପନ୍ୟାସ ସାହିତ୍ୟ ସମ୍ପର୍କରେ ଧାରଣା ଲାଭକରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଫକୀରମୋହନଙ୍କ 'ଲଛମା' ଏକ ସ୍ମରଣୀୟ ଐତିହାସିକ ଉପନ୍ୟାସ । ଓଡ଼ିଶାରେ ବର୍ଗୀ ଅତ୍ୟାଚାରର ବିଷୟ ଏଥିରେ ସମନ୍ୱିତ । ସେହିପରି କାଳିନ୍ଦୀ ଚରଣଙ୍କ 'ଆଜିର ମଣିଷ' ଉପନ୍ୟାସରେ ଭାରତ ସ୍ୱାଧୀନତାକାଳୀନ ବିବିଧ ଘଟଣାବଳୀର ପ୍ରତିବିମ୍ବ କିପରି ଉଦ୍ଭାସିତ, ତାହା ଛାତ୍ରଛାତ୍ରୀ ଅଧ୍ୟୟନ ମାଧ୍ୟମରେ ଜାଣିପାରିବେ ।

୨ୟ ଏକକ : ଗୋପୀନାଥ ମହାନ୍ତିଙ୍କ 'ଦାଦିବୁଢ଼ା' ହେଉ ବା ସୁରେନ୍ଦ୍ର ମହାନ୍ତିଙ୍କର 'କାଳାନ୍ତର', ଉଭୟରେ ଯଥାକ୍ରମେ ଓଡ଼ିଶାର ଆଦିବାସୀ ଜନଜୀବନ ଓ ପ୍ରାକୃତିକ ବିପର୍ଯ୍ୟୟର ସଂକେତ ନିହିତ । ଆମ ଉପନ୍ୟାସ ସାହିତ୍ୟରେ ସାମାଜିକ ବାସ୍ତବତାର ଲକ୍ଷଣକୁ ଛାତ୍ରଛାତ୍ରୀ ଅବଶ୍ୟ ଅଧ୍ୟୟନ ମାଧ୍ୟମରେ ଜାଣିପାରିବେ ।

୩ୟ ଏକକ : ରେବତୀ, ଏବେ ମଧ୍ୟ ବଞ୍ଚିଛି, ଶିକାର ଓ ଡିମିରିଫୁଲ ଓଡ଼ିଆ ସାହିତ୍ୟର ଚାରିଗୋଟି ଲୋକପ୍ରିୟ ଗଳ୍ପ । ଏଥିରୁ ଶିକ୍ଷାବ୍ୟବସ୍ଥା, ଦେଶପ୍ରେମ ଓ ଓଡ଼ିଆ ଜାତିର ସ୍ୱାଭିମାନ ସହିତ ମାର୍କ୍ସବାଦୀ ଚେତନା ଓ ମାନବୀୟ ମନସ୍ତତ୍ତ୍ୱର ନିଖୁଣ ଚିତ୍ର ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହୋଇପାରିବେ ।

୪ର୍ଥ ଏକକ : ରଚନାର ପରିମାଣ ଓ ଗୁଣବତ୍ତା ଦୃଷ୍ଟିରୁ ମନୋଜ ଦାସ, ଶାନ୍ତନୁ ଆଚାର୍ଯ୍ୟ, ବୀଣାପାଣି ମହାନ୍ତି ଓ ରାମଚନ୍ଦ୍ର ବେହେରାଙ୍କ ଗଳ୍ପ ଓଡ଼ିଆ ସାହିତ୍ୟକୁ ରଦ୍ଧିମନ୍ତ କରିଛି । ସେମାନଙ୍କର ଏକ ଏକ ଗଳ୍ପ ପଠନଦ୍ୱାରା ଶିକ୍ଷାର୍ଥୀମାନେ ଓଡ଼ିଆ ଗଳ୍ପ ସାହିତ୍ୟର ସାମଗ୍ରିକ ମୂଲ୍ୟବୋଧକୁ ଆକଳନ କରି ପାରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଲଛମା – ଫକୀର ମୋହନ ସେନାପତି **କିମ୍ବା** ଆଜିର ମଣିଷ - କାଳିନ୍ଦୀ ଚରଣ ପାଣିଗ୍ରାହୀ

୨ୟ ଏକକ : ଦାଦିବୁଢ଼ା - ଗୋପୀନାଥ ମହାନ୍ତି **କିମ୍ବା** କାଳାନ୍ତର- ସୁରେନ୍ଦ୍ର ମହାନ୍ତି

୩ୟ ଏକକ : ରେବତୀ –ଫକୀରମୋହନ ସେନାପତି, ଏବେ ମଧ୍ୟ ବଂଚିଛି–ଗୋଦାବରୀଶ ମହାପାତ୍ର,
ଶିକାର - ଭଗବତୀ ଚରଣ ପାଣିଗ୍ରାହୀ, ଡିମିରି ଫୁଲ- ଅଖିଳ ମୋହନ ପଟ୍ଟନାୟକ

୪ର୍ଥ ଏକକ : କ) ସୁନା ମେଡାଲ - ମନୋଜ ଦାସ
ଖ) କଳାପର୍ଦ୍ଦାର ଆରପଟେ- ଶାନ୍ତନୁ କୁମାର ଆଚାର୍ଯ୍ୟ
ଗ) ପାଟଦେଇ- ବୀଣାପାଣି ମହାନ୍ତି

ଘ) ଗୋପପୁର- ରାମଚନ୍ଦ୍ର ବେହେରା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ଓଡ଼ିଆ ଉପନ୍ୟାସ ସାହିତ୍ୟର ପରିଚୟ – ପଠାଣି ପଟ୍ଟନାୟକ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

୨. କଥାଶିଳ୍ପୀ ମନୋଜ ଦାସ - ଶତ୍ରୁଘ୍ନ ପାଣ୍ଡବ

୩. ଓଡ଼ିଆ ଗଳ୍ପର ଗତି ଓ ପ୍ରକୃତି – ବୈଷ୍ଣବ ଚରଣ ସାମଲ – ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୪. ଶହେ ପଚିଶ ବର୍ଷର ଆଧୁନିକ ଓଡ଼ିଆ କ୍ଷୁଦ୍ରଗଳ୍ପ : ଏକ ତାତ୍ତ୍ୱିକ ବିଶ୍ଳେଷଣ –ଡକ୍ଟର କବିତା ବାରିକ, ବିଦ୍ୟାପୁରୀ, କଟକ

୫. ଗୋପୀନାଥ ମହାନ୍ତିଙ୍କ କଥା ସାହିତ୍ୟର ବ୍ୟାପ୍ତି ଓ ଦୀପ୍ତି - ସଂ. ବିଜୟ କୁମାର ଶତପଥୀ, ଲିପି ହେମ୍ବ୍ରମ୍, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ

୬. ଗୋପୀନାଥ ମହାନ୍ତି ସ୍ରଷ୍ଟା ମାନସ – ସାରଳା ସାହିତ୍ୟ ସଂସଦ, କଟକ

୭. ରାମଚନ୍ଦ୍ର ବେହେରାଙ୍କ କଥାସାହିତ୍ୟରେ ସ୍ଥାପତ୍ୟ ଓ ବୈଚିତ୍ର୍ୟ - ଗିରୀଶ ଚନ୍ଦ୍ର ସାହୁ, ବିଦ୍ୟାପୁରୀ, କଟକ

୮. ସାହିତ୍ୟସାଧକ ଶାନ୍ତନୁ କୁମାର ଆଚାର୍ଯ୍ୟ- ସଂ. ବାଉରୀବନ୍ଧୁ କର, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ

ପାଠ୍ୟପୁସ୍ତକ(Text Books):

୧. ଦାଦିବୁଢ଼ା - ଗୋପୀନାଥ ମହାନ୍ତି,

୨. ଗୋପପୁର -ରାମଚନ୍ଦ୍ର ବେହେରା

୩. ମନୋଜ ପଂଚବିଂଶତି - ମନୋଜ ଦାସ

୪. କଳାପର୍ଦ୍ଦାର ଆରପଟେ - ଶାନ୍ତନୁ କୁମାର ଆଚାର୍ଯ୍ୟ

୫. ଆଜିର ମଣିଷ - କାଳିନ୍ଦୀ ଚରଣ ପାଣିଗ୍ରାହୀ

୬. କାଳାନ୍ତର - ସୁରେନ୍ଦ୍ର ମହାନ୍ତି

୭. ଲଛମା - ଫକୀରମୋହନ ସେନାପତି

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ଲଛମା ଉପନ୍ୟାସଟି କେଉଁ ମସିହାରେ ପ୍ରକାଶିତ ? (୧ ମାର୍କ)

୨. ସୁରେନ୍ଦ୍ର ମହାନ୍ତିଙ୍କ ଦୁଇଟି ଐତିହାସିକ ଉପନ୍ୟାସର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ଏବେ ମଧ୍ୟ ବଞ୍ଚିଛି ଗଳ୍ପରେ ଓଡ଼ିଆ ଜାତିର ସ୍ୱାଭିମାନ କିପରି ଫୁଟିଛି ଦର୍ଶାଅ ? (୫ ମାର୍କ)

୪. ନାରୀ ନିର୍ଯ୍ୟାତନାର ପୃଷ୍ଠଭୂମିରେ ରଚିତ ପାଟଦେଈ ଗଳ୍ପର ସାହିତ୍ୟିକ ମୂଲ୍ୟ ନିର୍ଦ୍ଧାରଣ କର । (୮ ମାର୍କ)

Core XI ପଞ୍ଚମ ପର୍ଯ୍ୟାୟ (Semester-V)

ଆଧୁନିକ ଓଡ଼ିଆ ଗଦ୍ୟସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଜୀବନୀ, ଆତ୍ମଜୀବନୀ, ଭ୍ରମଣ କାହାଣୀ, ପ୍ରବନ୍ଧ, ରମ୍ୟ ରଚନା ଆଦି ଓଡ଼ିଆ ଗଦ୍ୟସାହିତ୍ୟର ବିଭିନ୍ନ ରୂପକୁ ଚିହ୍ନିବା ପାଇଁ ଏହି ପତ୍ରଟି ପରିକଳ୍ପିତ । ଛାତ୍ରଛାତ୍ରୀମାନେ ବିଭିନ୍ନ ରୂପର ଗଦ୍ୟସାହିତ୍ୟର ବିବିଧ ରଚନା ଅଧ୍ୟୟନ କଲେ ଓଡ଼ିଆ ଗଦ୍ୟର ସମୃଦ୍ଧ ଧାରାକୁ ଉପଲବ୍ଧି କରିପାରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଏହି ଏକକରେ ଓଡ଼ିଆ ସାହିତ୍ୟର ଗୋଟିଏ ପ୍ରସିଦ୍ଧ ଆତ୍ମଜୀବନୀ ଅଥବା ଏକ ବିଶିଷ୍ଟ ଜୀବନୀର କିୟଦଂଶ ଅଧ୍ୟୟନ କରିବାର ସୁଯୋଗ ରହିଛି । 'ମୋ ସମୟର ଓଡ଼ିଶା' ରେ ପ୍ରାବନ୍ଧିକ କୃଷ୍ଣଚନ୍ଦ୍ରଙ୍କ ଜୀବନକଥା ସହିତ ସମକାଳୀନ ଓଡ଼ିଶାର ପ୍ରାଣସ୍ପନ୍ଦନ ତଥା 'ଗାନ୍ଧୀ ମଣିଷ' ରେ ଜାତିର ପିତା ମହାତ୍ମାଜୀଙ୍କ ଜୀବନର ବାର୍ତ୍ତା ଛାତ୍ରଛାତ୍ରୀଙ୍କ ପାଖକୁ ପହଞ୍ଚିପାରିବ ।

୨ୟ ଏକକ : ଓଡ଼ିଆ ଭ୍ରମଣକାହାଣୀର ବିଦେଶାନୁଭୂତିକୁ 'ପଶ୍ଚିମ ଆଫ୍ରିକାରେ ଓଡ଼ିଆ ଢେଙ୍କି' ଅଥବା 'ଆମେରିକା ଅନୁଭୂତି ' ଭ୍ରମଣ କାହାଣୀ ମାଧ୍ୟମରେ ଜାଣିବାର ଅବକାଶ ରହିଛି ଏହି ଏକକରେ ।

୩ୟ ଏକକ : ଓଡ଼ିଆ ଗଦ୍ୟ ସାହିତ୍ୟରେ ରମ୍ୟରଚନାର ସ୍ଥାନ ସ୍ୱତନ୍ତ୍ର । ଗୋପାଳଚନ୍ଦ୍ର ପ୍ରହରାଜ ଓ ନିତ୍ୟାନନ୍ଦ ମହାପାତ୍ର ଦୁଇଜଣ ରମ୍ୟରଚନାର ରଚୟିତା । ତାଙ୍କର ଏକ ଏକ ସ୍ମରଣୀୟ ରମ୍ୟରଚନାର କିୟଦଂଶ ପାଠକରି ଛାତ୍ରଛାତ୍ରୀ ଓଡ଼ିଆ ରମ୍ୟରଚନା ଅବଶ୍ୟ ଉପଲବ୍ଧି କରିପାରିବେ ।

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ସାହିତ୍ୟ ସମ୍ପର୍କରେ ବିଶେଷ ଧାରଣା ସୃଷ୍ଟି କରିବାପାଇଁ 'ଆର୍ଯ୍ୟ ଜୀବନ,' 'ମଧୁସନ୍ଧାନ ' ଏବଂ 'ଭଗବାନ ଓ ଓଡ଼ିଆ ଜାତି' ପ୍ରବନ୍ଧ ଉପଯୋଗୀ ହେବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ମୋ ସମୟର ଓଡ଼ିଶା (ପ୍ରଥମ ଛଅଟି ପରିଚ୍ଛେଦ- ୮୬ ପୃଷ୍ଠା ପର୍ଯ୍ୟନ୍ତ)—କୃଷ୍ଣଚନ୍ଦ୍ର ପାଣିଗ୍ରାହୀ

କିମ୍ବା ଗାନ୍ଧୀ ମଣିଷ (ପ୍ରଥମ ଦଶଟି ପରିଚ୍ଛେଦ, ୫୫ ପୃଷ୍ଠା ପର୍ଯ୍ୟନ୍ତ)- ଶରତ କୁମାର ମହାନ୍ତି

୨ୟ ଏକକ : ପଶ୍ଚିମ ଆଫ୍ରିକାରେ ଓଡ଼ିଆ ଢେଙ୍କି- ଭୁବନେଶ୍ୱର ବେହେରା (ଭ୍ରମଣକାହାଣୀ)

କିମ୍ବା ଆମେରିକା ଅନୁଭୂତି - ଗୋଲୋକ ବିହାରୀ ଧଳ (ଭ୍ରମଣକାହାଣୀ)

୩ୟ ଏକକ : ଭାଗବତ ଟୁଙ୍ଗୀରେ ସନ୍ଧ୍ୟା (ପ୍ରଥମ ଚାରୋଟି ସନ୍ଧ୍ୟା)- ଗୋପାଳ ଚନ୍ଦ୍ର ପ୍ରହରାଜ

କିମ୍ବା ପତ୍ର ଓ ପ୍ରତିମା (ପ୍ରଥମ ଚାରୋଟି ରଚନା)- ନିତ୍ୟାନନ୍ଦ ମହାପାତ୍ର

୪ର୍ଥ ଏକକ : ପ୍ରବନ୍ଧ ସାହିତ୍ୟ – କ) ଆର୍ଯ୍ୟଜୀବନ – ନୀଳକଣ୍ଠ ଦାସ

ଖ) ମଧୁସଂଧାନ – ଚନ୍ଦ୍ରଶେଖର ରଥ

ଗ) ଭଗବାନ ଓ ଓଡ଼ିଆ ଜାତି - ଚିତ୍ତ ରଞ୍ଜନ ଦାସ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ଜୀବନୀ ସାହିତ୍ୟ ଏକ ଅଧ୍ୟୟନ – ପଠାଣି ପଟ୍ଟନାୟକ, ଓଡ଼ିଶା ପା.ପୁ.ପ୍ର ଓ ପ୍ରକାଶନ ସଂ, ଭୁବନେଶ୍ୱର

୨. ସମାଲୋଚନାର ଦିଗ ଦିଗନ୍ତ- ଖଗେଶ୍ୱର ମହାପାତ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୩. ସାହିତ୍ୟ ଓ ସମାଲୋଚନା – କୁଞ୍ଜବିହାରୀ ଦାଶ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର୍, କଟକ

୪. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ସାହିତ୍ୟର ଇତିହାସ – ଅସିତ୍ କବି, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ

୫. ଓଡ଼ିଆ ଆତ୍ମଜୀବନୀ ସମୀକ୍ଷଣ- ଅଜାମ୍ବର ମଲ୍ଲ- ବିଜୟିନୀ ପବ୍ଲିକେଶନ୍ସ, କଟକ

୬. ଗୋପାଳ ଚନ୍ଦ୍ର ପ୍ରହରାଜଙ୍କ ଦୁଷ୍ପ୍ରାପ୍ୟ ରଚନାବଳୀ- କଇଳାଶ ପଟ୍ଟନାୟକ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

ପାଠ୍ୟପୁସ୍ତକ(Text Books):

୧. ମୋ ସମୟର ଓଡ଼ିଶା- କୃଷ୍ଣଚନ୍ଦ୍ର ପାଣିଗ୍ରାହୀ, କିତାବ ମହଲ, କଟକ

୨. ଗାନ୍ଧୀ ମଣିଷ- ଶରତ କୁମାର ମହାନ୍ତି, ମିତାବୁକ୍ସ, କଟକ

୩. ପଶ୍ଚିମ ଆଫ୍ରିକାରେ ଓଡ଼ିଆ ଢେଙ୍କି – ଭୁବନେଶ୍ୱର ବେହେରା, କଟକ ଷ୍ଟୁଡେଣ୍ଟସ୍ ଷ୍ଟୋର, କଟକ

୪. ଆମେରିକା ଅନୁଭୂତି- ଗୋଲୋକ ବିହାରୀ ଧଳ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୫. ପତ୍ର ଓ ପ୍ରତିମା- ନିତ୍ୟାନନ୍ଦ ମହାପାତ୍ର

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧.'ମୋ ସମୟର ଓଡ଼ିଶା' ଆତ୍ମଜୀବନୀରେ କେତେ ଗୋଟି ପରିଚ୍ଛେଦ ରହିଛି ? (୧ ମାର୍କ)

୨. ଆମେରିକା ଅନୁଭୂତି ଓ ପଶ୍ଚିମ ଆଫ୍ରିକାରେ ଓଡ଼ିଆ ଢେଙ୍କି ଭ୍ରମଣ କାହାଣୀ ଦ୍ୱୟର ରଚନାକାଳ ଲେଖ । (୨ ମାର୍କ)

୩. ଭାଗବତ ଟୁଙ୍ଗୀରେ ସନ୍ଧ୍ୟାର ମର୍ମବାଣୀ ଉଲ୍ଲେଖ କର । (୫ ମାର୍କ)

୪. ସଂକୀର୍ଣ୍ଣତା ନୁହେଁ, ଉଦାରତା ହିଁ ପ୍ରକୃତ ଧର୍ମୀୟ ଆଭିମୁଖ୍ୟ ହେବା ଆବଶ୍ୟକ - ଭଗବାନ ଓ ଓଡ଼ିଆ ଜାତି ପ୍ରବନ୍ଧରୁ ଏହାର ଯଥାର୍ଥତା ପ୍ରତିପାଦନ କର । (୮ ମାର୍କ)

Core XII ପଞ୍ଚମ ପର୍ଯ୍ୟାୟ (Semester-V)

ଓଡ଼ିଆ ଲୋକସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଲୋକସାହିତ୍ୟ ହିଁ ବିଦଗ୍ଧ ସାହିତ୍ୟର ଜନନୀ । ଓଡ଼ିଶାର ଲୋକସାହିତ୍ୟ ବହୁମୁଖୀ ଓ ବିଭବଶାଳୀ । ଏଥିରେ ଲୋକ ଜୀବନର ପ୍ରାଣବାଣୀ ପ୍ରସ୍ଫୁଟିତ । ଏହି ପତ୍ର ଅଧ୍ୟୟନ ମାଧ୍ୟମରେ ଛାତ୍ରଛାତ୍ରୀମାନେ ତାହା ଅବଗତ ହୋଇପାରିବେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଓଡ଼ିଶାରେ ପ୍ରଚଳିତ ପ୍ରବାଦ ଓ ପ୍ରବଚନ, ଢଗଢମାଳି, ଛଟା ଆଦିର ତାତ୍ତ୍ୱିକ ଦିଗ ଓ ତା'ର ପ୍ରାୟୋଗିକ ମୂଲ୍ୟ ଏହି ଏକକରୁ ଉପଲବ୍ଧ ହେବ ।

୨ୟ ଏକକ : ଓଡ଼ିଆ ଲୋକଗୀତର ସ୍ୱରୂପ, ରୂପଭେଦ ଓ ପ୍ରାଚୁର୍ଯ୍ୟ ବିଷୟରେ ଅବଗତ ହେବାପାଇଁ ଏହି ଏକକ ସହାୟକ ହେବ ।

୩ୟ ଏକକ : ଓଡ଼ିଆ ଲୋକକାହାଣୀର ଧାରା ଯେପରି ପ୍ରାଚୀନ ସେହିପରି ମନୋଜ୍ଞ । ଏହି ଏକକରେ ଲୋକକାହାଣୀର ବିବିଧତା ଓ ମହତ୍ତ୍ୱ ଉପଲବ୍ଧ ହେବ ।

୪ର୍ଥ ଏକକ : ଓଡ଼ିଶାର ବିଭିନ୍ନ ଅଞ୍ଚଳରେ ଭିନ୍ନଭିନ୍ନ ଲୋକନାଟକ ପ୍ରଚଳିତ । ଲୋକନାଟକର ସଂଜ୍ଞା ସ୍ୱରୂପ ସହ ଓଡ଼ିଆ ଲୋକନାଟକ ବିଷୟରେ ଜାଣିବା ପାଇଁ ଏହି ଏକକର ପାଠ୍ୟ ଖସଡ଼ା ସୁଯୋଗ ସୃଷ୍ଟି କରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଓଡ଼ିଆ ଲୋକବାଣୀର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ
(ପ୍ରବାଦ, ପ୍ରବଚନ, ଛଟା, ଢଗଢମାଳି, ନାଁଦିଆ)

୨ୟ ଏକକ : ଓଡ଼ିଆ ଲୋକଗୀତର ସଂଜ୍ଞା, ସ୍ୱରୂପ, ପ୍ରକାରଭେଦ ଓ ବିଭିନ୍ନ ଦିଗ

୩ୟ ଏକକ : ଓଡ଼ିଆ ଲୋକକାହାଣୀର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଲୋକନାଟକର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ (ପାଲା, ଦାସକାଠିଆ, ପ୍ରହ୍ଲାଦ ନାଟକ, ଦଣ୍ଡନାଚ, ଛଉନାଚ, ଲୀଳା, ଡାଲଖାଇ, କରମା)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Book of reference) :

୧. ଓଡ଼ିଆ ଲୋକଗୀତ ଓ କାହାଣୀ : କୁଞ୍ଜବିହାରୀ ଦାଶ, ବିଶ୍ୱଭାରତୀ ଗବେଷଣା ପ୍ରକାଶନ, ଶାନ୍ତିନିକେତନ

୨. ଲୋକଧାରା, ଲୋକସଂସ୍କୃତି ଓ ଲୋକସାହିତ୍ୟ – କୁମୁଦ ରଞ୍ଜନ ପାଣିଗ୍ରାହୀ, ସୁଖଦୁଃଖ ପବ୍ଲିକେଶନ୍ସ, ସମ୍ବଲପୁର

୩. ଓଡ଼ିଆ ଲୋକସାହିତ୍ୟ ଓ ଲୋକସଂସ୍କୃତି – କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ବିଦ୍ୟାପୁରୀ, କଟକ

୪. ଲୋକସାହିତ୍ୟ ତତ୍ତ୍ୱ – ଶ୍ୟାମସୁନ୍ଦର ମହାପାତ୍ର, ଓଡ଼ିଆ ବୁକ୍ ଷ୍ଟୋର, କଟକ

୫. ଲୋକସଂସ୍କୃତି ଓ ଲୋକସାହିତ୍ୟ – ନାରାୟଣ ସାହୁ, ବିଜୟ ପ୍ରକାଶନ, କଟକ

୬. ଓଡ଼ିଶାର ଦଣ୍ଡନାଟ – ସନ୍ତୋଷ କୁମାର ଶତପଥୀ, କେଦାର ପ୍ରିଣ୍ଟିଂ ପ୍ରେସ୍, ଭୁବନେଶ୍ୱର

୭. ଓଡ଼ିଆ ଲୋକନାଟକ – କଳଚୁରାଲ ଏକାଡ଼େମୀ, ରାଉରକେଲା

୮. ଓଡ଼ିଆ ଲୋକନାଟକ – ହେମନ୍ତ କୁମାର ଦାସ, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ

୯. ଓଡ଼ିଆ ଲୋକସାହିତ୍ୟ ଓ ଲୋକସଂସ୍କୃତି – ଅଜୟ କୁମାର ମିଶ୍ର, ବିଜୟିନୀ ପବ୍ଲିକେଶନସ୍

୧୦. ଓଡ଼ିଆ ଲୋକନାଟ୍ୟ ପରମ୍ପରା ଓ ପ୍ରହ୍ଲାଦ ନାଟକ– ଶାନ୍ତନୁ ରଥ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

୧୧. ପଶ୍ଚିମ ଓଡ଼ିଶାର ଲୋକନୃତ୍ୟ - ସଂ. ଦ୍ୱାରିକାନାଥ ନାୟକ, ବିଶ୍ୱ ବୁକ୍ସ/ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

ନମୁନା ପ୍ରଶ୍ନ(Sample Questions):

୧. ଓଡ଼ିଆ ଲୋକଗୀତ ଓ କାହାଣୀ ପୁସ୍ତକର ରଚୟିତା କିଏ ? (୧ ମାର୍କ)

୨. ଓଡ଼ିଆ କାନ୍ଦଣା ଗୀତର ଦୁଇଗୋଟି ଲକ୍ଷଣ ଲେଖ । (୨ ମାର୍କ)

୩. ଓଡ଼ିଆ ଲୋକକାହାଣୀର ଆରମ୍ଭ ଓ ଉପସଂହାର କିପରି ହୋଇଥାଏ, ଦର୍ଶାଅ । (୫ ମାର୍କ)

୪. ଦକ୍ଷିଣ ଓଡ଼ିଶାର ପ୍ରହ୍ଲାଦ ନାଟକ ଉପରେ ଆଲୋଚନାକର । (୮ ମାର୍କ)

Core XIII ପଞ୍ଚମ ପର୍ଯ୍ୟାୟ (Semester-V)

ଓଡ଼ିଆ ଭାଷା ଓ ଲିପିର ଐତିହାସିକ ବିବର୍ତ୍ତନ

Course Outcome (ପାଠ୍ୟକ୍ରମ ଫଳଶ୍ରୁତି) :

ଓଡ଼ିଆ ଭାଷା ଓ ଲିପିର ଉନ୍ମେଷ ଏବଂ ବିକାଶ ପ୍ରସଙ୍ଗ ଅବଗତହେବା ପାଇଁ ଶଂସିତ ପାଠ୍ୟପତ୍ରଟି ଉଦ୍ଦିଷ୍ଟ । ମୌଖିକ ସ୍ତରରୁ ଭାଷା ଲିଖିତ ସ୍ତରକୁ ଉନ୍ନୀତହେବା ପାଇଁ ଲୋଡ଼ାହୁଏ ଲିପି । ଓଡ଼ିଆ ଏକ ସମ୍ବିଧାନ ସ୍ୱୀକୃତ ଶାସ୍ତ୍ରୀୟ ଭାଷା । ତାହାର ଉଦ୍ଭବ ସହିତ ବିକାଶପର୍ବ ଓ ଓଡ଼ିଆ ଲିପିର ଐତିହାସିକ ବିବର୍ତ୍ତନଧାରା ସମ୍ବନ୍ଧରେ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତହେବାର ସୁଯୋଗ ଏଠାରେ ରହିଛି ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ପୃଥିବୀର ଭାଷା ପରିବାର ମଧ୍ୟରୁ କିପରି ଓଡ଼ିଆ ଭାଷାର ଉନ୍ମେଷ ଘଟିଛି ଏବଂ କାଳକ୍ରମେ ବିକାଶ ଲାଭ କରିଛି, ଶିକ୍ଷାର୍ଥୀମାନେ ତାହା ଏଠାରେ ଉପଲବ୍ଧି କରିପାରିବେ ।

୨ୟ ଏକକ : ଭାରତୀୟ ଲିପି ତତ୍ତ୍ୱ ସହିତ ଓଡ଼ିଆ ଲିପିର ଉଦ୍ଭବ ଓ ବିବର୍ତ୍ତନ ଜାଣିବା ନିମିତ୍ତ ଏହି ଏକକଟି ସଂଯୋଜିତ ।

୩ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ସର୍ବପ୍ରାଚୀନ ଲିଖିତରୂପକୁ ଜାଣିବା ନିମିତ୍ତ ଓଡ଼ିଆ ଅଭିଲେଖକୁ ଅନୁଧ୍ୟାନକରିବା ଆବଶ୍ୟକ । ସୁତରାଂ ଏହି ଏକକରେ ଶିଳାଲେଖ, ତାମ୍ରଫଳକ ଓ ପ୍ରାଚୀନ ସନନ୍ଦଗୁଡ଼ିକ ଉପରେ ଚର୍ଚ୍ଚାର ଅବକାଶ ରହିଛି ।

୪ର୍ଥ ଏକକ : ସାହିତ୍ୟ-କଳା ଦୃଷ୍ଟିରୁ ଚର୍ଯ୍ୟାପଦ ହିଁ ଲିଖିତ ସାହିତ୍ୟର ଆଦିମତମ ରୂପ । ଏହି ଚର୍ଯ୍ୟାପଦ ଓ ସାରଳା ସାହିତ୍ୟର ଭାଷାଗତ ବିଶେଷତ୍ୱ ଛାତ୍ରଛାତ୍ରୀ ଏହି ଏକକରେ ଉପଲବ୍ଧି କରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ଉଦ୍ଭବ ଓ ବିକାଶକ୍ରମ

୨ୟ ଏକକ : ଓଡ଼ିଆ ଲିପିର ଐତିହାସିକ ବିବର୍ତ୍ତନ

୩ୟ ଏକକ : ଓଡ଼ିଆ ଅଭିଲେଖର ଭାଷା (ଶିଳାଲେଖ, ତାମ୍ରଲେଖ, ପ୍ରାଚୀନ ସନନ୍ଦ)

୪ର୍ଥ ଏକକ : ଚର୍ଯ୍ୟାପଦ ଓ ସାରଳା ସାହିତ୍ୟର ଭାଷା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ଓଡ଼ିଆ ଭାଷାର ଉନ୍ମେଷ ଓ ବିକାଶ - ବାସୁଦେବ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୨. ଓଡ଼ିଆ ଧ୍ୱନିତତ୍ତ୍ୱ ଓ ଶବ୍ଦସମ୍ଭାର – ଧନେଶ୍ୱର ମହାପାତ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୩. ଓଡ଼ିଆ ଭାଷା ଓ ଲିପିର କ୍ରମବିକାଶ – କୁଞ୍ଜବିହାରୀ ତ୍ରିପାଠୀ, ଓ.ରା.ପା. ପୁ. ପ୍ର ଓ ପ୍ର.ସଂସ୍ଥା. ଭୁବନେଶ୍ୱର ।

୪. ଭାଷାତତ୍ତ୍ୱର ରୂପଚିତ୍ର - ନଟବର ଶତପଥୀ, ବିଜୟିନୀ ପବ୍ଲିକେଶନ, କଟକ ।

୫. ସାରଳା ମହାଭାରତର ଭାଷାତାତ୍ତ୍ୱିକ ଅନୁଶୀଳନ – ଧନେଶ୍ୱର ମହାପାତ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୬. ପ୍ରାଚୀନ ଓଡ଼ିଆ ଗଦ୍ୟ : ସରୂପ ଓ ସମ୍ଭାର - ହରପ୍ରସାଦ ମିଶ୍ର, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ, କଟକ ।

୭. ଭିନ୍ନ ସମୟ ଭିନ୍ନଦୃଷ୍ଟି(ଜଗନ୍ନାଥ ମନ୍ଦିରର ଦୁଇଟି ଶିଳାଲେଖ) - ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ

୮. ଓଡ଼ିଆ ଭାଷାର ଉତ୍ପତ୍ତି ଓ କ୍ରମବିକାଶ - ବଂଶୀଧର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୯. ଓଡ଼ିଆ ଭାଷାର ଇତିହାସ- ବିନାୟକ ମିଶ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୧୦. ଓଡ଼ିଆ ଭାଷାର ସୃଷ୍ଟି ଓ ବିକାଶ-ଉପେନ୍ଦ୍ର ପ୍ରସାଦ ଦଳାଇ, ଏ.କେ ମିଶ୍ର, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ପ୍ରଥମ ଓଡ଼ିଆ ଶିଳାଲେଖର ନାମ ଲେଖ । (୧ ମାର୍କ)

୨. ଓଡ଼ିଆ ଲିପି କେଉଁ ପ୍ରାଚୀନ ଲିପିର ବିବର୍ତ୍ତିତ ରୂପ ? (୨ ମାର୍କ)

୩. ଓଡ଼ିଆ ଶିଳାଲେଖର ଭାଷାଗତ ବିଶେଷତ୍ୱ ସୂଚାଅ । (୫ ମାର୍କ)

୪. ସାରଳା ସାହିତ୍ୟରୁ ପ୍ରାଚୀନ ଓଡ଼ିଆ ଭାଷାର ସ୍ୱରୂପ ଦର୍ଶାଅ । (୮ ମାର୍କ)

Core XIV **ଷଷ୍ଠ ପର୍ଯ୍ୟାୟ (Semester-VI)**

ଓଡ଼ିଆ ଭାଷା : ଧ୍ୱନିତତ୍ତ୍ୱ, ଶବ୍ଦ ସମ୍ଭାର, ଅନ୍ୟ ଭାଷାର ପ୍ରଭାବ ଓ ଶାସ୍ତ୍ରୀୟତା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଶାସ୍ତ୍ରୀୟ ଓଡ଼ିଆ ଭାଷାର ଶବ୍ଦଗତ ଓ ଧ୍ୱନି ତାତ୍ତ୍ୱିକ ଗୁରୁତ୍ୱ ଉପଲବ୍ଧି କରିବା ପାଇଁ ଏହି ପତ୍ରଟି ଗଠିତ । ସେହିପରି ତତ୍ସମ, ତଦ୍ଭବ, ଦେଶଜ, ବୈଦେଶିକ ଆଦି ଶବ୍ଦ ସମ୍ଭାରରେ ଓଡ଼ିଆ ଭାଷା କିପରି ପରିପୁଷ୍ଟ ଏବଂ ଅନ୍ୟ ଭାଷାର ପ୍ରଭାବରେ ଏହା କିପରି ରଦ୍ଧିମନ୍ତ, ତାହା ଛାତ୍ରଛାତ୍ରୀମାନେ ଜାଣି ରଖିବା ଆବଶ୍ୟକ । ଭାଷାର ଶାସ୍ତ୍ରୀୟତା ପ୍ରସଙ୍ଗ ମଧ୍ୟ ଶିକ୍ଷାର୍ଥୀଙ୍କ ପାଇଁ ଉପଯୋଗୀ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଧ୍ୱନିର ସଂଜ୍ଞା ଓ ବର୍ଗୀକରଣ ସହିତ ଆମ ଭାଷାର ଧ୍ୱନିତତ୍ତ୍ୱ ଉପରେ ଶିକ୍ଷାର୍ଥୀ ଏଠାରେ ଜ୍ଞାନଲାଭ କରିପାରିବେ । ଭାଷାର ବିବିଧ ଶବ୍ଦ ସମ୍ଭାର ମଧ୍ୟ ଶିକ୍ଷାର୍ଥୀଙ୍କ ଜ୍ଞାତବ୍ୟ ବିଷୟ ।

୨ୟ ଏକକ : ମାନକ ଓଡ଼ିଆ ଭାଷା ସହିତ ଓଡ଼ିଶାରେ ତାହାର ଅନେକ ଆଞ୍ଚଳିକ ରୂପ ବିଷୟରେ ଏହି ଏକକ ଧାରଣା ପ୍ରଦାନ କରିବ ।

୩ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷା ଉପରେ ଭିନ୍ନଭିନ୍ନ ଭାଷାର ପ୍ରଭାବ ସ୍ୱୀକାର୍ଯ୍ୟ । ତନ୍ମଧ୍ୟରୁ ଦ୍ରାବିଡ଼, ଯାବନିକ ଓ ଇଂରାଜୀ ଭାଷାର ପ୍ରଭାବ ସମ୍ପର୍କରେ ଏହି ଏକକରୁ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହେବେ ।

୪ର୍ଥ ଏକକ : ଭାରତର ୬ଷ୍ଠ ଶାସ୍ତ୍ରୀୟ ଭାଷା ରୂପେ ଓଡ଼ିଆ ଭାଷା ଗୌରବ ଅର୍ଜ୍ଜନ କରିଛି । ତାହାର ପ୍ରାଚୀନ ଐତିହ୍ୟ ଓ ଭାଷାଗତ ମର୍ଯ୍ୟାଦାକୁ ଅବଗତ ହେବା ସହିତ ତାର ଶାସ୍ତ୍ରୀୟ ମାନ୍ୟତା ବିଷୟରେ ଏହି ଏକକ ଛାତ୍ରଛାତ୍ରୀମାନଙ୍କୁ ପରିଚିତ କରାଇବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : କ) ଓଡ଼ିଆ ଧ୍ୱନି ତତ୍ତ୍ୱ (ଧ୍ୱନିର ସଂଜ୍ଞା ଓ ବର୍ଗୀକରଣ)
ଖ) ଶବ୍ଦ ସମ୍ଭାର (ତତ୍ସମ, ତଦ୍ଭବ, ଦେଶଜ ଓ ବୈଦେଶିକ)

୨ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ଆଂଚଳିକ ରୂପ(ଉତ୍ତରାଞ୍ଚଳୀୟ, ଦକ୍ଷିଣାଞ୍ଚଳୀୟ ଓ ପଶ୍ଚିମାଞ୍ଚଳୀୟ)

୩ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷା ଉପରେ ବିଭିନ୍ନ ଭାଷାର ପ୍ରଭାବ : ଦ୍ରାବିଡ଼, ଯାବନିକ ଓ ଇଂରାଜୀ

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ଶାସ୍ତ୍ରୀୟତା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ଓଡ଼ିଆ ଧ୍ୱନିତତ୍ତ୍ୱ ଓ ଶବ୍ଦ ସମ୍ଭାର – ଧନେଶ୍ୱର ମହାପାତ୍ର, କିତାବ ମହଲ, କଟକ ।

୨. ଓଡ଼ିଆ ଭାଷାର ଉନ୍ମେଷ ଓ ବିକାଶ - ବାସୁଦେବ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ . କଟକ ।

୩. ଶାସ୍ତ୍ରୀୟ ଓଡ଼ିଆ ଭାଷା – କରୁଣାକର କର – ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର ।

୪. ଓଡ଼ିଆ ଭାଷା ତତ୍ତ୍ୱ- ଦମୟନ୍ତୀ ବେଶ୍ରା, କିତାବ ଭବନ, ଭୁବନେଶ୍ୱର ।

୫. ଓଡ଼ିଆ ଭାଷାରେ ଦ୍ରାବିଡ ଭାଷାର ପ୍ରଭାବ - ପୀତାମ୍ବର ପ୍ରଧାନ, ଓ.ରା.ପା.ପୁ.ପ୍ର. ଓ ପ୍ର.ସଂସ୍ଥା , ଭୁବନେଶ୍ୱର ।

୬. ଓଡ଼ିଆ ଭାଷା ବିଭବ – ବିଜୟ ପ୍ରସାଦ ମହାପାତ୍ର – ବିଦ୍ୟାପୁରୀ, କଟକ ।

୭. ଭାଷା ଶାସ୍ତ୍ର ପରିଚୟ - ଗୋଲୋକ ବିହାରୀ ଧଳ, ଓ.ରା.ପା.ପୁ.ପ୍ର.ଓ ପ୍ର. ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର ।

୮. ଓଡ଼ିଆ ଭାଷାର ଉତ୍ପତ୍ତି ଓ କ୍ରମ ବିକାଶ - ବଂଶୀଧର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୯. ଭାଷାତତ୍ତ୍ୱ ଓ ଓଡ଼ିଆ ଭାଷାର ଦିଗଦିଗନ୍ତ - ହରପ୍ରାସାଦ ମିଶ୍ର, ବିଜୟିନୀ ପବ୍ଲିକେଶନ୍ସ, କଟକ ।

୧୦. ଓଡ଼ିଆ ଲିପି ଓ ଭାଷା- ଖଗେଶ୍ୱର ମହାପାତ୍ର, ଗ୍ରନ୍ଥମନ୍ଦିର କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ତଦ୍ଭବ ଶବ୍ଦର ସଂଜ୍ଞା ପ୍ରଦାନ କର । (୧ ମାର୍କ)

୨. ଓଡ଼ିଆ ଭାଷାରେ କେତେଗୋଟି ମୌଳିକ ସ୍ୱରଧ୍ୱନି ଅଛି ? ସେଗୁଡିକର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ଓଡ଼ିଆ ଭାଷାର ଆଞ୍ଚଳିକରୂପ ଉପରେ ଆଲୋକପାତ କର । (୫ ମାର୍କ)

୪. ଓଡ଼ିଆ ଭାଷା ଉପରେ ଇଂରାଜୀ ଭାଷା ପ୍ରଭାବର ସବିଶେଷ ଦୃଷ୍ଟାନ୍ତ ଦିଅ । (୮ ମାର୍କ)

Core XV ଷଷ୍ଠ ପର୍ଯ୍ୟାୟ (Semester-VI)

ଓଡ଼ିଆ ବ୍ୟାବହାରିକ ବ୍ୟାକରଣ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଭାଷା ବ୍ୟବହାରରେ ତ୍ରୁଟିଶୂନ୍ୟତା ଓ ଶୁଦ୍ଧତା ନିମିତ୍ତ ବ୍ୟାକରଣ ଜ୍ଞାନ ନିତାନ୍ତ ଆବଶ୍ୟକ। ଏହି ପାଠ୍ୟ ପତ୍ରରେ ଓଡ଼ିଆ ଭାଷାର ବ୍ୟାବହାରିକ ବ୍ୟାକରଣିକ ଜ୍ଞାନ ଅର୍ଜନ କରିବାର ସୁଯୋଗ ରହିଛି ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଓଡ଼ିଆ ଭାଷାରେ ବ୍ୟବହୃତ ବିଶେଷ୍ୟ, ବିଶେଷଣ,ସର୍ବନାମ ଓ ଅବ୍ୟୟ ବିଷୟରେ ଅବଗତ ହୋଇ ଛାତ୍ରଛାତ୍ରୀ ନିର୍ଭୁଲ ଭାଷା ପ୍ରୟୋଗରେ ସକ୍ଷମ ହେବେ ।

୨ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷାରେ କାରକ ଓ ବିଭକ୍ତିର ସଂଜ୍ଞା ସହିତ ତାର ପ୍ରକାରଭେଦ ଜାଣିବାପାଇଁ ଏହି ଏକକଟି ଉଦ୍ଦିଷ୍ଟ ।

୩ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷାର କୃଦନ୍ତ ଓ ତଦ୍ଧିତ ପଦ ତଥା ଉପସର୍ଗଗୁଡ଼ିକ ସମ୍ପର୍କରେ ଜାଣିବା ନିମିତ୍ତ ଏହି ଏକକର ପରିକଳ୍ପନା ।

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାରେ ସମାସ, ସନ୍ଧି ଆଦିର ଗୁରୁତ୍ୱ ସ୍ୱୀକାର୍ଯ୍ୟ। ଶବ୍ଦ ସଂକ୍ଷେପଣ ବା ଏକପଦୀକରଣ ଜ୍ଞାନ ମଧ୍ୟ ଭାଷା ପ୍ରୟୋଗରେ ଆବଶ୍ୟକ ହୁଏ । ଏ ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀଙ୍କୁ ଅବଗତ କରିବା ଏହି ଏକକର ଲକ୍ଷ୍ୟ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ବିଶେଷ୍ୟ, ବିଶେଷଣ, ସର୍ବନାମ, ଅବ୍ୟୟ

୨ୟ ଏକକ : କାରକ, ବିଭକ୍ତି

୩ୟ ଏକକ : କୃଦନ୍ତ, ତଦ୍ଧିତ ଓ ଉପସର୍ଗ

୪ର୍ଥ ଏକକ : ସନ୍ଧି, ସମାସ ଓ ଏକପଦୀକରଣ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧. ସର୍ବସାର ବ୍ୟାକରଣ- ନାରାୟଣ ମହାପାତ୍ର ଓ ଶ୍ରୀଧର ଦାସ, ନିଉ ଷ୍ଟୁଡେଣ୍ଟସ୍ ଷ୍ଟୋର, କଟକ ।

୨. ଆଧୁନିକ ଓଡ଼ିଆ ବ୍ୟାକରଣ – ଧନେଶ୍ୱର ମହାପାତ୍ର, କିତାବ ମହଲ, କଟକ ।

୩. ପ୍ରଚଳିତ ଓଡ଼ିଆ ଭାଷାର ଏକ ବ୍ୟାକରଣ – ବିଜୟ ପ୍ରସାଦ ମହାପାତ୍ର, ବିଦ୍ୟାପୁରୀ, କଟକ ।

୪. ଓଡ଼ିଆ ଭାଷା ଚର୍ଚ୍ଚା ପରମ୍ପରା ଗଗନେନ୍ଦ୍ରନାଥ ଦାସ, ଓଡ଼ିଆ ଗବେଷଣା ପରିଷଦ, କଟକ ।

୫. ଓଡ଼ିଆ ଧ୍ୱନିତତ୍ତ୍ୱ ଓ ଶବ୍ଦ ସମ୍ଭାର – ଧନେଶ୍ୱର ମହାପାତ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୬. ସାଧାରଣ ଓଡ଼ିଆ ବନାନ ଶୁଦ୍ଧି- ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ, ଭୁବନେଶ୍ୱର ।

୭. ନିର୍ଭୁଲ ଲେଖାର ମୂଳସୂତ୍ର- ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, କିତାବ ମହଲ, କଟକ ।

୮. ବ୍ୟାବହାରିକ ଓଡ଼ିଆ ବ୍ୟାକରଣ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ବ୍ରଜକିଶୋର ହୋତା, ଭାସ୍କର ପ୍ରଧାନ - ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

୯. ବୃହତ୍ ବ୍ୟାବହାରିକ ବ୍ୟାକରଣ - ଡକ୍ଟର ତ୍ରିଲୋଚନ ବେହେରା, ଗୋବିନ୍ଦ ଚନ୍ଦ୍ର ଲେଙ୍କା, ଫ୍ରେଣ୍ଡସ ପବ୍ଲିଶର୍ସ, ବିନୋଦ ବିହାରୀ, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. କାରକ କେତେ ପ୍ରକାର ଲେଖ । (୧ ମାର୍କ)

୨. କୃଦନ୍ତ ଓ ତଦ୍ଧିତ ମଧ୍ୟରେ ପାର୍ଥକ୍ୟ ଦର୍ଶାଅ । (୨ ମାର୍କ)

୩.ବିଶେଷ୍ୟର ସଂଜ୍ଞା ପ୍ରଦାନ କରି ପ୍ରକାରଭେଦ ଲେଖ । (୫ ମାର୍କ)

୪. ସନ୍ଧି କଣ? ଉଦାହରଣ ସହ ସନ୍ଧିର ରୂପଭେଦ ଦର୍ଶାଅ। (୮ ମାର୍କ)

Core XVI ସପ୍ତମ ପର୍ଯ୍ୟାୟ (Semester-VII)

ଓଡ଼ିଆ ଭାଷାର ବ୍ୟାବହାରିକ ପ୍ରୟୋଗ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସାରସ୍ୱତ ସୃଷ୍ଟି ବ୍ୟତୀତ ଭାଷା ବିବିଧ କାର୍ଯ୍ୟରେ ବ୍ୟବହୃତ ହୁଏ । ଭାଷାର ସେହି ବ୍ୟବହାରଗତ ପ୍ରୟୋଗ ରୀତି ଜାଣିବା ନିମିତ୍ତ ଓଡ଼ିଆ ଭାଷାର ବ୍ୟାବହାରିକ ପ୍ରୟୋଗ ପତ୍ର ପଠନ ପ୍ରାସଙ୍ଗିକ ମନେହୁଏ । ଏହି ପତ୍ରରେ ବିଭିନ୍ନ ବିଷୟ ଉପରେ ପ୍ରଦତ୍ତ ବକ୍ତବ୍ୟ ସମ୍ବାଦ ପ୍ରସ୍ତୁତି, ନଥି ପ୍ରସ୍ତୁତି, ବିଜ୍ଞପ୍ତି ପ୍ରକାଶନ ଏବଂ ଆଜିର ସମୟରେ ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ ବିଷୟକ ଜ୍ଞାନ ଅର୍ଜନ ଛାତ୍ରଛାତ୍ରୀଙ୍କ ପାଇଁ ଉପଯୋଗୀ ହେବ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : କୌଣସି ପ୍ରସଙ୍ଗ ଉପରେ ଦଳଗତ ଆଲୋଚନା ବା କୌଣସି ସମାରୋହରେ ଭାଷଣ ପ୍ରଦାନ କରିବାର କଳା କିପରି ହେବା ଆବଶ୍ୟକ, ଏହି ଏକକରୁ ସେହି ଶିକ୍ଷା ମିଳିବ ।

୨ୟ ଏକକ : ସାକ୍ଷାତକାର ଓ ସମ୍ବାଦ ପ୍ରସ୍ତୁତି ପାଇଁ ମଧ୍ୟ ଭାଷାର ଶୁଦ୍ଧତା ଓ ସଂଯମତା ଆବଶ୍ୟକ । ଛାତ୍ରୀଛାତ୍ରୀଙ୍କୁ ସେହି ଜ୍ଞାନ ପ୍ରଦାନ କରିବ ଏହି ଏକକଟି ।

୩ୟ ଏକକ : ବିଭିନ୍ନ କାର୍ଯ୍ୟାଳୟରେ କର୍ମଚାରୀମାନେ କିପରି ଓଡ଼ିଆ ଭାଷାରେ ନଥି ପ୍ରସ୍ତୁତକରି ଟିପ୍ପଣୀ ଲେଖିବେ, ଅନୁମୋଦନ ପତ୍ର ପ୍ରସ୍ତୁତ କରିବେ ବା କାର୍ଯ୍ୟାଳୟର ପତ୍ର ବିନିମୟ କିପରି ହେବ ତତ୍ ସମ୍ପର୍କୀୟ କଳାକୌଶଳ ଜାଣିବା ପାଇଁ ଏହି ଏକକଟି ସହାୟକ ହେବ ।

୪ର୍ଥ ଏକକ : ପ୍ରତ୍ୟେକ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ ଆଜିର ଯୁଗରେ ଜରୁରୀ ହୋଇପଡ଼ିଛି । ତେଣୁ ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ ବିଷୟରେ ଏହି ଏକକ ଛାତ୍ରଛାତ୍ରୀଙ୍କୁ ମାର୍ଗଦର୍ଶନ କରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଭାଷଣ କଳା, ଦଳଗତ ଆଲୋଚନା

୨ୟ ଏକକ : ସମ୍ବାଦ ପ୍ରସ୍ତୁତି, ସାକ୍ଷାତକାର

୩ୟ ଏକକ : କାର୍ଯ୍ୟାଳୟରେ ଓଡ଼ିଆ ଲିଖନ ବିଧି (ନଥି ପ୍ରସ୍ତୁତି, ଟିପ୍ପଣୀ, ଅନୁମୋଦନ, ଚିଠା ପ୍ରସ୍ତୁତି, ଅଧିସୂଚନା ବିଜ୍ଞପ୍ତି, ଘୋଷଣା ଲିଖନ, ପତ୍ର ଲିଖନ)

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ ସଫ୍ଟ ୱେୟାର ଏବଂ ହାର୍ଡ ୱେୟାର, ଓଡ଼ିଆ ଫଣ୍ଟସ୍, କୀ-ବୋର୍ଡ, ବନାନ ଓ ବ୍ୟାକରଣ ଯାଞ୍ଚ ପ୍ରକ୍ରିୟା, ଓଡ଼ିଆରେ ଇଂଟରନେଟ୍‌ର ବ୍ୟବହାର, ଓଡ଼ିଆ ସାମାଜିକ ୱେବ୍‌ସାଇଟ୍

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Books of reference) :

୧. ଗଣମାଧ୍ୟମ ଓ ଗଣଯୋଗାଯୋଗ- ଶିଶିର ବେହେରା, ଫ୍ରେଣ୍ଡସ ପବ୍ଲିଶର୍ସ, ବିନୋଦ ବିହାରୀ, କଟକ ।

୨. ଭାଷଣ କଳା ଓ ଅନ୍ୟାନ୍ୟ ପ୍ରସଙ୍ଗ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର ।

୩. ସମ୍ବାଦ ପତ୍ର ଓ ଗଣମାଧ୍ୟମ – ମୃଣାଳ ଚାଟାର୍ଜୀ, ଶେଫାଳୀ କମ୍ୟୁନିକେଶନ୍, ଢେଙ୍କାନାଳ ।

୪. ପ୍ରାୟୋଗିକ ଭାଷା ଓ ବିଜ୍ଞାପନର ଦିଗ ବିଦିଗ – କେ. ବି. ପଟ୍ଟନାୟକ, ଓ.ରା.ପା.ପୁ.ପ୍ର. ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୫. ସଂଯୋଗ ଅନୁବିଧି – ସନ୍ତୋଷ କୁମାର ତ୍ରିପାଠୀ, ନାଳନ୍ଦା, ବିନୋଦବିହାରୀ, କଟକ ।

୬. ଓଡ଼ିଆରେ କମ୍ପ୍ୟୁଟର ଶିକ୍ଷା – ରୁଦ୍ର ନାରାୟଣ ମହାପାତ୍ର, ସତ୍ୟନାରାୟଣ ବୁକ୍‌ଷ୍ଟୋର, କଟକ।

୭. ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟର ପ୍ରୟୋଗ – ସୁଧୀର ଚନ୍ଦ୍ର ମହାନ୍ତି, ଏ କେ ମିଶ୍ର, ପବ୍ଲିକେଶନସ୍, କଟକ ।

୮. ଯୋଗାଯୋଗର ଭାଷା ଓଡ଼ିଆ – ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ, ଭୁବନେଶ୍ୱର ।

୯. ଓଡ଼ିଆ ସାମ୍ବାଦିକତା ଓ ରାଧାନାଥ ରଥ- ସତ୍ୟ ରାୟ, ବିଦ୍ୟାପୁରୀ, କଟକ ।

୧୦. କାଯ୍ୟାଳୟ ନଥି – ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ, ଭୁବନେଶ୍ୱର ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ମୁଦ୍ରିତ ସମ୍ବାଦର ଯିଏ ତ୍ରୁଟି ବିଚ୍ୟୁତି ସଂଶୋଧନ କରନ୍ତି, ତାଙ୍କୁ କଣ କୁହାଯାଏ ? (୧ ମାର୍କ)

୨. ଅଧିସୂଚନା ବିଜ୍ଞପ୍ତି କଣ ? (୨ ମାର୍କ)

୩.ସଫ୍ଟ ୱେୟାର ଓ ହାର୍ଡ ୱେୟାର୍ ମଧ୍ୟରେ ପାର୍ଥକ୍ୟ କଣ ? (୫ ମାର୍କ)

୪. ଭାଷଣ କଳାର ଅଭିବୃଦ୍ଧି ପାଇଁ କେଉଁକେଉଁ ଦିଗପ୍ରତି ସଚେତନ ରହିବାକୁ ପଡ଼େ, ଦର୍ଶାଅ । (୮ ମାର୍କ)

Core XVII **ସପ୍ତମ ପର୍ଯ୍ୟାୟ (Semester-VII)**

ପ୍ରାଚ୍ୟ ଓ ପାଶ୍ଚାତ୍ୟ କାବ୍ୟତତ୍ତ୍ୱ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସ୍ନାତକ ଶ୍ରେଣୀର ଛାତ୍ରଛାତ୍ରୀମାନେ ପ୍ରାଚ୍ୟ ଓ ପାଶ୍ଚାତ୍ୟ କାବ୍ୟ ତତ୍ତ୍ୱ ସମ୍ପର୍କରେ ଜାଣିବା ଆବଶ୍ୟକ । ପ୍ରାଚୀନ ଓଡ଼ିଆ ସାହିତ୍ୟ, ପ୍ରାଚ୍ୟ କାବ୍ୟ ତତ୍ତ୍ୱ ଦ୍ୱାରା ଯେପରି ଅନୁପ୍ରାଣିତ ଆଧୁନିକ ସାହିତ୍ୟରେ ସେହିପରି ପାଶ୍ଚାତ୍ୟ କାବ୍ୟ ତତ୍ତ୍ୱର ପ୍ରଭାବ ଲକ୍ଷଣୀୟ । ଏଣୁ ଏହି ଉଭୟ କାବ୍ୟ ତତ୍ତ୍ୱ ସମ୍ପର୍କରେ ଆବଶ୍ୟକ ଜ୍ଞାନ ଆହରଣ ନିମିତ୍ତ ଏହି ପାଠ୍ୟ ପତ୍ରଟି ସହଯୋଗ କରିବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଭାରତୀୟ କାବ୍ୟ ତତ୍ତ୍ୱର ରସ, ରୀତି ଓ ଗୁଣର ସଂଜ୍ଞା, ସ୍ୱରୂପ ତଥା ପ୍ରକାରଭେଦ ଜାଣିବା ପାଇବା ଏହି ଏକକରେ ସୁଯୋଗ ରହିଛି ।

୨ୟ ଏକକ : କାବ୍ୟ ସ୍ରଷ୍ଟା ବକ୍ରୋକ୍ତି ଓ ଅଳଙ୍କାର ପ୍ରୟୋଗ କରି କାବ୍ୟର ମହତ୍ତ୍ୱ ବର୍ଦ୍ଧନ କରେ । ପ୍ରାଚ୍ୟ କାବ୍ୟ ତତ୍ତ୍ୱର ଏ ଉଭୟର ତାତ୍ତ୍ୱିକ ଦିଗ ଶିକ୍ଷାର୍ଥୀମାନେ ଜାଣି ପାରିବେ ଏହି ଏକକରେ ।

୩ୟ ଏକକ : ପାଶ୍ଚାତ୍ୟ କାବ୍ୟ ତତ୍ତ୍ୱରେ କ୍ଲାସିକ ରୋମାଣ୍ଟିକ ଓ ବାସ୍ତବ ବାଦର ଭୂମିକା ସ୍ୱୀକାର୍ଯ୍ୟ । ଏହି ତିନି ଗୋଟି ପାଶ୍ଚାତ୍ୟ ବାଦ ଉପରେ ଏହି ଏକକ ଧାରଣା ଦେବ। ।

୪ର୍ଥ ଏକକ : ମିଥ୍, ପ୍ରତୀକ, ଚିତ୍ରକଳ୍ପ ଆଧୁନିକ ସାହିତ୍ୟର ଅପରିହାର୍ଯ୍ୟ ଉପାଦାନ । ଏହି ତିନି ଗୋଟି ପାଶ୍ଚାତ୍ୟ ତତ୍ତ୍ୱ ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଏହି ଏକକରୁ ଜାଣି ପାରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ରସ, ରୀତି ଓ ଗୁଣର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାର ଭେଦ

୨ୟ ଏକକ : ବକ୍ରୋକ୍ତି ଓ ଅଳଙ୍କାରର ସଂଜ୍ଞା ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ

୩ୟ ଏକକ : କ୍ଲାସିସିଜମ୍ , ରୋମାଂଟିସିଜମ୍ ଓ ବାସ୍ତବବାଦ

୪ର୍ଥ ଏକକ : ପ୍ରତୀକବାଦ, ମିଥ୍ ଓ ଚିତ୍ରକଳ୍ପ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

୧. ଭାରତୀୟ ସାହିତ୍ୟ ତତ୍ତ୍ୱ - ବନମାଳୀ ରଥ, ଓଡ଼ିଶା ରା. ପା. ପୁ. ପ୍ର. ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର ।

୨. ଅଳଙ୍କାର ପ୍ରସଙ୍ଗ –ଗୋବିନ୍ଦ ଚନ୍ଦ୍ର ଉଦ୍‌ଗାତା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୩. ସାହିତ୍ୟ ତତ୍ତ୍ୱ ପ୍ରାଚ୍ୟ ପାଶ୍ଚାତ୍ୟ – ଜ୍ୟୋସ୍ନାମୟୀ ପ୍ରଧାନ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୪. କାବ୍ୟ ତତ୍ତ୍ୱ - ଜିତେନ୍ଦ୍ର କୁମାର ଦାଶ, ଏ. କେ. ମିଶ୍ର, କଟକ ।

୫. କାବ୍ୟ ବିଚାର – ସୁରେନ୍ଦ୍ର ନାଥ ଦାଶଗୁପ୍ତ, ଅନୁ – ଶିଶିର ବେହରା, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର

୬. ପାଶ୍ଚାତ୍ୟ ସାହିତ୍ୟ ଓ ସମୀକ୍ଷା ତତ୍ତ୍ୱ- ସଂ. କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ, କଟକ ।

୭. ସାହିତ୍ୟର ସୂଚୀପତ୍ର – ବିଭୂତି ପଟ୍ଟନାୟକ, ନାଳନ୍ଦା/ ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୮. କାବ୍ୟ ଓ କଳାକାର (ଶୁକ୍ଳାଭିସାର ତିମିରାଭିସାର) - ଚିନ୍ତାମଣି ବେହେରା, ଜଗନ୍ନାଥ ରଥ, କଟକ ।

୯. ସାମ୍ପ୍ରତିକ ପାଶ୍ଚାତ୍ୟ ସମାଲୋଚନା ତତ୍ତ୍ୱ – ଚିତ୍ତ ରଞ୍ଜନ ମିଶ୍ର, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ ।

୧୦. ସାହିତ୍ୟର ସନ୍ନିଧାନ : ପୂର୍ଣଚନ୍ଦ୍ର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ଏମ୍ପୋରିଅମ, ସମ୍ବଲପୁର ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ସାହିତ୍ୟରେ କେତେଗୋଟି ରୀତି ପ୍ରଚଳିତ ।(୧ ମାର୍କ)

୨. ଶୃଙ୍ଗାର ରସର ଦୁଇଗୋଟି ଭେଦ ଲେଖ । (୨ ମାର୍କ)

୩. କାକୁ ବକ୍ରୋକ୍ତି ଉପରେ ଆଲୋକପାତ କର । (୫ ମାର୍କ)

୪. ସାହିତ୍ୟରେ ମିଥ୍ ପ୍ରୟୋଗର ପ୍ରାସଙ୍ଗିକତା ଲେଖ । (୮ ମାର୍କ)

Core XVIII ସପ୍ତମ ପର୍ଯ୍ୟାୟ (Semester-VII)

ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ଅନୁଶୀଳନ (୧୯୪୭ ରୁ ୨୦୦୦)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଭାରତ ସ୍ୱାଧୀନତା ଲାଭକରିବା ପରେ ଶାସନ ବ୍ୟବସ୍ଥାରେ ଯେପରି ପରିବର୍ତ୍ତନ ଘଟିଲା, ଭାରତୀୟ ସାହିତ୍ୟ କ୍ଷେତ୍ରରେ ମଧ୍ୟ ସେହିପରି ବ୍ୟାପକ ପରିବର୍ତ୍ତନ ଘଟିଥିବାର ଲକ୍ଷ୍ୟ କରାଯାଏ । ଏହି ପରିପ୍ରେକ୍ଷୀରେ ସ୍ୱାଧୀନତା ପରକାଳର ଓଡ଼ିଆ କବିତାରେ ଆଙ୍ଗିକ ଓ ଆତ୍ମିକ ଦୃଷ୍ଟିରୁ କି କି ନୂତନତା ସମ୍ପାଦିତ ହେଲା ତାହାର ଅନୁଶୀଳନ କରି ସ୍ୱାଧୀନତୋତ୍ତର ଓଡ଼ିଆ କବିତାର ଗୁଣାତ୍ମକମୂଲ୍ୟ ଉପଲବ୍ଧି କରିବା ନିମିତ୍ତ ଏହି ପତ୍ରର ପାଠ୍ୟଖସଡ଼ା ପ୍ରସ୍ତୁତ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ପୃଷ୍ଠଭୂମିରେ ଯେଉଁସବୁ କାରଣ ଓ କାରକ ରହିଥିଲା, ତାହା ଅବଗତ ହେବା ନିମିତ୍ତ ଶଂସିତ ଏକକ ସହାୟକ ହେବ ।

୨ୟ ଏକକ : ପୂର୍ବବର୍ତ୍ତୀ କବିତାଠାରୁ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀକାଳର ଓଡ଼ିଆ କବିତାରେ ବହୁ ନୂତନଦିଗ ଆତ୍ମପ୍ରକାଶ କଲା । ସେହିସବୁ ଦିଗର ଅନୁଶୀଳନକରି ସ୍ୱାଧୀନତାପର ଓଡ଼ିଆ କବିତାର ଆତ୍ମିକ ବୈଶିଷ୍ଟ୍ୟକୁ ଚିହ୍ନିବାରେ ଏହି ଏକକ ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ସହାୟତା କରିବ ।

୩ୟ ଏକକ : ଆତ୍ମିକ ଦିଗ ପରି ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ଆଙ୍ଗିକ ଦିଗର ଆକଳନ କରିବା ସହିତ ତାହାର ବିଶେଷତ୍ୱ ନିର୍ଦ୍ଧାରଣ କରିବାପାଇଁ ଏହି ଏକକ ଉଦ୍ଦିଷ୍ଟ ।

୪ର୍ଥ ଏକକ: ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତା ବହୁ ବିଶିଷ୍ଟ କବିଙ୍କ ଦାନରେ ସମୃଦ୍ଧ। ସେମାନଙ୍କ ମଧ୍ୟରୁ ସଚ୍ଚିଦାନନ୍ଦ, ରମାକାନ୍ତ ପ୍ରମୁଖ କେତେଜଣ ସୁପ୍ରତିଷ୍ଠିତ କବିଙ୍କ କାବ୍ୟଧାରା ଉପରେ ଅବଗତ ହେବାପାଇଁ ଏହି ଏକକରେ ସୁଯୋଗ ରହିଛି ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ପୃଷ୍ଠଭୂମି

୨ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ଆତ୍ମିକ ବୈଶିଷ୍ଟ୍ୟ

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ଆଙ୍ଗିକ ଦିଗ

୪ର୍ଥ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ପ୍ରମୁଖ କାବ୍ୟସ୍ରଷ୍ଟା

(ସଚ୍ଚିଦାନନ୍ଦ, ଗୁରୁପ୍ରସାଦ, ରମାକାନ୍ତ, ସୀତାକାନ୍ତ, ରାଜେନ୍ଦ୍ର ପଣ୍ଡା, ପ୍ରତିଭା ଶତପଥୀ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ସତୁରୀରୁ ସହସ୍ରାବ୍ଦୀ – ନିତ୍ୟାନନ୍ଦ ଶତପଥୀ, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ, କଟକ ।

୨. ଆଧୁନିକ ଓଡ଼ିଆ କବିତାର କୁଳ ଓ ଶୀଳ - ଶରତ ଚନ୍ଦ୍ର ପ୍ରଧାନ, ବିଜୟିନୀ ପବ୍ଲିକେଶନସ୍, କଟକ ।

୩. ଆଧୁନିକତାର ଉତ୍ତରଣ : ଓଡ଼ିଆ କବିତା ଓ କବି ଦୃଷ୍ଟି - ବବ୍ରୁବାହନ ମହାପାତ୍ର, ବିଜୟିନୀ ପବ୍ଲି କେଶନସ୍, କଟକ ।

୪. ଆଧୁନିକ ଓଡ଼ିଆ କାବ୍ୟ ସାହିତ୍ୟ- ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର ।

୫. ଆଧୁନିକ ଉତ୍ତର ଆଧୁନିକ – ଦେବାଶିଷ ପାତ୍ର, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ ।

୬. ଆଧୁନିକ ଓଡ଼ିଆ କବିତା ପରିଚର୍ଚ୍ଚା - ଶତ୍ରୁଘ୍ନ ପାଣ୍ଡବ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୭. ସୂର୍ଯ୍ୟସ୍ନାତ – ଯତୀନ୍ଦ୍ର ମୋହନ ମହାନ୍ତି, ସୁବର୍ଣ୍ଣରେଖା, ଭୁବନେଶ୍ୱର-୬ ।

୮. ଆଧୁନିକ କାବ୍ୟ ଜିଜ୍ଞାସା : ଚିତ୍ର କଳ୍ପ - ଦାଶରଥି ଦାସ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୯. ନୂଆ କବିତାର ନକ୍ସା - ଦିଲୀପ କୁମାର ସ୍ୱାଇଁ, ବିଜୟିନୀ ପବ୍ଲିକେଶନସ୍, କଟକ ।

୧୦. କବିତା ୧୯୬୨ ଓ ନୂତନ କବିତାର ଭୂମିକା – ସଚ୍ଚିଦାନନ୍ଦ ରାଉତରାୟ , ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ସୀତାକାନ୍ତ ମହାପାତ୍ରଙ୍କ ପ୍ରଥମ କବିତା ସଙ୍କଳନର ନାମ କଣ? (୧ ମାର୍କ)

୨.ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳରେ ରଚିତ କବି ସଚ୍ଚିଦାନନ୍ଦଙ୍କ ଦୁଇଟି କବିତାଗ୍ରନ୍ଥର ନାମ ଲେଖ। (୨ ମାର୍କ)

୩. ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କବିତାର ରାଜନୀତିକ ପୃଷ୍ଠଭୂମି ଉପରେ ଆଲୋକପାତ କର।(୫ ମାର୍କ)

୪. ସ୍ୱାଧୀନତୋତ୍ତର ଓଡ଼ିଆ କବିତାର ଆତ୍ମିକ ବୈଶିଷ୍ଟ୍ୟ ନିର୍ଦ୍ଧାରଣ କର।(୮ ମାର୍କ)

Core XIX ସପ୍ତମ ପର୍ଯ୍ୟାୟ (Semester-VII)

ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କଥାସାହିତ୍ୟର ଅନୁଶୀଳନ (୧୯୪୭ ରୁ ୨୦୦୦)

Course Outcome (ପାଠ୍ୟକ୍ରମ ଫଳଶ୍ରୁତି):

ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳରେ ଓଡ଼ିଆ ଗଳ୍ প-ଉପନ୍ୟାସର ଗତି ଓ ପ୍ରବୃତ୍ତି କିପରି ଭିନ୍ନମୋଡ଼ ନେଇଛି ତାହାର କଳାତ୍ମକ ଅନୁଶୀଳନ ମାଧ୍ୟମରେ ସ୍ୱାଧୀନତା ପରକାଳର ଓଡ଼ିଆ କଥାସାହିତ୍ୟକୁ ସୂକ୍ଷ୍ମରୂପେ ଉପଲବ୍ଧି କରିବା ସ୍ନାତକ ସମ୍ମାନ ଛାତ୍ରଛାତ୍ରୀଙ୍କ ପାଇଁ ବିଶେଷ ଗୁରୁତ୍ୱ ରଖେ । ଛାତ୍ରଛାତ୍ରୀଙ୍କୁ ଶଂସିତ କାଳର କଥା ଓ କଥାକାର ଏବଂ ତାଙ୍କର ସାରସ୍ୱତ ଅବଦାନକୁ ଉପଲବ୍ଧି କରିବାପାଇଁ ଏହି ପତ୍ର ସହାୟକ ହେବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳ ଶ୍ରୁତି):

୧ମ ଏକକ : ସାହିତ୍ୟର ପ୍ରବୃତ୍ତିଗତ ପରିବର୍ତ୍ତନ ପଛରେ ବିବିଧ କାରଣ ବିଦ୍ୟମାନ ଥାଏ । ସେଗୁଡ଼ିକର ବିଶେଷ ଅନୁଶୀଳନ କରିବା ପାଇଁ ଶଂସିତ ଏକକ ଖୋରାକ ଯୋଗାଇବ ।

୨ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରେ ଓଡ଼ିଆ ଗଳ୍ପସାହିତ୍ୟ ଯେପରି ବ୍ୟାପକ ରୂପଲାଭ କରିଛି, ସେହିପରି ତାର ରଚନାଶୈଳୀ ଓ ଆତ୍ମିକ ସତ୍ତାରେ ଅଭିନବତା ପ୍ରସ୍ଫୁଟିତ ହୋଇଛି, ତାହାକୁ ଚିହ୍ନିବା ପାଇଁ ଏହି ଏକକର ପାଠ୍ୟଖସଡ଼ା ପଥ ପ୍ରଦର୍ଶନ କରିବ ।

୩ୟ ଏକକ : ବିଷୟ ବସ୍ତୁ ଓ ଉପସ୍ଥାପନା କୌଶଳ ଦୃଷ୍ଟିରୁ ସ୍ୱାଧୀନତା ପରେପରେ ଓଡ଼ିଆ ଉପନ୍ୟାସର ବିକାଶଧାରା ବେଶ୍ ଉଲ୍ଲେଖଯୋଗ୍ୟ । ସମାଜ, ରାଜନୀତି, ପଲ୍ଲୀ ଓ ସହରର ମାନବିକ ମୂଲ୍ୟବୋଧ, ପ୍ରାକୃତିକ ବିପର୍ଯ୍ୟୟ, ତଥା ବହୁ ସମସ୍ୟାକୁ ଆଧାର କରି ଉପନ୍ୟାସ ସାହିତ୍ୟର କିପରି ପୁଷ୍ଟି ବିଧାନ ହୋଇଛି, ଛାତ୍ରଛାତ୍ରୀ ଏହି ଏକକରୁ ତାହା ଅବଶ୍ୟ ଅନୁଭବ କରିପାରିବେ ।

୪ର୍ଥ ଏକକ : ଶତାଧିକ କଥାକାରଙ୍କ ମଧ୍ୟରୁ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳର କେତେଜଣ ଦିଗ୍‌ଗଜ ଗଳ୍ପକାର ଓ ଔପନ୍ୟାସିକଙ୍କ ସମ୍ପର୍କରେ ଏହି ଏକକ ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ଧାରଣା ପ୍ରଦାନ କରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ କଥାସାହିତ୍ୟର ପୃଷ୍ଠଭୂମି

୨ୟ ଏକକ : ସ୍ୱାଧୀନତୋତ୍ତର ଓଡ଼ିଆ ଗଳ୍ପର ଗତି ଓ ପ୍ରବୃତ୍ତି

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତୀ ଓଡ଼ିଆ ଉପନ୍ୟାସର ବିକାଶଧାରା ଓ ବୈଶିଷ୍ଟ୍ୟ

୪ର୍ଥ ଏକକ: ସ୍ୱାଧୀନତୋତ୍ତର ପ୍ରମୁଖ ଓଡ଼ିଆ କଥାକାର

କ) ଗଳ୍ପ -ମନୋଜ ଦାସ, ଅଖିଳମୋହନ ପଟ୍ଟନାୟକ, ବୀଣାପାଣି ମହାନ୍ତି

ଖ) ଉପନ୍ୟାସ – ସୁରେନ୍ଦ୍ର ମହାନ୍ତି, ଶାନ୍ତନୁ କୁମାର ଆଚାର୍ଯ୍ୟ, ପ୍ରତିଭା ରାୟ

ସହାୟକ ଗ୍ରନ୍ଥ ସୂଚୀ (Book of reference):

୧. ଓଡ଼ିଆ ଉପନ୍ୟାସ ସାହିତ୍ୟର ପରିଚୟ - ୧ମ ଓ ୨ୟ ଭାଗ ସଂ. ପଠାଣି ପଟ୍ଟନାୟକ, ଭୋଳାନାଥ ରାଉତ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

୨. ଓଡ଼ିଆ ଉପନ୍ୟାସ – କୃଷ୍ଣଚରଣ ବେହେରା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୩. ଗଳ୍ପ ଗାଳ୍ପିକ ଗଳ୍ପାୟନ - ଦେବାଶିଷ ପାତ୍ର, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

୪. ଓଡ଼ିଆ କଥା ସାହିତ୍ୟର ବିଭା ଓ ବିବିଧତା – ବବ୍ରୁବାହନ ମହାପାତ୍ର, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

୫. ଓଡ଼ିଆ କ୍ଷୁଦ୍ରଗଳ୍ପର ଇତିହାସ, (୧ମ ଓ ୨ୟ ଭାଗ) –ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ବୁକ୍ସ୍ ଏଣ୍ଡ୍ ବୁକ୍ସ୍, କଟକ

୬. ଓଡ଼ିଆ ଉପନ୍ୟାସ ପରିଚିତି (୧ମ ଓ ୨ୟ ଭାଗ) - ନାରାୟଣ ସାହୁ

୭. ଓଡ଼ିଆ କଥାସାହିତ୍ୟରେ ନାରୀବାଦ - ସଂ. ସବିତା ପ୍ରଧାନ, ଅଗ୍ରଦୂତ, କଟକ

୮. ସୁରେନ୍ଦ୍ର ସାହିତ୍ୟ ସମୀକ୍ଷଣ – ସଂ. ପ୍ରକାଶ କୁମାର ପରିଡା, ଗିରୀଶଚନ୍ଦ୍ର ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୯. ସାହିତ୍ୟ ସାଧକ ଶାନ୍ତନୁ କୁମାର ଆଚାର୍ଯ୍ୟ – ବାଉରୀବନ୍ଧୁ କର, ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ

୧୦. ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ପ୍ରମୁଖ ଗଳ୍ପସ୍ରଷ୍ଟା- ବ୍ରହ୍ମାନନ୍ଦ ଖୁଂଟିଆ, ନବଦିଗନ୍ତ, ବିନୋଦବିହାରୀ, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ଯେକୌଣସି ଏକ ଚେତନାପ୍ରବାହୀ ଉପନ୍ୟାସର ନାମ ଲେଖ । (୧ ମାର୍କ)

୨. ଦୁଇଟି ମନସ୍ତାତ୍ତ୍ୱିକ ଗଳ୍ପର ଉଦାହରଣ ଦିଅ । (୨ ମାର୍କ)

୩. ଅଖିଳମୋହନ ପଟ୍ଟନାୟକଙ୍କ ଗଳ୍ପକଳାର ବିଶେଷତ୍ୱ ଲେଖ । (୫ ମାର୍କ)

୪. ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ଉପନ୍ୟାସରେ ପ୍ରତିଫଳିତ ପାରିବାରିକ ଜୀବନ ଉପରେ ଆଲୋକପାତ କର । (୮ ମାର୍କ)

Core XX ଅଷ୍ଟମ ପର୍ଯ୍ୟାୟ (Semester-VIII)

ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ନାଟ୍ୟ ସାହିତ୍ୟର ଅନୁଶୀଳନ (୧୯୪୭ ରୁ ୨୦୦୦)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଓଡ଼ିଆ ନାଟକର ବିକାଶଧାରାରେ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀକାଳ ଯଥେଷ୍ଟ ଗୁରୁତ୍ୱରଖେ । ପୁନଶ୍ଚ, ନବନାଟ୍ୟ ଆନ୍ଦୋଳନ ପରେ ବିବିଧ ପରୀକ୍ଷାନିରୀକ୍ଷା ଓଡ଼ିଆ ନାଟକରେ ପ୍ରତିଭାତ ହୋଇଥାଏ । ଏକାଙ୍କିକା ବା କ୍ଷୁଦ୍ର ନାଟକ ମଧ୍ୟ ଆମ ସାହିତ୍ୟରେ ପ୍ରଭାବଶାଳୀ ଭୂମିକା ଗ୍ରହଣକରିଛି । ଏସବୁର ଗଭୀର ଅନୁଶୀଳନ ସହିତ ସଂଳାପ, ମଞ୍ଚ କୌଶଳ, ପ୍ରଭୃତି ବିବିଧ ବିଷୟର ଜ୍ଞାନ ହାସଲ କରିବାପାଇଁ ଏହି ପାଠ୍ୟପତ୍ରଟି ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ସାହାଯ୍ୟ କରିବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଏହି ଏକକଟି ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳର ନାଟ୍ୟସାହିତ୍ୟର ପୃଷ୍ଠଭୂମି, ତାର ଦିଗଦିଗନ୍ତ ଆକଳନ କରିବା ପାଇଁ ପ୍ରେରଣା ଯୋଗାଇବ ।

୨ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ନାଟ୍ୟସାହିତ୍ୟର ଅଙ୍ଗସଜ୍ଜା ଓ ଆତ୍ମିକରୂପର ଅନୁଧ୍ୟାନ କରିବାକୁ ଏହି ଏକକରେ ଛାତ୍ରଛାତ୍ରୀ ପ୍ରବୃତ୍ତ ରହିବେ ।

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ଛୋଟନାଟକ ବା ଏକାଙ୍କିକା ସାହିତ୍ୟର ଧାରା ଓ ଧର୍ମ ଅନ୍ୱେଷଣ କରିବାପାଇଁ ଶଂସିତ ଏକକଟି ଅନୁପ୍ରେରିତ କରିବ ।

୪ର୍ଥ ଏକକ : ଉଭୟ ନାଟକ ଓ ଏକାଙ୍କିକା ରଚନାରେ ନିମଗ୍ନ ଥିବା ନାଟ୍ୟକାରଙ୍କ ମଧ୍ୟରୁ କେତେଜଣ ବରେଣ୍ୟ ନାଟ୍ୟସ୍ରଷ୍ଟାଙ୍କ ରଚନାସମ୍ଭାର ଓ ତାର ଗୁଣଗତ ବିଶେଷତ୍ୱକୁ ଛାତ୍ରଛାତ୍ରୀ ଜାଣିବାର ସୁଯୋଗ ପାଇବେ ଏହି ଏକକରେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ନାଟ୍ୟ ସାହିତ୍ୟର ପୃଷ୍ଠଭୂମି

୨ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ନାଟକର ସ୍ୱରୂପ

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଏକାଙ୍କିକାର ଧରା ଓ ଧାରା

୪ର୍ଥ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ପ୍ରମୁଖ ଓଡ଼ିଆ ନାଟ୍ୟ ରଚୟିତା :

ନାଟକ -ଗୋପାଳ ଛୋଟରାୟ, ରାମଚନ୍ଦ୍ର ମିଶ୍ର, ମନୋରଂଜନ ଦାସ,

ଏକାଙ୍କିକା - ପ୍ରାଣବନ୍ଧୁ କର, ବିଜୟ ମିଶ୍ର, ବିଶ୍ୱଜିତ ଦାସ,

ସହାୟକ ଗ୍ରନ୍ଥ (Book of reference) :

୧. ଓଡ଼ିଆ ନାଟ୍ୟ ସାହିତ୍ୟର ବିକାଶଧାରା (୧ମ,୨ୟ.୩ୟ, ୪ର୍ଥ ଖଣ୍ଡ)- ହେମନ୍ତ କୁମାର ଦାସ, ସାଥୀମହଲ, କଟକ

୨. ଓଡ଼ିଆ ନାଟକର ଇତିହାସ – ନାଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ଫେଣ୍ଟସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୩. ସ୍ୱାଧୀନତୋତ୍ତର ଓଡ଼ିଆ ନାଟକ - ନାରାୟଣ ସାହୁ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ
୪. ନୂତନ ମୂଲ୍ୟବୋଧର ନାଟକ - ବିଜୟ କୁମାର ଶତପଥୀ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ
୫. ଓଡ଼ିଆ ନାଟ୍ୟ ସାହିତ୍ୟ – ସର୍ବେଶ୍ୱର ଦାସ - ଓ.ରା.ପା.ପୁ ପ୍ର ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର
୬. ଓଡ଼ିଆ ନାଟକର ଉଦ୍ଭବ ଓ ବିକାଶ - ରତ୍ନାକର ଚଇନି ,ବୁକ୍ସ ଏଣ୍ଡ୍ ବୁକ୍ସ, କଟକ
୭. ଉଦ୍ଭଟ ନାଟ୍ୟ ପରମ୍ପରା - ରତ୍ନାକର ଚଇନି - ଓ.ରା.ପା.ପୁ ପ୍ର ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର
୮. ଓଡ଼ିଆ ନାଟକରେ ଇତିହାସର ପ୍ରତିଧ୍ୱନି - ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ବିଦ୍ୟାପୁରୀ, କଟକ
୯. ଓଡ଼ିଆ ନାଟକର ଉତ୍ତର ଆଧୁନିକ ପର୍ବ – ହେମନ୍ତ କୁମାର ଦାସ, ବିଦ୍ୟାପୁରୀ, କଟକ
୧୦. ନାଟକ : ବ୍ୟାପ୍ତି ଓ ଦୀପ୍ତି - ସଂଘମିତ୍ରା ମିଶ୍ର, ଅଗ୍ରଦୂତ, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳର ଗୋଟିଏ ମିଥ୍ ନାଟକର ଦୃଷ୍ଟାନ୍ତ ଦିଅ । (୧ ମାର୍କ)
୨.ନବନାଟ୍ୟ ଆନ୍ଦୋଳନ ପରବର୍ତ୍ତୀ ଦୁଇଜଣ ପରୀକ୍ଷାଧର୍ମୀ ନାଟ୍ୟକାରଙ୍କ ନାମ ଲେଖ । (୨ ମାର୍କ)
୩. ଓଡ଼ିଆ ଏକାଙ୍କିକା ସାହିତ୍ୟକୁ ପ୍ରାଣବନ୍ଧୁ କରଙ୍କ ଅବଦାନ ଉଲ୍ଲେଖ କର । (୫ ମାର୍କ)
୪. ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ନାଟକର ସ୍ୱରୂପ ଦର୍ଶାଅ । (୮ ମାର୍କ)

Core XXI ଅଷ୍ଟମ ପର୍ଯ୍ୟାୟ (Semester-VIII)

ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ଗଦ୍ୟସାହିତ୍ୟ ଓ ପତ୍ରପତ୍ରିକାର ଅନୁଶୀଳନ (୧୯୪୭-୨୦୦୦)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳରେ ଓଡ଼ିଆ ଗଦ୍ୟସାହିତ୍ୟ ହୋଇଛି ବହୁମୁଖୀ । ପ୍ରବନ୍ଧ, ସମାଲୋଚନା ସହିତ ଜୀବନୀ, ଆତ୍ମଜୀବନୀ, ଭ୍ରମଣକାହାଣୀ ଆଦି ଏକାଳରେ ବ୍ୟାପକ ରୂପଲାଭ କରିଛି । ଓଡ଼ିଆ ପତ୍ରପତ୍ରିକା ମଧ୍ୟ ବିପୁଳ ସଂଖ୍ୟାରେ ଆତ୍ମପ୍ରକାଶ କରିଛି । ଗଦ୍ୟସାହିତ୍ୟ ଓ ପତ୍ରପତ୍ରିକାର ଏହି ବିବିଧତା ଓ ବ୍ୟାପକତାକୁ ଶିକ୍ଷାର୍ଥୀମାନେ ଅନୁଶୀଳନ କରିପାରିବେ ଏହି ପାଠ୍ୟପତ୍ରରେ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ସ୍ୱାଧୀନତା ପରକାଳର ମୌଳିକ ପ୍ରବନ୍ଧ ରଚନା ସହିତ ସାହିତ୍ୟ ସମାଲୋଚନା କ୍ଷେତ୍ର ହୋଇଛି ବିସ୍ତୃତ । ଚିନ୍ତାଶୀଳ ,ତତ୍ତ୍ୱମୂଳକ ଓ ଭାବାତ୍ମକ ପ୍ରବନ୍ଧ ସୃଷ୍ଟି ସହିତ ଲେଖକମାନେ ସମାଲୋଚନା ସାହିତ୍ୟକୁ କ୍ରମଶଃ ପରିପକ୍ୱ କରିଛନ୍ତି, ଯାହା ଏହି ଏକକରୁ ଉପଲବ୍ଧ ହେବ ।

୨ୟ ଏକକ : ଜୀବନୀ ଓ ଆତ୍ମଜୀବନୀ ଭିତରେ ସାମ୍ୟ-ବୈଷମ୍ୟ ବିଷୟରେ ଅବଗତ ହେବାସହ ଶିକ୍ଷାର୍ଥୀମାନେ ଏହି ଏକକରେ ଏହି ଦୁଇଦିଗର ସ୍ୱାଧୀନତା ପରକାଳୀନ ରୂପରେଖ ଓ ଗୁଣାତ୍ମକ ମୂଲ୍ୟକୁ ଅନୁଶୀଳନ କରିପାରିବେ ।

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପୂର୍ବବର୍ତ୍ତୀ ସମୟଠାରୁ ପରବର୍ତ୍ତୀକାଳରେ ଓଡ଼ିଆ ଭ୍ରମଣବୃତ୍ତାନ୍ତ ବୈଦେଶିକ ଅନୁଭୂତିରେ ବିଶେଷ ସମୃଦ୍ଧିବନ୍ତ ହୋଇଛି । ସ୍ୱଦେଶୀୟ ଭ୍ରମଣାନୁଭୂତି ଓ ବୈଦେଶୀୟ ଭ୍ରମଣ ସାହିତ୍ୟ ସମ୍ପର୍କରେ ଏହି ଏକକରୁ ଛାତ୍ରଛାତ୍ରୀ ଜ୍ଞାନଲାଭ କରିବେ।

୪ର୍ଥ ଏକକ : ପରିମାଣାତ୍ମକ ଦୃଷ୍ଟିରୁ ଦେଖିଲେ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ସମୟରେ ଓଡ଼ିଆ ଭାଷାରେ ବହୁ ପତ୍ରପତ୍ରିକା ଜନ୍ମ ନେଇଛି। କିନ୍ତୁ ଅନେକ ପତ୍ରିକାର ଅକାଳରେ ବିଲୟ ମଧ୍ୟ ଘଟିଛି । ଏହି ଏକକରେ ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ପତ୍ରପତ୍ରିକାର ସ୍ଥିତି ଓ ବ୍ୟାପ୍ତି ଛାତ୍ରଛାତ୍ରୀ ଆକଳନ କରିପାରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ଓ ସମାଲୋଚନା ସାହିତ୍ୟ

୨ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ଜୀବନୀ ଓ ଆତ୍ମଜୀବନୀ

୩ୟ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ଭ୍ରମଣବୃତ୍ତାନ୍ତ

୪ର୍ଥ ଏକକ : ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ପତ୍ରପତ୍ରିକା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ସାହିତ୍ୟର ଇତିହାସ - ଅସିତ କବି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୨. ଓଡ଼ିଆ ସମାଲୋଚନା ସାହିତ୍ୟର ଇତିହାସ - ଅସିତ କବି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୩. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ଓ ସମାଲୋଚନା ସାହିତ୍ୟର ପରିଚୟ - ପଠାଣି ପଟ୍ଟନାୟକ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ ।

୪. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ସାହିତ୍ୟର ଇତିହାସ - ବାଉରୀବନ୍ଧୁ କର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୫. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ଓ ସମାଲୋଚନା ସାହିତ୍ୟର ପରିଚୟ- ପଠାଣି ପଟ୍ଟନାୟକ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର୍, କଟକ ।

୬. ଓଡ଼ିଆ ଚରିତ ସାହିତ୍ୟ - ଲାବଣ୍ୟ ନାୟକ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ-୧୯୮୮ ।

୭. ଓଡ଼ିଆ ଆତ୍ମଜୀବନୀ – ଅଜାମ୍ବର ମଲ୍ଲ, ବିଜୟିନୀ ପବ୍ଲିକେଶନ୍, କଟକ ।

୮. ଓଡ଼ିଆ ଜୀବନୀ ସାହିତ୍ୟ - ଏକ ଅଧ୍ୟୟନ - ପଠାଣି ପଟ୍ଟନାୟକ, ଓ.ରା.ପା.ପୁ.ପ୍ର.ଓ ପ୍ର.ସଂସ୍ଥା ,ଭୁବନେଶ୍ୱର ।

୯. ଓଡ଼ିଆ ସମାଲୋଚନା ସାହିତ୍ୟ - ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ ,ଭୁବନେଶ୍ୱର ।

୧୦. ସାଂପ୍ରତିକ ଓଡ଼ିଆ ସାହିତ୍ୟ- ସାରଳା ସାହିତ୍ୟ ସଂସଦ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର୍, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ଝଙ୍କାର ସାହିତ୍ୟ ପତ୍ରିକା କେଉଁ ମସିହାରୁ ପ୍ରକାଶ ଲାଭ କରିଥିଲା ? (୧ ମାର୍କ)

୨. କୋଣାର୍କ ସାହିତ୍ୟ ପତ୍ରିକା କେଉଁ ଅନୁଷ୍ଠାନଦ୍ୱାରା କେବେ ଆତ୍ମପ୍ରକାଶ କରିଥିଲା ? (୨ ମାର୍କ)

୩.ସ୍ୱାଧୀନତା ପରକାଳର ବିଦେଶ ଭ୍ରମଣ ଅନୁଭୂତି ଉପରେ ଆଲୋକପାତ କର । (୫ ମାର୍କ)

୪. ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ କାଳରେ ଓଡ଼ିଆ ସମାଲୋଚନା ସାହିତ୍ୟ ହୋଇଛି ବିଭବଶାଳୀ - ଆଲୋଚନା କର । (୮ ମାର୍କ)

Core XXII ଅଷ୍ଟମ ପର୍ଯ୍ୟାୟ (Semester-VIII)

ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ ଓ ବିଜ୍ଞାନଭିତ୍ତିକ ସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଓଡ଼ିଆ ଭାଷାରେ ରଚିତ ଶିଶୁସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ ଆଧାରିତ ସାହିତ୍ୟ ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀଙ୍କ ଭିତରେ ସାଧାରଣ ଜ୍ଞାନର ପ୍ରସାର ନିମିତ୍ତ ଶଂସିତ ପାଠ୍ୟପତ୍ରଟି ପ୍ରସ୍ତୁତ । ଏହି ପତ୍ରରେ ଏ ଉଭୟର ତାତ୍ତ୍ୱିକ ଜ୍ଞାନ ସହିତ ଶିଶୁସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ ସାହିତ୍ୟର ଏକଏକ ଅଂଶ ଅଧ୍ୟୟନର ସୁଯୋଗ ପାଇବେ ଛାତ୍ରଛାତ୍ରୀ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଶିଶୁସାହିତ୍ୟର ସଂଜ୍ଞା, ସ୍ୱରୂପ ସହ ଓଡ଼ିଆ ଭାଷାରେ ରଚିତ ଶିଶୁସାହିତ୍ୟର ବିକାଶଧାରା ସମ୍ପର୍କରେ ଏହି ଏକକ ଧାରଣା ଦେବ ।

୨ୟ ଏକକ : ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟର ଧର୍ମ ଓ ସ୍ୱରୂପ କଣ, ସେ ସମ୍ପର୍କରେ ଜ୍ଞାନଲାଭ ସହିତ ଓଡ଼ିଆ ସାହିତ୍ୟରେ ବିଜ୍ଞାନ ଆଧାରିତ ରଚନାର ବିବର୍ତ୍ତନ ଧାରାକୁ ଅବଗତ ହେବାପାଇଁ ଏଠାରେ ସୁଯୋଗ ରହିଛି ।

୩ୟ ଏକକ: ବିଶିଷ୍ଟ ଶିଶୁସାହିତ୍ୟ ସ୍ରଷ୍ଟା ଦାଶ ବେନହୁରଙ୍କ ଗୋଲ୍ଡ ଫିସ୍ ଅଥବା ନଦୀୟା ବିହାରୀ ମହାନ୍ତିଙ୍କ -'ବଡ ଭାଇଙ୍କ କାହାଣୀ ମୁଣି' ଅଧ୍ୟୟନ କରି ଶିକ୍ଷାର୍ଥୀମାନେ ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ ସମ୍ପର୍କରେ ଜ୍ଞାନଲାଭ କରିବେ ।

୪ର୍ଥ ଏକକ: ଓଡ଼ିଶାର ଦୁଇଜଣ ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ ସ୍ରଷ୍ଟା ହେଉଛନ୍ତି, ଗୋକୁଳାନନ୍ଦ ମହାପାତ୍ର ଓ ଦେବକାନ୍ତ ମିଶ୍ର । ସେମାନଙ୍କ ମଧ୍ୟରୁ ଯେକୌଣସି ଜଣକର ରଚନା ପଢ଼ିବାର ସୁଯୋଗ ରହିଛି ଏହି ଏକକରେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ: ଶିଶୁସାହିତ୍ୟର ସଂଜ୍ଞା, ସରୂପ ଓ ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟର ବିକାଶଧାରା

୨ୟ ଏକକ: ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟର ସଂଜ୍ଞା, ସରୂପ ଓ ଓଡ଼ିଆ ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟର ବିକାଶକ୍ରମ

୩ୟ ଏକକ: ଶିଶୁସାହିତ୍ୟ ଅଧ୍ୟୟନ

ଗୋଲ୍ଡ ଫିସ୍- ଦାଶ ବେନହୁର **କିମ୍ବା** ବଡ଼ଭାଇଙ୍କ କାହାଣୀ ମୁଣି- ନଦିଆ ବିହାରୀ ମହାନ୍ତି

୪ର୍ଥ ଏକକ: ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ ଅଧ୍ୟୟନ

ଶତାବ୍ଦୀର ଆହ୍ୱାନ- ଦେବକାନ୍ତ ମିଶ୍ର

(ଭୌତିକ ବିଜ୍ଞାନ ଓ ସମାଜ ବିଜ୍ଞାନ, ବୃଦ୍ଧିର ସର୍ବୋଚ୍ଚ ସୀମା, ଶତାବ୍ଦୀର ଆହ୍ୱାନ)

କିମ୍ବା

ପୃଥିବୀ ବାହାରେ ମଣିଷ- ଗୋକୁଳାନନ୍ଦ ମହାପାତ୍ର

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

୧. ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ ଉନ୍ମେଷ ଓ ବିକାଶ - ମନୀନ୍ଦ୍ର ମହାନ୍ତି, ମାଣିକ ବିଶ୍ୱନାଥ ଦାତବ୍ୟ ସ୍ମୃତିନ୍ୟାସ, ଭୁବନେଶ୍ୱର

୨. ଆଧୁନିକ ଓଡ଼ିଆ ସାହିତ୍ୟ(ଓଡ଼ିଆ ଶିଶୁ ସାହିତ୍ୟ) - ଜାନକୀ ବଲ୍ଲଭ ମହାନ୍ତି, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ

୩. ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ-ସଂ. ଉତ୍କଳ ସାହିତ୍ୟ ସମାଜ, ବିଦ୍ୟାପୁରୀ, ବାଲୁବଜାର, କଟକ

୪. ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟର ଇତିହାସ-ଲକ୍ଷ୍ମୀକାନ୍ତ ଖୁଣ୍ଟିଆ, ଗୋବିନ୍ଦ ଚାନ୍ଦ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୫. ଆଧୁନିକ ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ : ବ୍ୟାପ୍ତି ଓ ବୈଚିତ୍ର୍ୟ, ଲକ୍ଷ୍ମୀକାନ୍ତ ଖୁଣ୍ଟିଆ, ଦେବାଶିଷ ପ୍ରକାଶନ, ଭୁବନେଶ୍ୱର

୬. ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟର ସାମାଜିକ ଇତିହାସ-ମହେଶ୍ୱର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୭. ସାଧୀନତୋତ୍ତର ଓଡ଼ିଆ ଶିଶୁ କବିତା- ଅନ୍ତର୍ଯ୍ୟାମୀ ପ୍ରଧାନ, ପଲ୍ଲୀପ୍ରଭା ପ୍ରକାଶନୀ, ପାଳସାହି, ଖୋର୍ଦ୍ଧା

୮. ଗୋକୁଳାନନ୍ଦ ମହାପାତ୍ରଙ୍କ ଉପନ୍ୟାସ ସୃଷ୍ଟି ଓ ସମୀକ୍ଷା- ସ୍ନିଗ୍ଧାରାଣୀ ମହାପାତ୍ର, ସତ୍ୟମ୍ ପବ୍ଲିକେଶନ୍, ଭୁବନେଶ୍ୱର

ପାଠ୍ୟପୁସ୍ତକ(Text books):

୧. ଗୋଲ୍ଡ ଫିସ- ଦାଶ ବେନହୁର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୨. ବଡ଼ଭାଇଙ୍କ କାହାଣୀ ମୁଣି- ନଦିଆ ବିହାରୀ ମହାନ୍ତି, ତେଲେଙ୍ଗା ବଜାର, କଟକ

୩. ଶତାବ୍ଦୀର ଆହ୍ୱାନ- ଦେବକାନ୍ତ ମିଶ୍ର, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୪. ପୃଥିବୀ ବାହାରେ ମଣିଷ- ଗୋକୁଳାନନ୍ଦ ମହାପାତ୍ର, ବିଦ୍ୟାପୁରୀ, କଟକ

ନମୁନା ପ୍ରଶ୍ନ: (Sample Questions) :

୧. ଓଡ଼ିଆ ଶିଶୁ ସାହିତ୍ୟର ଉନ୍ମେଷ ଓ ବିକାଶ ପୁସ୍ତକର ଲେଖକ କିଏ ? (୧ ମାର୍କ)

୨.ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ କାହାକୁ କୁହାଯାଏ ? (୨ ମାର୍କ)

୩. 'ବଡ ଭାଇଙ୍କ କାହାଣୀମୁଣି' ର ଶିଶୁଗଳ୍ପ ଗୁଡ଼ିକର ବୈଶିଷ୍ଟ୍ୟ ଉଲ୍ଲେଖକର । (୫ ମାର୍କ)

୪. ଭୌତିକ ବିଜ୍ଞାନ ଓ ସମାଜ ବିଜ୍ଞାନ ସମ୍ପର୍କରେ ଡକ୍ଟର ଦେବାକାନ୍ତ ମିଶ୍ରଙ୍କ ବକ୍ତବ୍ୟର ସାରମର୍ମ ଲେଖ । (୮ ମାର୍କ)

Core XXIII ଅଷ୍ଟମ ପର୍ଯ୍ୟାୟ (Semester-VIII)

ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ଇତିହାସ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସଂସ୍କୃତି ଗୋଟିଏ ଜାତିର ଅନ୍ତସତ୍ତାର ପରିଚୟ । ସଂସ୍କୃତି ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତହେବା ବିଧେୟ । ବିଭିନ୍ନତା ମଧ୍ୟରେ ଏକତା ହିଁ ଭାରତୀୟ ସଂସ୍କୃତିର ବିଶେଷତ୍ୱ। ତନ୍ମଧ୍ୟରେ ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ମହାନତା ସ୍ୱୀକାର୍ଯ୍ୟ। ସୁତରାଂ ସଂସ୍କୃତିର ବିଶେଷତ୍ୱ ସହିତ ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ବୈଶିଷ୍ଟ୍ୟ ଉପଲବ୍ଧି କରିବା ପାଇଁ ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ଏହି ପାଠ୍ୟପତ୍ର ପ୍ରେରଣା ଯୋଗାଇବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ସଂସ୍କୃତିର ପରିଚୟ, ତାର ସ୍ୱରୂପ ତଥା ବିଶେଷତ୍ୱ ସମ୍ପର୍କରେ ଏହି ଏକକ ବିଦ୍ୟାର୍ଥୀଙ୍କୁ ଅବଗତ କରାଇବ ।

୨ୟ ଏକକ : ଓଡ଼ିଶାର ସଂସ୍କୃତିକୁ ବୌଦ୍ଧ, ଶୈବ ଓ ଶାକ୍ତ ଚେତନା କିପରି ପରିପୁଷ୍ଟ କରିଛି, ତାହା ଏହି ଏକକରୁ ଉପଲବ୍ଧ ହେବ ।

୩ୟ ଏକକ : ଓଡ଼ିଶାରେ ବୈଷ୍ଣବମାନଙ୍କ ମଧ୍ୟରେ ଉତ୍କଳୀୟ ବୈଷ୍ଣବ ଗୋଷ୍ଠୀଙ୍କର ଭିନ୍ନଭିନ୍ନ ଦେବ ଉପାସନା ରହିଛି । ପ୍ରଭୁ ରାମଚନ୍ଦ୍ର ମଧ୍ୟ ବିଷ୍ଣୁ ରୂପେ ପୂଜିତ ହୁଅନ୍ତି ତେଣୁ ବୈଷ୍ଣବ ସଂସ୍କୃତି ପରିପ୍ରେକ୍ଷୀରେ ରାମ, କୃଷ୍ଣ, ଜଗନ୍ନାଥଙ୍କ ଉପାସନା ବିଷୟରେ ଛାତ୍ରଛାତ୍ରୀ ଏହି ଏକକରେ ଅବଗତ ହେବେ ।

୪ର୍ଥ ଏକକ : ଏହି ଏକକରେ ଓଡ଼ିଶାର ଜନଜାତିଙ୍କ ସାମାଜିକ ଜୀବନ, ପର୍ବପର୍ବାଣି ଓ ଦେବଦେବୀଙ୍କ ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଜାଣି ପାରିବେ । ଫଳତଃ ଏହି ପାଠ୍ୟପତ୍ରରେ ଶିକ୍ଷାର୍ଥୀମାନେ ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ପରିଚୟ ଲାଭ କରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ସଂସ୍କୃତିର ସଂଜ୍ଞା ସ୍ୱରୂପ ଓ ବିଶେଷତ୍ୱ

୨ୟ ଏକକ : ଓଡ଼ିଶାର ସଂସ୍କୃତି - ବୌଦ୍ଧ, ଶୈବ, ଶାକ୍ତ

୩ୟ ଏକକ : ଓଡ଼ିଶାର ବୈଷ୍ଣବ ସଂସ୍କୃତି (ରାମ ଉପାସନା, କୃଷ୍ଣ ଓ ଜଗନ୍ନାଥଙ୍କ ଉପାସନା)

୪ର୍ଥ ଏକକ : ଓଡ଼ିଶାର ଜନଜାତି ସଂସ୍କୃତି(ପର୍ବପର୍ବାଣି, ଦେବଦେବୀ, ବିବାହ ରୀତି)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference):

୧. ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ଇତିହାସ – ସଂସ୍କୃତି ବିଭାଗ ଓଡ଼ିଶା।

୨. ଓଡ଼ିଆ ସାହିତ୍ୟର ସାମାଜିକ ଓ ସାଂସ୍କୃତିକ ଇତିହାସ – ଚିତ୍ତରଞ୍ଜନ ଦାସ, ଓ.ରା.ପା..ପୁ.ଓ ପ୍ର. ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର
୩. ଓଡ଼ିଶାର ଧର୍ମଧାରା – କାହ୍ନୁ ଚରଣ ମିଶ୍ର , ଓଡ଼ିଶା ରାଜ୍ୟ ପାଠ୍ୟ ପୁ. ପ୍ରଣୟନ ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର
୪. ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଶ୍ରୀ ଜଗନ୍ନାଥ – ବାସୁଦେବ ସାହୁ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ
୫. ଓଡ଼ିଶାରେ ବୌଦ୍ଧଧର୍ମ – ନବୀନ କୁମାର ସାହୁ, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ, ଭୁବନେଶ୍ୱର
୬. ଓଡ଼ିଶାର ଜନଜାତି, ସମାଜ-ସଂସ୍କୃତି, ଭାଷା ଓ ଉନ୍ନୟନ- ଓ.ରା.ପା..ପୁ.ଓ ପ୍ର. ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର
୭. ଓଡ଼ିଶାର ଜନଜାତି : ଏକ ସାମାଜିକ ଓ ସାଂସ୍କୃତିକ ଅଧ୍ୟୟନ - ଦେବାଶିଷ ପାତ୍ର, ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ।
୮. ଓଡ଼ିଶାର ବୈଷ୍ଣବ ଧର୍ମ- କାହ୍ନୁ ଚରଣ ମିଶ୍ର, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ
୯. ଓଡ଼ିଶାରେ ବୌଦ୍ଧ ସଂସ୍କୃତି- ସୁରେନ୍ଦ୍ର କୁମାର ମହାରଣା, ଫ୍ରେଣ୍ଡସ୍ ପବଲିଶର୍ସ, କଟକ
୧୦. ଜଗନ୍ନାଥ ମନ୍ଦିର ଓ ଜଗନ୍ନାଥ ତତ୍ତ୍ୱ- ସୂର୍ଯ୍ୟନାରାୟଣ ଦାସ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ -୧୯୭୬

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ଉତ୍କଳୀୟ ବୈଷ୍ଣବମାନେ କେଉଁ ଦେବତାଙ୍କୁ ଆରାଧନା କରନ୍ତି ? (୧ ମାର୍କ)
୨.ଓଡ଼ିଶାର ଦୁଇଗୋଟି ପ୍ରସିଦ୍ଧ ଶାକ୍ତ ପୀଠର ନାମଲେଖ ? (୨ ମାର୍କ)
୩. ସଂକ୍ଷେପରେ ସଂସ୍କୃତିର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ଉପରେ ଆଲୋକପାତ କର । (୫ ମାର୍କ)
୪.ଓଡ଼ିଶାର ଜନଜାତି ସଂସ୍କୃତିର ପରିଚୟ ପ୍ରଦାନ କର । (୮ ମାର୍କ)

ପ୍ରଥମ ପର୍ଯ୍ୟାୟ(SEMESTER-I)

ସାମର୍ଥ୍ୟବର୍ଦ୍ଧକ ପାଠ୍ୟକ୍ରମ

Ability Enhancement Course (AEC)

ପରିଶୁଦ୍ଧ ଭାଷା ଓ ଲିଖନ ଧାରା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସାହିତ୍ୟର ଲିଖନ ଓ ଅଧ୍ୟୟନ କ୍ଷେତ୍ରରେ ଭାଷାର ପରିଶୁଦ୍ଧତା ନିତାନ୍ତ ଆବଶ୍ୟକ । ସାହିତ୍ୟକର୍ମ ବ୍ୟତିରେକ ବିଭିନ୍ନକ୍ଷେତ୍ରରେ ନିର୍ଭୁଲଭାଷା ବ୍ୟବହାର ହେବା ବାଞ୍ଛନୀୟ । ଭାରତର ସମ୍ବିଧାନସ୍ୱୀକୃତ ଭାଷାମାନଙ୍କ ମଧ୍ୟରେ ଓଡ଼ିଆଭାଷାର ସ୍ଥାନ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ । ଶିକ୍ଷାର୍ଥୀମାନେ ନିର୍ଭୁଲ ଭାଷା ପ୍ରୟୋଗକ୍ଷେତ୍ରରେ କିପରି ସମର୍ଥ ହେବେ, ସେଥିନିମିତ୍ତ ଏହି ପାଠ୍ୟପତ୍ରଟି ପରିକଳ୍ପିତ । ବିଭିନ୍ନ ପ୍ରତିଯୋଗିତାମୂଳକ ତଥା ପ୍ରାଶାସନିକ ସେବାମୂଳକ ନିଯୁକ୍ତ ହେବାପାଇଁ ସମ୍ମୁଖୀନ ହେଉଥିବା ପରୀକ୍ଷାନିମିତ୍ତ ମଧ୍ୟ ଏହା ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ସାହାଯ୍ୟ କରିବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ: କ) ଶବ୍ଦ ଗଠନରେ ଶୁଦ୍ଧତା
ଖ) ରୂଢ଼ିର ଅର୍ଥ ଅବଗତି
ଗ) ରୂଢ଼ିର ପ୍ରୟୋଗବିଧି ଶିକ୍ଷା

୨ୟ ଏକକ: କ) ବାକ୍ୟର ଗଠନରୀତି ଶିକ୍ଷା

ଖ) ବିବିଧ ପ୍ରକାର ବାକ୍ୟ ସମ୍ପର୍କରେ ଧାରଣା

ଗ) ନିର୍ଭୁଲ ବାକ୍ୟଲିଖନ ବିଦ୍ୟା

୩ୟ ଏକକ: କ) ବୃହତ୍ ଅନୁଚ୍ଛେଦକୁ ସଂକ୍ଷିପ୍ତ କରିବାର କୌଶଳ

ଖ) ବିଷୟଗତ ଶୀର୍ଷକ ନିର୍ଦ୍ଧାରଣ କଳା

ଗ) ଅନୁଚ୍ଛେଦରୁ ବିଭିନ୍ନ ପ୍ରଶ୍ନର ଉତ୍ତର ପ୍ରଦାନ

୪ର୍ଥ ଏକକ: କ) ସ୍ତମ୍ଭଲିଖନ ଜ୍ଞାନ

ଖ) ଫିଚର୍ ପ୍ରସ୍ତୁତି

ଗ) ନିର୍ଭୁଲ ପତ୍ରଲିଖନ ଓ ବିଜ୍ଞାପନ ପ୍ରସ୍ତୁତି କଳା

ପାଠ୍ୟ ବିଷୟ

ପ୍ରଥମ ଏକକ: (କ) ଶବ୍ଦର ସଂଜ୍ଞା, ଶୁଦ୍ଧ ଶବ୍ଦ ଓ ବର୍ତ୍ତାଶୁଦ୍ଧି

(ଖ) ରୂଢ଼ିର ଅର୍ଥ ଓ ପ୍ରୟୋଗ ବିଧି

ଦ୍ୱିତୀୟ ଏକକ: ବାକ୍ୟ ଗଠନରୀତି ଓ ପ୍ରକାର ଭେଦ

ତୃତୀୟ ଏକକ: ଅନୁଚ୍ଛେଦ ସଂକ୍ଷେପଣ, ଶୀର୍ଷକ ନିର୍ଦ୍ଧାରଣ ଓ ପ୍ରଶ୍ନୋତ୍ତର

ଚତୁର୍ଥ ଏକକ: ନିର୍ଭୁଲ ଲିଖନ ପଦ୍ଧତି, ସ୍ତମ୍ଭ ଲିଖନ, ଫିଚର୍, ପତ୍ର ଲିଖନ, ବିଜ୍ଞାପନ ପ୍ରସ୍ତୁତି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

୧. ସର୍ବସାର ବ୍ୟାକରଣ - ଶ୍ରୀଧର ଦାସ, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ ।

୨. ସାରସ୍ୱତ ବ୍ୟାବହାରିକ ବ୍ୟାକରଣ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସତ୍ୟ ନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର ।

୩. ବୃହତ୍ ଓଡ଼ିଆ ବ୍ୟାକରଣ- ତ୍ରିଲୋଚନ ବେହେରା, ଗୋବିନ୍ଦ ଚନ୍ଦ୍ର ଲେଙ୍କା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୪. ଆଧୁନିକ ଓଡ଼ିଆ ବ୍ୟାକରଣ- ଧନେଶ୍ୱର ମହାପାତ୍ର, କିତାବ୍ ମହଲ, କଟକ ।

୫. ସାଧାରଣ ଓଡ଼ିଆ ବନାନ ଶୁଦ୍ଧି- ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ, ଭୁବନେଶ୍ୱର ।

୬. ଗଣମାଧ୍ୟମ ଓ ଗଣଯୋଗାଯୋଗ – ଶିଶିର ବେହେରା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୭. ଯୋଗାଯୋଗ ମୂଳକ ମାତୃଭାଷା – ବିରଞ୍ଚି ନାରାୟଣ ସାମଲ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ ।

୮. ଯୋଗାଯୋଗର ଭାଷା – ସୁଧୀର ଚନ୍ଦ୍ର ମହାନ୍ତି, ପ୍ରାଚୀ ପ୍ରକାଶନ, କଟକ ।

୯. ନିର୍ଭୁଲ ଲେଖାର ମୂଳସୂତ୍ର, ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, କିତାବ ମହଲ, କଟକ ।

୧୦.ଓଡ଼ିଆ ଭାଷା ବ୍ୟାକରଣ ସୌରଭ, ଚନ୍ଦ୍ରଶେଖର ପତି, ଓଡ଼ିଶା ବୁକ୍ ଏମ୍ପୋରିୟମ୍, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧. ଶବ୍ଦ କାହାକୁ କୁହାଯାଏ ? (୧ ମାର୍କ)

୨.ପର୍ବତର ଦୁଇଟି ପ୍ରତିଶବ୍ଦ ଲେଖ । (୨ ମାର୍କ)

୩.ବାକ୍ୟର ପ୍ରକାରଭେଦ ଦର୍ଶାଅ। (୫ ମାର୍କ)

୪.ତୁମ ମହାବିଦ୍ୟାଳୟରେ ଏକ ଶିକ୍ଷକ ନିଯୁକ୍ତିପାଇଁ କୌଣସି ସମ୍ବାଦପତ୍ରରେ ଓଡ଼ିଆ ଭାଷାରେ କିପରି ବିଜ୍ଞାପନ ଦିଆଯିବ, ତାହାର ଏକ ନମୁନା ଲେଖ । (୮ ମାର୍କ)

ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ା
Multidisciplinary Course
ପ୍ରଥମ ପତ୍ର
ତୁଳନାତ୍ମକ ସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ବିବିଧ ଭାଷାର ସାହିତ୍ୟ ମଧ୍ୟରେ ତୁଳନାତ୍ମକ ଅଧ୍ୟୟନ ସାମ୍ପ୍ରତିକ ସମୟର ଏକ ପ୍ରାସଙ୍ଗିକ ବିଷୟ । ଏହାଦ୍ୱାରା ବିଶ୍ୱ ପରିପ୍ରେକ୍ଷୀରେ ସାହିତ୍ୟିକ ସମ୍ପର୍କ ବୃଦ୍ଧିପାଏ ଓ ବିଶ୍ୱ କଲ୍ୟାଣ ସାଧିତହୁଏ । ସ୍ନାତକଶ୍ରେଣୀର ବିଦ୍ୟାର୍ଥୀମାନେ ତୁଳନାତ୍ମକ ସାହିତ୍ୟ ଅଧ୍ୟୟନ ମାଧ୍ୟମରେ ବିବିଧଭାଷା ଓ ସାହିତ୍ୟର ଜ୍ଞାନ ଆହରଣ କରିପାରିବେ । ତେଣୁ ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ାରେ ତୁଳନାତ୍ମକ ସାହିତ୍ୟ ଅତ୍ୟନ୍ତ ଉପାଦେୟ ହେବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ତାତ୍ତ୍ୱିକଦିଗ ଉପରେ ଛାତ୍ରଛାତ୍ରୀ ଏଠାରେ ଅବଗତ ହୋଇପାରିବେ । ବିଶେଷତଃ ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ବିବିଧରୂପ ଜାଣିପାରିବେ ।

୨ୟ ଏକକ : ସଂସ୍କୃତ ହେଉଛି ଭାରତର ସର୍ବପ୍ରାଚୀନ କାବ୍ୟଭାଷା । ସଂସ୍କୃତ ସାହିତ୍ୟର ବିଖ୍ୟାତ କବି ଓ ନାଟ୍ୟକାର କାଳିଦାସଙ୍କ ସୁପ୍ରସିଦ୍ଧ 'ଅଭିଜ୍ଞାନ ଶାକୁନ୍ତଳମ୍' ନାଟକ ଓ ଆଧୁନିକ ଓଡ଼ିଆ କାବ୍ୟକାର ଗଙ୍ଗାଧରଙ୍କ 'ପ୍ରଣୟବଲ୍ଲରୀ'ର ତୁଳନାତ୍ମକ ଅଧ୍ୟୟନ କରିବାପାଇଁ ଏହି ଏକକରେ ସୁଯୋଗ ରହିଛି ।

୩ୟ ଏକକ : ହିନ୍ଦୀ ଭାରତର ରାଷ୍ଟ୍ର ଭାଷା । ଏହି ଭାଷାର ବିଖ୍ୟାତ ଲେଖକ ପ୍ରେମଚାନ୍ଦଙ୍କ ଗୋଦାନ ଉପନ୍ୟାସ ଓ ବିଶିଷ୍ଟ ଓଡ଼ିଆ କଥାକାର ଫକୀରମୋହନଙ୍କ 'ଛମାଣ ଆଠଗୁଣ୍ଠ'ର ତୁଳନାତ୍ମକ ସମୀକ୍ଷା ବେଶ୍ ଗୁରୁତ୍ୱ ରଖେ । ଏହି ଏକକରୁ ବିଦ୍ୟାର୍ଥୀମାନେ ତୁଳନାତ୍ମକ ଜ୍ଞାନ ଅର୍ଜନ କରିବେ ।

୪ର୍ଥ ଏକକ: ନୋବେଲ ପୁରସ୍କାର ପ୍ରାପ୍ତ The Waste Land ଗ୍ରନ୍ଥଟି ବିଶ୍ୱବ୍ୟାପୀ ପ୍ରଭାବ ବିସ୍ତାର କରିଛି । ତାହା ସହିତ ଯଶସ୍ୱୀ ଆଧୁନିକ କବି ଗୁରୁପ୍ରସାଦଙ୍କ କାଳପୁରୁଷର କିପରି ସାମଞ୍ଜସ୍ୟ ବା ତାରତମ୍ୟ ରହିଛି , ଛାତ୍ରଛାତ୍ରୀ ତାହା ଏଠାରେ ଅନୁଶୀଳନ କରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ତୁଳନାତ୍ମକ ସାହିତ୍ୟ: ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ

୨ୟ ଏକକ : ସଂସ୍କୃତ ଓ ଓଡ଼ିଆ : ଅଭିଜ୍ଞାନ ଶାକୁନ୍ତଳମ୍ ଓ ପ୍ରଣୟବଲ୍ଲରୀ

୩ୟ ଏକକ : ହିନ୍ଦୀ ଓ ଓଡ଼ିଆ

ଗୋଦାନ - ପ୍ରେମଚାନ୍ଦ ଓ ଛମାଣ ଆଠଗୁଣ୍ଠ-ଫକୀରମୋହନ ସେନାପତି

୪ର୍ଥ ଏକକ : ଇଂରାଜୀ ଓ ଓଡ଼ିଆ: The Waste Land– T.S.Eliot ଓ କାଳପୁରୁଷ- ଗୁରୁପ୍ରସାଦ ମହାନ୍ତି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧.ସାହିତ୍ୟ ତତ୍ତ୍ୱ : ପ୍ରାଚ୍ୟ ପାଶ୍ଚାତ୍ୟ – ଜ୍ୟୋସ୍ନାମୟୀ ପ୍ରଧାନ, ଫେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୨.ପାଶ୍ଚାତ୍ୟ ସାହିତ୍ୟ ଓ ସମୀକ୍ଷା ତତ୍ତ୍ୱ - ସଂ. କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ, କଟକ

୩.ସାମ୍ପ୍ରତିକ ପାଶ୍ଚାତ୍ୟ ସମାଲୋଚନା ତତ୍ତ୍ୱ – ଚିତ୍ତ ରଞ୍ଜନ ମିଶ୍ର, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ

୪.ପାଶ୍ଚାତ୍ୟ ସମାଲୋଚନା ତତ୍ତ୍ୱ – ଜିତେନ୍ଦ୍ର ନାରାୟଣ ପଟ୍ଟନାୟକ

୫.ତୁଲ୍ୟ କଷଟି – ସନ୍ତୋଷ ତ୍ରିପାଠୀ, ଏଥେନା, କଟକ

୬.ଗବେଷଣା ଅନୁବାଦ ଓ ସମ୍ପାଦନାକଳା – ନାରାୟଣ ସାହୁ, ସତ୍ୟ ନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧.କାହାକୁ ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ପିତା ବୋଲି କୁହାଯାଏ ? (୧ ମାର୍କ)

୨.ବିଶ୍ୱର କେଉଁ ଦୁଇଜଣ ପ୍ରସିଦ୍ଧ କବି ତଥା ନାଟ୍ୟକାରଙ୍କ ଉପରେ ମାୟାଧର ମାନସିଂହ ତୁଳନାତ୍ମକ ଗବେଷଣା କାର୍ଯ୍ୟ କରିଛନ୍ତି? (୨ ମାର୍କ)

୩. ଗୋଦାନ ଓ ଛମାଣ ଆଠଗୁଣ୍ଠର ପାଞ୍ଚୋଟି ସାମଞ୍ଜସ୍ୟ ଲେଖ । (୫ ମାର୍କ)

୪.ଦୁଷ୍ମନ୍ତ ଚରିତ୍ରକୁ ଚିତ୍ରଣ କରିବାରେ କାଳିଦାସ ଓ ଗଙ୍ଗାଧରଙ୍କ ଦୃଷ୍ଟିକୋଣର ତୁଳନା କର । (୮ ମାର୍କ)

ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ା
Multidisciplinary Course
ଦ୍ୱିତୀୟ ପତ୍ର

କଳା ବିଷୟ ଓ ସାହିତ୍ୟ (Humanities and Literature)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସାହିତ୍ୟ ବିବିଧ ବିଷୟର ଏକ ସମନ୍ୱିତ ରୂପ । ଏଥିରେ ଇତିହାସ, ରାଜନୀତି, ଭୂଗୋଳ, ଦର୍ଶନ ଆଦିର ତାତ୍ତ୍ୱିକ ଅନୁଶୀଳନ କରାଯାଇପାରେ । Arts ବା କଳା ବିଷୟ ସହିତ ସାହିତ୍ୟର ସମ୍ପର୍କ ଓ ସ୍ୱାତନ୍ତ୍ର୍ୟ ଜାଣିବାନିମିତ୍ତ ଏହି ପତ୍ରଟି ସହାୟକ ହେବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ସମାଜ ସାହିତ୍ୟର ମୂଳାଧାର। ସମାଜପାଇଁ ଓ ସମାଜକୁ ନେଇ ସାହିତ୍ୟ ସୃଷ୍ଟିହୁଏ । ତେଣୁ ସାହିତ୍ୟ ଓ ସମାଜର ଓତଃପ୍ରୋତ ସମ୍ପର୍କକୁ ଅବଗତ ହେବାପାଇଁ ଏହି ଏକକଟି ଉଦ୍ଦିଷ୍ଟ।

୨ୟ ଏକକ : ପ୍ରତ୍ୟେକ ସମୟର ସାହିତ୍ୟରେ ରାଜନୀତିର ଛାପ ଅବଶ୍ୟ ଲକ୍ଷଣୀୟ । ସାହିତ୍ୟ ଓ ରାଜନୀତିର ସମ୍ପର୍କ ସହିତ ରାଜନୀତିକ ସଂସ୍କାର ଆଣିବାପାଇଁ ଲେଖକ କିପରି ପ୍ରୟାସୀ ହୁଏ , ତାହା ବିଦ୍ୟାର୍ଥୀମାନେ ଏଠାରେ ଅବଗତ ହେବେ।

୩ୟ ଏକକ : ସମୟର ଅକ୍ଷତ ଛାପ ସାହିତ୍ୟରେ ଅଙ୍କିତ ହେଉଥିବାରୁ ସାରସ୍ୱତ ସୃଷ୍ଟିରେ ଇତିହାସର ଅନୁଶୀଳନ ପ୍ରାସଙ୍ଗିକ ହେବ ନିଶ୍ଚୟ ।

୪ର୍ଥ ଏକକ : କୁହାଯାଏ କବି ଓ ଲେଖକମାନେ ହେଉଛନ୍ତି ଜଣେ ଜଣେ ଦାର୍ଶନିକ, ତେଣୁ ବିଦ୍ୟାର୍ଥୀମାନେ ସାହିତ୍ୟ ସହ ଦର୍ଶନର ସମ୍ପର୍କ ତଥା ସାହିତ୍ୟ ରଚନାରେ ପ୍ରତିଫଳିତ ଦାର୍ଶନିକତାର ଆକଳନ କରିବା ବିଧେୟ ।

ପାଠ୍ୟବିଷୟ

ପ୍ରଥମ ଏକକ : ସାହିତ୍ୟ ଓ ସମାଜ

ଦ୍ୱିତୀୟ ଏକକ : ସାହିତ୍ୟ ଓ ରାଜନୀତି

ତୃତୀୟ ଏକକ : ସାହିତ୍ୟ ଓ ଇତିହାସ

ଚତୁର୍ଥ ଏକକ : ସାହିତ୍ୟ ଓ ଦର୍ଶନ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧.ସାହିତ୍ୟର ସନ୍ଧିଧାନ, ପୂର୍ଣ୍ଣ ଚନ୍ଦ୍ର ମହାନ୍ତି, ଫ୍ରେଣ୍ଡସ ଏମ୍ପୋରୀୟମ, ସମ୍ବଲପୁର

୨. ସାହିତ୍ୟର ସୂଚୀପତ୍ର – ବିଭୂତି ପଟ୍ଟନାୟକ, ଫ୍ରେଣ୍ଡସ ପବ୍ଲିଶର୍ସ, କଟକ

୩. ଓଡ଼ିଆ ଉପନ୍ୟାସରେ ସମାଜ ତତ୍ତ୍ୱ -କଇଳାଶ ପଟ୍ଟନାୟକ, ବିଦ୍ୟାପୁରୀ, କଟକ

୪. ସାହିତ୍ୟ ତତ୍ତ୍ୱ : ପ୍ରାଚ୍ୟ ପାଶ୍ଚାତ୍ୟ – ଜ୍ୟୋସ୍ନାମୟୀ ପ୍ରଧାନ, ଫେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୫. ସାହିତ୍ୟର ରୂପରେଖ – ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ବିଦ୍ୟାପୁରୀ, କଟକ

୬. ସାହିତ୍ୟ ତତ୍ତ୍ୱ - ଧନେଶ୍ୱର ମହାପାତ୍ର, ଗ୍ରନ୍ଥ ମନ୍ଦିର , କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ସାରଳା ମହାଭାରତରେ ଐତିହାସିକ ଚିତ୍ର ପୁସ୍ତକର ଲେଖକ କିଏ? (୧ ମାର୍କ)

୨.ଓଡ଼ିଆ ଉପନ୍ୟାସରେ ସମାଜତତ୍ତ୍ୱ ଉପରେ ଓଡ଼ିଶାର କେଉଁ ଦୁଇଜଣ ଆଲୋଚକ ଗବେଷଣାତ୍ମକ ପୁସ୍ତକ ଲେଖିଛନ୍ତି? (୨ ମାର୍କ)

୩.ସାହିତ୍ୟ ଓ ଇତିହାସ ମଧ୍ୟରେ ସମ୍ପର୍କ ନିର୍ଦ୍ଧାରଣ କର । (୫ ମାର୍କ)

୪.ପ୍ରାଚୀନ ଓଡ଼ିଆ ସାହିତ୍ୟରେ ପ୍ରତିଫଳିତ ରାଜତନ୍ତ୍ରର ଚିତ୍ର ପ୍ରଦାନକର । (୮ ମାର୍କ)

ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ା
Multidisciplinary Course
ତୃତୀୟ ପତ୍ର

ବିଜ୍ଞାନ ବିଷୟ ଓ ସାହିତ୍ୟ (Science and Literature)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

କଳା ଓ ବିଜ୍ଞାନ ପରସ୍ପର ପରିପୂରକ । ସାହିତ୍ୟ କଳା ଅନ୍ତର୍ଭୁକ୍ତ ବିଷୟ ହେଲେ ମଧ୍ୟ ତହିଁରେ ବୈଜ୍ଞାନିକ ଦୃଷ୍ଟିକୋଣର ଅଭାବ ନାହିଁ। ବିବିଧ ବିଜ୍ଞାନ ବିଷୟ ସହିତ ସାହିତ୍ୟର କିପରି ସମ୍ପର୍କ ରହିଛି, ସେ ସମ୍ପର୍କରେ ଜ୍ଞାନ ଅର୍ଜନ କରିବାପାଇଁ ଶଂସିତ ପତ୍ର ସହାୟକ ହେବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ ଯଥାକ୍ରମେ କଳ୍ପନା ଓ ବାସ୍ତବତା ଉପରେ ଅଧିରୂଢ଼ ବୋଲି କୁହାଯାଏ । ତା ସତ୍ତ୍ୱେ ଏ ଉଭୟର ସମ୍ପର୍କ କିଛି କମ୍ ନୁହେଁ । କଳ୍ପନା ହେଉଛି ବାସ୍ତବତାର କଳାତ୍ମକ ରୂପାୟନ। ପ୍ରତ୍ୟେକ ବାସ୍ତବତାକୁ ସରସ ପ୍ରକାଶ କରିବାପାଇଁ ମଧ୍ୟ କଳା ଜ୍ଞାନ ଆବଶ୍ୟକ । ଏହି ଏକକରେ ଛାତ୍ରଛାତ୍ରୀ ତାହା ଉପଲବ୍ଧି କରି ପାରିବେ।

୨ୟ ଏକକ : ପରିବେଶ ସଚେତନତା ଆଜି ସମୟର ସବୁଠୁ ବଡ ଆହ୍ୱାନ। ପରିବେଶ ବିଜ୍ଞାନକୁ ଆଧାରକରି ସାହିତ୍ୟରେ ମଧ୍ୟ ପ୍ରକାଶପାଏ ସଚେତନତା । ତାହା ଏହି ଏକକର ଅଧ୍ୟତବ୍ୟ ବିଷୟ ।

୩ୟ ଏକକ : ମନୁଷ୍ୟ ସମେତ ସମଗ୍ର ଜୀବଜଗତ ସାହିତ୍ୟର କେନ୍ଦ୍ରବିନ୍ଦୁ । ଜୀବନର କଲ୍ୟାଣ ହିଁ ଜୀବବିଜ୍ଞାନ ଓ ସାହିତ୍ୟ ଉଭୟର ଲକ୍ଷ୍ୟ । ପଶୁପକ୍ଷୀ, କୀଟପତଙ୍ଗ ମଧ୍ୟ ସାହିତ୍ୟର ଆଧାରଉତ୍ସ । ସୁତରାଂ ଜୀବବିଜ୍ଞାନ ଓ ସାହିତ୍ୟର ଅନ୍ତଃସମ୍ପର୍କ ବିଷୟରେ ଛାତ୍ରଛାତ୍ରୀ ଏହାଦ୍ୱାରା ଅବଗତ ହୋଇପାରିବେ ।

୪ର୍ଥ ଏକକ : ଆମ ପୁରାଣ ସାହିତ୍ୟରେ ଅନେକ ବିଜ୍ଞାନଭିତ୍ତିକ ତଥ୍ୟ ପରିଦୃଷ୍ଟ ହୋଇଥାଏ। ତାହାକୁ ଆକଳନ କରି ବିଜ୍ଞାନର ଯଥେଷ୍ଟ ଅଗ୍ରଗତି ହୋଇନଥିବା ସମୟରେ ପୁରାଣକାରମାନେ ସାହିତ୍ୟରେ କିପରି ବିଜ୍ଞାନଧର୍ମୀ ଅନୁଚିନ୍ତା ପ୍ରକଟ କରିଛନ୍ତି, ତାହା ବିଦ୍ୟାର୍ଥୀମାନେ ଜାଣିବା ସମୀଚୀନ ।

ପାଠ୍ୟ ବିଷୟ

ପ୍ରଥମ ଏକକ : (କ)ସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ: ସମ୍ପର୍କ ଓ ପାର୍ଥକ୍ୟ
(ଖ) ସାହିତ୍ୟରେ ବୈଜ୍ଞାନିକ ଦୃଷ୍ଟିଭଙ୍ଗୀ

ଦ୍ୱିତୀୟ ଏକକ : ସାହିତ୍ୟ ଓ ପରିବେଶ ବିଜ୍ଞାନ

ତୃତୀୟ ଏକକ : ସାହିତ୍ୟ ଓ ଜୀବବିଜ୍ଞାନ

ଚତୁର୍ଥ ଏକକ : ପୁରାଣରେ ବିଜ୍ଞାନର ସଂକେତ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧. ପ୍ରାଣୀ ବିଜ୍ଞାନ ପରିଚୟ - ବସନ୍ତ କୁମାର ବେହୁରା, ଉପେନ୍ଦ୍ର ଚନ୍ଦ୍ର ପଣ୍ଡା, ଓଡ଼ିଶା ରାଜ୍ୟ ପାଠ୍ୟ ପୁସ୍ତକ ପ୍ରଣୟନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୨. ଆମ ପରିବେଶ (ପ୍ରଦୂଷଣ ଓ ସୁରକ୍ଷା) - ଡକ୍ଟର ବିଶ୍ୱନାଥ ସାହୁ, ବିଶ୍ୱ କୁସୁମ ପ୍ରତିଷ୍ଠାନ, ସୂର୍ଯ୍ୟ ନଗର,ଭୁବନେଶ୍ୱର

୩. ପରିବେଶ ନାରୀବାଦ ଓ ହୃଷୀକେଶ ପଣ୍ଡାଙ୍କ କଥା ସମ୍ଭାର - ବସ୍ତୁବାହନ ମହାପାତ୍ର, ବିଜୟିନୀ ପବ୍ଲିକେଶନ୍, କଟକ

୪. ବିଜ୍ଞାନର ରୂପ - ଦେବକାନ୍ତ ମିଶ୍ର, ଜଗନ୍ନାଥ ରଥ, ବିନୋଦ ବିହାରୀ କଟକ

୫. ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ ଓ ଓଡ଼ିଆ ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ - ନିରୋଦ କୁମାର ମନ୍ତ୍ରୀ, କଲ୍ୟାଣୀ ପବ୍ଲିକେସନ, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧.ପରିବେଶ ବିଜ୍ଞାନ ଉପରେ ଆଧାରିତ ଗୋଟିଏ ପୁସ୍ତକର ନାମ ଲେଖ ? (୧ ମାର୍କ)

୨. ଓଡ଼ିଆ ସାହିତ୍ୟର ଦୁଇଟି ମାନବେତର ଗଳ୍ପର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ସାହିତ୍ୟର କଳ୍ପନା ପଛରେ କିପରି ବାସ୍ତବତା ଲୁକ୍କାୟିତ ଥାଏ, ବୁଝାଇ ଦିଅ। (୫ ମାର୍କ)

୪. ପୁରାଣ ସାହିତ୍ୟରେ ନିହିତ ବୈଜ୍ଞାନିକ ଦୃଷ୍ଟିଭଙ୍ଗୀ ଉପରେ ଆଲୋକପାତ କର। (୮ ମାର୍କ)

ଦକ୍ଷତା ବିକାଶମୂଳକ ପାଠ୍ୟକ୍ରମ

Skill Enhancement Course (SEC)

ପ୍ରଥମ ପତ୍ର

ଅନୁବାଦ ସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳ ଶ୍ରୁତି) :

ଛାତ୍ରଛାତ୍ରୀଙ୍କ ଦକ୍ଷତା ବୃଦ୍ଧି ପାଇଁ ଅନୁବାଦ ସାହିତ୍ୟ ବିଶେଷ ସହାୟକ ହେବ । ଅନୁବାଦର ତାତ୍ତ୍ୱିକ ଦିଗ ସହିତ ଓଡ଼ିଆ ଅନୁବାଦ ସାହିତ୍ୟର ରୂପରେଖ ଏବଂ ଅନ୍ୟ ଭାଷାର ସାହିତ୍ୟକୁ ଓଡ଼ିଆରେ ଅନୁବାଦ କରିବା ତଥା ବିଶିଷ୍ଟ ଓଡ଼ିଆ ରଚନାକୁ ଅନ୍ୟ ଭାଷାରେ ଅନୁବାଦ କରିବା ବିଷୟରେ ଏହି ପାଠ୍ୟପତ୍ରରୁ ବିଦ୍ୟାର୍ଥୀମାନେ ଜ୍ଞାନ ଆହରଣ କରିପାରିବେ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଅନୁବାଦ କଣ? ତାହାର ସ୍ୱରୂପ କିପରି ? ଅନୁବାଦ କ୍ଷେତ୍ରରେ କେଉଁକେଉଁ ଦିଗପ୍ରତି ସଚେତନ ହେବା ଆବଶ୍ୟକ, ସେହି ଜିଜ୍ଞାସାକୁ ଚରିତାର୍ଥ କରିବ ଶଂସିତ ଏକକଟି ।

୨ୟ ଏକକ : ପ୍ରାଚୀନକାଳଠାରୁ ଆଧୁନିକକାଳ ପର୍ଯ୍ୟନ୍ତ ଓଡ଼ିଆ ଅନୁବାଦ ସାହିତ୍ୟର ଗତିକ୍ରମ ଓ ତାର ବିଶେଷତ୍ୱକୁ ଏଠି ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହେବେ ।

୩ୟ ଏକକ : ଓଡ଼ିଶାର ଅନୁବାଦକମାନେ ବିବିଧ ଭାରତୀୟ ଭାଷାର ସାହିତ୍ୟକୁ ଓଡ଼ିଆ ଭାଷାରେ ଅନୁବାଦ କରିଥିବା ଦୃଷ୍ଟିଗୋଚର ହୁଏ । ଏହି ଏକକରେ ବିଦ୍ୟାର୍ଥୀମାନେ ହିନ୍ଦୀ କିମ୍ବା ବଙ୍ଗଳା ଭାଷାର ସ୍ମରଣୀୟ ରଚନାକୁ ଓଡ଼ିଆ ଭାଷାରେ ଅନୁବାଦ କରିବାର ସୁଯୋଗ ପାଇବେ।

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାରେ ରଚିତ ସାହିତ୍ୟକୃତିର ଅନୁବାଦ କାର୍ଯ୍ୟ ଅନ୍ୟଭାଷାକୁ ଆଶାନୁରୂପ ହୋଇନାହିଁ । ଏହି ଏକକରେ ହିନ୍ଦୀ କିମ୍ବା ଇଂରାଜୀ ଭାଷାରେ ଓଡ଼ିଆ ସାହିତ୍ୟର ଏକ ଉଲ୍ଲେଖଯୋଗ୍ୟ ରଚନାର କିୟଦଂଶ ଅନୁବାଦ କରିବାର ପ୍ରାବଧାନ ରହିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଅନୁବାଦର ସଂଜ୍ଞା ସ୍ୱରୂପ

୨ୟ ଏକକ : ଓଡ଼ିଆ ଅନୁବାଦ ସାହିତ୍ୟ

୩ୟ ଏକକ : ଅନ୍ୟଭାଷାର ସାହିତ୍ୟ : ଓଡ଼ିଆ ଅନୁବାଦ
(ହିନ୍ଦୀ କିମ୍ବା ବଙ୍ଗଳା)

୪ର୍ଥ ଏକକ : ଅନ୍ୟ ଭାଷାର ଅନୁବାଦ (ହିନ୍ଦୀ କିମ୍ବା ଇଂରାଜୀ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧. ଅନୁବାଦ ତତ୍ତ୍ୱ ଓ ପ୍ରୟୋଗ – ସଂ. ମନୋରଞ୍ଜନ ପ୍ରଧାନ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

୨. ସାହିତ୍ୟ ତତ୍ତ୍ୱ : ପ୍ରାଚ୍ୟ ପାଶ୍ଚାତ୍ୟ – ଜ୍ୟୋସ୍ନାମୟୀ ପ୍ରଧାନ, ଫେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୩. ଗବେଷଣା ଅନୁବାଦ ସମ୍ପାଦନାକଳା – ନାରାୟଣ ସାହୁ, ସତ୍ୟ ନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର

୪. ଅନୁବାଦ କଳା : ପରିସୀମା ଓ ପୁରୋଦୃଷ୍ଟି – ସଂ ସଂଘମିତ୍ରା ମିଶ୍ର, ପଣ୍ଡିତ ଶ୍ରୀଧର ଦାସ ମେମୋରିଆଲ ଟ୍ରଷ୍ଟ, ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, ଭୁବନେଶ୍ୱର

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. ରତ୍ନାକର ଗର୍ଗବଟୁ କେଉଁ ବିଖ୍ୟାତ ଗ୍ରନ୍ଥର ଓଡ଼ିଆ ଅନୁବାଦକ ? (୧ ମାର୍କ)

୨. ନୀଳକଣ୍ଠଙ୍କ 'ପ୍ରଣୟିନୀ' କେଉଁ କବିଙ୍କ କେଉଁ ଇଂରାଜୀ ରଚନାର ଅନୂଦିତ ରୂପ । (୨ ମାର୍କ)

୩. ହିନ୍ଦୀ ଭାଷାର ରଚନାକୁ ଓଡ଼ିଆ ଭାଷାରେ ଅନୁବାଦ କରିଥିବା ଜଣେ ବିଶିଷ୍ଟ ଅନୁବାଦକଙ୍କ ବିଷୟରେ ଲେଖ । (୫ ମାର୍କ)

୪. ଓଡ଼ିଆ ଭାଷାର କେଉଁକେଉଁ ରଚନା ହିନ୍ଦୀ ବା ଇଂରାଜୀ ଭାଷାରେ ଅନୂଦିତ ତାହାର ବିବରଣୀ ପ୍ରଦାନ କର । (୮ ମାର୍କ)

ଦକ୍ଷତା ବିକାଶମୂଳକ ପାଠ୍ୟକ୍ରମ
Skill Enhancement Course (SEC)
ଦ୍ୱିତୀୟ ପତ୍ର

ଗଣମାଧ୍ୟମ ଓ ଗଣଯୋଗାଯୋଗ

Course Outcome (ପାଠ୍ୟକ୍ରମ ଫଳଶ୍ରୁତି) : ସାମ୍ପ୍ରତିକ ସମୟରେ ଗଣମାଧ୍ୟମର ଭୂମିକା ମଧ୍ୟ ଖୁବ୍‌ପ୍ରଭାବଶାଳୀ । ତେଣୁ ସ୍ନାତକଶ୍ରେଣୀର ଛାତ୍ରଛାତ୍ରୀ ଗଣମାଧ୍ୟମ ସମ୍ପର୍କରେ ଅବଗତହେଲେ ସେମାନଙ୍କ ଦକ୍ଷତା ବୃଦ୍ଧିରେ ସହାୟକ ହେବ । ସେ ଦୃଷ୍ଟିରୁ ଏହିପାଠ୍ୟ ପତ୍ରଟି ହେବ ଉପାଦେୟ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଗଣମାଧ୍ୟମ ଓ ତାର ବିବିଧରୂପ ସମ୍ପର୍କରେ ଜାଣିବାପାଇଁ ଏହି ଏକକ ସହାୟତା କରିବ ।

୨ୟ ଏକକ : ଗଣମାଧ୍ୟମଗୁଡ଼ିକ ସମାଜର ବାସ୍ତବତାକୁ ପରିପ୍ରକାଶ କରିବାସହ ଜନସମାଜକୁ ସଚେତନ କରେ । ସୁତରାଂ ଗଣମାଧ୍ୟମର ସାମାଜିକ ଦାୟିତ୍ୱବୋଧ କିପରି ହେବା ଆବଶ୍ୟକ, ତାହା ଏହି ଏକକର ଅଧ୍ୟୟନରୁ ଶିକ୍ଷାର୍ଥୀ ଜାଣିପାରିବେ ।

୩ୟ ଏକକ : ଗଣଯୋଗାଯୋଗ କଣ, ସେ ସମ୍ପର୍କରେ ଅବଗତ ହୋଇ ତାର ସ୍ୱରୂପ ଓ ଉପାଦେୟତା ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଶିକ୍ଷାଲାଭ କରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ: ଗଣମାଧ୍ୟମ ଓ ତାର ପ୍ରକାରଭେଦ

୨ୟ ଏକକ: ଗଣମାଧ୍ୟମର ସାମାଜିକ ଦାୟିତ୍ୱବୋଧ

୩ୟ ଏକକ: ଗଣଯୋଗାଯୋଗର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ଉପାଦେୟତା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧ . ସମ୍ବାଦ ପତ୍ର ଓ ଗଣମାଧ୍ୟମ – ମୃଣାଳ ଚାଟାର୍ଜୀ, ଶେଫାଳୀ କମ୍ୟୁନିକେସନ, ଢେଙ୍କାନାଳ

୨ . ଗଣମାଧ୍ୟମ ଓ ଗଣଯୋଗାଯୋଗ – ଶିଶିର ବେହେରା, ଫ୍ରେଣ୍ଡସ ପବ୍ଲିକେଶନ୍, କଟକ

୩ . ଯୋଗାଯୋଗର ଭାଷା ଓଡ଼ିଆ – ଓଡ଼ିଆ ଭାଷା ପ୍ରତିଷ୍ଠାନ , ଭୁବନେଶ୍ୱର

୪ . ଯୋଗାଯୋଗ ମୂଳକ ମାତୃଭାଷା – ବିରଞ୍ଚି ନାରାୟଣ ସାମଲ , ସତ୍ୟ ନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧ . ସମାଜ ଖବରକାଗଜ କେଉଁ ପ୍ରକାର ଗଣମାଧ୍ୟମ? (୧ ମାର୍କ)

୨ . ପାଞ୍ଚଗୋଟି ବୈଦ୍ୟୁତିକ ଗଣମାଧ୍ୟମର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩ . ଗଣମାଧ୍ୟମର ପାଞ୍ଚଗୋଟି ସାମାଜିକ ଦାୟିତ୍ୱ ଲେଖ ।(୫ ମାର୍କ)

୪ . ଗଣଯୋଗାଯୋଗର ସ୍ୱରୂପ ଓ ବିଶେଷତ୍ୱ ଲେଖ । (୮ ମାର୍କ)

ଦକ୍ଷତା ବିକାଶମୂଳକ ପାଠ୍ୟକ୍ରମ

Skill Enhancement Course (SEC)

ତୃତୀୟ ପତ୍ର

ଓଡ଼ିଆ କମ୍ପ୍ୟୁଟର ଶିକ୍ଷା

Course Outcome: (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ଆଜିର ଯୁଗକୁ କମ୍ପ୍ୟୁଟରର ଯୁଗବୋଲି ଗଣନା କରାଯାଏ । କମ୍ପ୍ୟୁଟରର ଜ୍ଞାନକୌଶଳ ଛାତ୍ରଛାତ୍ରୀଙ୍କ ପାଇଁ ଅତ୍ୟନ୍ତ ଉପାଦେୟ। ତେଣୁ ସ୍ନାତକଶ୍ରେଣୀରେ ଓଡ଼ିଆ କମ୍ପ୍ୟୁଟର ଶିକ୍ଷା ପାଠ୍ୟପତ୍ରଟି ଶିକ୍ଷାର୍ଥୀଙ୍କ ଦକ୍ଷତାବୃଦ୍ଧିରେ ସହାୟକ ହେବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : କମ୍ପ୍ୟୁଟର ଓ ତାର ବିଭିନ୍ନ ଅଂଶ ସମ୍ପର୍କରେ ପରିଚୟ ହାସଲ ନିମିତ୍ତ ଏହି ଏକକ ପରିକଳ୍ପିତ।

୨ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ ଓ ସାମାଜିକ ଗଣମାଧ୍ୟମର ବ୍ୟବହାର ପ୍ରସଙ୍ଗରେ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହେବେ।

୩ୟ ଏକକ : କମ୍ପ୍ୟୁଟରରେ ଓଡ଼ିଆ ମୁଦ୍ରଣ ଶିକ୍ଷାପାଇଁ ଛାତ୍ରଛାତ୍ରୀ ଏହି ଏକକରେ ଅଭ୍ୟାସ କରିପାରିବେ ଏବଂ ପରୀକ୍ଷାରେ ତାଙ୍କର ମୁଦ୍ରଣ ଦକ୍ଷତା ନିର୍ଣ୍ଣୟ କରାଯାଇପାରିବ।

୪ର୍ଥ ଏକକ: କମ୍ପ୍ୟୁଟର ମାଧ୍ୟମରେ ଛାତ୍ରଛାତ୍ରୀମାନେ କିପରି ପାୱାରପଏଣ୍ଟରେ ସ୍ଲାଇଡ୍ ପ୍ରସ୍ତୁତ କରିବେ। ଟେବୁଲ୍, ଫିଗର୍ସ ପ୍ରଭୃତି ପ୍ରସ୍ତୁତକରିବା ସହିତ କମ୍ପ୍ୟୁଟର ସଂଚାଳନରେ ଦକ୍ଷତା ଅର୍ଜନକରିବେ, ଏହି ଏକକଟି ସେ ବିଷୟରେ ଜ୍ଞାନ ପ୍ରଦାନକରିବ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : କମ୍ପ୍ୟୁଟର ଓ ତାର ବିଭିନ୍ନ ଅଂଶ

୨ୟ ଏକକ : ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ ଓ ସାମାଜିକ ଗଣମାଧ୍ୟମର ବ୍ୟବହାର

୩ୟ ଏକକ : କମ୍ପ୍ୟୁଟରରେ ଓଡ଼ିଆ ଡି.ଟି.ପି ଶିକ୍ଷା

୪ର୍ଥ ଏକକ : ପାୱାରପଏଣ୍ଟରେ ସ୍ଲାଇଡ୍ ପ୍ରସ୍ତୁତ, ଟେବୁଲ୍ , ଫିଗର୍ସ, ପିକଚର୍

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of reference) :

୧. ମୌଳିକ କମ୍ପ୍ୟୁଟର ଶିକ୍ଷା – ଦେବକାନ୍ତ ମିଶ୍ର, ଶୁଭ୍ରାଂଶୁ ଶେଖର ତ୍ରିପାଠୀ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ।

୨. ଓଡ଼ିଆରେ କମ୍ପ୍ୟୁଟର ଶିକ୍ଷା – ରୁଦ୍ରନାରାୟଣ ମହାପାତ୍ର, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ।

୩. ଓଡ଼ିଆ ଭାଷାରେ କମ୍ପ୍ୟୁଟରର ପ୍ରୟୋଗ – ସୁଧୀର ଚନ୍ଦ୍ର ମହାନ୍ତି, ଏ.କେ. ମିଶ୍ର ପବ୍ଲିକେଶନ, ଭୁବନେଶ୍ୱର।

୪. କମ୍ପ୍ୟୁଟରରେ ଓଡ଼ିଆ ଭାଷାର ବ୍ୟବହାର ଓ ପ୍ରୟୋଗ – ରୁଦ୍ରପ୍ରସାଦ ମିଶ୍ର, ଆଜିଅନ୍ତା ପବ୍ଲିଶର୍ସ, ଜଗତସିଂହପୁର।

୫. କମ୍ପ୍ୟୁଟର ଶିକ୍ଷା – ରାନୁ ବନିକ୍, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ।

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. କମ୍ପ୍ୟୁଟରର ଉଦ୍ଭାବକ କିଏ? (୧ ମାର୍କ)

୨. ମାଉସ୍‌ର ଦୁଇଟି କାର୍ଯ୍ୟ ଲେଖ । (୨ ମାର୍କ)

୩. ଇନ୍‌ପୁଟ ଡିଭାଇସ୍ କାହାକୁ କୁହାଯାଏ, ଉଦାହରଣ ସହ ଲେଖ । (୫ ମାର୍କ)

୪. କମ୍ପ୍ୟୁଟରର ବିଭିନ୍ନ ଅଂଶ ଓ ତାର କାର୍ଯ୍ୟକାରିତା ଦର୍ଶାଅ । (୮ ମାର୍କ)

ଗ୍ରୀଷ୍ମ ଅବକାଶକାଳୀନ ପାଠ୍ୟକ୍ରମ
Summer Vacation Course (SVC)
ସର୍ଜନ କଳା

୧ମ ପତ୍ର (Paper-I)

କବିତା: ପଠନ ଓ ଲିଖନ କଳା

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି) :

ସ୍ନାତକଶ୍ରେଣୀର ଛାତ୍ରଛାତ୍ରୀଙ୍କ ମଧ୍ୟରେ ସର୍ଜନଶୀଳତାକୁ ଉତ୍ସାହିତ କରିବା ପାଇଁ ଏହିପତ୍ରଟି ପରିକଳ୍ପିତ । ଓଡ଼ିଆ ଭାଷାରେ ଗଳ୍ପକବିତା, ପ୍ରବନ୍ଧ, କ୍ଷୁଦ୍ରନାଟକ ରଚନା କରିବାର ଅଭ୍ୟାସ ବଳବତ୍ତର ରହିଲେ ଭବିଷ୍ୟତରେ ଛାତ୍ରଛାତ୍ରୀମାନେ ସର୍ଜନଶୀଳସାହିତ୍ୟିକଭାବେ ପ୍ରତିଷ୍ଠା ଅର୍ଜନ କରିବେ । କେବଳ ଶ୍ରେଣୀ ଗୃହର ଅଧ୍ୟୟନ ଭିତରେ ସାହିତ୍ୟ ଶିକ୍ଷା ସୀମାବଦ୍ଧ ହେବା ଅନୁଚିତ । ଛାତ୍ରର ସର୍ଜନଶୀଳ ମାନସିକତା ଏହିପତ୍ର ମାଧ୍ୟମରେ ବିକଶିତ ହୋଇପାରିବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : କବିତାର ପରିଭାଷା ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଅବଗତ ହେବେ ।

୨ୟ ଏକକ : କବିତା ରଚନାର ଶୈଳୀ କିପରି ହେବା ଆବଶ୍ୟକ ତାହା ଏଠାରେ ଉପଲବ୍ଧ ହେବ ।

୩ୟ ଏକକ : ଛାନ୍ଦସିକ କବିତା ଓ ମୁକ୍ତ କବିତାର ଧାରା ଆମ ସାହିତ୍ୟରେ ରହିଆସିଛି, ମାତ୍ର କବିତା ଯୁଗପୋଯୋଗୀ ହେବା ଆବଶ୍ୟକ । ତାହାର ପଠନ ଓ ଆବୃତ୍ତି କଳା ଶିକ୍ଷାର୍ଥୀମାନେ ଜାଣିବା ଉଚିତ୍ ।

୪ର୍ଥ ଏକକ : ଏହି ଏକକରେ କବିତା ରଚନା ସମ୍ପର୍କରେ ଦିଗଦର୍ଶନ ମିଳିପାରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ: କବିତାର ପରିଭାଷା

୨ୟ ଏକକ: କବିତାର ରଚନା ଶୈଳୀ

୩ୟ ଏକକ: ଛନ୍ଦ ଯୁକ୍ତ ଓ ମୁକ୍ତ ଛନ୍ଦ କବିତା ପଠନ/ ଆବୃତ୍ତି

୪ର୍ଥ ଏକକ: କବିତା ଲିଖନବିଧି ଓ ସତର୍କତା

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧. ସାହିତ୍ୟର ସନ୍ଧିଧାନ - ପୂର୍ଣ୍ଣଚନ୍ଦ୍ର ମହାନ୍ତି, ୱାର୍ଡ ୱାଲଡ୍, ଏ-୨, ସେକ୍ଟର-୭, ମର୍କତ ନଗର, କଟକ ।

୨. ସାହିତ୍ୟର ସୂଚୀପତ୍ର- ବିଭୂତି ପଟ୍ଟନାୟକ,ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୩. ସାହିତ୍ୟର ଗଠନରୀତି- ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୪. ସାହିତ୍ୟର ଡାଳପତ୍ର- ସୁରେନ୍ଦ୍ର କୁମାର ମହାରଣା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୫. ଓଡ଼ିଆ କାବ୍ୟକୌଶଳ- ସୁଦର୍ଶନ ଆଚାର୍ଯ୍ୟ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୬. ଆଧୁନିକ କବିତାର ଦିଗଦର୍ଶନ- ସଂ- ଅପୂର୍ବ ରଂଜନ ରାୟ

୭. ସୂର୍ଯ୍ୟସ୍ନାତ – ଯତୀନ୍ଦ୍ର ମୋହନ ମହାନ୍ତି, ସୁବର୍ଣ୍ଣରେଖା, ଭୁବନେଶ୍ୱର-୬ ।

୮.କବିତା ୧୯୬୨ ଓ ନୂତନ କବିତାର ଭୂମିକା – ସଚ୍ଚିଦାନନ୍ଦ ରାଉତରାୟ , ଗ୍ରନ୍ଥମନ୍ଦିର, କଟକ ।

ନମୁନା ପ୍ରଶ୍ନାବଳୀ (Sample questions) :

୧. କିଏ କବିତାକୁ ଶକ୍ତିଶାଳୀ ଭାବନାର ସ୍ୱତଃସ୍ଫୂର୍ତ୍ତ ପରିପ୍ରକାଶ ବୋଲି କହିଛନ୍ତି (୧ ମାର୍କ)

୨. ଅମିତ୍ରାକ୍ଷର ଛନ୍ଦର ଏକ କାବ୍ୟ ବା କବିତାର ଉଦାହରଣ ଦିଅ । (୨ ମାର୍କ)

୩. କବିତାରେ ଆତ୍ମକଥନ ଶୈଳୀ କହିଲେ କଣ ବୁଝ , ସଦୃଷ୍ଟାନ୍ତ ଲେଖ ।(୫ ମାର୍କ)

୪. ନିଜ ମନରୁ ଏକ କବିତା ରଚନା କର । (୮ ମାର୍କ)

ଗ୍ରୀଷ୍ମ ଅବକାଶକାଳୀନ ପାଠ୍ୟକ୍ରମ
Summer Vacation Course (SVC)
ସର୍ଜନ କଳା

୨ୟ ପତ୍ର (Paper-II)

ଗଳ୍ প : ପଠନ ଓ ଲିଖନ କଳା

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଏହି ଏକକରୁ କ୍ଷୁଦ୍ରଗଳ୍ପର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ଉପରେ ଧାରଣା ମିଳିପାରିବ ।

୨ୟ ଏକକ : କ୍ଷୁଦ୍ରଗଳ୍ପର ଶିଳ୍ପରୀତି ସଂପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଏଠାରେ ଜାଣିପାରିବେ ।

୩ୟ ଏକକ : କ୍ଷୁଦ୍ରଗଳ୍ପ ପଠନରେ ଶୁଦ୍ଧତା ଓ ଉଚ୍ଚାରଣ ସ୍ପଷ୍ଟତା କିପରି ଆବଶ୍ୟକ ତାହାର ଅବଗତି ମିଳିବ ।

୪ର୍ଥ ଏକକ : କ୍ଷୁଦ୍ରଗଳ୍ପ ରଚନାର କଳାକୌଶଳ ଶିକ୍ଷାକରି ଛାତ୍ରଛାତ୍ରୀ ଗଳ୍ପଲେଖିବାରେ ପ୍ରୟାସୀ ହେବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଗଳ୍ପର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ

୨ୟ ଏକକ : ଗଳ୍ପର ଶିଳ୍ପରୀତି

୩ୟ ଏକକ : ଗଳ୍ପ ପଠନ (ଆବୃତ୍ତିରେ ଧାରାବାହିକତା, ଉଚ୍ଚାରଣ ସ୍ପଷ୍ଟତା)

୪ର୍ଥ ଏକକ : ଗଳ୍ପ ଲିଖନ (କାହାଣୀ - ଚରିତ୍ର - ପ୍ରସଙ୍ଗ ଉପସ୍ଥାପନା ଶୈଳୀ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧. ସାହିତ୍ୟର ସମ୍ବିଧାନ - ପୂର୍ଣ୍ଣଚନ୍ଦ୍ର ମହାନ୍ତି, ୱାର୍ଡ ୱାଲଡ୍, ଏ-୨, ସେକ୍ଟର-୬, ମର୍କତ ନଗର, କଟକ ।

୨. ସାହିତ୍ୟର ସୂଚୀପତ୍ର- ବିଭୂତି ପଟ୍ଟନାୟକ,ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୩. ସାହିତ୍ୟର ଗଠନରୀତି- ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୪. ସାହିତ୍ୟର ଡାଳପତ୍ର- ସୁରେନ୍ଦ୍ର କୁମାର ମହାରଣା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୫. ଓଡ଼ିଆ କ୍ଷୁଦ୍ରଗଳ୍ପର ଇତିହାସ– ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

Sample questions (ନମୁନା ପ୍ରଶ୍ନାବଳୀ):

୧. କ୍ଷୁଦ୍ରଗଳ୍ପର ଏକ ସଂଜ୍ଞା ପ୍ରଦାନକର । (୧ ମାର୍କ)

୨. ଓଡ଼ିଆ ସାହିତ୍ୟରେ ବ୍ୟଙ୍ଗଗଳ୍ପ ରଚନା କରୁଥିବା ଦୁଇଜଣ ଲେଖକଙ୍କ ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ଗଳ୍ପପଠନ ସମୟରେ ପାଠକ କେଉଁକେଉଁ ଦିଗପ୍ରତି ଧ୍ୟାନଦେବା ଆବଶ୍ୟକ ?(୫ ମାର୍କ)

୪. ମନରୁ କଳ୍ପନାକରି ଏକ କ୍ଷୁଦ୍ରଗଳ୍ପ ରଚନା କର । (୮ ମାର୍କ)

ଗ୍ରୀଷ୍ମ ଅବକାଶକାଳୀନ ପାଠ୍ୟକ୍ରମ

Summer Vacation Course (SVC)

ସର୍ଜନ କଳା

୩ୟ ପତ୍ର (Paper-III)

ପ୍ରବନ୍ଧ : ପଠନ ଓ ଲିଖନ କଳା

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ପ୍ରବନ୍ଧର ସଂଜ୍ଞା ଓ ପ୍ରକାରଭେଦ ଉପରେ ଏହି ଏକକରେ ଜାଣିବାର ସୁଯୋଗ ରହିଛି ।

୨ୟ ଏକକ: ପ୍ରବନ୍ଧ ରଚନାରେ ପ୍ରାବନ୍ଧିକ କିପରି କଳାକୌଶଳ ପ୍ରୟୋଗ କରିଥାଏ ତାହା ଏଠାରେ ଶିକ୍ଷାର୍ଥୀମାନେ ଜାଣିପାରିବେ ।

୩ୟ ଏକକ : ପ୍ରବନ୍ଧପାଠ କଲାବେଳେ ଆବଶ୍ୟକ ବିରାମ ସ୍ପଷ୍ଟ ଉଚ୍ଚାରଣ ଓ ଧାରାବାହିକତା କିପରି ରକ୍ଷା କରାଯିବ , ସେହି ଜ୍ଞାନ ଛାତ୍ରଛାତ୍ରୀ ପାଇପାରିବେ ।

୪ର୍ଥ ଏକକ : କୌଣସି ଏକ ବିଷୟ ଉପରେ କିପରି ପ୍ରବନ୍ଧ ରଚନା କରାଯିବ ତାହା ଉପଲବ୍ଧିକରି ଛାତ୍ରଛାତ୍ରୀ ପ୍ରବନ୍ଧ ରଚନାରେ ସମର୍ଥ ହେବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ପ୍ରବନ୍ଧର ପରିଭାଷା ଓ ପ୍ରକାର

୨ୟ ଏକକ : ପ୍ରବନ୍ଧ ରଚନାର କଳା ଓ କୌଶଳ

୩ୟ ଏକକ : ପ୍ରବନ୍ଧ ପଠନ କଳା (ବିଷୟ ନିର୍ବାଚନ)

୪ର୍ଥ ଏକକ : ପ୍ରବନ୍ଧ ଲିଖନ (ଭାଷା - ଭାବ - ପ୍ରସଙ୍ଗ)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧. ସାହିତ୍ୟର ସନ୍ଧିଧାନ - ପୂର୍ଣ୍ଣଚନ୍ଦ୍ର ମହାନ୍ତି, ୱାର୍ଡ ୱାଲଡ୍, ଏ-୨, ସେକ୍ଟର-୭, ମର୍କତ ନଗର, କଟକ ।

୨. ସାହିତ୍ୟର ସୂଚୀପତ୍ର- ବିଭୂତି ପଟ୍ଟନାୟକ,ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୩. ସାହିତ୍ୟର ଗଠନରୀତି- ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୪. ସାହିତ୍ୟର ଡାଳପତ୍ର- ସୁରେନ୍ଦ୍ର କୁମାର ମହାରଣା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୫. ଓଡ଼ିଆ ପ୍ରବନ୍ଧ ସାହିତ୍ୟର ଇତିହାସ- ଅସିତ କବି, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

Sample questions (ନମୁନା ପ୍ରଶ୍ନାବଳୀ):

୧. ପ୍ରଥମ ଓଡ଼ିଆ ପ୍ରବନ୍ଧର ନାମଲେଖ । (୧ ମାର୍କ)

୨. ମଧୁସୂଦନ ରାଓଙ୍କ ଯେକୌଣସି ୨ଟି ପ୍ରବନ୍ଧର ନାମ ଉଲ୍ଲେଖ କର । (୨ ମାର୍କ)

୩. ଚିନ୍ତାମୂଳକ ପ୍ରବନ୍ଧ ରଚନାରେ କୃତିତ୍ୱ ଅର୍ଜନ କରିଥିବା ଜଣେ ପ୍ରାବନ୍ଧିକଙ୍କ ରଚନାର ପରିଚୟ ଦିଅ ।(୫ ମାର୍କ)

୪. ତୁମ ଅନୁଭୂତିରୁ ଏକ ସାର୍ଥକ ପ୍ରବନ୍ଧ ରଚନାକର । (୮ ମାର୍କ)

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ଗ୍ରୀଷ୍ମ ଅବକାଶକାଳୀନ ପାଠ୍ୟକ୍ରମ

Summer Vacation Course (SVC)

ସର୍ଜନ କଳା

୪ର୍ଥ ପତ୍ର (Paper-IV)

କ୍ଷୁଦ୍ରନାଟକ: ପଠନ ଓ ଲିଖନ କଳା

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ନାଟକର ପରିଭାଷା ଓ ଭିନ୍ନଭିନ୍ନ ପ୍ରକାର ନାଟକ ଉପରେ ଏହି ଏକକରେ ଦିଗ୍‌ଦର୍ଶନ ମିଳିପାରିବ ।

୨ୟ ଏକକ : କ୍ଷୁଦ୍ର ପରିସର ମଧ୍ୟରେ ରଚିତ ନାଟ୍ୟକୃତିର ବିଷୟପ୍ରସ୍ଥ ଓ ସଂଳାପ କିପରି ହେବା ଉଚିତ୍ ସେହି ଧାରଣା ଏଠାରେ ମିଳିପାରିବ ।

୩ୟ ଏକକ : ନାଟକର ପଠନକଳା ସ୍ୱତନ୍ତ୍ର । ଛାତ୍ରଛାତ୍ରୀ ଯେକୌଣସି କ୍ଷୁଦ୍ରନାଟକକୁ କିପରି ପଠନକରିବେ ତାହା ଏହି ଏକକରୁ ଜାଣିପାରିବେ ।

୪ର୍ଥ ଏକକ : ବିଷୟବସ୍ତୁ ପରିକଳ୍ପନା ଦୃଶ୍ୟବିଭାଜନ ଓ ଉପସଂହାର ନିର୍ଦ୍ଧାରଣ ବିଷୟରେ ଅବଗତ ହୋଇ ନାଟକରଚନାରେ ଛାତ୍ରଛାତ୍ରୀ ଆଗ୍ରହପ୍ରକାଶ କରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ: ନାଟକର ସଂଜ୍ଞା ଓ ବିବିଧରୂପ

୨ୟ ଏକକ: କ୍ଷୁଦ୍ର ନାଟକ: ପରିସର ଓ ସଂଳାପ

୩ୟ ଏକକ: କ୍ଷୁଦ୍ର ନାଟକ: ପଠନ ପ୍ରକ୍ରିୟା - ପରିବେଷଣ

୪ର୍ଥ ଏକକ: କ୍ଷୁଦ୍ର ନାଟକ: ଲିଖନ , ବିଷୟ ପରିକଳ୍ପନା, ଦୃଶ୍ୟ ବିଭାଜନ ଓ ପରିଣତି ନିର୍ଦ୍ଧାରଣ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧. ସାହିତ୍ୟର ସନ୍ଧିଧାନ - ପୂର୍ଣ୍ଣଚନ୍ଦ୍ର ମହାନ୍ତି, ୱାର୍ଡ ୱାଲଡ୍, ଏ-୨, ସେକ୍ଟର-୭, ମର୍କତ ନଗର, କଟକ ।

୨. ସାହିତ୍ୟର ସୂଚୀପତ୍ର- ବିଭୂତି ପଟ୍ଟନାୟକ,ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୩. ସାହିତ୍ୟର ଗଠନରୀତି- ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୪. ସାହିତ୍ୟର ଡାଳପତ୍ର- ସୁରେନ୍ଦ୍ର କୁମାର ମହାରଣା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୫. ଓଡ଼ିଆ ନାଟ୍ୟ ସାହିତ୍ୟ- କୃଷ୍ଣଚରଣ ବେହେରା, ଫ୍ରେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ ।

୬. ସାହିତ୍ୟର ରୂପରେଖ - ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ବାଳକୃଷ୍ଣ ବେହେରା, ବିଦ୍ୟାପୁରୀ, ବାଲୁବଜାର, କଟକ-୨୦୧୭

Sample questions (ନମୁନା ପ୍ରଶ୍ନାବଳୀ):

୧. ଓଡ଼ିଆ ଭାଷରେ ରଚିତ ଏକ ଟ୍ରାଜେଡି ନାଟକର ଦୃଷ୍ଟାନ୍ତ ଦିଅ । (୧ ମାର୍କ)

୨. ନାଟକରେ ବ୍ୟବହୃତ ପାଞ୍ଚ ପ୍ରକାର ସଂଳାପ ମଧ୍ୟରେ ଯେକୌଣସି ଦୁଇଟି ଉଲ୍ଲେଖକର । (୨ ମାର୍କ)

୩. ମିଳନାନ୍ତକ ନାଟକର ପରିଣତି ଉପରେ ଆଲୋକପାତ କର । (୫ ମାର୍କ)

୪. ମନରୁ କଳ୍ପନା କରି ଗୋଟିଏ କ୍ଷୁଦ୍ର ନାଟକ ରଚନାକର । (୮ ମାର୍କ)

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ମୂଲ୍ୟବୋଧଭିତ୍ତିକ ପାଠ୍ୟକ୍ରମ
Value Added Course (VAC)
୧ମ ପତ୍ର (Paper-I)
ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତି

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଶ୍ରୀଜଗନ୍ନାଥ ଓଡ଼ିଶାର ଜାତୀୟ ଦେବତା । ସମଗ୍ର ବିଶ୍ୱ ପରିପ୍ରେକ୍ଷୀରେ ତାଙ୍କର ମହିମା ବିସ୍ତୃତ । ସମସ୍ତ ଧର୍ମ ମତବାଦର ସମନ୍ୱୟ ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତିରେ କଳନା କରାଯାଏ । ଶଂସିତ ପାଠ୍ୟପତ୍ରରେ ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତିର ଉନ୍ମେଷ ଓ ବିଶେଷତ୍ୱ ସହିତ ଜଗତପତି ଶ୍ରୀଜଗନ୍ନାଥଙ୍କ ଦ୍ୱାଦଶ ଯାତ୍ରା, ବହୁଭଜନ, ଜଣାଣରେ ପ୍ରତିଫଳିତ ତାଙ୍କର ରୂପ, ଗୁଣ, ମହିମା ପ୍ରଭୃତି ସମ୍ପର୍କରେ ଛାତ୍ରଛାତ୍ରୀମାନେ ଅବଗତ ହୋଇପାରିବେ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଜଗନ୍ନାଥ ସଂସ୍କୃତିର ଉନ୍ମେଷଧାରା ଖୁବ୍‌ପ୍ରାଚୀନ । ସାମ୍ୟ ଓ ମୈତ୍ରୀ ତାଙ୍କ ସଂସ୍କୃତିର ପ୍ରଧାନ ବିଶେଷତ୍ୱ । ଏହି ଏକକରେ ଛାତ୍ରଛାତ୍ରୀ ତାହା ଅବଗତ ହୋଇପାରିବେ।

୨ୟ ଏକକ : ସବୁନଦୀ ସମୁଦ୍ରରେ ମିଳିତ ହେବାପରି ବିଭିନ୍ନ ଧର୍ମ ଓ ସମ୍ପ୍ରଦାୟର ସମନ୍ୱୟ ଘଟିଛି ଶ୍ରୀଜଗନ୍ନାଥଙ୍କ ସଂସ୍କୃତିରେ । ତନ୍ମଧ୍ୟରୁ ବୌଦ୍ଧ, ଜୈନ ଓ ବୈଷ୍ଣବ ସଂସ୍କୃତି ସହିତ ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତିର ସମ୍ପର୍କକୁ ବିଦ୍ୟାର୍ଥୀ ଏଠାରେ ଅବଗତ ହେବେ ।

୩ୟ ଏକକ : ଲୀଳାମୟ ଜଗନ୍ନାଥଙ୍କ ଦ୍ୱାଦଶ ଯାତ୍ରା ଖୁବ୍‌ପ୍ରସିଦ୍ଧ, ତାହାର ବିଧିବିଧାନ ଓ ଉଦ୍ଦେଶ୍ୟ ସମ୍ପର୍କରେ ଅବଗତ ହେବା ଆବଶ୍ୟକ । ପୁନଶ୍ଚ ଶ୍ରୀଜଗନ୍ନାଥଙ୍କୁ କେନ୍ଦ୍ରକରି ଓଡ଼ିଶାର ଅଜସ୍ର ଭକ୍ତି ଗୀତିକା ରଚିତ । ଭାଷାର ସରଳତା, ଭାବର ଲାଳିତ୍ୟ ଓ ଭକ୍ତିଭାବର ମହତ୍ତ୍ୱ ତହିଁରେ ପ୍ରସ୍ଫୁଟିତ । ଏହି ଏକକର ଅଧ୍ୟୟନରୁ ତାହା ଉପଲବ୍ଧ ହେବ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : (କ) ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତିର ଉନ୍ମେଷ ଓ ବିକାଶ

(ଖ) ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତିର ବିଶେଷତ୍ୱ

୨ୟ ଏକକ : ବୌଦ୍ଧ, ଜୈନ ଓ ବୈଷ୍ଣବ ସଂସ୍କୃତି ସହ ଶ୍ରୀଜଗନ୍ନାଥ ସଂସ୍କୃତିର ସମ୍ପର୍କ

୩ୟ ଏକକ : (କ) ଶ୍ରୀ ଜଗନ୍ନାଥଙ୍କ ଦ୍ୱାଦଶ ଯାତ୍ରା

(ଖ) ଶ୍ରୀଜଗନ୍ନାଥ କୈନ୍ଦ୍ରିକ ଓଡ଼ିଆ ଭଜନ ଓ ଜଣାଣ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧.ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ଇତିହାସ -ପ୍ରବୋଧ କୁମାର ମିଶ୍ର, ବିଦ୍ୟାପୁରୀ, କଟକ

୨.ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଶ୍ରୀ ଜଗନ୍ନାଥ- ବାସୁଦେବ ସାହୁ, ଫ୍ରେଣ୍ଡସ ପବ୍ଲିଶର୍ସ

୩.ଜଗନ୍ନାଥ ମନ୍ଦିର ଓ ଜଗନ୍ନାଥ ତତ୍ତ୍ୱ -ସୂର୍ଯ୍ୟନାରାୟଣ ଦାଶ, ଫ୍ରେଣ୍ଡସ ପବ୍ଲିଶର୍ସ

୪.ଓଡ଼ିଶାର ଇତିହାସ – ପ୍ୟାରୀମୋହନ ଆଚାର୍ଯ୍ୟ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. 'ଜଗତ ଦର୍ଶନରେ ଜଗନ୍ନାଥ' ପୁସ୍ତକର ରଚୟିତା କିଏ? (୧ ମାର୍କ)

୨. କେଉଁ ମାସ କେଉଁ ତିଥିରେ ଜଗନ୍ନାଥଙ୍କ ଗୁଣ୍ଡିଚା ଯାତ୍ରା ଅନୁଷ୍ଠିତ ହୁଏ? (୨ ମାର୍କ)

୩. ବୌଦ୍ଧ ସଂସ୍କୃତି ସହ ଜଗନ୍ନାଥ ସଂସ୍କୃତିର ସାମଞ୍ଜସ୍ୟ ପ୍ରଦର୍ଶନ କର । (୫ ମାର୍କ)

୪. ଶ୍ରୀଜଗନ୍ନାଥଙ୍କ ଦ୍ୱାଦଶ ଯାତ୍ରାର ବିବରଣୀ ଦିଅ । (୮ ମାର୍କ)

ମୂଲ୍ୟବୋଧଭିତ୍ତିକ ପାଠ୍ୟକ୍ରମ
Value Added Course (VAC)
୨ୟ ପତ୍ର (Paper-II)
ଆଦିବାସୀ ସଂସ୍କୃତି

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଓଡ଼ିଶା ଏକ ଆଦିବାସୀ ବହୁଳ ରାଜ୍ୟ । ଏଠାରେ ବିଭିନ୍ନ ଆଦିବାସୀ ସଂପ୍ରଦାୟ ପ୍ରାଚୀନକାଳରୁ ରହି ଆସୁଛନ୍ତି । ଏହି ଜନଜାତିଙ୍କ ପରିଚୟ ତଥା ସାଂସ୍କୃତିକ ଜୀବନଧାରାକୁ ବିଦ୍ୟାର୍ଥୀମାନେ ଅବଗତହେବା ସମୀଚୀନ । ଏହି ପାଠ୍ୟ ପତ୍ରରେ ଆଦିବାସୀ ସଂସ୍କୃତିର ଦେବଦେବୀ, ବିବାହ ରୀତି , ପର୍ବପର୍ବାଣି ଆଦି ସମ୍ପର୍କରେ ଜାଣିବାର ସୁଯୋଗ ମିଳି ପାରିବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ଓଡ଼ିଶାରେ ଯେଉଁ ଜନଜାତିମାନେ ବସବାସ କରନ୍ତି, ସେମାନଙ୍କର ସାଧାରଣ ପରିଚୟ ଜାଣିବା ପାଇଁ ଏହି ଏକକଟି ପରିକଳ୍ପିତ।

୨ୟ ଏକକ : ଦେବଦେବୀ ଆରାଧନା ଆଦିବାସୀ ସଂସ୍କୃତିର ଭିନ୍ନ ପରିଚୟ ଦେଇଥାଏ । ଆଦିବାସୀଙ୍କ ପୂଜିତ ଦେବଦେବୀ, ତାଙ୍କ ସଂସ୍କୃତିର କିପରି ଏକ ଅଭିନ୍ନ ଅଙ୍ଗ, ତାହା ଏ ଏକକରୁ ଉପଲବ୍ଧ ହେବ ।

୩ୟ ଏକକ : ଆଦିବାସୀ ସମାଜରେ ବିବିଧ ପର୍ବପର୍ବାଣୀ କିପରି ପାଳିତ ହୁଏ ଏବଂ ସେମାନଙ୍କର ବିବାହ ରୀତିରେ କିପରି ସ୍ୱତନ୍ତ୍ରତା ରହିଛି, ଏହି ଏକକଟି ତାହାର ଧାରଣା ଦେଇ ପାରିବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଓଡ଼ିଶାର ଜନଜାତିଙ୍କ ପରିଚୟ

୨ୟ ଏକକ : ଆଦିବାସୀ ସଂସ୍କୃତିର ଦେବ-ଦେବୀ

୩ୟ ଏକକ : ଆଦିବାସୀ ସମାଜର ବିବାହ ରୀତି ଓ ପର୍ବପର୍ବାଣି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧.ଓଡ଼ିଶାର ଆଦିବାସୀ – ରବୀନ୍ଦ୍ର ମୋହନ ସେନାପତି, ବିଦ୍ୟାଭରତୀ, କଟକ

୨.ଆଦିବାସୀ ଭାଷା ଓ ସାହିତ୍ୟ – ଦମୟନ୍ତୀ ବେଶ୍ରା, ଜ୍ଞାନ ଯୁଗ ପବ୍ଲିକେଶନ୍, ଭୁବନେଶ୍ୱର

୩.ଓଡ଼ିଶାର ଜନଜାତି, ସମାଜ ସଂସ୍କୃତି ଓ ଭାଷା ଉନ୍ନୟନ – ଓ.ରା.ପା.ପୁ. ଓ ପ୍ର. ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୪.ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ଇତିହାସ – ସଂସ୍କୃତି ବିଭାଗ, ଓଡ଼ିଶା

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧.ଓଡ଼ିଶାରେ କେତେ ପ୍ରକାର ଆଦିବାସୀ ବସବାସ କରନ୍ତି ? (୧ ମାର୍କ)

୨. ଦୁଇଟି ଆଦିବାସୀ ପର୍ବର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ଆଦିବାସୀ ସମାଜର ବିବାହ ରୀତି ଉପରେ ଆଲୋକପାତ କର । (୫ ମାର୍କ)

୪. ଆଦିବାସୀ ସଂସ୍କୃତିରେ ଦେବଦେବୀ ଆରାଧନାର ବିଶେଷତ୍ୱ ଦର୍ଶାଅ । (୮ ମାର୍କ)

ମୂଲ୍ୟଭିତ୍ତିକ ପାଠ୍ୟକ୍ରମ
Value Added Course (VAC)
୩ୟ ପତ୍ର (Paper-III)
ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ପରିଚୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ଧର୍ମ ଓ ଆଧ୍ୟାତ୍ମିକତା ଦୃଷ୍ଟିରୁ ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ପରିଚୟ ସୁବିଦିତ । ଓଡ଼ିଶା ପୁଣି ଉନ୍ନତ କଳାର ଦେଶ ଭାବେ ପରିଚୟ ବହନ କରେ । ବିବିଧ ପର୍ବପର୍ବାଣି ଓ ଯାନିଯାତ୍ରା ଆମ ସଂସ୍କୃତିର ଅନ୍ୟତମ ଅଂଶ ବିଶେଷ। ତେଣୁ ପାଠ୍ୟପତ୍ରଟିରେ ଶିକ୍ଷାର୍ଥୀମାନେ ସଂସ୍କୃତି ସଂପନ୍ନ ଓଡ଼ିଶାର ପରିଚୟ ଲାଭ କରିବେ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

୧ମ ଏକକ : ଓଡ଼ିଶାର ଉଦାର ଧର୍ମ ପରମ୍ପରା ଓ ବିବିଧ ଦେବଦେବୀ ଉପାସନା ଆମ ସଂସ୍କୃତିକୁ କିପରି ସମୃଦ୍ଧ କରିଛି, ତାହା ଏହି ଏକକରୁ ଉପଲବ୍ଧ ହୋଇ ପାରିବ।

୨ୟ ଏକକ : ଓଡ଼ିଶାର ସଂସ୍କୃତିରେ ବାରମାସରେ ତେରପର୍ବ ପାଳନ ବିଧି ରହିଛି । ଆଞ୍ଚଳିକ ସ୍ତରରେ ମଧ୍ୟ ଓଡ଼ିଶାରେ ବିଭିନ୍ନ ଯାନିଯାତ୍ରା ଅନୁଷ୍ଠିତ ହୁଏ । ଏ ସବୁ ଓଡ଼ିଶାର ଜନଜୀବନକୁ ଏକତା ଓ ଭାଇଚାରାରେ ଅନୁବନ୍ଧିତ କରିଥାଏ । ଏ ବିଷୟରେ ଛାତ୍ରଛାତ୍ରୀ ଏଠାରେ ଜ୍ଞାନଲାଭ କରିବେ ।

୩ୟ ଏକକ : କଳା ଓ ଭାସ୍କର୍ଯ୍ୟ କ୍ଷେତ୍ରରେ ଓଡ଼ିଶାର ଶିଳ୍ପଗୌରବ ଖୁବ୍ ପ୍ରସିଦ୍ଧ । ତନ୍ମଧ୍ୟରୁ ନୃତ୍ୟକଳା-ଓଡ଼ିଶୀ, ଛଉ, ଚଇତି ଘୋଡ଼ା, ଚିତ୍ରକଳା- ପଟ୍ଟଚିତ୍ର, ବାନ୍ଧ କଳା, ପ୍ରସ୍ତର କଳା ଓ ଆଦିବାସୀ କଳା ଓ ଭାସ୍କର୍ଯ୍ୟ କଳାରେ ମନ୍ଦିର ଓ ଗୃହ ନିର୍ମାଣ, ପ୍ରସ୍ତର ମୃଣ୍ମୟ ବାଲୁକା ଶିଳ୍ପ ଆଦି ସମ୍ପର୍କରେ ଏହି ଏକକଟି ଛାତ୍ରଛାତ୍ରୀଙ୍କୁ ଅବଗତ କରାଇବ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ଓଡ଼ିଶାର ଧର୍ମ ପରମ୍ପରା

(କ) ବୌଦ୍ଧ, ଶୈବ, ଶାକ୍ତ

(ଖ) ବୈଷ୍ଣବ (ରାମ ଉପାସନା, କୃଷ୍ଣ ଉପାସନା, ଶ୍ରୀଜଗନ୍ନାଥ ଉପାସନା)

୨ୟ ଏକକ : ଓଡ଼ିଶାର ପର୍ବପର୍ବାଣି ଓ ଯାନିଯାତ୍ରା

(ଓଡ଼ିଶାର ବିବିଧ ଅଞ୍ଚଳର ପର୍ବପର୍ବାଣି ଓ ଯାନିଯାତ୍ରା ଉପରେ ଆଲୋକପାତ)

୩ୟ ଏକକ: ଓଡ଼ିଶାର କଳା ଓ ଭାସ୍କର୍ଯ୍ୟ

(ନୃତ୍ୟ କଳା, ଚିତ୍ର କଳା, ଭାସ୍କର୍ଯ୍ୟ କଳା)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧. ଓଡ଼ିଶାରେ ବୌଦ୍ଧ ଧର୍ମ – ନବୀନ କୁମାର ସାହୁ, ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ

୨.ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଶୈବ ଧର୍ମ – କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସୁଧା ପ୍ରକାଶନ, କଟକ

୩. ଓଡ଼ିଶୀ ବୈଷ୍ଣବ ଧର୍ମ – କାହ୍ନୁ ଚରଣ ମିଶ୍ର , ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡେମୀ

୪. ଓଡ଼ିଆ ସାହିତ୍ୟରେ ବିଭିନ୍ନ ଧର୍ମଧାରା – ଫକୀର ମୋହନ ଦାସ , ଉତ୍କଳଗୌରବାଣୀ ସଂସଦ

୫. ଓଡ଼ିଶାର ପର୍ବପର୍ବାଣୀ ଓଷାବ୍ରତ ଯାନିଯାତ୍ରା – ଶ୍ରୀ ବ୍ରଜମୋହନ ମହାନ୍ତି – ଉତ୍କଳ ପାଠକ ସଂସଦ, ଓଡ଼ିଶା ବୁକ୍ ଷ୍ଟୋର, କଟକ

୬. ଓଡ଼ିଶାର ଆଦିବାସୀ ଚିତ୍ରକଳା- ଶ୍ରୀ ରବୀନ୍ଦ୍ର କୁମାର ସାହୁ-ଆଦିବାସୀ ଭାଷା ଓ ସଂସ୍କୃତି ଏକାଡ଼େମୀ, ଭୁବନେଶ୍ୱର

୭. ଭାରତୀୟ ନୃତ୍ୟକଳା-ଧିରେନ୍ଦ୍ରନାଥ ପଟ୍ଟନାୟକ- ଓଡ଼ିଶା ସାହିତ୍ୟ ଏକାଡ଼େମୀ, ଭୁବନେଶ୍ୱର

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions):

୧. 'ଓଡ଼ିଶାରେ ବୌଦ୍ଧ ଧର୍ମ' ପୁସ୍ତକର ଲେଖକ କିଏ ? (୧ ମାର୍କ)

୨.ଶିବଙ୍କୁ କାହିଁକି ଅର୍ଦ୍ଧନାରୀଶ୍ୱର କୁହାଯାଏ ? (୨ ମାର୍କ)

୩. ଶାକ୍ତଧର୍ମ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୫ ମାର୍କ)

୪.ଓଡ଼ିଶାର କେଉଁକେଉଁ ପ୍ରସିଦ୍ଧ ମନ୍ଦିରରେ ଭାସ୍କର୍ଯ୍ୟକଳାର ନିଦର୍ଶନ ରହିଛି, ଦର୍ଶାଅ । (୮ ମାର୍କ)

Core I ସପ୍ତମ ପର୍ଯ୍ୟାୟ (Semester-VII)

ପ୍ରଥମ ପତ୍ର (Paper-I)

(କେବଳ ଗବେଷଣା ପତ୍ର ନେଇ ଅଧ୍ୟୟନ କରୁଥିବା ଓଡ଼ିଆ ସମ୍ମାନ ସ୍ନାତକ ଛାତ୍ରଛାତ୍ରୀଙ୍କ ପାଇଁ ଉଦ୍ଦିଷ୍ଟ)

ଗବେଷଣା ପଦ୍ଧତି

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ସ୍ନାତକ ଶ୍ରେଣୀର ଅନୁସନ୍ଧିସୁ ଶିକ୍ଷାର୍ଥୀମାନଙ୍କ ଗବେଷଣା ମନୋବୃତ୍ତିକୁ ଚରିତାର୍ଥକରିବା ପାଇଁ ଏହି ପତ୍ରଟି ଉଦ୍ଦିଷ୍ଟ । ଗବେଷଣାରେ ପ୍ରବୃତ୍ତ ହେବାପୂର୍ବରୁ ତାହାର ତାତ୍ତ୍ୱିକ ଓ ବୈଧାନିକ ଦିଗ ଉପରେ ଜ୍ଞାନ ଆହରଣ କରିବା ନିମିତ୍ତ ଏହା ସହାୟକ ହେବ ।

ସୂଚନାଯୋଗ୍ୟ ଯେ, ସପ୍ତମ ପର୍ଯ୍ୟାୟ(7th Semester) ପାଇଁ ଉଦ୍ଦିଷ୍ଟ ଥିବା ପ୍ରଥମ ପତ୍ରକୁ ଅଧ୍ୟୟନ ନକରି ଗବେଷଣାରେ ପ୍ରବୃତ୍ତ ଛାତ୍ରଛାତ୍ରୀ ଏହି 'ଗବେଷଣା ପଦ୍ଧତି' ପତ୍ରଟିକୁ ଅଧ୍ୟୟନ କରିବେ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି) :

ପ୍ରଥମ ଏକକ : ଗବେଷଣାର ସଂଜ୍ଞା - ସ୍ୱରୂପ ଓ ବିବିଧ ଗବେଷଣା ପ୍ରକ୍ରିୟା ସଂପର୍କରେ ଏହି ଏକକଟି ଦିଗ୍‌ଦର୍ଶନ ଦେବ ।

ଦ୍ୱିତୀୟ ଏକକ : ଗବେଷଣାରେ ବିଷୟ ନିର୍ବାଚନ ପ୍ରସଙ୍ଗ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ । ଛାତ୍ରଛାତ୍ରୀ କିପରି ବିଷୟ ଭିତ୍ତିକ ଶୀର୍ଷକ ଚୟନ କରି ତାହାର ପରିଚ୍ଛେଦ ବିଭାଜନ କରିବେ ଓ ଗବେଷଣାର ଭାଷା ଶୈଳୀ କିପରି ହେବ ତାହା ଏଥିରୁ ଉପଲବ୍ଧି କରିପାରିବେ ।

ତୃତୀୟ ଏକକ : ବାସ୍ତବରେ ଗବେଷଣା ଏକ କଷ୍ଟକର କାର୍ଯ୍ୟ । ଏଥିପାଇଁ ଗବେଷକର ଧର୍ମ କଣହେବା ଉଚିତ ଓ ସେ କିପରି ତଥ୍ୟ ସଂଗ୍ରହ କରିବାରେ ଅକୁଣ୍ଠିତ ପରିଶ୍ରମ କରିବେ ତାହା ଅବଗତ ହେବେ ।

ଚତୁର୍ଥ ଏକକ : ଗବେଷଣା ନିବନ୍ଧର ଗଠନରୀତି , ପାଦଟୀକା, ସହାୟକ ଗ୍ରନ୍ଥତାଲିକା ପ୍ରସ୍ତୁତି ସଂପର୍କୀୟ ବିଧିବିଧାନ ସଂପର୍କରେ ଏହି ଏକକଟି ଶିକ୍ଷାର୍ଥୀଙ୍କୁ ଧାରଣା ଦେବ ।

ପାଠ୍ୟ ବିଷୟ

ପ୍ରଥମ ଏକକ: ଗବେଷଣାର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ
ସାହିତ୍ୟ ଗବେଷଣାର ବିବିଧ ରୂପ (ଐତିହାସିକ, ନନ୍ଦନତାତ୍ତ୍ୱିକ, ତୁଳନାତ୍ମକ)

ଦ୍ୱିତୀୟ ଏକକ: ଗବେଷଣାର ବିଷୟ ନିର୍ବାଚନ ଓ ପରିଚ୍ଛେଦ ବିଭାଜନ
ଗବେଷଣାର ଭାଷା ଶୈଳୀ

ତୃତୀୟ ଏକକ: ଗବେଷକର ଧର୍ମ, ତଥ୍ୟ ସଂଗ୍ରହ
ଗବେଷଣାରେ ତତ୍ତ୍ୱାବଧାରକଙ୍କ ଦାୟିତ୍ୱ

ଚତୁର୍ଥ ଏକକ : ଗବେଷଣା ନିବନ୍ଧର ଗଠନରୀତି
ପାଦଟୀକା ଓ ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ ପ୍ରସ୍ତୁତି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ(Books of Reference):

୧. ଗବେଷଣା ପ୍ରବିଧି ସଂପାଦନା ଓ ଅନୁବାଦ କଳା – ସୁବୋଧ କୁମାର ଚାଟାର୍ଜୀ, ବିଦ୍ୟାପୁରୀ, କଟକ

୨. ଗବେଷଣା ପ୍ରକରଣ, ସଂପାଦନା ଓ ଅନୁବାଦ ପ୍ରବିଧି –କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ଜ୍ଞାନଯୁଗ ପବ୍ଲିକେଶନ୍ସ, ଭୁବନେଶ୍ୱର

୩. ଗବେଷଣା ଅନୁବାଦ ସଂପାଦନାକଳା ସମାଲୋଚନା- ନାରାୟଣ ସାହୁ , ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

୪. ଗବେଷଣା ବିଧି ଓ ଅନୁବାଦକଳା –ସଂ-ବନମାଳୀ ରାଉତ , ମନୋରମା ବିଶ୍ୱାଳ ମହାପାତ୍ର, ଓଡ଼ିଶା ଗବେଷଣା ପରିଷଦ, କଟକ

୫. Methodology and Technique of Research –R.K. Burma and Gopal Burma, Arjun Publishing House, New Delhi ।

Sample questions (ନମୁନା ପ୍ରଶ୍ନାବଳୀ):

୧. ଗବେଷଣା ଶବ୍ଦର ବ୍ୟୁତ୍ପତ୍ତିଗତ ଅର୍ଥ କଣ ? (୧ ମାର୍କ)

୨. ଗବେଷକର ୨ଟି ଧର୍ମ ଲେଖ । (୨ ମାର୍କ)

୩. ଗବେଷଣାରେ ପାଦଟୀକା କିପରି ପ୍ରସ୍ତୁତ କରାଯାଏ ଦୃଷ୍ଟାନ୍ତ ସହ ଲେଖ । (୫ ମାର୍କ)

୪. ଐତିହାସିକ ଗବେଷଣାର ବୈଶିଷ୍ଟ୍ୟ ଉପରେ ଆଲୋକପାତ କର । (୮ ମାର୍କ)

ଗବେଷଣାର ବିସ୍ତାରିତ କ୍ଷେତ୍ର

୧. ଅଞ୍ଚଳ ଭିତ୍ତିକ ଲୋକସାହିତ୍ୟ ଓ ସଂସ୍କୃତି
୨. ଜିଲ୍ଲା ସ୍ତରୀୟ ସାହିତ୍ୟ ସାଧକଙ୍କ ପରିଚୟ ଓ କୃତିତ୍ୱ
୩. ଆଞ୍ଚଳିକ / କଥିତ ଓଡ଼ିଆ/ ଆଦିବାସୀ ଭାଷାର ସ୍ୱରୂପ ଓ ବୈଶିଷ୍ଟ୍ୟ
୪. ଅବଲୁପ୍ତପ୍ରାୟ ଲୋକକଳା: ସଂଗ୍ରହ ଓ ସମୀକ୍ଷଣ
୫. ପ୍ରମୁଖ ସାରସ୍ୱତ ସ୍ରଷ୍ଟା ଓ ଯୁଗୀୟ ଆଭିମୁଖ୍ୟ ଆକଳନ

ଗବେଷଣା ନିମିତ୍ତ ନିୟମ ଓ ନିର୍ଦ୍ଦେଶାବଳୀ:-

ଗବେଷଣାର ବିଷୟ ନିର୍ବାଚନ ନିମନ୍ତେ ଛାତ୍ରଛାତ୍ରୀମାନେ ଉଲ୍ଲିଖିତ ବିସ୍ତାରିତ ପ୍ରସଙ୍ଗରୁ ଏକ ସୁକ୍ଷ୍ମଦିଗକୁ ନିର୍ବାଚନ କରିବେ । ଦିଗ୍‌ଦର୍ଶକମାନେ ସେମାନଙ୍କୁ ଏଦିଗରେ ସହାୟତା କରିବେ । ପ୍ରତ୍ୟେକ ଗବେଷଣା ପ୍ରକଳ୍ପ ଅନ୍ୟୂନ ଚାରୋଟି ପରିଚ୍ଛେଦରେ ବିଭକ୍ତ ହେବ । A-4 ସାଇଜ୍ ପେପରରେ ଗୋଟିଏ ପାର୍ଶ୍ୱରେ ଲିଖିତ ସନ୍ଦର୍ଭଟି ଅନ୍ୟୂନ ୮୦ ପୃଷ୍ଠା ବିଶିଷ୍ଟ ହେବ । ଛାତ୍ରଛାତ୍ରୀଙ୍କୁ ଅନ୍ୟୂନ୍ୟ ୧୫ ରୁ ୨୦ଟି ସମୀକ୍ଷା ପୁସ୍ତକର ସହାୟତା ନେବାକୁ ପଡ଼ିବ । ପ୍ରତ୍ୟେକ ପରିଚ୍ଛେଦରେ ପାଦଟୀକା ରହିବା ଆବଶ୍ୟକ । ନିବନ୍ଧର ଉପସଂହାର ପରେ ଗବେଷଣା ପଦ୍ଧତି ଅନୁଯାୟୀ ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ ରହିବ। ଏସବୁ ଗବେଷଣାତ୍ମକ ବିବରଣୀ ଉପସ୍ଥାପନ ପ୍ରକ୍ରିୟା ସଂପର୍କରେ ଛାତ୍ରଛାତ୍ରୀ ଗବେଷଣା ପଦ୍ଧତି ଶୀର୍ଷକ ପତ୍ରରେ ସବିଶେଷ ତାତ୍ତ୍ୱିକ ଅଧ୍ୟୟନ କରିବାର ସୁଯୋଗ ପାଇବେ । ନିବନ୍ଧ ପ୍ରସ୍ତୁତି ଓ ଉପସ୍ଥାପନା ୬୦+୨୦=୮୦ ନମ୍ବର ଏବଂ ମୌଖିକ ପରୀକ୍ଷା ପାଇଁ ୨୦ନମ୍ବର ରହିବ । ବାହ୍ୟ ଓ ଅଭ୍ୟନ୍ତରୀଣ ପରୀକ୍ଷକଙ୍କଦ୍ୱାରା ମୂଲ୍ୟାୟନ ହେବ । ସମୟ ନିର୍ଘଣ୍ଟ- ୧ ବର୍ଷ । ସପ୍ତମ ପର୍ଯ୍ୟାୟ(SEMESTER-VII) ରେ ଗବେଷଣା ପଦ୍ଧତି ଅଧ୍ୟୟନ ସହ ଛାତ୍ରଛାତ୍ରୀମାନେ ବିଷୟ ନିର୍ବାଚନ ଓ ତଥ୍ୟ ସଂଗ୍ରହ କାର୍ଯ୍ୟ କରିବେ। ଅଷ୍ଟମ ପର୍ଯ୍ୟାୟ(SEMESTER-VIII) ରେ ନିବନ୍ଧ ପ୍ରସ୍ତୁତି ଓ ଉପସ୍ଥାପନା କରିବେ ।

ଗବେଷଣା ନିବନ୍ଧ ପ୍ରସ୍ତୁତ କରୁଥିବା ଛାତ୍ରଛାତ୍ରୀ ସ୍ୱକୀୟ ନିବନ୍ଧ ପାଇଁ ୧୨ କ୍ରେଡିଟର weightage ପାଇବେ । ଏତଦ୍ ସମେତ ଏହି ପର୍ଯ୍ୟାୟରେ ୪+୪=୮ କ୍ରେଡ଼ିଟ ବିଶିଷ୍ଟ ୨ ଟି ପାଠ୍ୟପତ୍ରର ପରୀକ୍ଷା ମଧ୍ୟ ଦେବାକୁ ପଡ଼ିବ । ଏହିପରି ଭାବରେ ଅଷ୍ଟମ ପର୍ଯ୍ୟାୟ(SEMESTER-VIII) ର ପରୀକ୍ଷା ନିମନ୍ତେ ସେମାନଙ୍କ ପାଇଁ ମୋଟ ୨୦ କ୍ରେଡ଼ିଟ୍‌ର ପାଠ୍ୟ ଅଧ୍ୟୟନ କରିବାକୁ ପଡ଼ିବ । ସୂଚନାଯୋଗ୍ୟ ଯେ, ଗବେଷଣା ପତ୍ର ନନେଇ ୪ ବର୍ଷିଆ ପାଠ୍ୟକ୍ରମ ବିଶିଷ୍ଟ ସମ୍ମାନ ସ୍ନାତକ ଛାତ୍ରଛାତ୍ରୀମାନେ ୪X୪=୧୬ କ୍ରେଡିଟର(Core-I) + ୧ x ୪ = ୪(Core-II) ର ପାଠ୍ୟକ୍ରମ ଅଧ୍ୟୟନ କରିବେ ।

Suggestive Area of discussion for Refresher Course

* ଓଡ଼ିଆ ୟୁନିକୋଡ ଓ ଇ - ରିସୋର୍ସର ବ୍ୟବହାର
* ତୁଳନାତ୍ମକ ସାହିତ୍ୟ
* ଅନୁବାଦର କଳା କୌଶଳ
* ନିବନ୍ଧ ପ୍ରସ୍ତୁତି ଓ ଗବେଷଣା ପଦ୍ଧତି
* ଶିଶୁ ସାହିତ୍ୟ
* ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ
* E-journal, YouTube, Classroom ଆଦି ସମ୍ବନ୍ଧୀୟ ICT
* Blended Mode Based Teaching Learning
* Smart class
* ଓଡ଼ିଶାର ସାଂସ୍କୃତିକ ଇତିହାସ: ପର୍ବପର୍ବାଣି, ଓଷାବ୍ରତ ଓ ଧର୍ମଧାରା
* ଶ୍ରୀଜଗନ୍ନାଥ ଓ ଆଦିବାସୀ ସଂସ୍କୃତି
* ଓଡ଼ିଶାର ରାଜନୀତିକ ଇତିହାସ ଓ ସାମାଜିକ ବିବର୍ତ୍ତନ
* ନିର୍ଭୁଲ ଓଡ଼ିଆ ଲିଖନ କୌଶଳ ଓ ବ୍ୟାବହାରିକ ବ୍ୟାକରଣ
* ଧ୍ୱନି ତତ୍ତ୍ୱ ଓ ଶୁଦ୍ଧ ଓଡ଼ିଆ ଉଚ୍ଚାରଣ
* ସ୍ୱାଧୀନତା ପରବର୍ତ୍ତୀ ଓଡ଼ିଆ ସାହିତ୍ୟ ସାଂସ୍କୃତିକ ଉତ୍ଥାନ
* ପରଂପରାର୍ଜିତ ଜ୍ଞାନକୌଶଳ ଓ ଲୋକସଂସ୍କୃତି
* ଆଲୋଚନା ଚକ୍ର, କର୍ମଶାଳା ଆଦି ଆୟୋଜନ କରିବାର ତାତ୍ପର୍ଯ୍ୟ ଓ ପରିଚାଳନା କୌଶଳ
* ସର୍ଜନଶୀଳ ରଚନାକୌଶଳ (ଗଳ୍ପ, କବିତା, ପ୍ରବନ୍ଧ, ସମାଲୋଚନା, ଫିଚର୍ ଓ ସମ୍ବାଦ)
* ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ

List of Resource Persons for Unit wise Video Clip

1. ସାରଳା ମହାଭାରତ - ପ୍ର. ନୀଳାଦ୍ରିଭୂଷଣ ହରିଚନ୍ଦନ, ପ୍ର. ଉଦୟନାଥ ସାହୁ
2. ଭାଗବତ - ପ୍ର. ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ପ୍ର. ଉଦୟନାଥ ସାହୁ
3. ରାମାୟଣ - ପ୍ର. ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ସୁବୋଧ ଚାଟାର୍ଜୀ
4. ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟ - ପ୍ର. ବାଉରୀବନ୍ଧୁ ସାହୁ, ପ୍ର. ଶରତ ଚନ୍ଦ୍ର ରଥ
5. ପାଶ୍ଚାତ୍ୟ କାବ୍ୟତତ୍ତ୍ୱ - ପ୍ର. ବିଜୟ ଶତପଥୀ, ଛାୟାକାନ୍ତ ଷଡ଼ଙ୍ଗୀ
6. ପ୍ରାଚ୍ୟ କାବ୍ୟତତ୍ତ୍ୱ - ପ୍ର. ବସନ୍ତ କୁମାର ପଣ୍ଡା, ପ୍ର. ଅଶୋକ ଦାଶ
7. ଶାସ୍ତ୍ରୀୟ ଭାଷା: ଓଡ଼ିଆ - ପ୍ର.ଦେବୀ ପ୍ରସନ୍ନ ପଟ୍ଟନାୟକ, ସୁବ୍ରତ ପୃଷ୍ଟି, ବସନ୍ତ କୁମାର ପଣ୍ଡା, ପ୍ର.ଅଶୋକ ଦାଶ, ଅନ୍ତର୍ଯ୍ୟାମୀ ମିଶ୍ର
8. ଓଡ଼ିଆ ଲିପି - ପ୍ର. ଦେବୀ ପ୍ରସନ୍ନ ପଟ୍ଟନାୟକ, ଉପେନ୍ଦ୍ର ପ୍ରସାଦ ଦଳାଇ, ହର ପ୍ରସାଦ ଦାସ, କୈଳାସ ଚନ୍ଦ୍ର ଟିକାୟତରାୟ
9. ଓଡ଼ିଆ ବ୍ୟାକରଣ - ନଟବର ଶତପଥୀ, କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ପ୍ର. ସଦାନନ୍ଦ ନାୟକ
10. ଓଡ଼ିଆ ଧ୍ୱନି ତତ୍ତ୍ୱ - ପ୍ର. ସବିତା ପ୍ରଧାନ, ପ୍ର.ପଞ୍ଚାନନ ମହାନ୍ତି,
11. ଚର୍ଯ୍ୟାଗୀତି - ପ୍ର. କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ପ୍ର. ସଦାନନ୍ଦ ନାୟକ
12. ପଞ୍ଚସଖା ସାହିତ୍ୟ - ବାବାଜୀ ପଟ୍ଟନାୟକ, ସୁନନ୍ଦା ତ୍ରିପାଠୀ
13. ନାଥ ସାହିତ୍ୟ - ପ୍ର. ବୈଷ୍ଣବ ଚରଣ ସାମଲ, ପ୍ରଦୀପ୍ତ ପଣ୍ଡା
14. ରାଧାନାଥ, ଗଙ୍ଗାଧର, ମଧୁସୂଦନ ଓ ଫକୀର ମୋହନ - ପ୍ର. ମଣୀନ୍ଦ୍ର କୁମାର ମେହେର, ପ୍ର. ବବ୍ରୁବାହନ ମହାପାତ୍ର
15. ଆଧୁନିକ କବିତା - ପ୍ର. ଗିରିବାଳା ମହାନ୍ତି, ଶତ୍ରୁଘ୍ନ ପାଣ୍ଡବ, ପ୍ର. ବବ୍ରୁବାହନ ମହାପାତ୍ର, ପ୍ର. ସନ୍ତୋଷ କୁମାର ତ୍ରିପାଠୀ
16. ଆଧୁନିକ ଗଦ୍ୟ ସାହିତ୍ୟ - ପ୍ର. ମନୋରଞ୍ଜନ ପ୍ରଧାନ, ପ୍ର. ଆଦିକନ୍ଦ ସାହୁ
17. ସବୁଜ ସାହିତ୍ୟ - ସୁପ୍ରିୟା ମଲ୍ଲିକ, ପ୍ରମୋଦ ପାଢ଼ୀ, ପ୍ର. ପ୍ରସନ୍ନ ସ୍ୱାଇଁ
18. ପ୍ରଗତିବାଦୀ ସାହିତ୍ୟ - ପ୍ର. ବିଜୟ କୁମାର ଶତପଥୀ, ପ୍ର. ବବ୍ରୁବାହନ ମହାପାତ୍ର
19. ନାଟକ - ପ୍ର. ନୀଳାଦ୍ରି ଭୂଷଣ ହରିଚନ୍ଦନ, ନାରାୟଣ ସାହୁ, ପ୍ର.ବିଜୟ ଶତପଥୀ, ପ୍ର. ସଙ୍ଘମିତ୍ରା ମିଶ୍ର
20. ଲୋକ ସାହିତ୍ୟ ତତ୍ତ୍ୱ - ପ୍ର. ଶ୍ୟାମ ସୁନ୍ଦର ମହାପାତ୍ର, ପ୍ର. କୁମୁଦ ରଞ୍ଜନ ପାଣିଗ୍ରାହୀ, ପ୍ର. କଇଳାଶ ପଟ୍ଟନାୟକ
21. ଆଦିବାସୀ ସଂସ୍କୃତି- ପ୍ର. ସବିତା ପ୍ରଧାନ, ଡ. ଦେବାଶିଷ ପାତ୍ର, ଡ. ଦମୟନ୍ତି ବେଶ୍ରା
22. ଶ୍ରୀ ଜଗନ୍ନାଥ ସଂସ୍କୃତି - ପ୍ର. ସୁରେନ୍ଦ୍ରନାଥ ଦାଶ, ସିଦ୍ଧେଶ୍ୱର ମହାପାତ୍ର, ଭାସ୍କର ମିଶ୍ର
23. ଅନୁବାଦ ସାହିତ୍ୟ - ପ୍ର. ମନୋରଞ୍ଜନ ପ୍ରଧାନ, ଶିଶିର ବେହେରା
24. ଗଣ ମାଧ୍ୟମ ଓ ଯୋଗାଯୋଗ - ପ୍ର. ସନ୍ତୋଷ ତ୍ରିପାଠୀ, ଶିଶିର ବେହେରା, ଡ.ନୃସିଂହ ଷଡଙ୍ଗୀ
25. ଓଡ଼ିଆ ଭାଷାର କମ୍ପ୍ୟୁଟରୀକରଣ- ଡ. ରୁଦ୍ରନାରାୟଣ ମହାପାତ୍ର, ଗିରୀଶ ଚନ୍ଦ୍ର ମିଶ୍ର
26. ଆତ୍ମଜୀବନୀ - ଦେବୀ ପ୍ରସାଦ ଶତପଥୀ,
27. ଭ୍ରମଣ ସାହିତ୍ୟ – ପ୍ର. କୈଳାସ ପଟ୍ଟନାୟକ, ପ୍ର. ପ୍ରକାଶଚନ୍ଦ୍ର ପଟ୍ଟନାୟକ, ପ୍ର. ଗୌରାଙ୍ଗ ଚରଣ ଦାଶ
28. ତୁଳନାତ୍ମକ ସାହିତ୍ୟ - ପ୍ର. ଆଦିକନ୍ଦ ସାହୁ, ପ୍ର. ମନୋରଞ୍ଜନ ପ୍ରଧାନ, ପ୍ର, ପ୍ରକାଶଚନ୍ଦ୍ର ପଟ୍ଟନାୟକ, ଗୌରାଙ୍ଗ ଚରଣ ଦାଶ
29. ଆଧୁନିକ ସାହିତ୍ୟର ପୃଷ୍ଠଭୂମି - ପ୍ର. ମନୋରଞ୍ଜନ ପ୍ରଧାନ, ଶରତ କୁମାର ଜେନା
30. ଓଡ଼ିଶାର ଇତିହାସ - ଅତୁଲ ଚନ୍ଦ୍ର ପ୍ରଧାନ, ମନୋରଞ୍ଜନ ପ୍ରଧାନ
31. ଓଡ଼ିଆ କମ୍ପ୍ୟୁଟରୀକରଣ – ରୁଦ୍ରନାରାୟଣ ମହାପାତ୍ର,
32. ଓଡ଼ିଆ ସାହିତ୍ୟର ଇତିହାସ - ବୈଷ୍ଣବ ଚରଣ ସାମଲ, କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ପ୍ରେମାନନ୍ଦ ମହାପାତ୍ର, ବବ୍ରୁବାହନ ମହାପାତ୍ର

33. ଓଡ଼ିଆ ଲୋକସାହିତ୍ୟ – ପ୍ର.କଇଳାଶ ପଟ୍ଟନାୟକ, ଗିରୀଶ ଚନ୍ଦ୍ର ମିଶ୍ର, କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ଅଜୟ ମିଶ୍ର, ପ୍ର. ଜ୍ୟୋସ୍ନା ବିଶ୍ୱାଳ ରାଉତ, ରୁଦ୍ରାଣୀ ମହାନ୍ତି

34. ଓଡ଼ିଆ କଥା ସାହିତ୍ୟ- କଇଳାଶ ପଟ୍ଟନାୟକ, ଡ. କବିତା ବାରିକ୍

Suggestive Area for Internship

* ଓଡ଼ିଶା ଓ ଓଡ଼ିଶା ବାହାରେ ଥିବା ସରକାରୀ ଓ ଅଣସରକାରୀ ସାହିତ୍ୟ ଓ ସାଂସ୍କୃତିକ ଅନୁଷ୍ଠାନକୁ ପରିଦର୍ଶନ ।
* ଐତିହ୍ୟ ସ୍ଥଳ ଓ ଐତିହାସିକ ପୀଠ, ତୀର୍ଥସ୍ଥାନ, ପ୍ରମୁଖ କବି ଲେଖକଙ୍କ ଜନ୍ମଭୂମିକୁ ଜ୍ଞାନାର୍ଜନ ନିମିତ୍ତ ଭ୍ରମଣ ।

  ବିଶ୍ୱ ନାଟ୍ୟ ଗ୍ରାମ - ସୁବୋଧ ପଟ୍ଟନାୟକ, ରଘୁରାଜପୁର, ବରପାଲି, ବରଗଡ଼, ବ୍ରହ୍ମପୁର, ଭଦ୍ରକ, କେନ୍ଦୁଝର, ମୟୁରଭଞ୍ଜ ଆଦି ଅଞ୍ଚଳରେ ଅନୁଷ୍ଠିତ ହେଉଥିବା ସାଂସ୍କୃତିକ କାର୍ଯ୍ୟକ୍ରମରେ ଅଂଶ ଗ୍ରହଣ ।

  ମିଶ୍ର ଶାଳ - ଅଜୟ କୁମାର ମିଶ୍ର,କଟକ ଓ ଦାସିଆ ଅଜା ପାଠାଗାର, ନୟାଗଡ଼ ।
* ସାହିତ୍ୟ ଅନୁଷ୍ଠାନ, ପ୍ରକାଶନ ସଂସ୍ଥା, ପତ୍ରିକା, ଖବର କାଗଜ ଓ ବିଶ୍ୱବିଦ୍ୟାଳୟ ସ୍ତରୀୟ ଆଲୋଚନା ଚକ୍ର, କର୍ମଶାଳା ଓ ଦଳଗତ ଆଲୋଚନାଦିରେ ଅଂଶ ଗ୍ରହଣ ।
* ନିଜ ମହାବିଦ୍ୟାଳୟରେ ମାସକୁ ଥରେ Seminar/Workshop/Symposium ଆୟୋଜନ କରିବା ।
* ଓଡ଼ିଶାର ନାଟ୍ୟ ସଂଗଠନ ଗୁଡ଼ିକର ପରିଦର୍ଶନ ।
* ସମ୍ବାଦ ସାହିତ୍ୟଘର ଗୁଡ଼ିକର ପରିଭ୍ରମଣ ।
* ପ୍ରଜାତନ୍ତ୍ର ବିଷ୍ଣୁବ ମିଳନରେ ଯୋଗଦାନ ।
* ବିଭିନ୍ନ ଜିଲ୍ଲାରେ ଅନୁଷ୍ଠିତ ଲୋକ ମହୋତ୍ସବ, ବାଲିଯାତ୍ରା, ଧନୁଯାତ୍ରା, ଦୋଳଯାତ୍ରା, ଚନ୍ଦନ ଯାତ୍ରା, ଚଇତି ପର୍ବ , ମକର ମେଳା ଆଦି ପରିଦର୍ଶନ ।
* ଉତ୍କଳ ସାହିତ୍ୟ ସମାଜ, ଓଡ଼ିଶା ରାଜ୍ୟ ସଂଗ୍ରହାଳୟ ଓ ହରେକୃଷ୍ଣ ମହତାବ ରାଜ୍ୟ ପାଠାଗାର ପରିଭ୍ରମଣ ।

E- Resources

* ଓଡ଼ିଆ ବିଭବ (ସୃଜନିକା)
* SOA
* ମାତୃ ଏକାଡେମୀ
* Virtual Tutorial Project- vtputkal.odisha.gov.in
* Google
* Wikipedia
* YouTube
* EResources -OSOU
* EResources of OSHEC
* EResources of ATLC
* sodhganga.inflibnet.ac.in

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