List of Multidisciplinary Courses for Model Curriculum

sl no.	Multidisciplinary Courses
1.	Medical Biotechnology and Molecular Diagnostics
2.	Bio resource technologies And Bio-Product
3.	Nano biotechnology
4.	Oceanography
5.	Climatology
6.	Geo informatics
7.	Financial Literacy
8.	Indian Economy and Society
9.	Entrepreneurship Development
10.	Social Psychology
11.	Educational Psychology
12.	Health Psychology
13.	Fundamentals of Sanskrit Grammar
14.	Samskrta –Sastra- Paricyah
15.	Philosophy of Bhagavad Gita
16.	Critical Thinking And Applied Reasoning
17.	Peace and Conflict Studies
18.	An Introduction of Public Administration
19.	Indian Administration
20.	State Administration
21.	Population and Society
22.	Crime and Society
23.	Science ,Technology and Society
24.	Sociology for Social Workers
25.	Psychology for Social Workers
26.	Economics for Social Workers
27.	Law for Social Workers
28.	Anthropology for Social Workers
29.	Economics
30.	Fundamentals of Entrepreneurship and E-Commerce
31.	Entrepreneurship Development and Start-up
32.	Business Model Innovation
33.	Vector Borne Diseases and Epidemiology
34.	Vermitechnology/Apiculture/Sericulture/LacCulture/Sustainable Eco-tourism (Any one to be offered depending on the expertise available at College/University)

35.	Environmental Impact Assessment and Environmental management plan (EIA and EMP).
36.	Bio Safety and Intellutal Property Rights
37.	Management of Human Microbial Diseases
38.	Bio fertilizers and Bio pesticides
39.	History of Science, Technology, and Medicine in India (HISTM)
40.	History of Environment and Ecology in Modern India
41.	History of Education in Modern India
42.	Gardening and Vermicomposting
43.	Herbarium Preparation
44.	Tissue Culture of Plants
45.	Physics
46.	Mathematics for Computer Science
47.	Operation Research
48.	Political Process in India
49.	Organisational Behaviour
50.	Elements of Economics
51.	Food And Nutrition
52.	Child Development
53.	Family Resource Management
54.	Hindi Sahityik Patrakarita
55.	Vigyapan: Abdharana Aur Prayojanmulak Aayam
56.	Hindi Sahitya Aur Cinema
57.	Human Rights Education
58.	Environmental Education
59.	Historical Bases of Indian Education
60.	Educational Thinkers of Modern India
61.	Computer Fundamentals
62.	Introduction to Web Technologies
63.	Internet and Ethical Practices
64.	Principles of Management
65.	Enterprise Resource Planning
66.	Operations Research
67.	Nano Materials and Applications
68.	Bio Physics
69.	Introduction to Spectroscopy
70.	Human Rights
71.	Understanding Gandhi and Ambedkar
72.	Gender and Politics
73.	Media & Information Literacy
74.	Media, Culture & Society

75.	Media, Conflicts And Disasters
76.	Principles of Human Resource Management
77.	Green Human Resource Management
78.	Corporate Social Responsibility
79.	Discrete Mathematics
80.	Linear Programing Problem
81.	Programing on C++
82.	Mathematical Modelling
83.	Mathematical Finance
84.	Numerical Methods
85.	Introduction Programming with MATLAB
86.	Introduction to Machine Learning
87.	Statistical Methods For Scientists And Engineers (Nptel)
88.	Survival Analysis And Biostatistics
89.	Applied Multivariate Statistical Modeling (Nptel)
90.	Probability And Stochastics For Finance (Nptel)
91.	Machine Learning
92.	Library and Society
93.	Management of Libraries
94.	Library Resources and Services
95.	Indian Knowledge System
96.	Media Literacy and Critical Thinking
97.	Indian Systems of Health and Wellness
98.	Biochemistry
99.	Environment al Chemistry
100.	Biophysical chemistry
101.	ତୁଳନାତ୍ମକ ସାହିତ୍ୟ
102.	ବିଜ୍ଞାନ ବିଷୟ ଓ ସାହିତ୍ୟ
103.	କଳା ବିଷୟ ଓ ସାହିତ୍ୟ
104.	Watershed Development and Mnagement
105.	Planning and Development Smart Cities
106.	Geography of Gender
107.	Demography
108.	Agricultural Geography
109.	Climate Science
110.	Medical Geography
111.	Tribal Geography
112.	Sustainable Tourism

Medical Biotechnology and Molecular Diagnostics

Course Objective:

This course aims to provide solid background in genetic and molecular bases of diseases and the physiopathological mechanisms occurring in human beings in disease states, in order to develop diagnostics and therapeutic strategies.

Learning Outcome:

This course is designed to provide students with basic knowledge of various aspects of biotechnology and its applications specifically in the domains of health Biotechnology including forensic science. By acquiring knowledge from this course, students will be equipped to apply these techniques effectively in their future employment opportunities.

Unit-I

The Advent of Medical Biotechnology, Biotechnology in Medicine: Fundamentals, Biotechnology in Medicine: Advances, Analytical Techniques in Medical Biotechnology

Unit-II

Immunology in Medical Biotechnology, Immunology in Medical Biotechnology, Epigenetics and Medical Biotechnology, Stem Cell Technology in Medical Biotechnology. Molecular methods in Clinical Microbiology, Applications of PCR, RFLP, Hybridization (Nucleic acid base) methods, Immunofluorescent, Immune diagnostic test.

Unit-III

Enzyme Immunoassay- Enzymes available for Enzyme immune assays and conjugation of enzymes: General Idea. Solid phases used in Enzyme Immunoassays. Homogeneous and Heterogenous Enzyme Immunoassays. Enzyme Immune Histochemical Techniques.

Unit-IV

Use of Monoclonal and Polyclonal Antibodies in Enzyme Immunoassays. Introduction and Principles of Forensic Science and Techniques. Forensic Science Laboratory and its Organization and Services. Tools and Techniques in Forensic Science. Injury types, methods of assessing various types of death. Principles of DNA Fingerprinting: Role of satellite DNA, Different types of repetitive sequences in Fingerprinting. Application of DNA Fingerprinting in Forensic media.

Text Books

- ✓ *Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington. B.B. Nanda and R.K. Tiwari.*
- ✓ *S B Primrose, R M Twyman and R W Old (2001). Principles of gene manipulation 6th Edition, S B University Press.*
- ✓ *J. Sambrook and D W Russel (2001). Molecular cloning: A laboratory Manual, Vol-1-3, CSHL.*
- ✓ *Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi (2001). M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).*
- ✓ S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).

Bio resource technologies And Bio-Product

Course Objective:

This course aims to cover the use of natural renewable materials derived from plants and animals such as products of food, feed and fiber to produce medicines, chemical sand fuels for energy production.

Learning Outcome:

- Fundamental understanding of the bio resources and its applications for attainment of social objectives (energy, environment, product, sustainability).
- Acquire knowledge with respect to the properties of the bio resources and the conversion technologies.
- Exhibiting knowledge of the systems used for bio resources and bio resource technology.
- Understanding about analysis of data and their applications in design of the systems and development of the bioprocess.

Unit-1

Bio resources- natural and anthropogenic; importance of bio-resources and their utilization. Natural bio-resources: agricultural, forestry and aquatic biomass. Biomass availability, production and food security, non-edible biomass characteristics. Anthropogenic bio-resources: Organic wastes-domestic and industrial; characteristics of municipal sewage / sludge and industrial sludges.

Unit-2

Conversion processes: biochemical, thermo-chemical and physico-chemical conversion processes Biochemical processes: Microbial anaerobic and aerobic processes, enzymatic processes; fermentation for alcohols and acids; penicillin and other therapeutic products. Production of single cell protein (SCP); bio-pulping, bio gasification.

Unit-3

Thermo-chemical processes: pyrolysis (coke and pyro-oils), oxidation-combustion, gasification (downdraft, updraft and fixed bed gasification, fluidized bed and entrained bed gasification). Various methods of manufacture of activated carbons

Unit-4

Biofuels, biomaterials, specialty chemicals (gylcol, acetic acid and downstream chemicals), anhydrous alcohols-ethanol and butanol; biodiesel, bio-aviation turbine fuel (BATF). Physico-chemical processes: Pretreatment, steam/acid/alkali hydrolysis, effect of temperature on hydrolysis

Text Books:

- ✓ *Tripathi, G., "Bioresource Technology", CBS Publications (2002).*
- ✓ *Pandey, A., "Concise Encyclopaedia of Bioresource Technology", CRC Press (2004).*
- ✓ *Shuler, M., Kargi, F., "Bioprocess Engineering, Basic Concept", Prentice Hall of India Pvt. Ltd. (2004)*

Nano biotechnology

Course Objective:
This course aims to provide scientific understanding of application of nanomaterials and technology in agriculture, health and environment. It exploits the unique characteristics of nano-size particles to create new substances for human welfare.

Learning Outcome:
Students will able to Apply principles of basic science in understanding and prediction of matter at Nanoscale Get advanced ideas in emergent area of nanotechnology. Understand the principles of quantum mechanics for understanding the nano systems.

Unit-I

- Basics of Nanotechnology History of nanotechnology, origins of nanotechnology, beyond Moore's Law. Definitions and scales, size scale effects (effects in optical, electrical and thermal properties). Current state of Nanotechnology, future of Nanotechnology. Nanotechnology in Nature and applications. Tools of trade – seeing the Nano scale, nature of light, electron microscope, scanning probe microscope in seeing the nano scale.
- Molecular building blocks for nanostructure systems, Nano materials – formation of materials, carbon nano materials, Bucky ball, Graphene (2D), Carbon nano tubes, Inorganic nano materials, Zero

Dimensional Nano-Structures, One Dimensional Structures, Two Dimensional and three dimensional Structures.

Unit-II

- Nano materials Synthesis Colloidal nano-precipitation Sol-gel processing, Solvothermal, hydrothermal, coprecipitation, Spray pyrolysis, sonochemical method, Electro spraying and spin coating routes, Self-assembly, self-assembled monolayers, gas phase synthesis. Langmuir-Blodgett (LB) films, micro emulsion polymerization- templated synthesis.
- Synthesis of biological nanoparticles Synthesis of nucleic acid (DNA & RNA), protein and viral nanoparticles and their applications. Applications of inorganic nano materials in biology- examples: silver and gold nanoparticles.
- Biological Methods Use of natural plants for synthesis of nanoparticles- synthesis of metal nanoparticles using phytochemicals. Materials and fabrication of nanoparticles for drug delivery, Nanoencapsulation for Drug Delivery, Encapsulation Methods.

Unit-III

Characterization of Nano materials Nanostructured Materials Characterization Techniques Surface Plasmon Resonance Spectroscopy, X-ray diffraction (XRD), SEM, EDAX,TEM, Elemental mapping, FTIR, UV-Visible spectrophotometer, Nanomechanical Characterization using Nanoindentation, Differential Scanning Calorimeter (DSC), Differential Thermal Analyzer (DTA), Thermo gravimetric Analysis (TGA), TEM, X-ray Photoelectron Spectroscopy (XPS), Scanning Probe Microscopy (SPM), Electrochemcial Characterization measurements, Dynamic Light Scattering, Zeta (potential).

Unit-IV

- Applications of Nanomaterial Therapeutic Applications Concept of nanomedicine, nanoparticles for controlled drug delivery, general requirements for use of nanoparticles, magnetic nanoparticles for targeting cancer cells. New designs and applications for therapeutic nanoparticles and nanocapsules.
- Therapeutic application in infectious diseases, degenerative and autoimmune diseases. Nanoparticles for delivery of drugs, targeted drug delivery, advantages. Ocular applications of nano carrier drug delivery. Nanoparticle drug delivery for neuro-inflammatory diseases, nanoparticle delivery for cancer therapy, nanoparticle delivery of natural product therapies.

Text Books

- ✓ *Synthesis, Properties, and Applications of Oxide Nanomaterials, edited by José A. Rodriguez, Marcos Fernández-García*
- ✓ *Nanochemistry: A Chemical Approach to Nano materials, By Geoffrey A. Ozin, André C.Arsenault, LudovicoCademartiri*
- ✓ *Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers. Daniel L.Schodek, Paulo Ferreira, Michael F. Ashby*
- ✓ *Nanomaterial Interfaces in Biology: Methods and Protocols, Paolo Bergese, Kimberly Hamad- Schifferli*
- ✓ *Optical Properties and Spectroscopy of Nano materials, Jin Z. Zhang*

Oceanography

Course Objective

- To introduce the oceans, its bathymetric divisions and features.
- To learn about waves and currents
- To learn about the properties of seawater
- To learn about ocean current and its impact on environment

Learning Outcome:

- Describe the ocean floor topographic features.
- Understand the origin of waves, tides and current.
- Describe the properties of seawater and their interaction with energy.
- Understand the various ocean currents and water mass circulation and their drivers.

Unit - I: Introduction to Oceanography

Ocean Floor Topography – Continental Shelf, Continental Slope, Continental Margin, Continental Rise, Submarine Canyons, Mid Oceanic Ridges, Trenches, Abyssal Plains.
Wave theories, Tides- type of tides, tidal currents, rip currents.

Unit - II: Properties of Seawater

Salinity and chlorinity; temperature; thermal properties of sea water; density and stability, conductivity, viscosity, heat budget, colligative and other properties of sea water.

Unit - III: Ocean Currents and Circulation

Definition, direct and indirect forces acting on sea water, surface currents, Coriolis effect, geostrophic currents, upwelling, sinking, circulation, El-Nino, La-Nina, significance of major ocean currents of the world, measurement of currents. Thermo-haline circulation.

Suggested practical:

- Observed the oceanographic divisions using Google Earth. Creating bathymetric profiles
- GEBCO Undersea features and landforms
- Major currents and Ocean circulation patterns of world oceans.

Textbook:

- ✓ Trujilo, A. and Thurman, H. (2012) Essentials of Oceanography, 12th Edition, Pearson

Suggested readings:

- ✓ Gross, M. G. (1977). Oceanography: A view of the earth.
- ✓ Invitation to Oceanography (2009) Paul R. Pinet Jones & Barlett Learning

Climatology

Course Objective:

- To introduce Climate, climate change and its implications.
- To explain climate system and heat budget of earth
- To introduce the mechanism and effects of Monsoon
- To provide an understanding of Atmosphere and Hydrosphere and their circulation patterns

Learning Outcome:

- Describe a systematic observation on Climate and implications of climate change.
- Explain the significance of climate and climate change
- Elaborate the heat budget and the mechanism of monsoon
- Evaluate the various circulation patterns of Atmosphere and Hydrosphere and its impact on climate

Unit - I: Climate system and classification and Climate change

Components of the climate system, Climate controlling factors, Climate system response, response rates and interactions within the climate system. Basis of classification; Koppen's classification; Thornthwaite's classification; Brief idea on Types of Climate found in India. Climate forcing and feedbacks,.

Unit - II: Heat budget of Earth and Interactions

Incoming solar radiation, receipt and storage of heat; Heat transformation; Earth's heat budget.
Interactions amongst various sources of earth's heat; Monsoon, its mechanism and its intensity influencing factors; Effects of monsoon.

Unit - III: Atmosphere & Hydrosphere

Stratification of atmosphere and atmospheric circulation; Atmosphere-ocean interaction and its effect on climate; Heat transfer in ocean; Global oceanic conveyor belt and its control on earth's climate; Surface and deep circulation.

Practical

1. Study of distribution of major climatic regimes of India on map.
2. Distribution of major wind patterns on World map.
3. Ocean currents and heat circulation

Text Book:

- ✓ *Rudiman, W.F., 2001. Earth's climate: past and future. Edition 2, Freeman Publisher.*

Suggested Readings:

- ✓ Rohli, R.V. and Vega, A.J., 2007.Climatology. Jones and Barlatt.
- ✓ Lutgens, F., Tarbuck, E., and Tasa, D., 2009. The Atmosphere: An Introduction to Meteorology. Pearson Publisher.
- ✓ Aguado, E., and Burt, J., 2009. Understanding weather.

Geo informatics

Course Objectives

- To introduce the fundamentals of Remote Sensing and GIS
- To provide the basic concepts of thermal remote sensing and an understanding of the various remote sensing image resolution
- To explain the various methods of spatial data collection and analysis for terrain modelling and network analysis

Learning Outcomes

- Explain the principles of coordinate systems and projections
- Elaborate on the basic principles of remote sensing and spectral signature of materials

- Analyze and interpret a remote sensing image
- Evaluate coordinate systems and perform map transformations.
- Perform simple spatial analysis in GIS

Unit - I: Remote sensing

Electromagnetic spectrum, Black body radiation, Spectral signature; Resolutions: Spatial, Spectral, Temporal and Radiometric; Remote Sensing Platforms and Sensors; Image Enhancement and Image Interpretation.

Unit - II: Coordinates and Projections

Geographic coordinates, Concept of datum and geoid. GPS & GNSS, Map Projections, Map Grid systems, Map Grid Transformations and Distortions.

Unit - III: GIS

Principle and Components of GIS, Spatial Data Models, Data collection methods, Data structures and storage, Spatial data operation and analysis (Interpolation, Buffer, Overlay). GIS applications in Terrain and Network Analysis.

Practical:

1. Image properties – Spatial, Radiometric and Spectral
2. Image Operations – Compositing, Mosaicking and Enhancement
3. Coordinate Transformation
4. GIS Data input and overlay analysis

Textbooks

- ✓ *Reddy, A. (2014). Textbook of. Remote Sensing and. Geographical Information Systems.*

Suggested Books :

- ✓ *Curra, P.J. (1986). Principles of Remote Sensing. John Wiley & Sons, New York.*
- ✓ *Gupta R.P. Remote Sensing Geology, Springer*
- ✓ *Demers, M.N. (2012). Fundamentals of GIS, 4th Edition, Wiley Blackwell*
- ✓ *Burrough, P.A. (2016). Principles of GIS. 3rd Edition, OUP*

Financial Literacy

Course Description

This course exposes students to different aspect of financial literacy such as investment, taxation and insurance. Understanding the relevance of financial planning. Banking sector reforms and monetary policy with special reference to India are also covered. It also highlights the organization, structure of money and capital market, monetary management and instruments of trading.

Course outcome:

- To understand the operational aspects of the banking system, functions of central banks and monetary policies, India‘s banking system, and banking sector reforms.
- To gain the requisite knowledge to handle various aspects of investment and wealth management.
- To develop the ability to understand and deal with Stock Market Operations.
- To acquire an insight into the Indian tax structure and its filing process.

Module I: Banking

- Commercial Banking- Meaning and Functions, Process of Credit Creation; Concept of Micro-finance. Central Banking- Functions; Methods of Credit Control; Recent Reforms in Banking Sector in India; Monetary Policy: Objectives & Limitations (with Reference to India).

- ***LO: This module shall give the students an understanding of the banking hierarchy and its functionality and the ways central banks influence the financial system.***

Module II: Investment Planning and management

- Investment opportunity and financial product, Insurance planning: life and non-life including medical insurance Scheme
- ***LO: This module shall enable the students to acquire an understanding of the concept and meaning of investment, the investment process, and various investment schemes.***

Module III: Money Market

- Money Market: Meaning - Constituents of organized money market; Features of Indian Money Market. Instruments of money market. Capital Market: Capital Market Instruments-Shares, Equities, Debentures and Bonds; New Instruments, Types of bonds and equities, Primary Market and Secondary Market, Interlink between Money Market and Capital Market. SEBI & Capital Market in India. Markets for Derivatives: Forward, Futures, and Options, Derivatives trading in India.
- **LO: Upon completion of this module, the learners shall be able to appreciate and analyze the mechanism and regulation of financial instruments and determine how the value of stocks, bonds, and securities are calculated.**

Module IV: Taxation

- Introduction to basic Tax structure in India for personal taxation; aspect of personal tax planning; exemption and deduction for individual; e-filling.
- ***LO: This module shall explain the basic concepts and provide the knowledge about the Computation of Income Tax, Submission of Income Tax Returns, Advance Tax, and Tax deducted at Source.***

Text Book

- ✓ *Bhole, L. M. (2011): Financial institutions and Market, Tata McGraw hill, 5th Edition, New Delhi.*
- ✓ *Introduction to Financial Planning (4th Edition 2017)- Indian Institute of Banking*

Reference Book

- ✓ *Mishkin, F. S. and Eakins S. G (2009): Financial Market and institutions, PE, 6th Edition, New Delhi.*

Indian Economy and Society

Course Description

- This course aims to provide an overview of the contemporary discussions on economy, policy, gender and labour issues and environmental issues. This course will serve as a general studies paper for many competitive examinations and keep the student updated with the contemporary socio-economic issues. The course is multi-disciplinary one covering economics, political sciences, sociology and environmental sciences.

Course Outcomes

- To gain the basic ideas on the Indian Economy, Indian political system, environmental concerns, gender perspectives, and issues of labour rights.
- To understand the growth of the Indian Economy and its sectoral composition.
- To know the distribution of powers between centre state and local governments; and the role of finance commissions in transferring funds to PRIs and ULBs.
- To familiarise and sensitize students about gender concerns and labour rights issues, besides the environmental concerns, and national and global initiatives to halt the degradation of the environment.

Unit I: Macroeconomic scenario: GDP Growth and Sectoral composition

- India‘s GDP growth in recent years. Contribution of Agriculture and allied activities, Industry and service sectors to GDP and growth of these sectors in the recent years. Major government initiatives taken by the government to strengthen the economic growth and sectoral growth.
- ***LO: This module will educate the students on India’s recent scenarios of GDP growth, sectoral composition, and government initiatives to strengthen economic growth.***

Unit II: Indian polity: Centre and state relation, role of PRIs and ULBs

- Division of power between centre and states: Union List, State list and Concurrent list. Major expenditure obligations and revenue raising abilities of the Union and the state government. 73rd and 74th Constitutional amendments PESA. Status of State Finance Commissions and devolution of functions .functionaries and funds to PRIs and ULBs in India
- ***LO: This module will educate the students on the distribution of powers between unions, states, and local governments and the status of state finance commissions in the devolution of funds to Panchayat Raj Institutions and Urban Local Bodies.***

Unit III: Gender and Labour issues:

- The ideas of Gender. Gender, work and organisation: accounting women's work; impact of policies of globalization on women's work; gender inequality and labour force participation; gender justice and human rights
- Labour Market: wage employment vs self-employment; wage differentials; skill mismatch and productivity; reasons for declining labour share in national income, social security and labour welfare; Labour market regulations and it's impact on employment

- ***LO: This module will educate students about the basic concepts of gender-related issues, and labour rights.***

Unit IV: Environmental Concerns:

- Threats of climate change and actions: Observed Changes, Impacts, and attribution; Responses undertaken to date. Current mitigation and adaptation actions, and Policies are not sufficient; Understanding Net Zero CO2 and Net zero GHG emissions.
- ***LO: This module will sensitize the students about the threats of climate change, mitigation, adaptation, and commitment of nations to achieve Net Zero emmissions.***

Basic Readings:

- ✓ For Module I please refer to Economic Survey of India latest year
- ✓ For Module II please refer to the 7th Schedule of the Indian Constitution and Latest Finance Commission of India Report, Chapter on local governments
- ✓ For Module III:
  (a) Government of India (1974), Towards Equality : Report of the Committee on the Status of Women in India, Dept. Of Social Welfare, Ministry of Education and Social Welfare
  (b) Mazumdar, Vina (1983), Women, Work and Employment: Struggle for a Policy, ICSSR, New Delhi
  (c) Borjas, George J. Labor Economics. 5th ed. Boston, MA: McGraw-Hill/Irwin, 2010
  (d) Orley Ashenfelter, Richard Layard, David E. Card (1986), Handbook of labor economics, 1st Edition, North-Holland
- ✓ For Module IV please refer to the Section 2 of Synthesis Report of The IPCC Sixth Assessment Report (AR6) longer Report IPCC IPCC_AR6_SYR_LongerReport.pdf

Entrepreneurship Development

Course description

- The purpose of the course is to expose the student to the basic concept of entrepreneurship and common myths of becoming an entrepreneur. Students will be exposed to the functions of entrepreneurship and problem faced by them. The course aims to impart understanding of Entrepreneurial Finance, Assistance and role of Entrepreneurial development agencies and in familiarizing students on developing a Business Plan and to provide basic understanding of Launching a new Venture.

Course Outcomes:

- To understand the basic concept of Entrepreneurship and the common myths of becoming an entrepreneur.
- To appreciate the functions of entrepreneurs and the challenges faced by them.
- To gather knowledge about the scope of becoming an entrepreneur and the steps to a venture business plan.
- To get acquainted with the issues concerning the sustainability of a business plan.

Module I

- Meaning, Definition, and concept of entrepreneur, entrepreneurship and entrepreneurship development. The entrepreneurial development mind set, Entrepreneurship categories, Entrepreneurship challenges, Ethics and Entrepreneurship, Corporate Entrepreneurship, Social responsibility in Entrepreneurship, Entrepreneurship Ecosystem
- ***LO: This module shall impart knowledge of the different concepts related to Entrepreneurship.***

Module II

- From Idea to opportunity, Idea generation-sources and methods, Identification and Classification of Ideas. Individual creativity: idea to business opportunity, opportunity assessment, Challenges of new venture start up, Venture capital, Angel investing, crowd funding

- ***LO: This module explains the risks faced by entrepreneurs, especially by start-ups, and some ideas regarding entrepreneurial finance and the agencies that help entrepreneurs.***

Module III

- Developing a business plan: Environmental Scanning and SWOT analysis and The business plan as an entrepreneurial tool, Business planning process: elements of business planning, preparation of project plan, Components of an Ideal Business plan-market plan, Financial plan, operational plan, and feasibility Analysis-aspects and methods: Economic analysis, Financial analysis, Market and technological feasibility
- ***LO: Students will become capable of developing a business plan and launching new ventures after studying this module.***

Module IV

- The practice of sustaining and growing: Evolution of a startup, Collaboration, Networking, Intellectual property, Innovation for Business Growth, Entrepreneurial growth strategies, Franchising, Stalling, Sickness and Revival, Exiting the venture, Social Entrepreneurship, Rural Entrepreneurship, Women and Entrepreneurship.
- ***LO: This module will educate the students about some of the sustainable business management strategies.***

Basic Reading List

- ✓ *Charantimath, P. M. (2018): Entrepreneurship Development Small Business Enterprises, Pearson Education publication*
- ✓ *Roy, R. (2020): Entrepreneurship, 3rd Ed, Oxford publication*
- ✓ *Desai, V: Small -Scale Industries and Entrepreneurship, Himalaya Publishing House*

Reference Book

- ✓ *Kumar, S. A., Poornima, S. C., Abraham, M. K., and Jayashree, K: Entrepreneurship Development. New Age Publication;*
- ✓ *Bhatt, A. K. (2023): Innovation and Entrepreneurship, Laxmi Publication*

Social Psychology

Introduction:

Social psychology is the scientific study of the nature and causes of human behavior in a social context. This

course is designed to introduce the students to the field of social psychology, to explain how social psychologists think about and study human behavior; and to encourage reflection about the implications of social psychology for the situations we encounter in everyday life.

Course Outcomes:

- To help students develop awareness of the concepts, problems and issues in the discipline of social psychology
- To make students understand the individuals and groups in respect to patterns of social behavior.
- To help students gain insight into group behaviour.

UNIT-I: Introduction to Social Psychology and Group Behaviour

(i) Nature, goal, and scope of Social Psychology; Methods of Social Psychology- Observation, Questionnaire, Interview, and Experiment

(ii) Group - Group structure and function, Social facilitation, Social loafing, Group Cohesiveness

Learning Outcomes

- Know the scope of studying social psychology and the methods to gather data in the social context to explain them.
- Understand the significant aspects of group behavior and social influence that constitute the core of human relationships.

UNIT- II: Social Behavior

(i) Pro-social behavior- Meaning and Characteristics, Determinants of Pro-Social Behaviour:- personal, situational and socio-cultural, Theoretical Perspectives: Empathy-Altruism Hypothesis, Negative State Relief Model

(ii) Aggression: - Meaning and Characteristics, Determinants of Aggression: Personal, social and Situational determinants of aggression; prevention and control of aggression

Learning Outcomes

- Gain knowledge on the dynamics of social behavior

Practical:

(i) **Ethical Values:** To assess the ethical values of five adolescents by using Donelson's Ethical Position Questionnaire (EPQ)

(ii) **Attitude towards Women**: To measure the attitude of three boys and three girls towards Women by using Spence, Helmrich & Stapps' Attitude towards Women scale.

Text Books*:*

- ✓ *Baron R. A & Byrne. D. (2003). Social Psychology. 10th Edition, Prentice Hall*

- ✓ *Baron. R.A., Byrne, D. & Bhardwaj. G (2010). Social Psychology (12th Ed).New Delhi: Pearson*
- ✓ *Mohanty, N., Varadwaj, K. & Mishra, H.C. (2014). Explorations of Human Nature and Strength: Practicals in Psychology, Divya Prakashani, Samantarapur, Bhubaneswar.*

Reference Books:

- ✓ *Dash, U.N., Dash, A.S., Mishra, H.C., Nanda, G.K. & Jena, N. (2004). Practical Exercises in Psychology: Learning about Yourself and Others. Panchasila, Bhubaneswar*
- ✓ *Misra, G. (1990). Applied Social Psychology. New Delhi: Sage.*
- ✓ *Misra, G. (2009). Psychology in India, Volume 4: Theoretical and Methodological Implications*

Educational Psychology

Introduction:

This course provides an introduction to concepts, theories, and recent trends in educational psychology. The topics covered include cognitive development during the school years, classroom management, instructional approaches, motivation and individual differences.

Course Outcomes:

- To provide students with an overview of the purposes and uses of educational psychology.
- To make students understand the ways that educators motivate their students to learn and strive for excellence
- To make students explore the ways that educators manage learning environments to maximize learning and providing inclusive education

UNIT-I: Foundations of Educational Psychology

(i) Concepts of educational psychology, The teaching-learning process, Goals of teaching and objectives for

learning, transfer of training, reinforcements in learning process

(ii) Theories of cognitive development-Piaget, Bruner, and Vygotsky.

Learning Outcomes

- Understand the basic concepts of educational Psychology and describe the developmental issues faced by school age children.

UNIT- II: Motivation and Classroom Management

(i) Meaning of motivation, Intrinsic and extrinsic motivation, Motivational techniques in classroom teaching;

(ii) The goals of classroom management, Characteristics of an effective teacher, Creating inclusive environment and teaching children with learning disability and ADHD

Learning Outcomes

- Explain the role of motivation on learning and classroom behavior, describe classroom management techniques and gain insight into challenges presented by children with ability differences.

Practical:

(i) **Academic Behaviour:** To assess the academic attitude and behavior of college students by using Sia's Academic Behavior Scale

(ii) **Academic Stress:** To assess the academic stress of two higher Secondary students using Rao's Academic Stress Scale.

Text Books*:*

- ✓ *Gage, N. L., & Berliner, D. C. (2009) Educational psychology (5th ed.). Boston, MA: Houghton Mifflin.*
- ✓ *Woolfolk, A.E. (2004). Educational Psychology (9th Ed.), Allyn & Bacon, London /Boston*
- ✓ *Mohanty, N., Varadwaj, K. & Mishra, H.C. (2014). Explorations of Human Nature and Strength: Practicals in Psychology, Divya Prakashani, Samantarapur, Bhubaneswar.*

Reference Books*:*

- ✓ *Chauhan, S. S. (2010). Advanced Educational Psychology, Vikash Publishing*

Health Psychology

Introduction:

Health psychology is a specialty area that focuses on how biology, psychology, behavior and social factors influence health and illness. This course is designed to provide help students to understand how Health Psychology as a specialty within psychology addresses the role of behavioral factors in health and illness. Basic theories, models and applications are also included.

Course Outcomes:

- To help the students understand the issues of Health Psychology and how to address them by the bio-psychosocial model of health and illness.
- To help the students to describe behavioral factors that influence health and illness.
- To guide the students understand about health enhancing behaviors including coping with illness.

UNIT-I: Introduction

(i) Meaning & Goals of Health Psychology, mind body relationship, Bio medical model vs. biopsychosocial model of health and illness,

(ii) Nature of stress, cognitive appraisal of stressors, causes and effects of stress, management and coping of stress

Learning Outcomes

- Know the basics of health and illness from the Bio-psychosocial perspectives.

UNIT- II: Health promoting and compromising behaviour

(i) Health promotion, health habit, role of behavioural factors in disease; yoga, meditation, diet, exercise, prevention strategies (primary, secondary, tertiary)

(ii) Health compromising behaviour- causes and treatment of obesity, eating disorder, alcohol and smoking. Management of illness: diabetes, heart disease, AIDS, cancer

Learning Outcomes

- Understand the significance of behavioral and psychological correlates of health and illness.
- Understand the importance of health enhancing behavior.

Practical:

(i) **Coping Strategies:** To assess of the Coping Strategies of 4 college students by Tobin's Coping Strategy Inventory (TCSI)

(ii) **Sleep Quality:** To assess the Sleep Quality of 4 college students using the Pittsburgh Sleep Quality Index (PSQI)

Text Books*:*

- ✓ *Taylor, S.E. (2006). Health Psychology (6th Ed.). New York: Tata McGraw Hill*
- ✓ *Brannon and Feist. Health Psychology.*
- ✓ *Swain, S. Applied Psychology, New Vishal Publications, New Delhi*

Reference Books*:*

- ✓ *Mohanty, N., Varadwaj, K. & Mishra, H.C. (2014). Explorations of Human Nature and Strength: Practicals in Psychology, Divya Prakashani, Samantarapur, Bhubaneswar.*
- ✓ *Ogden, J. (2007). Essentials of Health Psychology. McGraw Hill*

Fundamentals of Sanskrit Grammar

Unit-I

Sanskrit Alphabets, Karakam, vibhaktih, Vacanam, Purusah, Padam, Lingam, Vacyam.

Unit-II

Lakarah, Pratyayah, Upasargah, Avyayah, Dhatupathah.

Unit-III

Vaikarana- Paricayah, Paninih, Katyayanah, Patanjalih, Khattoji Dikshitah, Bharttrharih, Nagesah, Vamana-Jayadityah.

Unit-IV

Vakyaracanam, Anuvada- Vidhisca.

Core Readings:

- ✓ *Samskrta Vyakarana Darpana,*
- ✓ *Samskrta Vyakarana manjusa, Kamalesh Bhatia, Chaukhamba Sanskrit Pratisthan, Delhi,2022*

Suggested Readings:

- ✓ *Samskrta jnananidhi, Dr.Ram Vilash Choudhuri and Dr. Dhruva Kumari Choudhuri, MLBD, Delhi, Reprint,2016*
- ✓ *A Higher Sanskrit Grammar, M.R. Kale, MLBD, Delhi,2005*

Samskrta –Sastra- Paricyah

Unit-I

General Idea about the following Samhitas: Rgveda, Yajurveda, Samaveda and Atharva Veda.

Unit-II

General Idea about the following Upanisadas: Isa, Kena, Katha, Prashna, Munda, Mandukya, Taittiriya, Aitareya, Chandogya and Brhadaranyaka.

Unit-III

General Idea about the following Epics & Puranas: Ramayana, Mahabharatam and 18 Mahapuranas

Unit-IV

General Idea about the following Kavyas: Haravijayam, Buddhacaritam, Saundaranandam, Raghvamsam, Kumarasambhavam, Kiratarjuniyam, Sisupalavadham, Naisadhiyacaritam, Meghadutam, Vasavadatta, Kadambari, Harshacaritam, Dasakumaracaritam,Abhijnanasakuntalam, Pancatantram and Hitopadesah.

Core Readings:

- ✓ *History of Sanskrit Literature, A.A. Macdonell, MLBD, Delhi,2003*
- ✓ *Samkrta Sahitya ka Itihasa, Baladev Upadhyaya, Sarada Niketan, Varanasi*

Suggested Readings:

- ✓ *Samkrta Sahityara Itihasa, H.K. Satapathy, Kitab Mahal, Cuttack.*

Philosophy of Bhagavad Gita

Introduction:

This course on the philosophy of the Bhagavad Gita will offer a comprehensive exploration of the profound philosophical and spiritual teachings found within this ancient Indian text, and provide its applications in Modern life situations, particularly when guidance is required for very many problems in life.

Course Outcomes:

- Understanding of the ideal of dharma and its role in a civilized society,
- Understanding of the role and importance of knowledge, action, and devotion in life.
- Knowledge of leading life with a sense of detachment.

Learning Outcome

- **Unit-I** Yoga is to purify our actions, Yoga is to control the mind and senses and Yoga is to link oneself to Supreme with devotion. Yoga is the path of selfless actions without expecting the consequences or results. the spiritual seeker acts according to Dharma (righteousness).
- **Unit-II** An important philosophical concept in Karma yoga, it means to act unselfishly, or without personal gain in mind. When acting out of Nishkama Karma, an individual is acting or acting without any expectation that good will be returned to him/her or without attachment to its fruits.
- **Unit-III** Jnana yoga encourages its adepts to think and speak of themselves in the third person as a way to distance themselves from the Ego and detach their eternal self (atman) from the body-related one (*māyā*).
- **Unit-IV** the Bhagavad Gita places great emphasis on devotion to God. Through devotion, an individual can attain the ultimate truth and realize their unity with the divine. This path of devotion is accessible to all, irrespective of their social standing or spiritual knowledge.

Unit-I:

Dharma:-Varnadharma, Svabhava, Sadharma- Paradharma

Unit-II:

Karma:-Classification of Karma; Sense of Agency, Niṣkāma Karma, Lokasaṁgraha, Relation between Karma Yoga and Jñāna yoga.

Unit-III:

Jnana:- Distinction between Jnana and Vijñāna. Criteria of True Knowledge (Buddhi Yoga & JñānaYoga), Kṣetra, Kṣetrajña, Puruṣottama.Sāttvika, Rājasika and Tāmasika Jñāna

Unit-IV:

Bhakti Yoga:- Four kinds of devotees, Characteristics of Ideal Bhakti- Saraṇāgati & Prapattikrupa (grace); Relation between Bhakti Yoga & Jñāna Yoga

Prescribed Books

- ✓ *S. Radhakrishnan, the Bhagavad Gītā (Trs.&Ed.)*
- ✓ *S. C. Panigrahi, the Concept of Yoga in the Gita, Prajnaloka, Puri*

Reference Books

- ✓ *K. M. Munshi & R. R. Diwakar, Bhagavad Gītā & Modern Life*
- ✓ *Basanta Kumar Dash, Philosophy of Isopanisad and the Gita, Gyanajuga Publication, Bhubaneswar*
- ✓ *G. K. Warrier, Śrimad Bhagavad Gītā Bhāsya of Sri Sankarāchārya: (Trs), Advaita Ashram, Ramakrishna Math.*
- ✓ *P. N. Srinivasachari, the Ethical Philosophy of Gītā.*
- ✓ *Pandita Nilakantha Das, Srimad Bhagavad Gītā, New Students Store Binod Vihari, Cuttack.*
- ✓ *VIharilal Pandits ed., Śrimad Bhagavad Gītā, (Odia) DharmaGrantha Store, Cuttack..*

E- Recourses

1. https://youtu.be/bedsn7xIn0w?si=VW5iQdLgDu5UDhA6
2. https://anubooks.com/uploads/session_pdf/16623612876.pdf
3. https://ijcrt.org/papers/IJCRT2101218.pdf
4. https://youtu.be/HHIv6qJlRjI?si=MML5aslZRwUvE1Rl
5. https://en.wikipedia.org/wiki/Jnana-Vijnana_Yoga
6. https://en.wikipedia.org/wiki/Bhakti_yoga

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. Dharma Literally Means_____?
2. What Is Sreya?
3. What Is Varna Dharma?
4. What Is the Meaning of Dharma In the Bhagavad Gita? Discuss.

Unit – II

1. _____ is the Vikarma?
2. Distinguish Between Karma, Vikarma, and Akarma.
3. Who Is Fit to Follow the Path of Jnana?

4. Discuss the Concept of Bondage and Liberation In the Bhagavad Gita

Unit – III

1. _____ Is Called Ksetra?
2. State the Characteristics of Tamasika Jnana.
3. State the Characteristics of Sattvika Jnana.
4. Explain the Jnana of the Bhagavad Gita and illustrate its Significance.

Unit – IV

1. _____ Is the Highest State of Bhakti?
2. How Jnana and Bhakti Are Related?
3. How Can One Attain the Highest State Niskama Bhakti?
4. What Are the Characteristics of A True Devotee? Discuss.

Critical Thinking and Applied Reasoning

Introduction:

This course on critical thinking and applied reasoning would equip students with essential skills for analyzing, evaluating, and constructing arguments in various contexts. Students will engage in exercises, case studies, and discussions to develop their critical thinking skills and apply them to a wide range of practical and intellectual challenges. By the end of the course, students would be equipped with the tools and mindset necessary to think critically, reason effectively, and make well-informed decisions in their personal and professional lives.

Course Outcomes:

- Attaining a proper understanding of the method of analysis, evaluation, and interpretation in critical thinking and the primacy of critical thinking in philosophical pursuit.
- Attaining an ability to understand different arguments and identify the logical /semi-logical fallacies in the arguments.
- Attaining the knowledge of analogical reasoning and its applicability in the legal and moral domains.

Learning Outcome

- **Unit I** When One is acquainted with critical thinking, he/she must explore new ideas and try to distinguish between non-relevant data from the relevant ones...
- **Unit II** In our everyday life, It is necessary to form a valid argument, which justifies our opinion about something. & this unit teaches how to form an argument, for which Our mental activities & thinking capacity have been developed. and to make clear the structure of logical arguments, We identify the Premises & Conclusion.
- **Unit III the** study of fallacies provides a base or foundation to evaluate & analyze the error or defect in the argument.
- **Unit IV** Reasoning plays a very important role in making a good & strong decision, which builds our life with peace & positivity. & some types of reasoning like analogical reasoning (It helps us gain new knowledge by comparing one entity with another), Moral reasoning (It justifies a person's intentions behind his actions), Legal reasoning (It gives us a major outlook or models by which We can righteously do our duty).

Unit I:
Introduction to Critical Thinking: Standards of Critical Thinking: Benefits and Limitations.

Unit II:
Arguments and Recognizing arguments: Definition and Contents of Argument, Premises hidden Premises, Conclusions intermediate Conclusions

Unit III :
Fallacies: Introduction, Fallacies of Relevance, Fallacies of Presumption, Fallacies of Ambiguity, Illicit Transference, Fallacies in Ordinary Language

Unit IV:
Types of Reasoning: Analogical, Legal, and Moral; Science &Superstition: Distinction, Evidentiary Support, Objectivity, and Integrity.

Prescribed Books: -

- ✓ *Hurley, Patrick. J.- A Concise Introduction to Logic, 12th Ed.*
- ✓ *Sen, Madhuchhanda- An Introduction to Critical Thinking, Pearson India Ltd.*

Reference Books:

- ✓ *David Kelley, Art of Reasoning: An Introduction to Logic and Critical Thinking, W. W. Norton, Incorporated.*
- ✓ *Alec Fisher, Critical Thinking; An Introduction, Cambridge University Press.*

E- Recourses

- https://youtube.com/playlist?list=PLtKNX4SfKpzX_bhh4LOEWEGy3pkLmFDmk&si=_pchcRWwvgMp4hzO
- https://open.library.okstate.edu/criticalthinking/chapter/__unknown__-2/#:~:text=Thinking%20clearly%20and%20systematically%20can,not%20just%20having%20new%20ideas.
- https://youtu.be/zFfSf2nska8?si=Ez6hB0LhIDyfYQgr
- https://open.library.okstate.edu/criticalthinking/chapter/__unknown__/
- https://youtu.be/vEkxq636_gc?si=UjJsr6yekOj0ltcY
- https://iep.utm.edu/fallacy/
- https://youtu.be/yAjkQ1YqLEE?si=RZDdRejljarLJre6
- https://www.indeed.com/career-advice/career-development/types-of-reasoning

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. What is Critical Thinking?
2. How critical thinking is related to applied reasoning?
3. Explain the Standards of Critical Thinking.
4. Elaborate the Benefits and Limitations of critical thinking.

Unit II

1. What is an argument?
2. What do you mean by the construction of an argument?
3. Differentiate between Premises and Hidden Premises
4. How argument plays a significant role in critical thinking.

Unit III

1. Violation of any rules is known as _____.
2. What are Fallacies of Relevance, give an example.
3. What are Fallacies in Ordinary Language?
4. Explain Fallacies of Presumption with examples

Unit IV

1. What is Reasoning?
2. What are the Types of Reasoning?
3. Difference between Science &Superstition.
4. Define Analogical, Legal, and Moral reasoning

Peace and Conflict Studies

Introduction:

This course on peace and conflict studies will discuss the complexities of understanding, analyzing, and addressing conflicts while promoting peace and justice. Students will gain a comprehensive understanding of the theories,

methods, and practical applications of peace and conflict studies. They would be equipped with the knowledge and skills needed to contribute to peace building efforts in diverse contexts.

Course Outcomes:

- Protection of basic human rights.
- Promotion of the culture of cooperation and understanding.
- Resolution of conflicts through open dialogue.
- Framing of peace-building mechanisms

Learning Outcome

- **Unit-I** Students will be able to analyze the Concept of Peace and Conflict. They will be able to reflect on the contemporary issues related to Peace-justice such as War, Human Rights Violations.
- **Unit-II** Students will appreciate the value of Peace in Indian Tradition. They can use the learning to promote harmony, and brotherhood and achieve the motto of Vasudhaiva Kutumbakam.
- **Unit-III** Students will be able to distinguish the theories of peace of Hobbes, Kant, and John Rawls.
- **Unit-IV** Students will be able to philosophically analyze the peace initiatives in the international society. They will be able to decide what initiative achieves a better state of peace and stability.

Course Components:

- **Unit-I:** Concept of Peace- Issues related to peace-Justice, the dignity of Man, Analyzing Conflict: Conflict Dynamics. Intractability, Escalation, and De-escalation; Human Rights violation, Human Equality, Democracy, and Tolerance.
- **Unit-II:** Peace in Indian Tradition – Peace and concept of Dharma, Gita concept of Lokasamgraha, Buddha's concept of peace - Gandhi on peace through satyagraha, Non-Violence- Inseparability of ends and means, the concept of National Integration.
- **Unit-III:** Theories of peace – Hobbes' concept of quarrel- competition, desire for safety, desire for recognition. Kant's concept of a morally autonomous being, John Rawl's justice as fairness.
- **Unit-IV:** Peace and International Society- a philosophical analysis of peace initiatives – (1) coercive (threat system) (2) co-operative (regulated exchange system) (3) convergent (transnational integration through values) (4) Non- violent resistance.

<u>Prescribed Books:-</u>

- ✓ *Peter Singer, Practical Ethics, Cambridge (chapter 9)*
- ✓ *Peter Signer, One World, Orient Longman (chapters 4 & 5)*
- ✓ *T. M.P Mahadevan Invitation to Indian Philosophy. Madras Arnold Heinmann.*
- ✓ *J.B. Kripalini, Gandhi: His Life and Thought. New Delhi: Government of India*
- ✓ *Publications.*

- ✓ *Manmohan Chodhari, Exploring Gandhi. New Delhi: Gandhi Peace Foundation.*
- ✓ *Dr. GR Sharma, An introduction to Gandhian Thought, New Delhi: Atlantic.*
- ✓ *Surendra Varma, Metaphysical foundations of M.K. Gandhi's Thought. New Delhi:Orient Longmans.*
- ✓ *S.R Bhakshi, Gandhi and His Social Thought Delhi: Criterion Publication.*

References Books:-

- ✓ *Ranabira Samaddara, Introductory Essay- Peace Studies, Sage books.*
- ✓ *Peter Singer, One World, Orient Longman*
- ✓ *R. Balasubrahmaniam, Technique of Non-violent resistance, Gandhian thought, University of Madras.*
- ✓ *Surendra Varma, Metaphysical foundations of M.K. Gandhi's Thought. New Delhi:Orient Longmans.*
- ✓ *SR Bhakshi, Gandhi and His Social Thought Delhi: Criterion Publication.*
- ✓ *Ātmakatha athavā Satyara Prayoga (Odia), Tr. of An Autobiography or the Story of My Experiment with Truth by M.K. Gandhi, Tr. to Odia by Gopabandhu Chaudhury, Nabajivan Trust, Ahmedabad.*
- ✓ *J.B. Kripalani, Theory of Satyagraha in Gandhi and his life and through, Govt of India,*

E- Recourses:

- ✓ **https://youtu.be/X3JZ7daip0Q?si=6gk904CkXT74LKBs**
- ✓ **https://www.hawaii.edu/powerkills/TJP.CHAP2.HTM**
- ✓ **https://iep.utm.edu/justwest/**

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. the word peace derives from _____.

2. Human Equality means what?

3. Difference between Escalation and De-escalation.

4. What is the Concept of Peace, and how it is related to Justice & the dignity of Man?

Unit II

1. What is the meaning of lokasamgraha according to Gita?

2. Explain the concept of Dharma.

3. Discuss Buddha's concept of peace.

4. How did Gandhi apply non-violence in the society for peace?

Unit III

1. Justice of fairness given by ____.

2. Motto of Hobbs's concept of Quarrel competition.

3. Define Kant's concept of morality.

4. Discuss John Rawls' theory of Justice.

Unit IV

1. What are the different types of peace?

2. Explain coercive (threat system)

3. Explain co-operative (regulated exchange system)

4. State the difference between

(1) coercive (threat system) (2) cooperative (regulated exchange system) (3) convergent (transnational integration through values) (4) Non- violent resistance.

An Introduction to Public Administration

Course Outcomes:

Students will be able to

- To provide the students a basic understanding of the principles of public administration.
- To know evolution of the discipline and approaches to study public administration
- To understand about organizations in public administration
- To define the concept of public administration and the basic principles of the discipline.
- To explain the difference between Public Administration and Private Administration

Unit 1: Introduction

- Public Administration: Meaning, Nature, Scope & Significance
- Evolution of the Discipline
- Public Administration and Private Administration

Unit 2: Approaches to the study of Public Administration

- Classical Approach: Historical, Legal, Bureaucratic
- Modern Approach: Behavioral, System, Ecological

Unit 3: Organisations and Public Administration

- Formal and informal, Government and Non -Government organizations
- Line, Staff, and Auxiliary Agencies

Unit 4: Principles in Public Administration

- Hierarchy, Unity of Command, Span of Control, Coordination
- Centralization and Decentralization
- Supervision and Delegation

Textbooks:

- ✓ "*Public Administration: Concepts and Theories" by Prof. Ramesh K. Arora and Prof. Rajni Goyal (Publisher: New Age International)*
- ✓ *"Public Administration in India: Theories and Practices" by Dr. Mohit Bhattacharya (Publisher: Prentice-Hall of India)*
- ✓ *RumkiBasu (2004), Public Administration: Concepts and Theories, Sterling Publishers Pvt. Ltd., New Delhi*
- ✓ *Mohit Bhattacharya (1997) Restructuring Public Administration, Jawahar Book Centre, New Delhi.*
- ✓ Reference Books •BidyutChakravorty (2013), Public Administration", Sage, New Delhi. •Amita Singh 2002, "Public Administration: Roots and Wings" Galgotia Publishers, New Delhi • L.D. White (1948) Introduction to the study of Public Administration, New Delhi, Macmillan Publication.

Reference Books:

- ✓ *"Modern Public Administration: Theories and Practices" by Padma Ramachandran (Publisher: PHI Learning Private Limited)*
- ✓ *"Public Administration: Trends, Issues, and Practices" by Dr. B.L. Fadia and Dr. KuldeepFadia (Publisher: SahityaBhawan Publications)*
- ✓ *"Public Administration: Concepts and Cases" by Prof. Hoshiar Singh and Dr. Meenu Agrawal (Publisher: McGraw-Hill Education)*
- ✓ *Dr. VishnooBhagawan, Dr. VidyaBhusan, Dr. VandanaMohala: Public Administration, S.Chand Publishing Ltd.*

Indian Administration

Course Outcomes: Students will be able to

- To provide students a basic understanding of the evolution of Indian Administration
- To help students to gain knowledge about structural and functional dynamics of Indian administration.
- To Know the evolutionary period of Indian Administration.
- Define the concept of the fundamental rights and duties of Indian Citizens

UNIT 1: Evolution of Indian administration

- Genesis of Indian Administration
- Government of India Act(s) of 1909, 1919, 1935.

UNIT 2: Salient Features of Indian Constitution

- Fundamental Rights - its features and limitations
- Directive Principles of State Policy
- Fundamental Duties

UNIT 3: Federal Structure in India

- Centre-state relations: Legislative, Administrative and Financial

UNIT 4: Union Administration

- Central Secretariat, Cabinet Secretariat,
- Prime Minister's Office (PMO)

Text Books:

- ✓ *B.L. Fadia and KuldeepFadia, (2014) "Indian Administration" SahityaBhawan, Agra;*
- ✓ *BidyutChakrabarty, Prakash Chand, (2016),"Indian Administration : Evolution and Practice" , SAGE Publications, New Delhi;*

Reference Books

- ✓ *Amita Singh, (2005), Administration Reforms, Sage Publications, New Delhi*
- ✓ *Kuldeep Mathur,(2015), Government to Governance, National Book Trust*
- ✓ *Hoshiar Singh and Pankaj Singh (2011), Indian Administration, Pearson, Delhi.*
- ✓ *S.R. Maheswari (2011), Indian Administration, New Delhi, Orient Longman.*

- ✓ *Pratap Bhanu Mehta &Nirja Gopal Jayal (2011), The Oxford Companion to Politics in India, Oxford University Press, New Delhi.*
- ✓ *Padmalaya Mahapatra, (2013),"Indian Administration: Central – State – District", Gyanayuga, Bhubaneswar*

State Administration

Course Outcomes:

Students will be able to

- To help the students to understand the relation between Centre and state in Indian federation.
- To gather knowledge about the structural and functional dynamics of State administration.
- Understand the functioning of executive and administrative institutions in a state.
- Explain the structure and function of administrative institutions at state and district level.

UNIT 1: Introduction to State Administration

- Overview of State Administration
- Structure of State Administration

UNIT 2: Executive Power at the State Level

- Role and Responsibilities of the Governor and Chief Minister
- Role of State Cabinet

UNIT 3: State Administration in Odisha

- Line Departments in Odisha
- Chief Secretary, State Secretary and Different departments

UNIT 4: District Administration

- Structure of District administration
- Role of District Collector and Block Development Officer

Text Books:

- ✓ *B.L. Fadia and Kuldeep Fadia (2014), Indian Administration, Sahitya Bhawan, Agra..*
- ✓ *Bidyut Chakrabarty, Prakash Chand (2016), Indian Administration: Evolution and Practice, SAGE Publications, New Delhi.*

Reference Books:

- ✓ *Kuldeep Mathur,(2009),Policy-Making in India: Who Speaks? Who Listens?, Hindustan Publishing corporation*.
- ✓ *Hoshiar Singh and Pankaj Singh (2011), Indian Administration, Pearson, Delhi.*
- ✓ *S.R. Maheswari (2011), Indian Administration, New Delhi, Orient Longman.*
- ✓ *Pratap Bhanu Mehta & Nirja Gopal Jayal (2011), The Oxford Companion to Politics in India, Oxford University Press, New Delhi.*
- ✓ *Padmalaya Mahapatra (2013), Indian Administration: Central – State – District, Gyanayuga, Bhubaneswar*

Population And Society

Demography shows the dynamics of advancement or backwardness of any nation-state worldwide. The demographic composition and trends of any nation-state reflects upon as well as affect its own society. In this context, India is going to be the most populous country of the world surpassing China's population. Hence, it is highly necessary to engage the students to learn population dynamics and its impact on society.

Course Outcome:

By the time the students have completed this course, they will be able to understand the significance of sociology in studying population and society relationship and will have an idea on Indian population structure, population policies and population programmes. And the role of various agencies in population control.

Unit: I: Population Studies

1.1 Meaning of population, Genesis and Growth of Population Studies
1.2 Scope and Importance of Population Studies
1.3 Population & Society relationship
1.4. Population trends-World and India

Learning outcome: *Students will be able to explain the significance of population studies and the sociological significance of population and society relationship.*

Unit: II: Population Theories
2.1 Malthusian Theory
2.2 Optimum Theory of Population
2.3 Theory of Demographic Transition
2.4 Applicability of Population Theories in Contemporary Scenario

Learning outcome: *Students will be able to analyse the contributions of different school of thoughts for the growth of population studies and the application of these theories in contemporary demographic changes.*

Unit: III: Determinants of Population Growth
3.1 Fertility
3.2 Migration
3.3 Mortality
3.4 Measures to control population growth

Learning outcome: *Students will be able to demonstrate an understanding of the major determinants of population growth.*

Unit: IV: Population Policies and Programmes
4.1 National Family Planning Programme 1952
4.2 National Population Policy 1976
4.3 National Population Policy 2000
4.4 National Population Policy 2011

Learning outcome: *Students will be able to explain the impact of various policies in controlling population boom, balancing sex ratio, reducing mortality etc.*

Lesson Plan:

Unit	Thrust Areas	Method	Total No. of Classes	References
I	Population Studies Meaning of population, Genesis and Growth of Population Studies Scope and Importance of Population Studies Population & Society relationship Population trends- World and India	Theory class and Tutorial class	15	Bhende, A. A., & Kanitkar, T. (2011). *Principles of population studies*. New Delhi: Himalaya Publishing House. Weeks, J. R. (2015). *Population: An introduction to concepts and issues*. Belmont, California: Wadsworth Publishing Company.
II.	Population Theories Malthusian Theory Optimum Theory of Population Theory of Demographic Transition Applicability of Population Theories in Contemporary Scenario	Theory class and Tutorial class	15	Bhende, A. A., & Kanitkar, T. (2011). *Principles of population studies*. New Delhi: Himalaya Publishing House. Weeks, J. R. (2015). *Population: An introduction to concepts and issues*. Belmont, California: Wadsworth Publishing Company.
III	Determinants of Population Growth Fertility Migration Mortality Measures to control population growth	Theory class and Tutorial class	15	Bhende, A. A., & Kanitkar, T. (2011). *Principles of population studies*. New Delhi: Himalaya Publishing House. Weeks, J. R. (2015). *Population: An introduction to concepts and issues*. Belmont, California: Wadsworth Publishing Company.
IV	Population Policies and Programmes National Family Planning	Theory class and Tutorial class	15	Bhende, A. A., & Kanitkar, T. (2011). *Principles of population studies*. New Delhi: Himalaya Publishing House.

	Programme-1952 National Population Policy- 1976 National Population Policy-2000 National Population Policy- 2011			

Text Books:

- ✓ *Bhende, A. A., & Kanitkar, T. (2011). Principles of population studies. New Delhi: Himalaya Publishing House.*
- ✓ *Weeks, J. R. (2015). Population: An introduction to concepts and issues. Belmont, California: Wadsworth Publishing Company*.

Reference Books:

- ✓ *Agarwal, S.N. (1989). Population studies with Special Reference to India. New Delhi: Lok*
- ✓ *Bose, A. (1991). Demographic Diversity in India. Delhi: B. R. Publishing Corporation.*
- ✓ *Cassen, R. (2016). India: population, economy, society. Springer.*
- ✓ *Dubey, S.N. (2001). Population of India. Delhi: Authors Press.*
- ✓ *Jain, R.K. (2013). A Textbook of Population Studies. Neha Publishers & Distributors.*

Sample Questions

Part-I

Fill in the Blanks (1x12)

(a) _____ is the main proponent of demographic transition theory.

Part-II

Answer any 8 questions within two or three sentences. (2x8)

(a) Define fertility.

Part -III

Answer any 8 questions within 75 words each. (3x8)

(a) Briefly discuss the causes of declining fertility rate of India.

Part-IV

Answer all the within 500 words each. (7x4)

(a) Critically analyse the population control measures taken by government of India.

CRIME AND SOCIETY

Crime is an integral and normal feature of human society. However, present-day societies witness an eruption of distinct crimes which were neither known nor so rampant in the past. Similarly, the socio-economic milieu from which criminals are drawn today is not the same as they were in the past. Further, with the advances in our knowledge of crime causation, a significant shift in our approaches to crime control and prevention has been increasingly visualized. Correction has emerged as an important alternative to punishment. Hence the relevance of the course on crime and society is inevitable.

Course outcomes:

- Students can visualize the changing profile of crime and criminals in the contemporary society.
- The students can demonstrate knowledge about theoretical perspectives on crime
- Get sensitized with social causes and consequences of crimes and the measures to control crime as well.
- To prepare themselves for professional roles in assuming criminal justice, criminal administration system and reformative institutions

Unit I: Meaning and Concepts of Crime and Delinquency

1.1 Crime and Society - An Introduction
1.2 Meaning and Characteristics
1.3 Typology of Crimes: Conventional, Organized, Political, Cyber, White-collar Crime
1.4 Delinquency: Meaning and Nature

Learning outcome:

- After going through the unit, the students can reflect upon the meaning, characteristics, typology of crime along with the concept of delinquency.

Unit II: Theories of Crime

2.1 Classical theory
2.2 Differential Association Theory
2.3 Delinquent Subculture theory
2.4 Anomic Theory and Labeling theory

Learning outcome:

- This unit aims to impart the fundamental sociological theories of crime to the students focusing on classical theory, differential association theory, delinquent subculture theory, anomic theory and labeling theory.

Unit III: Changing Profile of Crime and Criminals

3.1 Victimology and Juvenile delinquency and crime.
3.2 Theories of Punishment: Retributive Theory
3.3 Deterrent Theory &
3.4 Reformative Theory

Learning outcome:

- After reading this unit, the students can demonstrate the changing profile of crime and criminals from a sociological perspective.

Unit IV: Correctional Measures:

4.1 Nature and significance of correctional measures
4.2 Community-based measures
4.3 Prison-based measures
4.4 Changes in Probation, Parole, Open Prison

Learning outcome:

- After going through the unit, the students can provide an in-depth understanding of various legal and extra-legal corrective measures of crime like prison, parole, probation and community-based measures.

Lesson Plans:

Unit	**Thrust area**	**Teaching methods**	**Total number of classes required**	**References**
I	Meaning, definition, concepts related to crime and its Characteristics, Typology of Crimes: Conventional, Organized, Political, Cyber, White-collar Crime, Delinquency: Meaning and Nature	Lecture and tutorial class	15	Ahuja, Ram. (2015). Criminology. Jaipur: Rawat Publication. Chapter-1
II	Major theories of Crime: Classical theory, Differential Association Theory,	Lecture and tutorial class	15	Marsh, I., Melville, G., Morgan, K., Norris, G., & Walkington, Z. (2007). Theories of crime. Routledge. Chapter-4 Swayamprabha, Theories of criminal

	Delinquent Subculture theory, Anomic Theory and Labeling theory.			behaviour https://www.youtube.com/watch?v=FthBlnS0A-8 Swayamprabha sociological theories of crime https://youtu.be/In_q1LcZDms?si=1zv0jvew-yAsPTRs
III	Changing Profile of Crime and Criminals: Victimology and Juvenile delinquency and crime, Theories of Punishment: Retributive Theory, Deterrent Theory & Reformative Theory	Lecture and tutorial class	15	Mohanty, Rabindra K. & Mohanty, Satyajit. (2015). Textbook of criminology penology and victimology. New Delhi: Himalaya Publishing House. CEC UGC-03, Changing profile of crime and criminals. https://www.youtube.com/watch?v=YDV90hlYepc
IV	Correctional Measures: Nature and significance of correctional measures, Community-based measures, Prison-based measures, Changes in Probation, Parole, Open Prison	Lecture and tutorial class	15	Ahuja, Ram. (2015). Criminology. Jaipur: Rawat Publication. Swayamprabha, Criminal justice system-01 https://www.youtube.com/watch?v=X0zbinGSjpU Swayamprabha, Criminal justice system-02 https://www.youtube.com/watch?v=arxB2rqMo0A

Text books:

- ✓ *Ahuja, Ram. (2015). Criminology. Jaipur: Rawat Publication.*
- ✓ *Mohanty, Rabindra K. & Mohanty, Satyajit. (2015). Textbook of criminology penology and victimology. New Delhi: Himalaya Publishing House.*

References:

- ✓ *Marsh, I., Melville, G., Morgan, K., Norris, G., & Walkington, Z. (2007). Theories of crime. Routledge.*
- ✓ *Merton, R.K. (1968). Social theory and social structure. New York: The Free Press.*
- ✓ *Ministry of Home Affairs. (1998). Crime in India. New Delhi: Government of India.*
- ✓ *Sutherland, E. H., Cressey, D. R., & Luckenbill, D. F. (1992). Principles of criminology. Altamira Press.*

e. Resources:

1. CEC UGC-03, Changing profile of crime and criminals.
https://www.youtube.com/watch?v=YDV90hlYepc
2. Crime and Society Swayamprabha
https://onlinecourses.swayam2.ac.in/cec19_hs08/preview
1. Meaning and types of crime, Juvenile delinquency–causes and consequences, theories of punishment (Odisha State Open University)
https://drive.google.com/file/d/1y0uh8Qjqcadr4oh8cmK79rMb1rdEWGvJ/view
2. Swayam Prabha crime and delinquency https://youtu.be/mW1gu5f_0cc?si=B1HXlvdnSzyX97IB
3. Swayamprabha sociological theories of crime https://youtu.be/In_q1LcZDms?si=1zv0jvew-yAsPTRs
4. Swayamprabha, Criminal justice system-01
https://www.youtube.com/watch?v=X0zbinGSjpU
5. Swayamprabha, Criminal justice system-02
https://www.youtube.com/watch?v=arxB2rqMo0A

Sample Question

Answer all questions of the given Part-I, II, III & IV

Part-I

I. Answer all questions of the following. Marks 1×12=12

Q. Phishing is a _____ crime.

Part-II

2. Write any eight questions within two or three sentences each. Marks 8×2=16

Q. What is delinquency?

Part-III Marks 8×3=24

3.Answer any eight questions within 75 words each.

Q. Write a note on white-collar Crime.

Part-IV Marks 7×4=28

4. Answer all of the following with 500 words each.

Q. Critically examine the significance of Differential Association theory of crime.

Science, Technology and Society

The role of science and technology has become essential in every aspect of human life. Further, the new development in the global order has broadened the scope of science and technology in society. It is crucial to understand how science and technology shape the society and vice-versa.

Course Outcome:

By the time the students have completed this course, they will be able to understand the relationship between science and society, and the conceptual and theoretical issues in the study of sociology of science.

Unit-I: Building the Concepts of Science, Technology and Society

1.1 Scientific Revolution and the Era of Enlightenment
1.2 Science- the basic tenets, difference between Science and Common Sense
1.3 Technology-The Basic Features, history of technological development.
1.4 Relationship between Society, Science and Technology,E-governance, Surveillance Society

Learning Outcome: *Students will be able to explain the relationship between science, technology and society.*

Unit-II: India's Progress in Science through Ages

2.1 Science in different periods in India: Ancient, Medieval and Modern
2.2 Globalization and the new Scientific Revolution
2.3 The rise of Information and Knowledge Society
2.4 Science, Technology and Social Deliverables, Technology & emerging political process, Global and India

Learning outcome: Students will be able to analyse the development of science at global and national level from a historical perspective.

Unit-III: Science and Technology Education and Research

3.1 Popularising Science and Technology education in India
3.2 The building of iconic scientific and technological institutions
3.3 Privatization of Scientific and Technological Education
3.4 STEM Education: Students enrolment and challenges

Learning Outcome: *Students will be able to demonstrate an understanding of recent changes in science and technology education and the shift of research domain.*

Unit-IV: India's Policies for Science and Technology

4.1 Scientific Policies and Programmes under five-year plans
4.2 Incentivising science and technology education in educational institutions.
4.3 Department of Science and Technology (DST)
4.4 Policies and programmes for expanding science and technology education, State policies, Digital Divide & Inclusion.

Learning Outcome: *Students can explain the scientific policies and programmes launched time to time, disciplinary specialisation of science, inclusivity and digital divide*.

Lesson Plan:

Unit	Thrust Areas	Method	Total No. of Classes	References
I	Building the Concepts of Science, Technology and Society Scientific Revolution and the Era of Enlightenment	Theory class and Tutorial class	15	(1) Gobo, G., & Marcheselli, V. (2023). *Science, Technology and Society: An Introduction*. Springer Nature. (2) Bridgstock, M. (1998). *Science, technology and society: an introduction*. Cambridge University Press.

	Science- the basic tenets, difference between Science and Common Sense Technology-The Basic Features, history of technological development. Relationship between Society, Science and Technology,E-governance, Surveillance Society			(3) Science Technology and Society Studies by Sangeeta Dey. UGC e-Adhyayan. Link: https://ebooks.inflibnet.ac.in/antp10/chapter/science-technology-and-society-studies/ Video Lecture: Science, Technology and Society By Prof. Sambit Mallick, IIT Guwahati Link: https://youtube.com/@sciencetechnologyandsociet6773?si=H_9KAALzU7y4BGfw
II.	India's Progress in Science through Ages Science in different periods in India: Ancient, Medieval and Modern Globalization and the new Scientific Revolution The rise of Information and Knowledge SocietyScience, Technology and Social Deliverables, Technology & emerging political process, Global and India	Theory class and Tutorial class	15	Science Technology and Society Studies by Sangeeta Dey. UGC e-Adhyayan. Link: https://ebooks.inflibnet.ac.in/antp10/chapter/science-technology-and-society-studies/ Video Lecture: Science, Technology and Society By Prof. Sambit Mallick, IIT Guwahati Link: https://youtube.com/@sciencetechnologyandsociet6773?si=H_9KAALzU7y4BGfw
III	Science and Technology Education and Research Popularising	Theory class and Tutorial class	15	Science Technology and Society Studies by Sangeeta Dey. UGC e-Adhyayan. Link: https://ebooks.inflibnet.ac.in/antp10/

	Science and Technology education in India The building of iconic scientific and technological institutions Privatization of Scientific and Technological Education STEM Education: Students enrolment and challenges.			chapter/science-technology-and-society-studies/ Video Lecture: Science, Technology and Society By Prof. Sambit Mallick, IIT Guwahati Link: https://youtube.com/@sciencetechnologyandsociet6773?si=H_9KAALzU7y4BGfw
IV	India's Policies for Science and Technology Scientific Policies and Programmes under five-year plans Incentivising science and technology education in educational institutions. Department of Science and Technology (DST) Policies and programmes for expanding science and technology education, State policies, Digital Divide & Inclusion.	Theory class and Tutorial class	15	Science Technology and Society Studies by Sangeeta Dey. UGC e-Adhyayan. Link: https://ebooks.inflibnet.ac.in/antp10/chapter/science-technology-and-society-studies/ Video Lecture: Science, Technology and Society By Prof. Sambit Mallick, IIT Guwahati Link: https://youtube.com/@sciencetechnologyandsociet6773?si=H_9KAALzU7y4BGfw

Text book:

- ✓ *Gobo, G., & Marcheselli, V. (2023). Science, Technology and Society: An Introduction. Springer Nature.*
- ✓ *Bridgstock, M. (1998). Science, technology and society: an introduction. Cambridge University Press.*

References:

- ✓ *Aggarwal, V. (2018). Leading science and technology: India next? New Delhi: Sage*
  - *Publisher.*
- ✓ *Arnold, David. 2004. The New Cambridge History of India: III Science, Technology and medicine in Colonial India. Cambridge: Cambridge University Press*
- ✓ *Baber, Zaheer. 1996. The Science of Empire: Scientific Knowledge, Civilization, and Colonial Rule in India. New York: State University of New York Press.*
- ✓ *Bauchspies, Wenda K., Jennifer Croissant, and Sal Restivo. 2006. Science, Technology and Society: A Sociological Approach. USA: Blackwell Publishing.*
- ✓ *Merton, R. K. (1938). Science, technology and society in seventeenth century England. Osiris, 4, 360-632.*
- ✓ *Merton, R. K. (1963). The ambivalence of scientists. Bulletin of the Johns Hopkins Hospital, 112, 77-97.*
- ✓ *Pattnaik, Binay Kumar. (2013). Readings in Indian Sociology: Volume IV Sociology of Science and Technology in India, New Delhi: Sage Publications*

E-resources:

1. Science Technology and Society Studies by Sangeeta Dey. UGC e-Adhyayan. https://ebooks.inflibnet.ac.in/antp10/chapter/science-technology-and-society-studies/
2. Science, Technology and Society By Prof. Sambit Mallick, IIT Guwahati
   Link: https://youtube.com/@sciencetechnologyandsociet6773?si=H_9KAALzU7y4BGfw

Sample Questions

Part-I

Fill in the Blanks (1x12)

(b) Sociologist _____ discussed about the Science, technology and society in seventeenth century England.

Part-II

Answer any 8 questions within two or three sentences. (2x8)

(b) What is science?

Part -III

Answer any 8 questions within 75 words each. (3x8)

(b) What is STEM education?

Part-IV

Answer all the within 500 words each. (7x4)

(b) Discuss India's Progress in Science through Ages citing suitable examples.

Sociology for Social Work

Course Objectives

- To understand foundational sociological concepts

- To explore the causes, and consequences of social change
- To analyze the nature of social stratification
- To discuss the concept and impact of social problems

Learning Outcomes

- Able to examine basic social institutions
- Able to discuss the mechanisms of social control
- Able to understand the implications of social stratification on individual opportunities
- Able to explore sociological perspectives on addressing and mitigating social problems

Unit - I: Sociological Concepts

- Thinking Sociologically: Common Sense and Sociological Imagination (Mills, C.W).
- Social Sciences and Natural Sciences. Social Construction of Reality (Berger). Nature and Culture.
- Community, Association, Institution, Society, Culture, Civilization and Socialization.
- Basic social institutions: marriage, family and religion.
- Social Processes: cooperation, competition, conflict, accommodation, and assimilation;

Unit – II: Theories of Social Change

The Evolutionary Perspective, Cyclical Theories, Structural Functionalist Perspective, Conflict Perspective.

Unit – III: Social Structure

- Concept of Social Structure and Function. Social Structure and Agency, Structuration.
- Social Stratification: Nature and Types – Tribe, Caste, Class, Gender, Power and Authority.

Unit – IV: Social Problems

Concept and Meaning-Casteism, Communalism, Regionalism, Family Disorganization, Poverty and Social Exclusion, Social Change and Conflict.

Reading List

- ✓ *Ahuja, R. (2012). Social Problems in India. Jaipur: Rawat Publication.*
- ✓ *Davis F.J. (1987). Social problems: Enduring major issues and social change. Kolkata: Allied publication.*
- ✓ *Dhanagare, D.N. (1993). Themes and perspectives in Indian sociology. Jaipur: Rawat Publication.*
- ✓ *EItzen, D.S. (1980). Social Problems. Boston: Allyn and Bacon.*
- ✓ *Madan, G.R. (2009). Indian Social Problems. Kolkata: Allied Publication.*
- ✓ *Prasad, L.M. (2001) Social Problems. New Delhi: Anmol Publication.*

- ✓ *Ritzer, G. (1992). Sociological Theory. New York: McGraw Hill.*
- ✓ *Singh, Y. (1973). Modernization of Indian tradition. Delhi: Thomson press.*
- ✓ *Singh, Y. (1996). Indian Sociology social conditioning and emerging concerns. Delhi: Vistaar publication.*
- ✓ *Singh, Y. (2004). Identity & Theory in Indian Sociology. Jaipur: Rawat Publication.*
- ✓ *Turner, J.H. (1995). The structure of sociological theory. Jaipur: Rawat Publication.*

Psychology for Social Work

Course Objectives

- To define psychology and discuss its relevance and application in social work, exploring various psychological perspectives and their influence on human behavior.
- To understand the concept of personality and compare different theories of personality development
- To understand the relevance of psychology in social work
- To cover human growth and development across the lifespan, detailing the social, emotional, cognitive, and physical stages and their associated challenges.

Learning Outcomes

- Able to examine factors influencing human behavior including heredity, environment, and self-concept
- Able to identify the processes of adjustment, coping mechanisms, defense mechanisms, and resilience in personality development
- Able to explore the concepts of prejudice, stereotypes, discrimination, and their impacts on social behaviors and attitudes

- Able to apply psychological principles to understand and manage transitions, aging, social problems, dying, and bereavement

UNIT – I: Nature and Scope of Psychology

Definition, scope and importance of Psychology in Social Work practice. Perspectives in Psychology: Psychoanalytic, Psychodynamic and Gestalt, Behavioural, Cognitive and Humanistic. Factors influencing Human Behaviour- Heredity, Environment and Self.

UNIT – II: Personality Development

- Meaning of personality. Theories of personality: Psychoanalytic (Freud, Jung), Humanistic (Carl Rogers) and Behavioural (Pavlov, Skinner).Psycho-social theory by Erickson, Cognitive theory by Jean Piaget.
- Processes of Adjustment: Concept and Factors. Coping Mechanism, Defense Mechanism and Resilience.
- Processes of Perception, Cognition and Distortions.

UNIT – III: Relevance of Social Psychology to Social Work.

- Prejudice, stereotypes and discrimination. Attitude formation: changing attitudes and behavior.
- Collective Behaviour: Groups, Crowds, Scape-goating. Motivation (Maslow and Victor Frankl) and Leadership

UNIT – IV: Applied Psychology

- Human growth and development: Social, Emotional, Cognitive and Physical Stages in Life Span approach from conception to old age: characteristics, needs, tasks and problems at each stage.
- Knowledge of Self, Child and Family. Transition: understanding and managing personal change, Aging and social problems, Dying and bereavement.

Reading List:

- ✓ *Baron, R. and Misra, G (2013). Psychology. New Delhi: Pearson*
- ✓ *Baron, R.A. and Byron, D. (1998).Social Psychology. New Delhi: Prentice Hal.*
- ✓ *Bcoket, C. (2002). Human Growth and Development: A Psychosocial introduction. London: Sage Publications*
- ✓ *Kuppuswamy. (1980). An introduction to Social Psychology. Bombay: Media Promoters and Publishers Pvt Ltd*
- ✓ *Myers, D.G. (2005). Social Psychology (8th ed.). New Delhi: Tata McGraw Hill Pub. Co.*
- ✓ *Morgan, C.T., King, R.A. Weisz, J.R., Schopler, J. (2001). Introduction to Psychology. New Delhi: Tata McGraw and Hill.*
- ✓ *Nicolson, P., & Bayne, R. (2014). Psychology for Social Work: Theory and Practice. London: Palgrave*
- ✓ *Rao, K. R., &Paranjpe, A. C. (2017). Psychology in the Indian Tradition. New York: Springer*
- ✓ *Ryan, R. M. (2012). Oxford handbook of human motivation. New York : Oxford*
- ✓ *Saraswathi, T. S. (2003). Culture, socialization and human development: Theory, research and applications in India. New Delhi: Sage Publications*
- ✓ *Specht, J. (2017). Personality development across the lifespan. 1st Edition. London: Academic Press*

- ✓ *Herbert Martin. (1986) Psychology for Social Workers, London: Palgrave Macmillan*

Economics for Social Work

Course Objectives

- To introduce basic economic concepts and discuss the structure of economic systems
- To delve into the economic functions and impact of various financial institutions and government policies
- To evaluate development economics, its significance, and contemporary challenges in the field.
- To discuss the interrelationship between economics and social work

Learning Outcomes

- Able to explore the economic roles of different sectors such as households, businesses, government, and the external sector
- Able to think about ways to address contemporary economic problems including inflation, poverty, inequality, unemployment, exploitation of labor, and conditions affecting social security

Unit – I: Introduction to Economics

Goal and scope of Economics. Basic concepts in Economics- value, price and profit. The Economic system- production, consumption and distribution; Households, Business, Government and External Sector

Unit-II: **The National Economy**

Measuring national output: GDP and GNP. Role of the Banking System. Role of the Government- Regulation, Revenue and Expenditure.

Unit – III: Contemporary Economic Issues

Development Economics: Meaning, Nature and Significance, Contemporary development problems: Inflation, Poverty, Inequality, Unemployment, Exploitation of Labour-wages, working conditions, social security.

Unit –IV Economics and Social Work

Relationship of Economics with Social Work. The Non-Profit Sector: CSR Foundations, NGOs and FBOs. Foreign Aid

Reading List

- ✓ Sowell, T. (2004). Basic economics: a citizen's guide to the economy. Basic Books: New York
- ✓ Dasgupta, Partha. (2009). Economics: A Very Short Introduction. OUP: India
- ✓ Nayar, Deepak.(2013). Catch Up Developing Countries in the World Economy. OUP: India

- ✓ Pai, Roopa and Suneja, Mohit. (2013) So You Want to Know About Economics. Rupa Publications: India

- ✓ Srivastava, S. S. and Tandon, Rajesh. How Large Is India's Non-Profit Sector? Economic and Political Weekly, Vol. 40, No. 19 (May 7-13, 2005), pp. 1948-1952

- ✓ Mason, Dyana P. Introduction To The Nonprofit Sector. https:/ opentext.uoregon.edu/ intrononprofit/?p=4#oembed-1
- ✓ Banerjee, Abhijit V. and Dufflo, Esther. (2011) Poor Economics: Rethinking Poverty And The Ways To End It, Random House: India
- ✓ Bhowmik, Sharit.(2012). Industry, Labour and Society, Orient Blackswan: New Delhi.

Law for Social Workers

Course Objectives

- To be acquainted with the principles of law and justice
- To understand the legal system and legal instruments for intervention
- To understand the law as it applies to marginalized and excluded groups
- To analyze the intersection of law and social work, emphasizing the application of legal knowledge in fighting social injustice and advocating for social change

Learning Outcomes

- Able to develop a basic understanding of the legal system and how to engage with it
- Able to explore the types of law in India including civil, criminal, and personal law and their applications
- Able to understand the process of filing writ petitions, and the use of the Right to Information Act
- Able to give a social context to the law and work effectively within the legal framework to promote social justice

Unit – I: Introduction to Law

Meaning of Law. Principles of Natural Justice. Rule of Law. Sources of Law.

Unit-II: The Indian Legal System

Types of Law- Civil, Criminal, Personal. The three criminal codes- Bharatiya Nyaya Sanhita Act (BNSS), 2023; the Bharatiya Sakshya Adhiniyam (BSS), 2023; and the Bharatiya Nagarik Suraksha Sanhita (BNSSS), 2023.

Unit-III: Legal instruments for intervention

Writs of Habeas Corpus, Mandamus, Prohibition, Certiorari and Quo warranto. Writ petition and filing a writ petition. Right to Information and requesting for information. Filing a FIR with the police. Rights of the accused.

Unit-IV: Law and Social Work

Interface between the practices of Law and Social Work. Giving a social context to the Law. Fighting against social injustice. Working for Social Change.

Reading List:

- ✓ *Huchhanavar, S. (2018). Introduction to Natural Justice. Available at SSRN 3246245.*
- ✓ *Wright, R. W. (1999). Principles of justice. Notre Dame L. Rev., 75, 1859.*
- ✓ *Solum, L. B. (2006). Natural justice. Am. J. Juris., 51, 65.*
- ✓ *Baxi, U. (2007). The rule of law in India. Sur. Revista Internacional de Direitos Humanos, 4, 6-27.*

- ✓ *Khanna, Gyanvi. (2024) New Criminal Laws Are Continuation Of Colonial Logic, Expand Police Powers : Professor Anup Surendranath https://www.livelaw.in/top-stories/new-criminal-laws-are-continuation-of-colonial-logic-expand-police-powers-professor-anup-surendranath-246737*
- ✓ *Atrey, Abhishek. (2021). Law of Writs - Practice and Procedure, Kamal Publishers: New Delhi*
- ✓ *Goel, Dewakar & Yadav, Abha (2016). Right to Information - Concept, Procedure & Practice, Universal Law Publishing: New Delhi*
- ✓ *Bora Baishya, Satavisa & Borah, Upasana* ***(2021).*** *A Handbook on F.I.R.* ***: From Investigation to Trial, Notion Press.***
- ✓ *Stein , Theodore J. (2004) The Role of Law in Social Work Practice and Administration, Columbia University Press*
- ✓ *Madden, Robert G. 2003.* Essential law for social workers. *New York: Columbia Univ. Press.*
- ✓ *Braye, Suzy and Preston-Shoot, Michael. 'Social work and the Law' in Adams, Robert. Dominelli, Lena and Payne, Malcom. (ed.) (1998) Social Work: Themes, Issues and Critical Debates, Springer Link: UK*

Anthropology for Social Workers

Course Objectives

- To explore the intersection of Anthropology and Social Work
- To understand the status of vulnerable populations such as the tribes and the outcastes in the country
- Understand social problems and their relationship to identity
- Analyse constitutional norms and legal instruments concerning the tribes and castes.

Learning Outcomes

- Able to appreciate social identities and understand their relationship with social problems
- Able to appreciate the legal and administrative provisions for their protection
- Able to decipher social problems uniquely associated with their social status
- Understand the contemporary concerns of these populations and the response of the state

Unit – I: Anthropology and Social Work

Meaning and scope of Anthropology. Relationship with Social Work. Indian Anthroplogy- Caste and Tribe studies, linguistic and religious minorities.

Unit-II: Status of ST, SC, and OBC

Geographic and Demographic profile. Legal and administrative framework. Education, health, livelihood and employment status.

Unit-III: Problems of ST, SC and OBC

Problems of exploitation, deprivation, land alienation, displacement, enforced migration, bonded labour and trafficking, discrimination, atrocities, non-representation in services.

Unit-IV: Contemporary issues concerning ST, SC and OBC

The UN Right to self-determination of indigenous peoples. The Forest Rights Act 2006, The PESA Act 1996, Land Acquisition Law 2013. Reservation and de-reservation in education and employment.

Reading List

- ✓ *Teicher, Morton. (1951) Anthropology and Social Work in Human* Organization *(1951) 10 (3): 22–24. https://doi.org/10.17730/humo.10.3.e3841w2118237034*
- ✓ *Lewis, D. (2012). Anthropology and development: the uneasy relationship. In A Handbook of Economic Anthropology, Second Edition. Edward Elgar Publishing.*
- ✓ *Kanuha, V. K. (2000). "Being" native versus "going native": Conducting social work research as an insider. Social work, 45(5), 439-447.*
- ✓ *Ministry of Tribal Affairs, Government of India. (2014). Report of the High Level Committee on Socio-economic, Health and Educational Status of Tribal Communities of India. https://cjp.org.in/wp-content/uploads/2019/10/2014-Xaxa-Tribal-Committee-Report.pdf*
- ✓ *Shah, Ghanashyam and Bara, Joseph. (Eds.) (2020). Social Inclusion and Education in India Scheduled Tribes, Denotified Tribes and Nomadic Tribes, Routledge: NY.*
- ✓ *Pangannavar, Arjun Y. (2014), Scheduled Castes (SCs) in India: Socio-Economic Status & Empowerment Policies, New Century Publications: India.*
- ✓ *Shah, Ghanashyam. Sujatha, K. and Thorat Sukhadeo. (2020) Educational Status of Scheduled Castes: Attainment and Challenges, Rawat: New Delhi.*
- ✓ *Somanaboina, Simhadri and Ramagoud, Akhileshwari. (Eds.) (2022). The Routledge Handbook of the Other Backward Classes in India: Thought, Movements and Development, Routledge: India*

Economics

Course Objectives

- To provide knowledge to students about the concepts of Economics dealing with consumer behaviour, producer's strategy, and make them understand regarding the behaviour of firms under different market structures.
- To provide the students with the knowledge of basic concepts of Marco economics and modern tools of Macro-economic analysis.

Course Outcomes

After completing the course, the student shall be able to

- To understand the basic economic concepts like demand, supply, determination of price.
- To Understand how consumer will maximize satisfaction by spending on different goods
- To understand how producer will maximize profit by minimizing the cost.
- To Analyse the behaviour of firms and response of firms to different market situations.
- To understand the different macro-economic issues and analyse the sector specific policies.

Unit-1: Demand, Supply & Consumer Behaviour:

- Concepts Of Demand and Law of Demand, Change in Demand and Change in Quantity Demand, Concepts of Supply and Law of Supply, Change in Supply and Change in Quantity Supply, Market Equilibrium, Elasticity of Demand and Elasticity of Supply.
- Concepts Of Utility, Measurement of Utility, The Indifference Curve, Budget Line, Consumer's Equilibrium, Income and Substitution Effects, Price Consumption Curve (PCC), Income Consumption Curve (ICC), Engel Curve.

Unit-2: Production Function, Cost & Market Structure

Derivation of Production function, Law of Variable Proportion, Isoquants, Producer's Equilibrium, returns to scale, Cost: short run and long run. Different forms of Market, Perfect competition: equilibrium of firm and industry, Monopoly: short run and long run equilibrium, allocative inefficiency and deadweight loss, Monopolistic competition: short run and long run equilibrium, excess capacity, oligopoly market: kinked demand curve.

Unit-3: National Income Accounting

Introduction of different Macro-Economic variables, Concepts of National income, Measurement of National income, Circular Flow of Income and Expenditure in Closed Economy and Open Economy.

Unit-4: National Income Equilibrium & Macro Economic Problems

Consumption Function, APC & MPC, Concept of Investment & Investment Multiplier, Business Cycle and Its Phases, RBI & Monetary Policy. Inflation, Interest Rate, Foreign Exchange Rates and Balance of Payment.

Suggested Readings

- ✓ *Microeconomics: Theory and Applications" by K. N. Modi - published by Kalyani Publishers, Cuttack, Odisha.*
- ✓ *"Principles of Economics" by S. K. Misra and V. K. Puri - published by Himalaya Publishing House, Cuttack, Odisha.*
- ✓ *"Indian Economy: Policies and Performance" by M. L. Jhingan - published by Sultan Chand & Sons, Bhubaneswar, Odisha.*
- ✓ *"Development Economics" by P. T. Joseph - published by VK Publications, Bhubaneswar, Odisha*
- ✓ *Principle of micro economics by Gregory Mankiw*
- ✓ *Advanced economic theory by Dr. H.L Ahuja*
- ✓ *Managerial economics by Dr. D.M Mithani*
- ✓ *Macroeconomics by M.L Jhingan*
- ✓ *Principle of Macroeconomics by Gregory Mankiw*
- ✓ *Economics by Paul Samuelson and William Nordhaus*

Fundamentals of Entrepreneurship and E-Commerce

Course Objectives:

The course aims to

- Understand the basic concepts and theories of entrepreneurship.
- Identify and evaluate business opportunities in the digital economy.
- Develop skills in creating effective business plans and strategies.
- Gain knowledge of e-commerce platforms and technologies.
- Learn digital marketing techniques for online businesses.

- Understand the legal and ethical considerations in e-commerce.
- Develop critical thinking and problem-solving skills relevant to entrepreneurship and e-commerce.

Course Outcomes

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

- Understand Entrepreneurship Concepts and Identify Business Opportunities.
- Navigate Legal and Ethical Considerations for E-Commerce Platforms.
- Implement Digital Marketing Strategies.
- Manage and Analyze E-Commerce Performance.
- Develop Growth Strategies.

Unit-1: Introduction to Entrepreneurship

Definition of entrepreneurship, Characteristics of successful entrepreneurs, Importance of entrepreneurship in the economy, Types of entrepreneurship. Opportunity Recognition and Idea Generation; Identifying business opportunities, Idea generation techniques, Market research and analysis, Identifying target markets and customer segments.

Unit-2: Business Planning

Components of a business plan, Writing an executive summary, Marketing plan development, Financial projections and budgeting.Legal and Ethical Considerations; Legal structures for businesses, Intellectual property rights, Ethical considerations in entrepreneurship, Corporate social responsibility.

Unit-3: Introduction to E-Commerce

Definition and scope of e-commerce, Evolution of e-commerce, Types of e-commerce models (B2B, B2C, C2C), E-commerce platforms and technologies.Building an E-Commerce Website; Website design principles, Choosing a domain name and hosting provider, Payment gateways and security, User experience optimization. Digital Marketing for E-Commerce; Search engine optimization (SEO), Pay-per-click (PPC) advertising, Social media marketing,E-mail marketing.

Unit-4: E-Commerce Logistics and Fulfilment

Order processing and fulfilment, Inventory management, Shipping and delivery options, Returns and customer service.E-Commerce Analytics and Performance Measurement; Key performance indicators (KPIs) for e-commerce, Web analytics tools, Customer feedback and reviews. Scaling and Growth Strategies; Scaling an e-commerce business, International expansion, Strategic partnerships and collaborations, Exit strategies: mergers, acquisitions, IPOs

Case Studies: Analysis of successful e-commerce ventures

Suggested Readings

- ✓ *Singh, K. (2008). Rural Development - Principles, Policies, and Management. New Delhi: Sage Texts.*
- ✓ *Samanta, R. K. (2000). New Vista in Rural Development Strategies & Approaches. Delhi: B.R. PublishingCorporation.*
- ✓ *Hussain, T., Tahir, M., &Tahir, R. (2017). Fundamentals of Rural Development. New Delhi: I. K.International Publishing House Pvt. Ltd.*
- ✓ *Sahu, B. K. (2003). Rural Development in India. New Delhi: Anmol Publications Pvt. Ltd.*
- ✓ *Dutta, S. K., &Ghosh, D. K. (2002). Empowering Rural Women. New Delhi: AkanshaPublishing House.*
- ✓ *Dutta, S. K., &Ghosh, D. K. (2006). Institutions for Development: The case of Panchayats. New Delhi: MittalPublications.*
- ✓ *Agarwala, K. N., Lal, A., &Agarwala, D. (2000). Business on the Net: An Introduction to the whats and hows ofE-commerce. Noida, Uttar Pradesh: Macmillan Publishers India Limited.*
- ✓ *Awad, E. M. (2009). Electronic Commerce from vision to fulfillment. Delhi: PHI Learning.*
- ✓ *Bajaj, K. K., &Debjani, N. (2005). E-Commerce. New Delhi: Tata McGraw Hill Education.*
- ✓ *Chhabra, T.N., Jain, H. C., & Jain, A. An Introduction to HTML. Delhi: DhanpatRai& Co.*
- ✓ *Dietel, H. M., Dietel, P. J., &Steinbuhler, K. (2001). E- Business and E- commerce for Managers. New Jersey:Prentice Hall.*
- ✓ *Diwan, P., & Sharma, S. (2002). Electronic commerce- A Manager's Guide to E- Business. Delhi: Vanity BooksInternational.*
- ✓ *Kosiur, D. (1997). Understanding Electronic Commerce. New Delhi: Prentice Hall of India Pvt. Ltd.*
- ✓ *Turban, E., King, D., Lee, J., Warkentin, M., Chung, H. M., & Chung, M. (2002). Electronic Commerce: AManagerial Perspective. New Jersey: Prentice Hall Publishing.*
- ✓ *Whiteley, D. (2000). E-Commerce: Strategy, Technologies and Applications. New York: McGraw Hill.*

Entrepreneurship Development and Start-up

Course Objectives

The paper aims to provide exposure to the students to the entrepreneurial culture and industrial growth and to prepare them to set up and manage their own small units.

Course Outcomes:

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

- Identify and assess the different types of entrepreneurs and barriers to entrepreneurship;
- Develop the decision making skills to be an entrepreneur by creating new ideas;
- Understand the financial assistance provided by the government and other organizations;
- Demonstrate capacity to improve student achievement, engagement and retention;
- Enhances the critical thinking skills and gives a chance to think from a different perspective about industries.

Unit 1: Introduction

Evolution of term 'Entrepreneurship'; Factors influencing; Characteristics of an entrepreneur; Types of entrepreneur; Edupreneurship; Barriers to entrepreneurship; Creativity and entrepreneurship- Creativity and entrepreneurship ; Steps in Creativity; Innovation and inventions ; Skills of an entrepreneur ; Decision making and Problem Solving (steps indecision making);

Unit 2: Organisation Assistance and legal aspects

Assistance to an entrepreneur; New Ventures; Financial assistance to MSME; Copyright, Patent, Trademark, Franchise. Acts governing Entrepreneurship.

Unit 3: Mobilizing Resources

Resource Mobilization for entrepreneurship: Resources mobilization, types of resources, Process of resource mobilization, Arrangement of funds; writing a Funding Proposal, Traditional sources of financing, Venture capital, Angel investors, Business Incubators.

Unit 4: Managerial Aspects of Business and Government Initiatives

Managing finance; Understanding capital structure; organisation structure and management of human resources of a new enterprise; Marketing-mix; Management of cash; Relationship management; Cost management, Government initiatives for promoting entrepreneurship.

Suggested Readings

- ✓ *Aron, R. A., & Tang, J. (2021). The Role of Entrepreneurs in Society: An Action Perspective. Edward Elgar Publishing.*
- ✓ *Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2021).Entrepreneurship. McGraw-Hill Education.*
- ✓ *Kuratko, D. F., & Neck, H. M. (2017). Entrepreneurship: Theory, Process, and Practice. Cengage Learning.*
- ✓ *Shane, S. A. (2017). A General Theory of Entrepreneurship: The Individual-Opportunity Nexus. Edward Elgar Publishing.*
- ✓ *Shepherd, D. A., &Patzelt, H. (2020). The New Field of Sustainable Entrepreneurship: Studying Entrepreneurial Action Linking "What Is to Be Sustained "with" What Is to Be Developed". Springer.*
- ✓ *Desai, V. (2009). Dynamics of Entrepreneurial Development and Management. Mumbai: Himalaya PublishingHouse.*
- ✓ *Dollinger, M. J. (2008). Entrepreneurship: Strategies and Resources. New Jersey: Prentice Hall.*
- ✓ *Hisrich, R., Peters, M., & Shepherd, D. (2017). Entrepreneurship. New York: McGraw Hill Education.*
- ✓ *Rao, T. V., &Kuratko, D. F. (2012). Entrepreneurship: A South Asian Perspective. Boston: Cengage Learning*

Business Model Innovation

Course Objectives

- Understand the fundamentals of business models and their role in organizational success.
- Learn techniques for analyzing and evaluating existing business models.
- Identify opportunities for business model innovation within different industries and contexts.
- Develop skills in designing and prototyping new business models.
- Explore strategies for implementing and scaling innovative business models.
- Assess the impact of business model innovation on organizational performance and competitiveness.

Course Outcomes:

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

- Understanding of Business Model Concepts
- Identification of Innovation Opportunities
- Design and Prototyping Skills
- Implementation and Scaling Strategies
- Ethical and Regulatory Awareness.

Unit-1: Introduction to Business Model Innovation

Definition and importance of business model innovation, Evolution of business models, Overview of successful business model innovations, Fundamentals of business models, Components of a business model canvas, Business model archetypes and typologies. Analyzing Existing Business Models; Techniques for analyzing existing business models, SWOT analysis, Value chain analysis, Porter's Five Forces framework

Unit-2: Identifying Opportunities for Innovation

Trends and drivers of business model innovation, Identifying customer needs and pain points, Market analysis and opportunity assessment. Design Thinking for Business Model Innovation; Introduction to design thinking, Empathy mapping, Ideation techniques, Prototyping and iteration. Regulatory and Ethical Considerations; Regulatory challenges in business model innovation, Ethical considerations in innovation, Intellectual property protection,

Unit-3: Lean Startup Methodology & Implementation Strategies

Lean startup principles, Minimum Viable Product (MVP), Customer validation and feedback loops, Pivot vs. persevere decisions. Strategies for implementing innovative business models, Organizational alignment and change management, Risk management and mitigation strategies

Unit-4: Scaling Innovative Business Models

Scaling challenges and opportunities, Growth strategies for innovative startups, Partnership and collaboration models. Measuring Impact and Success; Key performance indicators (KPIs) for business model innovation, Metrics for assessing the impact of innovation. Sustainable business model innovation; Triple bottom line approach (people, planet, profit), Social entrepreneurship and impact investing.

Vector Borne Diseases and Epidemiology

Prorogram Outcomes

- The multidisciplinary programme is incorporated for the students to acquire the knowledge on various vector borne disease and their outbreak.
- The students will learn about role of various insects in causal behaviour towards disease manifestation.
- The target learners will be able to understand the concept of disease outbreak, spread and epidemiology.

Course Outcomes:

- Student will be able to understand the concepts of vector borne disease, vectors and host-vector relationship with specificity and their various modes of transmission.
- Target population will learn the types of insect vectors and disease caused by them.
- Students will be able to gain the knowledge on objectives and core functions ofepidemiology.
- Students will gain the in-depth knowledge on epidemiological parameters like communicable and non-communicable disease and about their control measures.

Learning Outcomes:

- Knowledge gain on principles and concepts of vector borne disease.
- Student will be well acquainted with the various types of vectors for causal and spreadof disease.
- Learners will be able to disseminate the gained knowledge on epidemiological functions and significant role in public health management system.
- Students will be able to distinguish and initiate control measures towards various types of communicable and non-communicable diseases.

Unit 1: Insects, Concept of Vectors, Insects as Vectors

General Features of Insects, Morphological features, Head – Eyes, Types of antennae, Mouth parts with reference to feeding habits, Brief introduction of Carrier and Vectors (mechanical and biological vector), Reservoirs, Host-vector relationship, Vectorial capacity, Adaptations as vectors, Host Specificity, Classification of insects up to orders, detailed features of orders with insects as vectors – Diptera, Siphonaptera, Siphunculata, Hemiptera.

Unit 2: Vectors and diseases

Important insect vectors – Mosquitoes, Sandfly, Houseflies; Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis; Control of mosquitoes, Study of sand fly-borne diseases – Visceral Leishmaniasis, Cutaneous Leishmaniasis, Phlebotomus fever; Control of Sandfly, Study of house fly as important mechanical vector, Myiasis, Control of house fly

Unit 3: Epidemiology-an introduction

Definition, Objective and uses and core functions of epidemiology, Epidemiologic approach, Historical evolution of epidemiology, Concept of health and disease, Determinants of health and diseases, Difference

between epidemiology and clinical/preventive medicine, Epidemiology as the cornerstone of public health/health - for example: contribution of Nurses' Health study, British Doctors' study and Framingham Heart Study to public health etc.

Unit 4: Disease types, mode of transmission and management

Difference between infectious and communicable diseases vs. non communicable diseases, Natural history of disease, Chain of infection, Mode and route of transmission of diseases, Meaning of outbreak or epidemic, endemic and pandemic, incubation period, latency period, clinical case, subclinical case, carrier, infectivity, pathogenicity and virulence, theories and principles of causation- epidemiological triad, web of causation, Bradford Hill criteria and Rothman's Causal pies, levels of prevention and modes of intervention.

Text Books

- ✓ *Mathews, G. (2011). Integrated Vector Management: Controlling Vectors of Malariaand Other Insect Vector Borne Diseases. Wiley-Blackwell*
- ✓ *Chapman, R.F. (1998). The Insects: Structure and Function. IV Edition, CambridgeUniversity Press, UK.*

Suggested Readings

- ✓ *Mike Service (2012) Medical Entomology for Students Cambridge University Press;5th edition.*
- ✓ *Pedigo L.P. (2002). Entomology and Pest Management. Prentice Hall Publication*
- ✓ *Understanding the fundamentals of Epidemiology- An evolving text. Victor Schoenbackand Wayne B.Rosamond (2000).*
- ✓ *Modern Epidemiology- Kenneth Rothman, Sebastien Haneuse , Timothy L. Lash , Tyler J.VanderWeele (2021).*

Vermitechnology

Program Outcomes

- The students will gain the knowledge on methods of vermin culture and itseconomic importance.
- Students will well acquaint with usefulness of various species of earthworms andtheir life cycles.
- The target learners will gain knowledge on earthworm farming and practices ofvermicomposting and its applications.

Course Outcomes

- Gain basic knowledge on history of vermicomposting and its technology of biotransformation of anthropogenic residues.
- Understand the role and importance of earthworms maintaining soil texture andtheir types, reproduction and life cycle.
- Get acquainted with small scale earthworm farming and types ofvermicomposting practices in Odisha.
- Gain knowledge on application and economic importance of vermicomposting, and learn the characteristics of earthworm suitability.

Learning Outcomes

- Strengthens student's knowledge on vermin culture and its importance of four R`s (i.e. reduce, reuse, recycle and restore).
- Gain knowledge on identifying utility of key species of earthworms towards production of good quality vermin compost.
- Gain knowledge on vermin composting methods in Odisha.
- Disseminate knowledge on benefits of vermicomposting in various sectors.

Unit 1: Introduction to vermin culture

Definition, meaning, history, economic importance, value in the maintenance of soil structure, role as four R's of recycling (reduce, reuse, recycle and restore). Role in bio- transformation of the residues generated by human activity and production of organic fertilizers; matter and humus cycle (product, qualities); ground population, transformation process in organic matter; useful species of earthworms, local and exotic species; complementary activities of auto-evaluation; key to identify the species of earthworms.

Unit 2: Biology of *Eisenia fetida* and *Eudrilus eugeniae*

Taxonomy Anatomy, physiology and reproduction of Lumbricidae and Eudrilidae; life cycle of *Eisenia fetida* and *Eudrilus eugeniae*: alimentation, fecundity, annual reproducer potential and limit factors (gases, diet, humidity, temperature, pH, light, and climatic factors); complementary activities of auto evaluation.

Unit 3: Vermicomposting

Small-scale earthworm farming for home gardens - earthworm compost for home gardens; conventional commercial composting - earthworm composting larger scale (pit, brick and, heap systems, and Kadapa slab method); types of vermicomposting practised in Odisha; earthworm farming, extraction (harvest), vermicomposting harvest and processing; products; vermiwash collection, composition and use; enemies of earthworms, sickness and worm's enemies; frequent problems – prevention and fixation; complementary activities of autoevaluation.

Unit 4: Applications of vermiculture

Benefits of vermicompost, use of vermicompost in agriculture; basic characteristics of earthworm suitable for vermicomposting; problems in vermicomposting, vermicomposting of dairy waste; economics and marketing of vermicompost and vermi wash.

Text Books

- ✓ *Bhatt J.V. & S.R. Khambata (1959) "Role of Earthworms in Agriculture" Indian Council of Agricultural Research, New Delhi*
- ✓ *Edwards, C.A. and J.R. Lofty (1977) "Biology of Earthworms" Chapman and Hall Ltd., London.*
- ✓ *Lee, K.E. (1985) "Earthworms: Their ecology and Relationship with Soils and Land Use" Academic Press, Sydney.*
- ✓ *Dash, M.C., B.K. Senapati, P.C. Mishra (1980) — Verms and Vermicomposting¦ Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, Jyoti Vihar, Orissa.*
- ✓ *Wallwork, J.A. (1983) "Earthworm Biology" Edward Arnold (Publishers) Ltd. London.*
- ✓ *Kevin, A and K.E.Lee (1989) "Earthworm for Gardeners and Fisherman" (CSIRO, Australia, Division of Soils).*
- ✓ *Satchel, J.E. (1983) —Earthworm Ecology Chapman Hall, London.*

Apiculture

Program Outcomes

- Provide knowledge on economic aspects of livestock management.
- Make available information on lucrative facets of animal rearing and goods obtained.
- To familiarize with apiculture features

Course Outcomes

- Foundation through skilled learning for entrepreneurship.
- Acquire skills in developing economically viable ventures using bees.
- To know the basic concepts of beekeeping.
- Discern bee species, understand culture techniques, honey harvesting, and the identification and management of diseases and pests.
- Students will be equipped with practical knowledge that can be immediately appliedin the field or even used to start their own beekeeping enterprise

Learning Outcomes

- Gain knowledge of the Biology of Bees, their identification, and social structure.
- Acquire skills in rearing bees and honey extraction.
- Identify pests of bees and their control and eradication.
- Skilled learning for entrepreneurship.

Unit 1:

Biology of Bees: Apis and Non-Apis Bee species and their identification. General Morphology of Apis Honey Bees. Social Organization of Bee Colony.

Unit 2:

Rearing of Bees: Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth box, Bee Pasturage, Selection of Bee Species for Apiculture, Modern Bee Keeping Equipment, Methods of Extraction of Honey (Indigenous and Modern).

Unit 3:

Diseases and Enemies: Bee Diseases and Enemies, Control and Preventive measures

Unit 4:

Bee Economy and Entrepreneurship: Products of Apiculture Industry and their uses- Honey, Bees Wax, Propolis,

Pollen. Bee Keeping Industry – Recent Efforts, Modern Methods in employing artificial Beehives for cross pollination in horticultural gardens.

Sericulture

Program Outcomes

- Make available information on economic aspects of livestock management.
- Familiarize with profitable aspects of animal rearing and goods obtained.
- To acquaint with sericulture techniques.

Course Outcomes

- Crucial knowledge of Sericulture.
- Gain a comprehensive understanding of mulberry plant cultivation, various types of silkworms, advanced culture techniques, silk production, common diseases and pests.
- Equips students with the skills to start their own business.

Learning Outcomes

- Gain knowledge of the silkworms, their identification, biology, rearing and diseases.
- Identify pests of silkworms and their control.
- Skilled learning for entrepreneurship.

Unit 1:

Introduction to Sericulture: Definition, history and present status; Silk route, Types of silkworms, Distribution and Races- Exotic and indigenous races. Mulberry and non-mulberry Sericulture.

Unit 2:

Biology of Silkworm, Life cycle of *Bombyx mori* , Structure of silk gland and secretion of silk.

Unit 3:

Rearing of Silkworms, Selection of mulberry variety and establishment of mulberry garden, Rearing house and rearing appliances. Disinfectants: Formalin, bleaching powder, RKO, Silkworm rearing technology: Early age and Late age rearing, Type of mountages Spinning, harvesting and storage of cocoons.

Unit 4:

Pests, Diseases and Entrepreneurship in Sericulture: Pests of silkworm: Uzi fly, dermestid beetles and vertebrates. Pathogenesis of silkworm diseases: Protozoan, viral, fungaland bacterial, Control and prevention of pests and diseases.

Prospects of Sericulture in India with special reference to Sericulture industry in Odisha, employment potential in mulberry and non-mulberry sericulture.

Suggested Readings:

Economic Zoology: Apiculture and Sericulture

- ✓ *Bisht D.S., Apiculture, ICAR Publication.*
- ✓ *Chaudhuri S. 2017. Economic Zoology. Kolkata: New Central Book Agency Pvt. Ltd.*
- ✓ *Chun and Chen Da-Chung; 1988 Silkworm Rearing; Pub. By FAO, Rome.*
- ✓ *Cramp D. 2012. The Complete Step by Step Book of Beekeeping. Anness Publishing.*
- ✓ *Econ Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd.,*
- ✓ *Jolly, M. S: Appropriate Sericultural Techniques*
- ✓ *Krishnaswamy, Improved Method of Rearing Young age silkworm; 1986 S., Bangalore*
- ✓ *Mathews G. 2011. Integrated Vector Management: Controlling Vectors of Malaria and Other Insect Vector Borne Diseases. Wiley-Blackwell*
- ✓ *Narasimhanna MN. 1988. Manual of Silkworm Egg Production;, CSB, Bangalore.*
- ✓ *Prost PJ. 1962. Apiculture. Oxford and IBH, New Delhi.*
- ✓ *Rangaswami G. 1976. Manual on Sericulture; Food and Agriculture Organisation, Rome*
- ✓ *Sarkar S; Kundu G & Chaki K C - Introduction to Economic Zoology; NCBA, Kolkata*
- ✓ *Sengupta, K, ;1989 A Guide for Bivoltine Sericulture*
- ✓ *Singh S. Beekeeping in India, Indian council of Agricultural Research, New Delhi.*
- ✓ *Ullal SR, Narasimhanna MN. Handbook of Practical Sericulture: CSB, Bangalore*

LAC Culture

Program Outcomes

- Enables student learning about lac culture and application.
- Students will be well acquainted with the host plants for lac culture and its process of cultivation.
- Studying this programme will enable the learners about utility and lac culture practices in India.

Course Outcomes

- Gain knowledge on various insects strains used in lac culture and its cultivation.
- Gain knowledge on processing of lac and use of their products in mass industrial use.
- Imbibe the knowledge about various methods of lac culture and its improvement and its challenges.

Learning Outcomes

- The learning outcome of the course includes students centric skill enhancement in lac culture technology and its practice for livelihood.
- The student will be well acquainted with the principles and procedures of lac cultivation techniques.
- Students will be able to identify the pest of lac host plant and develop strategic prevention and control of pest system associated.
- Learners will be able to utilize the gained knowledge on preparation of lac culture, preparation of feeding ground, and can take the corrective measures for its improvements.

Unit 1:

Introduction, distribution, importance of lac culture, strains of lac insect and lac crops, lac insect morphology, Life cycle of Lac insect and parthenogenesis, metamorphosis.

Unit 2:

Lac host plant, General practice for lac cultivation (Inoculation- natural, artificial), drawbacks of natural inoculation, precautions to be taken during artificial inoculation, time of inoculation, swarming, phunki removal, harvesting of lac- immature and mature, harvesting time.

Unit 3:

Processing, composition and properties of lac: lac products and their uses, pests of lac host plant, lac ecosystem, Prevention and control of insect enemies, microbial flora associated with lac insects.

Unit 4:

Lac culture practices in India: Local, Improved (Coupe system- Rangeeni Coupe, Kusumi coupe), Alteration of plant, Preparation of feeding ground for lac insects, measures for improved lac culture, problems of lac culture in India.

Suggested Reading

- ✓ *Introduction to Economic zoology- Sarkar, Kundu and Chaki (NCBA Publication)*

SUSTAINABLE ECO – TOURISM

Program Outcomes

- Student will gain the knowledge on concepts of eco-tourism and it functional role towards environmental balance.
- Student will be able to acquire the knowledge on various eco-tourism projects on bio reserves, national parks of Odisha and the Country, eco-tourism regulation andlaws.

Course Outcomes

- Students will be able to understand the principles, functions and type of eco- tourism, eco-tourism activities and its impact on nature and environment.
- The learners will gain the knowledge on sustainable eco-tourism and its socio- economic relevance, facilities, planning and management.
- Students will be able to understand the role of national and international laws and regulations for sustainable eco-tourism.

Learning Outcomes

- The learning outcome of the course involves strengthening the students in understanding the need of eco-tourism, and its impact on environment.
- Understand sustainable eco-tourism and resource management.
- The learners will be able to understand the responsibilities, issue and challenges of conservation of protected area for eco-tourism projects along with community participation.
- The students will be able to apply the knowledge of primary role of national and international agencies towards implementation and execution for sustainable eco-tourism management.

Unit-1: **Ecotourism**

Evolution, Principles, Trends and Functions of Ecotourism , Mass Tourism vs Eco tourism, Typology of Eco-tourists, Ecotourism Activities & Impacts, Western Views of Ecotourism, Quebec Declaration, Kyoto Protocol, Oslo Declaration, Ecological Foot Prints. Relationship between Tourism & Ecolgy.

Unit-2: Alternative & Responsible Tourism

Ecotourism development - Sustainable Ecotourism. Resource Management, Socio-economic Development. Ecotourism Policies, Planning and Implementation. Eco-friendly Facilities and Amenities. Carrying Capacity, Alternative Tourism & Responsible ecotourism- Ecotourism Programming.

Unit 3: **Eco Tourism Trends, Issues and Challenges**:

Conservation of Ecotourism Protected Area Management through Ecotourism - Community Participation - Types of Participation, Issues and Challenges - Ecotourism Projects - Case Studies on Periyar National Park, Thenmala Eco-Project, Similipal Ecotourism Project, Sunderbans Eco tourism Project, Kaziranga National Park, Nandadevi Biosphere Reserve, Corbett National Park, Gulf of Manar, Kruger National Park, South Africa.

Unit 4: Role of National and International Agencies

Ecotourism Development Agencies- Role of the International Ecotourism Society – the UNWTO, UNDP, WWF - Department of Forest and Environment - Government of India, ATREE, EQUATIONS.

Suggested Readings

- ✓ *Weaver, D. (2001). The Encyclopedia Of Ecotourism, Cabi Publication.*
- ✓ *Fenel, D. A. and Dowling, R. K.(2003). Ecotourism Policy and Planning, CabiPublishing, USA*
- ✓ *Sukanta K Chaudhury. (2006). Cultural, Ecology and Sustainable Development, Mital, New Delhi.*
- ✓ *Ralf Buckley (2004), Environment Impacts of Ecotourism, Cabi, London.*
- ✓ *Ramesh Chawla (2008), Ecology and Tourism Development, Sumit International, NewDelhi.*

Environmental Impact Assessment and Environmental Management Plan (EIA AND EMP)

Program Outcomes

- Understand the basic concept of environmental impact assessment.
- Predict assessment impacts on water, air, soil, and biological components of ourenvironment.
- Design and develop environmental management plan using local examples as case studies.
- Gain knowledge about various pollution act and understand the process of environmental clearance procedure in India.

Course Outcomes

- Identify and accept the need for a sustainable environment.
- Gain comprehensive understanding of mitigation measures.
- The course equips students with the skills to join as EIA trainee.
- Understand Environmental management system and its implementation procedure.

Learning Outcomes

- Gain knowledge about the importance of environmental audit.
- Understand the possible effects on various components of ecosystem.
- Learn the mechanism of approval of projects and core committee constitution.
- Understand the requirement and importance of Environment mitigation plan.

Unit 1

EIA: Objectives, Concept and Scope of EIA , Structure of EIA: Environmental Assessment Process , Environmental attributes-Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods. EIA review- Baseline Conditions - Construction Stage Impacts, post project impacts.

Unit 2

EIA Analysis: Adhoc method, Overlays, Check list, Matrices, models, comparative studies, Prediction and Methods of Assessment of Impacts on Various Aspects of Environment;Application of various models for the Prediction of impact on Air Environment, WaterEnvironment, Noise Environment and Land.

Unit 3

Environmental clearance procedure for industrial and other developmental projects, Environmental Impact Statement (EIS), EIA of Air and Water Environment, Case Studies, List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

Unit 4

EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief & Rehabilitation, Stipulating the Conditions, Monitoring Methods, Pre- Appraisal and Appraisal.

Text Books

- ✓ *Anjaneyulu. Y and Manickam. V., Environmental Impact Assessment Methodologies, B.S.Publications, Hyderabad, 2007*
- ✓ *Barthwal, R. R., Environmental Impact Assessment, New Age International Publishers, 2002.*

Reference Books

- ✓ *Jain, R.K., Urban, L.V., Stracy, G.S., Environmental Impact Analysis, Van Nostrand Reinhold Co., New York, 1991.*
- ✓ *Rau, J.G. and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., New York, 1996.*
- ✓ *Reference Books: 1. Environmental Impact Analysis Handbook – by Rau Whooten; McGraw Hill publications*
- ✓ *Environmental Impact Assessment – by Larry Canter; McGraw Hill publications*
- ✓ *Environmental Impact Analysis – A Decision Making Tool by R K Jain 4. Handbook of Environment Impact Assessment by Judith Petts; McGraw Hill publications*

Management Of Human Microbial Diseases

Unit 1 Human Diseases

- Infectious and non infectious diseases, microbial and non microbial diseases, Deficiency diseases, occupational diseases, Incubation period, mortality rate, nosocomial infections.
- Microbial diseases: Respiratory microbial diseases, gastrointestinal microbial diseases, Nervous system diseases, skin diseases, eye diseases, urinary tract diseases, Sexually transmitted diseases: Types, route of infection, clinical systems and general prevention methods, study of recent outbreaks of human diseases (SARS/Swine flu/Ebola) – causes, spread and control, Mosquito borne disease – Types and prevention.

Unit 2 Therapeutics of Microbial diseases

- Treatment using antibiotics: beta lactam antibiotics (penicillin, cephalosporins), quinolones, polypeptides and aminoglycosides. Judicious use of antibiotics, importance of completing antibiotic regimen, Concept of DOTS, emergence of antibiotic resistance, current issues of MDR/XDR microbial strains. Treatment using antiviral agents: Amantadine, Acyclovir, Azidothymidine. Concept of HAART.

Unit 3 Prevention of Microbial Diseases

- General preventive measures, Importance of personal hygiene, environmental sanitation and methods to prevent the spread of infectious agents transmitted by direct contact, food, water and insect vectors.
- Vaccines: Importance, types, vaccines available against microbial diseases, vaccination schedule (compulsory and preventive) in the Indian context.

Suggested Readings

- ✓ *Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication*
- ✓ *Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication*
- ✓ *Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th edition. Elsevier*
- ✓ *Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's*

Microbiology. 9th edition. McGraw Hill Higher Education

- ✓ *Madigan MT, Martinko JM, Dunlap PV and Clark DP. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition.*

BIOFERTILIZERS AND BIOPESTICIDES

Unit 1 Biofertilizers

- General account of the microbes used as biofertilizers for various crop plants and their advantages over chemical fertilizers.
- SymbioticN2ixers:Rhizobium -Isolation,characteristics,types,inoculum production and field application, legume/pulses plants.
- Frankia - Isolation, characteristics, Alder, Casurina plants, non-leguminous crop
- symbiosis.
- Cyanobacteria, Azolla - Isolation, characterization, mass multiplication, Role in rice cultivation, Crop response, field application.

Unit 2 Non - Symbiotic Nitrogen Fixers, Phosphate Solubilizers and Mycorrhizal Biofertilizers

- Free living Azospirillum, Azotobacter - free isolation, characteristics, mass inoculums, production and field application.
- Phosphatesolubilizing microbes - Isolation,characterization,massinoculum production, field application
- Importance of mycorrizal inoculum, types of mycorrhizae and associated plants, Mass inoculums production of VAM, field applications of Ectomycorrhizae and VAM.

Unit 3 Bioinsecticides

General account of microbes used as bioinsecticides and their advantages over synthetic pesticides, Bacillus thuringiensis, production, Field applications, Viruses – cultivation and field applications.

Suggested Readings

- ✓ *Kannaiyan, S. (2003). Bioetchnology of Biofertilizers, CHIPS, Texas.*
- ✓ *Mahendra K. Rai (2005). Hand book of Microbial biofertilizers, The Haworth Press, Inc. New York.*
- ✓ *Reddy, S.M. et. al. (2002). Bioinoculants for sustainable agriculture and forestry, Scientific Publishers.*
- ✓ *Subba Rao N.S (1995) Soil microorganisms and plant growth Oxford and IBH publishing co. Pvt. Ltd. NewDelhi.*
- ✓ *Saleem F and Shakoori AR (2012) Development of Bioinsecticide, Lap Lambert Academic Publishing GmbH KG*

- ✓ *Aggarwal SK (2005) Advanced Environmental Biotechnology, APH publication.*

Biosafety and Intellectual Property Rights (Theory)

Unit 1 Biosafety

- Introduction; biosafety issues in biotechnology; Biological Safety Cabinets & their types; Primary Containment for Biohazards; Biosafety Levels of Specific Microorganisms
- Biosafety Guidelines: Biosafety guidelines and regulations (National and International); GMOs/LMOs- Concerns and Challenges; Role of Institutional Biosafety Committees (IBSC), RCGM, GEAC etc. for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication; Overview of International Agreements - Cartagena Protocol.
- AERB/RSD/RES guidelines for using radioisotopes in laboratories and precautions.

Unit 2 Introduction to Intellectual Property

- Patents, Types, Trademarks, Copyright & Related Rights, Industrial Design and Rights, Traditional Knowledge, Geographical Indications- importance of IPR – patentable and non patentables – patenting life – legal protection of biotechnological inventions – World Intellectual Property Rights Organization (WIPO).
- Grant of Patent and Patenting Authorities: Types of patent applications: Ordinary, PCT, Conventional, Divisional and Patent of Addition; An introduction to Patent Filing Procedures; Patent licensing and agreement; Patent infringement- meaning, scope, litigation, case studies, Rights and Duties of patentowner.

Unit 3

Agreements and Treaties: GATT, TRIPS Agreements; Role of Madrid Agreement; Hague Agreement; WIPO Treaties; Budapest Treaty on international recognition of the deposit of microorganisms; UPOV & Brene conventions; Patent Co-operation Treaty (PCT); Indian Patent Act 1970 & recent amendments.

Suggested Reading

- ✓ *Bare Act, 2007.Indian Patent Act 1970 Acts & Rules, Universal Law Publishing Co. Pvt.Ltd., New Delhi.*
- ✓ *Kankanala C (2007). Genetic Patent Law & Strategy, 1st Edition, Manupatra InformationSolution Pvt. Ltd. New Delhi.*
- ✓ *Mittal, D.P. (1999). Indian Patents Law, Taxmann, Allied Services (p) Ltd.*
- ✓ *Singh K K (2015). Biotechnology and Intelectual Property Rights: Legal and SocialImpliocations, Springer India.*
- ✓ *Goel D & Prashar S (2013). IPR, Biosafety and Bioethics. Pearson*

History of Science, Technology, and Medicine in India (HISTM)

Course Objectives:

- Students will be able to understand and appreciate those material sciences, medicines, mathematics, and astronomy has a long history in India.
- The emergence of modern science and scientism has led to the emergence of hegemonic knowledge disciplinary on account of different pedagogic practices which were fundamentally different from the pedagogic practices.
- While ancient knowledge system emphasises on illumination based on mediation and reflexive quest and learning, the modern scientism emerges from the emergence of the western knowledge system that recognises sensory experiences as the only basis of knowledge formation.
- Students will be encouraged to read Sulabhsutras, Charakasamhita, modern analysis of ayurveda and material sciences advancement in pre-colonial India.

Course Outcomes:

- Appreciate the indigenous knowledge base of India.
- Develop a critical aptitude to analyse ancient texts such as Sulabhsutras, Charaka Samhita and appreciate their nature.
- Recognize the difference between western approach and Indian approach to body and mind.
- Understand and appreciate the approaches of HISTEM.

Unit I: Introduction:

1. What is Science? Traditions of Gyan, Vigyan, and Ilma, in Pre-Modern India
2. What is Scientific Revolution? Historiography and Debates
3. Approaches to HISTEM

Unit II: Science and Medicine in Ancient India

1. Diseases and their cure in the Atharvaveda
2. Metal casting in ancient India: Copper, Bronze and Iron
3. Science and technological advancements under the Guptas- Aryabhatta, Varahamihira and Brahmagupta

Unit III: Science, Technology and Medicine in Medieval India

1. Arabic medicine and astronomy in India
2. Boat and Ship-building activities in India:
3. Manufacturing of textile and ceramics in India

Unit IV: Science and Technology in colonial and Post-colonial India

1. Science and the Raj: Policies, Institutions, and Practices
2. Western Medicine: Practitioners, Epidemics, and Challenges of Public Health
3. Science and the Indian Awakening: Mahendralal Sarkar, Prafulla Chandra Ray, Jagdish Bose, CV Raman, and others.

Unit I:

Students will learn and realise that Science can be studied historically, and in fact, how most of the science that they read in their school and early college curriculum was, in fact, history of science. They will be introduced to tools and techniques to do History of Science from an outsiders' perspective.

Unit II:

Students will learn about the tradition of medicine and technological advances in early India. By doing so they will realise that every society in some way is a society based on science. This will also help in dispelling the myth that the pursuits of science and technology are only a modern activity.

Unit III:

Continuing the discussion of Unit II, students will learn about the similar themes and tropes in Unit III, by focussing on Medieval India.

Unit IV:

In Unit IV, students will learn about the shaping of modern science with the advent of industrialization and colonialism. How modern science played a key role in the making of the modern nation-state?

Suggested Readings:

- ✓ *Deepak Kumar, Science and the Raj (Delhi, 1995)*

- ✓ *DM Bose, SN Sen, and BV Subbarayappa (eds.), A Concise History of Science in India (New Delhi, 1971)*
- ✓ *Zaheer Baber, The Science of Empire: Scientific Knowledge, Civilisation, and Colonial Rule in India (Delhi, 1998)*
- ✓ *Deepak Kumar, Science and Empire: Essays in the Indian Context: 1700-1947 (Delhi, 1992)*
- ✓ *David Arnold, Science, Technology, and Medicine in Colonial India (Cambridge: 2004)*
- ✓ *Dhruv Raina, Images and Contexts: The Historiography of Science and Modernity in India, Oxford University Press: Delhi, 2003*

Reference Reading

- ✓ *Debiprasad Chattopadhyaya (ed.), Studies in the History of Science in India, (New Delhi: 1982)*
- ✓ *Rahman on 'Science and Technology in Medieval India' (pp. 805-815) in DebiprasadChattopadhyaya (ed.), Studies in the History of Science in India, (New Delhi: 1982)*
- ✓ *Bridget Allchin, Origins of a Civilization: The Prehistory and Early Archaeology of South Asia. New Delhi and New York: Viking, 1997.*
- ✓ *HC Bhardwaj, Aspects of Ancient Indian Technology, Motilal Banarasi Das, Varanasi, 1979.*
- ✓ *Irfan Habib, Technology in Medieval India, c. 650-1750, (Tulika Books)*

Internet Resources

1. Consult different issues of *Journal of Science and Technology in India*, published by National Academy of Sciences, India. Example: https://nasi.org.in/wp-content/uploads/2020/08/Journey-of-Science-Technology-in-India-A-Historical-Perspective.pdf

Activities to Do

1. Collection and compilation of the names of scientists and their contribution in every period of history of India. Moreover, collating the information with already published compendiums.

Collection and compilation of photographs of scientists and their different writings from every period of history of India

History of Environment and Ecology in Modern India

Course Objectives:

- Make students aware of the historiography of environmental history of South Asia.
- Discuss the changing human-nature relationship in the last two centuries in south Asia.
- Make students aware of how colonial state extended control over land, forest, water, wildlife, etc. and how people resisted it.
- Further analyse these issues in post-colonial period and make students aware of the natural world around them.

Course Outcomes

- Demonstrate an awareness of the nature of environmental change that Indian sub-continent has gone through historically.
- Identify socio-cultural practices of people of India evolved overtime for managing natural resources.
- Understand the role of the modern states in regulating and extracting natural resources.

Unit I: Colonialism and Ecology

Colonialism as Ecological Watershed, Colonial State and Forest Control, Forest Acts and Customary Rights, State Forestry and People: Peasants, Pastoralists, tribal, Scientific Forestry and Forest Management, Forest exploitation and deforestation

Unit II: Colonialism and Management of Water Resources

Traditional use of water resources and its decline,

Large-scale canal irrigation and its environmental consequences

Unit III: Wildlife Management

- Nature of Hunting in ancient and medieval times,
- Colonialism, Masculinity and Hunting,
- Wildlife Conservation and National Parks, Human Animal Conflicts Around National Parks

Unit IV: Environmental Movements in Post-Colonial India

- Biomass for Business: Industrial Use of wood, Large Dams and Environmental Problems, Changing Urban Environment: Health, hygiene, waste disposal and treatment, air pollution.
- Historical Roots of environmental Protests, Environmental Movements, Environmentalism, Wildlife Conservation Act and Protected Areas, Forest Conservation Act 1980 and Forest and Livelihood Act 2006, Air and water Pollution Acts and Regulations

Unit I: Students will learn how environmental crisis and its offshoots like global warming and climate change are a modern phenomenon and has issues like "Man vs Nature" at its heart. They will learn how colonialism fundamentally reshaped our ecology.

Unit II: Students will also learn how colonial policies in the nineteenth and early-twentieth century's fundamentally altered and shaped the water resources and their management.

Unit III: The shaping of the wildlife management and the formulation of different forestry laws is the learning content of this unit. Students will grasp the facts about how flora and fauna was identified, classified, and catalogued by the state.

Unit IV: Students will learn how many laws and policies on the environment and many times resulting environmental degradation resulted in resistance by those who were directly affected by the crisis. Students will learn about different social movements for environment.

Suggested Readings:

- ✓ *Arnold, David and R. Guha, eds, Nature, Culture, Imperialism: Essays on Environmental History of South Asia, OUP, Delhi, 1995.*
- ✓ *Bavisker, Amita, In the Belly of the River: Tribal Conflict in the Narmada Valley, OUP, Delhi, 1995.*
- ✓ *Dangwal, Dhirendra Datt, Himalayan Degradation: Colonial Forestry and Environmental Change in India, CUP (Foundation Imprint), Delhi, 2009.*
- ✓ *Gadgil, Madav and Ramachandra Guha, This Fissured Land, OUP, Delhi, 1992.*
- ✓ *Grove, Richard H. Green Imperialism: Colonial Expansion, Tropical Eden and the Origins of Environmentalism, 1600-1860, OUP, Delhi, 1995.*
- ✓ *Guha, R. and Gadgil, 'State Forestry and Social Conflict in British India', Past and Present, vol. 123 (1989).*
- ✓ *Guha, R., 'An Early Environmental Debate in India: Making of the 1878 Forest Act', in Indian Economic and Social History Review, (IESHR) vol. 27 (1990)*
- ✓ *Guha, R., 'Forestry in British and Post-British India: A Historical Analysis', Economic and Political Weekly (EPW), Oct-Nov 1983.*
- ✓ *Guha, R., The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya, Permanent Black, Delhi, 2009 (20th year edition).*
- ✓ *Habib, Irfan, Man and Environment, Tulika, 2011.*
- ✓ *Moosvi, Shireen, People, Taxation and Trade in Mughal India, OUP, Delhi, 2008.*
- ✓ *Rangarajan, Mahesh, India's Wildlife History: An Introduction, Permanent Black, 2001.*
- ✓ *Thapar, Romila, 'Perceiving the Forests: Early India', Studies in History (SIH), 17, 1 (2001)*
- ✓ *MA History IGNOU Materials (MAHI, Block MHI-08).*

Reference Readings:

- ✓ *Agnihotri, Indu, 'Ecology, Land Use and Colonization: The Canal Colonies of Punjab', IESHR, 33, 1(1996).*
- ✓ *Agrawal, Arun, Environmentality, OUP, Delhi, 2003.*

- ✓ *Agrawal, Arun and K. Sivaramakrishnan, Social Nature: Resource, Representation and Rule in India, OUP. Delhi, 2001.*
- ✓ *D'Souza, Rohan, Drowned and Dammed, OUP, Delhi, 2006.*
- ✓ *Gadgil M. and R. Guha, Ecology and Equity, Penguin, 1995.*
- ✓ *Grove, Richard, Vineeta Damodaran and Satpal Sangwan, eds, Nature and the Orient: Essays on Environmental History of South and Southeast Asia, OUP, Delhi, 1998.*
- ✓ *Guha, R. and Juan Alier-Martinez, Varieties of Environmentalism, Earthscan, London, 1997.*
- ✓ *Guha, R., 'The authoritarian Biologist and the arrogance of anti-Humanism', Ecologists, 1997, pp. 14-20.*
- ✓ *Guha, Summit, Ethnicity and Environment in Western India, Cambridge University Press (CUP), 1999.*
- ✓ *Khan, Shahmullah, 'State of Vegetation and Agricultural Productivity: Pargana Haveli Ahmadabad', SIH, 13, 2 (1998), pp. 313-24.*
- ✓ *Kumar, Deepak et al, British Empire and Natural World, OUP, Delhi, 2010.*
- ✓ *Mann, Michael, 'Environmental History and Historiography on South Asia: Context and Some Recent Publications', South Asia Chronicle, vol. 3 2013.*
- ✓ *Prasad, Archana, 'The Baiga: Survival Strategies and Local Economy in Colonial Central Provinces', in SIH, 13, 2(1998), pp. 325-48.*
- ✓ *Prasad, A., ed., Environment, Development and Society in Contemporary India, Macmillan, Delhi, 2008.*
- ✓ *Prasher-Sen, Aloka 'Of Tribes, Hunters and Barbarians: Forest Dwellers in Mauryan Period', SIH, vol. 13, 2(1998), pp. 173-192.*
- ✓ *Rajan, R, Modernizing Nature: Forestry and Imperial Eco-Development 1800-1950, Orient Longman, 2007.*
- ✓ *Rangan, H., Of Myths and Movements: Rewriting Chipko in the Himalayan History, OUP, Delhi, 2001.*
- ✓ *Rangarajan, Fencing the Forest: Conservation and Ecological Change in India's Central Provinces, 1860-1914, OPU, Delhi, 1996.*
- ✓ *Rangarajan, M. and Vasant Saberwal, eds, Battle over Nature, Permanent Black, 2006.*
- ✓ *Rangarajan, M., Environmental Issues in India: A Reader, Pearson, Paperback, 2006*
- ✓ *Rangarajan, M. and K. Sivaramakrishnan, India's Environmental History, Permanent Black, Delhi, 2011.*
- ✓ *Rangarajan, M, 'The Raj and the natural world: The war against the 'dangerous beast' in colonial India', SIH, 1998, pp 265-300.*

- ✓ *Saikia, Aroopjyoti, Forest and Ecological History of Assam, OUP, Delhi, 2010.*
- ✓ *Sengupta, Nirmal, 'The Indigenous Irrigation Organisatio of South Bihar', IESHR, 17, 2 (1980), pp. 157-89.*
- ✓ *Sinha Kapur, Nandini, Environmental History of Early India, OUP, Delhi, 2011.*
- ✓ *Sivaramakrishnan, K., Modern Forests: Statemaking and Environmental Change in Colonial Eastern India, Oxford University Press, Delhi, 1999.*
- ✓ *Sivaramakrishnan, K. and Gunnel Cederlof, Ecological Nationalism, Permanent Black, 2009.*
- ✓ *Trivedi, K. K., 'Estimating Forests, Waste and Fields, c. 1600', SIH, 13, 2(1998), pp. 301-12.*

Internet Resources

- ✓ Lecture by Mahesh Rangarajan https://www.youtube.com/watch?v=EDWlFYbgpS4
- ✓ Lecture by Mahesh Rangarajan https://www.youtube.com/watch?v=X6emo9KuAww

Activities to Do

1. Students are expected to collect and compile different laws on environment as they are passed and enacted in India after 1947.

2. Students are expected to collect information on various environmental activists in different states of India, and record their contributions.

3. Students are expected to collect and compile news reports on different change-makers who are doing their bit to protect and safeguard the environment through different measures.

History of Education in Modern India

Course Objective:

- To get general awareness on education in India over centuries and to understand its evolution.
- To understand what it meant ‘to be educated’ in the pre-modern India, and how the terms
- To understand and get a general awareness about the establishment of modern schools and universities, and how shaping of these institutions, ideas, and practices made India “modern.”

Course Outcome:

- Students will learn about the different policies and practices that reshaped the conception of modern education.
- Students will get to appreciate the evolution of educational practices from Early India to Modern India.
- Students will learn and grasp the diversities of educational practices and how they were made uniform with the advent of colonialism and its reshaping forces.

Unit I: Pre Colonial education, Western Challenge Western Encounter and Educational Challenges

Educational activities of East India company (1600-1765), Educational Policy of the East India Company (1765-1813), Danish Mission (1706-92), Work of Serampore Trio and others in Bengal (1758-1813), Indigenous education in early 19th century: Reports of Madras, Bombay and Bengal presidencies.

Unit II: Before and After Macaulay:

- Private educational enterprise by British Officials and non-officials (1813 – 53), Private Indian enterprise in education (1813-53), Macaulay's Minutes on Education (1835) & its main recommendations,
- Wood's Despatch (1854) and its significance,
- Understanding ideological and administrative influences on Education

Unit III: Education between Command, Commissions and National Alternatives

- Indian Education Commission (1882-83) & its main recommendations; Indian Universities Commission (1902), Calcutta University Commission (1917-19) & its critical appraisal
- Zakir Husain Committee Report (1938) &Nai Talim,
- Post-war educational developments (Sergeant Plan, 1944).

Unit IV: Education in Contemporary India: Issues in the foundation of Aided and autonomous educational institutions and Politics

- Establishment of IITs and IIMs, Growth of Indian Universities,
- Kothari Commission Report and NEP of 1986
- NEP 2020

Unit I: Students will learn about the pre-colonial education models, and how the Western encounter changed the face of education. Basically, they will be equipped to think and know what is "modern" about the "Modern Education".

Unit II: Students will learn about the impact of TB Macaulay and his legacy for education in India. By closely reading different Minutes on Education, students will be able to adjudge the impact and influence of Macaulay on education.

Unit III: Students will learn how different commissions and committees shape educational policies and curriculum design. They will grasp the political and historical context under which educational policies are made and changed, and what rationale justify such moves.

Unit IV: Students will learn about education in contemporary India, and how different institutions of national importance came into being. What is the role of education in making India developed, and how are we dealing with the issues of equity and fairness in education historically.

Select Readings:

- ✓ *Dharampal (ed.), The Beautiful Tree: Indigenous Education in the Eighteenth Century, Biblia Impex, New Delhi, 1983.*
- ✓ *J.P. Naik and Syed Nurullah, A Students' History of Education in India, (1800-1973), Macmillan India Ltd, Delhi, First Published 1945, Sixth Revised Edition 1974, Reprinted 2004.*
- ✓ *Joseph Dibona, (ed.), One Teacher One School, Biblia Impex, New Delhi, 1983.*
- ✓ *Mahatma Gandhi, Educational Reconstruction, Wardha, Hindustani Talimi Sangh, 1938.*
- ✓ *Mushirul Hasan (ed.), Knowledge, Power and Politics: Educational Institutions in India, Roli Books, 1998.*
- ✓ *Sabyasachi Bhattacharya, Joseph Bara and Chinna Rao Yagati (ed.), Educating the Nation: Documents on the Discourse of National Education in India (1880-1920), Kanishka, 2003.*
- ✓ *Sabyasachi Bhattacharya, Joseph Bara and Chinna Rao Yagati (eds.), Development of Women's Education in India: A Collection of Documents (From 1850 to 1920), Kanishka, New Delhi, 2001.*
- ✓ *William Hunter, Report of the Indian Education Commission, Superintendent of Government Printing, Calcutta, 1884. 9. Michael Dodson, Orientalism, Empire, and National Culture: India, 1770-1880. (Basingstoke & New York: Palgrave Macmillan, 2007) (New Delhi: Foundation Books, 2009)*
- ✓ *Agrawal, J.C. (1984). Landmarks in the History of Modern Indian Education: New Delhi: Vikas Publishing House, Pvt. Ltd*
- ✓ *Rao, Parimala V, Beyond Macaulay, 1780-1860, Routledge, 2020*
- ✓ *Ghosh, Suresh Chandra, The History of Education in Modern India, 1757-2012, Orient Blackswan, 2000.*
- ✓ *Singh, Sahana, The Educational Heritage of Ancient India, 2017.*
- ✓ *Aldrich, Richard, An Introduction to the History of Education, London, Hodder and Stoughton, 1982*

- ✓ *Bell, Andrew, An Analysis of the Experiment in Education, Made at Egmore, Near Madras, London,T. Bensley, 1807*
- ✓ *Carnoy, Martin, Education as Cultural Imperialism, New York, Longman, 1974*
- ✓ *Kopf, David, British Orientalism and Bengal Renaissance: The Dynamics of Indian Modernisation 1773–1835, Berkley, University of California Press, 1960.*
- ✓ *Kumar, Krishna, Political Agenda of Education: A Study of Colonialist and Nationalist Ideas, New Delhi, Sage Publication, 1991*
- ✓ *Kumar, Nita, Lessons from Schools, History of Education in Banaras, New Delhi, Sage Publication, 2000.*
- ✓ *Majumdar, Bhagaban Prasad, First Fruits of English Education: 1817–1857, Calcutta, Bookland, 1972*
- ✓ *Metcalf, Thomas R., Ideologies of the Raj, Cambridge, Cambridge University Press, 1995*
- ✓ *Paranjape, M.R. (ed.), A Source Book of Modern Indian Education, Bombay, Pal-grave Macmillan, 1938.*
- ✓ *Trevelyan, Charles E., On the Education of the People of India, London, Longman, Orme, Brown, Green and Longmans, 1838.*

Internet Resources

1. Parimala V Rao, Colonial State and Indigenous Vernacular Schools. https://www.youtube.com/watch?v=k7f4Xzc-Oe4

Activities to Do

1. Students will collect and compile all the reports of various education commissions and committees since 1947.

2. Students will collect and compile the profiles of prominent educationists and policy makers in the field of education.

Gardening and Vermicomposting

Course Objectives:

- To introduce the students with the concept and importance of horticulture.
- To introduce the students with the methods for plant propagation.
- To introduce the students with the scope and importance of vermicomposting.

Course Outcomes:

- Students would understand the scope and importance of the horticulture.
- Students would get the skill to propagate the plants through asexual methods.
- Students would understand the importance and use of vermicomposting for horticulture.

Unit-I: Introduction to horticulture, importance of horticulture crops, Principle of cop production technology, essential plant nutrients and their deficiency symptoms, organic and inorganic manures, water management in horticulture crops

***LO: The students will know about the concept and importance of horticulture*.**

Unit-II:

Types of plant propagation, root curing and tubers, grafting, leaf cutting, runners and offsets, rooting media, rooting hormone, types of nursery bed, irrigation & *protection*
***LO*: The students will be able to know how to do the plant propagation.**

Unit-III: Vermiculture: Definition, scope and importance; vermicomposting using garden waste; use of vermicomposting in garden
***LO: The students will be able to know and how to use the vermicomposting*.**

Practicals:

1. Identification and description of salient features of ornamental plants
2. Study of asexual propagation methods (grafting, cutting, layering)
3. Study of techniques for rooting
4. Study of irrigation techniques (drip irrigation)
5. Study of preparation of nursery bed.

Text Books:

- ✓ *Rao, K. M. (2005). Textbook of horticulture. Macmillan.*

Reference book:

- ✓ Don, M. (2021). The Complete Gardener: A Practical, Imaginative Guide to Every Aspect of Gardening. Dorling Kindersley Ltd.
- ✓ *Solankey, S. S., Akhtar, S., Maldonado, A. I. L., Rodriguez-Fuentes, H., Contreras, J. A. V., & Reyes, J. M. M. (Eds.). (2020). Urban Horticulture: Necessity of the Future. BoD–Books on Demand.*

HERBARIUM PREPARATION

Course Objectives:

- To introduce the basics of herbaria and herbarium specimens.
- To educate on the methods for preparation and handling of specimens and materials.
- To know the methods of collection, processing and storage of herbarium specimens.
- To learn about the range of application of herbaria in plant taxonomy.

Course Outcomes:

- The students shall have a basic knowledge on the herbaria and herbarium specimens.
- The students shall get the opportunities to learn the basics specimen processing and proper storage for use.
- The students shall be able to understand the range of application of the herbatia and herbarium specimens.
- The students would be able to learn the application of modern tools for information collection, storage and sharing.

Unit-I: LO: The learners shall gain knowledge on the importance of herbarium in plant taxonomy.

- Herbaria: Introduction, history and objectives; Types of herbaria; role of herbaria in teaching, and research; important herbaria of India and the world.
- Herbarium specimen - types and diversity- loose seeds, dried and bulky fruits, algae, fungi, wood sections, pollen, microscope slides, silica-stored materials, DNA extractions, and fluid-preserved flowers or fruits; use of specimens. Plant collections and maintenance of live specimen.

Unit-II: LO: The learners shall gain knowledge and skills on the preparation and processing of herbarium specimens.

Herbarium methodology: Collection, field notes; Processing of specimen-poisoning, pressing, drying, mounting, stitching, identification and arrangement. Methods to address specimen diversity - Algae, fungi, and bryophytes; methods of their collection, processing and preservation.

Unit-III: LO: The students shall be able to understand the long-term storage, and use of specimen as well as on the procedure for data and knowledge sharing in the field.

Maintenance and curing of specimen, materials and illustrations-moisture management, heating, chemical treatments, fumigation. Handling of Specimen; library and special collections; exchange of specimens. Use of computer, databases and webs - Local and global databases; Herbaria for outreach activities - services, education, plant identification and conservation.

Practical:

1. Field survey and collection of plant materials
2. Methods of pressing and drying
3. Drying of materials by using chemicals- alcohol, glycerol, formaldehyde, FAA
4. Preservation of materials-moist and dried
5. Mounting, labelling and cataloguing of herbarium specimen
6. Use of computers for herbarium cataloguing and management
7. Seed collection and storage

Text book:

- ✓ *E. Amodu (2017). Field Herbarium Techniques, Lambert Academic Publishers.*

Reference Book:

- ✓ Specimen preparation guide-University of Florida Herbarium –(FLAS)-2023
- ✓ Sanwal et al. (2020). Introduction to procedures for preparation of herbarium specimen, NBPGR, - New Delhi
- ✓ Victor J, et al (2004). Herbarium essentials – The southern African herbarium user manual. SABD Network Report.

Tissue Culture Of Plants

Course Objectives:

- To know the about the plant tissue culture techniques and its practical applications.
- To understand the requirement for setting up a tissue culture laboratory.
- To know the commercial aspects of plant tissue culture.

Course Outcomes:

On completion of the course the students shall

- Have ability to understand the basic of plant tissue culture methods.
- Have knowledge to develop a startup facility using tissue culture techniques.
- Be able to understand the economics of the process and know its potential.

UNIT-I: LO: Knowledge on the basis of tissue culture, its laboratory and basic requirements.

Introduction to plant tissue culture: Laboratory organization and instruments requirement, aseptic techniques required for tissue culture, culture medium (MS) and its composition, plant growth regulators and their uses in plant tissue culture, preparation of culture media. Totipotency.

UNIT-II: LO: Understanding the different methods of plant regeneration through plant tissue culture.

Micropropagation: Micropropagation by mature nodal explants, surface sterilization, stages of micropropagation, selection of plants and explants, proliferation of shoot, rooting of shoots, acclimatization; organogenesis, environment inside the culture room.

UNIT-III: LO: Ability to know the applications of plant tissue culture.

Tissue culture applications: Uses of micropropagation, another culture (haploid and doubled haploid production), shoot apex/ tip culture (virus elimination), secondary metabolite production, synthetic seed production (germplasm transfer); Cryopreservation and in vitro culture (germplasm conservation).

Practical:

1. Sterilization of plasticwares, glass wares and use of autoclaves or its alternatives.
2. Preparation of tissue culture medium (e.g., MS medium).
3. Readiness of Laminar air flow cabinet for aseptic culture work (Demonstration).
4. Demonstration of in vitro sterilization and inoculation methods using nodal explants of any plant species as per available.
5. Over all study of micro propagation by photographs.
6. Study of anther culture through photographs.
7. Preparation of synthetic seeds.

Text Books:

- ✓ *Chawla, H. S. (2010). Introduction to Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.*
- ✓ *Purohit S.D. (2013) Introduction to Plant Cell, Tissue and Organ Culture. PHI Learning Private Ltd., Delhi*

Reference Books:

- ✓ *Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.*
- ✓ *Singh, B. D. (2018). Plant Biotechnology Kalyani Publishers, New Delhi.*
- ✓ *Gupta, P. K. (2017). Plant Biotechnology, Rastogi Publication, Meerut.*

Nano Materials and Applications (3 credits) Theory: 2 credits

CO-1: Basic understanding of nanostructured shape, application of Schrodingerequation in nanostructured

CO-2: Understanding of nanomaterial synthesis

CO-3: Understanding of nanomaterials different Characterization

CO-4: Understating of different optical properties of nanomaterials

CO-5: Apply the above concepts in Experiments

UNIT 1: NANOSCALE SYSTEMS:

Length scales in physics, Nanostructures: 1D, 2D and 3Dnanostructures (nano dots, thin films, nanowires, nano rods), Band structure and density of states of materials at nanoscale, Size Effects in nano systems, Quantum confinement: Applications of Schrodinger equation- Infinite potential well, potential step, potential box, quantum confinement of carriers in 3D, 2D, 1D nanostructures and its consequences. (10 Lectures)

UNIT 2:

SYNTHESIS OF NANOSTRUCTURE MATERIALS: Top down and Bottom up approach, Photolithography. Ball milling. Gas phase condensation. Vacuum deposition. Physical vapordeposition (PVD): Thermalevaporation-beam evaporation, Pulsed Laser deposition. Chemical vapor deposition (CVD). Sol-Gel. Electro deposition. Spray pyrolysis. Hydrothermal synthesis. Preparation through colloidal methods. MBE growth of quantum dots. (8 Lectures)

UNIT 3:

CHARACTERIZATION: X-Ray Diffraction.OpticalMicroscopy.Scanning Electron Microscopy. Transmission Electron Microscopy. Atomic Force Microscopy. Scanning TunnelingMicroscopy. (8 Lectures)

UNIT 4:

OPTICAL PROPERTIES: Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure. Quasi-particlesand excitons. Excitons in direct and indirect band gap semiconductor nanocrystals. Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization-absorption, emission and luminescence. Optical properties of heterostrctures and nanostructures. (14 Lectures)

Reference books:

1. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).
2. S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company)
3. K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology(PHI Learning Private Limited).
4. Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).
5. M. Hosokawa, K. Nogi, M. Naita, T. Yokoyama, Nanoparticle Technology Handbook (Elsevier, 2007).
6. Bharat Bhushan, Springer Handbook of Nanotechnology (Springer-Verlag, Berlin, 2004).

LABORATORY: 1 credit

1. Synthesis of metal nanoparticles by chemical route.
2. Synthesis of semiconductor nanoparticles.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.
4. XRD pattern of nanomaterials and estimation of particle size.
5. 5. To study the effect of size on color of nanomaterial.
6. Growth of quantum dots by thermal evaporation.
7. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study transmittance spectra in UV-Visible region.

Reference Books:

1. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).
2. S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company).
3. K.K. Chattopadhyay and A.N. Banerjee, Introduction to Nanoscience & Technology(PHI Learning Private Limited).
4. Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).

BIO PHYSICS

CO-1: Basic fundamentals of living organism and its interactions in domains of Physics in biology
CO-2: Understating of heat transfer in biomaterials and its mechanism
CO-3: Diversifying of thermal, statistical physics in biological domain.
CO-4 : Understating fluid mechanisms in living organism in the domain of Physics

UNIT 1:

Building Blocks & Structure of Living State: Atoms and ions, molecules essential for life, what is life. Living state interactions: Forces and molecular bonds, electric &thermal interactions, electric dipoles,casimir interactions, domains of physics in biology. (18Lectures)

UNIT 2:

Heat Transfer in biomaterials: Heat Transfer Mechanism, The Heat equation, Joule heating of tissue. Living State Thermodynamics: Thermodynamic equilibrium, first law of thermodynamics and conservation of energy. Entropy and second law of thermodynamics, Physics of many particle systems, Two state systems, continuous energy distribution, Composite systems, Casimir contribution of free energy, Protein folding and unfolding. (19 Lectures)

UNIT 3:

Open systems and chemical thermodynamics: Enthalpy, Gibbs free energy and chemical potential, activation energy and rate constants, enzymatic reactions, ATP hydrolysis & synthesis, Entropy of mixing, the grand canonical ensemble, Hemoglobin. Diffusion and transport Maxwell-Boltzmann statistics, Fick's law of diffusion, sedimentation of Cell Cultures, diffusion in a centrifuge, diffusionin an electric field, Lateral diffusion in membranes, Navier stokes equation, low Reynold's Number Transport, Active and passive membrane transport. (19 Lectures)

UNIT 4

Fluids: Laminar and turbulent fluid flow, Bernoulli's equation equation of continuity,venture effect, Fluid dynamics of circulatory systems, capillary action. Bioenergetics and Molecular motors: Kinesins, Dyneins, and microtubule dynamics, Brownian motion, ATP synthesisin Mitochondria, Photosynthesis in Chloroplasts, Light absorption in biomolecules, vibrational spectra of bio-biomolecules. (19 Lectures)

Reference Books:

1. Introductory Biophysics, J. Clay comb, JQP Tran, Jones & Bartelett Publishers
2. Aspects of Biophysics, Hughe S W, John Willy and Sons.
3. Essentials of Biophysics by P Narayanan, New Age International

Introduction to Spectroscopy

CO-1: Basic understanding of atomic models and its spectroscopy nature

CO-2: Conceptual understanding of Spectra of Alkali elements

CO-3: Understating the basic of X-ray and its applications

CO-4: Understating molecular spectroscopy

UNIT 1:

Vector Atomic Model: Inadequacies of Bohr and Bohr-Sommerfeld atomic models w.r.t. spectrum of Hydrogen atom (fine structure of H-alpha line). Modification is due to the finite mass of the nucleus and the Deuteron spectrum. Vector atomic model (Stern-Gerlach experiment included) and physical & geometrical interpretations of various quantum numbers for single & many valence electron systems. LS & JJ couplings, spectroscopic notation for energy states, selection rules for transition of electrons and intensity rules for spectral lines. Fine structure of H- alpha line based on vector atomic model. (1 0 lectures)

UNIT 2:

Spectra of Alkali & Alkaline Elements: Spectra of alkali elements: Screening constants for s, p, d& amp; f orbitals; sharp, principle, diffuse & amp; fundamental Series; doublet structure of spectra and fine structure of Sodium D line. Spectra of alkaline elements: Singlet and triplet structure of spectra.(6 lectures)

UNIT 3:

X-rays & X-Ray Spectra: Nature & production, Continuous X-ray spectrum & Duane-Hunt' s law, Characteristic X-ray spectrum & Mosley's law, Fine structure of Characteristic X-ray spectrum, and X-ray absorption spectrum.(7 lectures)

UNIT 4:

Molecular Spectra: Discrete set of a molecule's electronic, vibrational and rotational energies. Quantization of vibrational energies, transition rules and pure vibrational spectra. Quantization of rotational energies, transition rules, pure rotational spectra and determination of inter nuclear distance. Basics of UV Visible & photoluminescence spectroscopy (7 lectures)

Reference Books:

1. H.E. White, "Introduction to Atomic Spectra", McGraw Hill, 1934 8.
2. C.N. Banwell, E.M. McCash, "Fundamentals of Molecular Spectroscopy", McGrawHill, 2017, 4e 9.
3. R Murugeshan, Kiruthiga Sivaprasath, "Modern Physics", S. ChandPublishing, 2019, 18e 10.
4. S.L. Gupta, V. Kumar, R.C. Sharma, "Elements of Spectroscopy", Pragati Prakashan, Meerut, 2015, 27

Physics

Course objective:

The course has objectives to provide Basic knowledge of Physics witha special reference to electronics part. Students will be able to know the fundamentals of electronics devices.

Course Outcome:

After completion of this course, the students will be able to

- Understand the basic ofelectric current as they have to deal with electronic devices.
- Get idea regarding semiconductor and components like diode.
- Know the fundamentals of transistor

UNIT-I

Electric Current, Electric Currents in Conductors, Ohm's law, Drift of Electrons and the Origin of Resistivity, Limitations of Ohm's Law, Resistivity of Various Materials, Temperature Dependence of Resistivity, Electrical Energy, Power, Cells, emf, Internal Resistance, Cells in Series and in Parallel, Kirchhoff's Rules, Wheatstone Bridge

UNIT-II

Semiconductor: Bonds in Semiconductors, Crystals, Commonly Used Semiconductors, Energy Band Description of Semi- conductors, Effect of Temperature on Semi- conductors, Hole Current, Intrinsic & Extrinsic Semiconductor, n-type & P-Type Semiconductor, Charge on n- type and p-type Semiconductors, Majority and Minority, Carriers.

UNIT-III

Properties of pn-Junction, Applying D.C. Voltage across pn- Junction or Biasing a pn- Junction, Current Flow in a Forward Biased pn-Junction, Volt-Ampere Characteristics of pn Junction, Important Terms, Limitations in the Operating Conditions of pn- Junction.

UNIT-IV

Transistor, Some Facts about the Transistor, Transistor Symbols, Transistor Connections, Characteristics of Common Base Connection, Measurement of Leakage Current, Common Collector Connection, Commonly Used Transistor Connection, Transistor Load Line Analysis, Practical Way of Drawing CE Circuit, Performance of Transistor, Amplifier, Power Rating of Transistor, Semiconductor Devices Numbering System

Text Books:

- ✓ *PHYSICS PART – I TEXTBOOK FOR CLASS XII*

Reference Books:

- ✓ *Principles of Electronics by V K Mehta & Rohit Mehta*

Mathematics for Computer Science

Course Objective:

The course stresses the students to learn how to think logically and mathematically. It describes different ways to solve mathematical problems and how to use it in computer science. There are four thematic areas covered in this course: mathematical foundations, combinatorial analysis, Graph Theory and Group Theory.

Course Outcome:
On completion of this course, students will be able to

- Understand the basic principles of sets and operations in sets.
- Demonstrate an understanding of relations and functions and be able to determine theirproperties.
- Apply counting principles in various field of computer science.

- Model problems in Computer Science using graphs and trees.
- Use shortest path and other techniques of Graph theory in Computer Networking.
- Demonstrate different traversal methods for trees and graphs.
- Get basic ideas of Group Theory.

UNIT-I

Sets and Functions**:** Sets, Relations, Functions, Closures of Equivalence Relations, Partial ordering, Lattice, Sum of products and product of sumsand Exclusions

UNIT-II

Combinatory: Permutations, Combinations, Pigeon hole principle. Recurrence Relation: Recurrence Relations, Solving Recurrence relation, Generating Functions.

UNIT-III

Graphs: Introduction to graphs, graphs terminologies, Representation of graphs, Isomorphism, **Connectivity& Paths:** Connectivity, Euler and Hamiltonian Paths, Introduction to tree, tree traversals, spanning tree and tree search: Breadth first search, Depth first search, cut-set, cut-vertex.

UNIT-IV

Group Theory: Groups, Abelian Group, Finite & Infinite Group, Properties of Group, Permutation Group, Cyclic Permutation, Sub Group, Lagrange Theorem

Text Books:

- ✓ *Discrete Mathematics and its Applications by Kenneth H. Rosen.*
- ✓ *Modern Algebra by A R Vasishta*

Reference Books:

- ✓ *Elements of Discrete Mathematics by C.L. Liu and D.P. Mohapatra, TMH,2012*
- ✓ *J. P Tremblay, R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TMH,1997.*

Operation Research

Course Objectives:

To familiarize the students with the role of operations and its interaction with other activities of a firm and their integration in a highly competitive global environment. To enable the students to apply the understanding of production processes in quantitative analysis of problems arising in the management of operations.

Course Outcome:
On completion of this course, the students will be able to

- Design new simple models, like: CPM to improve decision –making and develop critical thinking and objective analysis of decision problems.
- Determine the optimal solution for Transportation problems.
- Plan, Schedule and Control the given project.

UNIT-I

Definition of operation research, models of operation research, scientific methodology of operations research, Stages of Development of Operations Research, scope of operations research, importance of operations research in decision making, role of operations management, limitations of OR.

UNIT-II

Transformation process model: Inputs, Process and outputs; Classification of operations; Responsibilities of Operations Manager, Process types in manufacturing: Project, jobbing, batch, line, mass, continuous; Process types in services: professional services, services shops, mass services; Plant location; Layout planning.

UNIT-III

Quality management: Introduction; Meaning; Quality characteristics of goods and services; Tools and techniques for quality improvement: check sheet, histogram, scatter diagram, cause and effect diagram, Pareto chart, process diagram, statistical process control chart; Quality assurance; Total quality management (TQM) model; Service quality, concept of Six Sigma and its application.

UNIT-IV

Transportation problem –Introduction, Initial basic feasible solution - NWC method, Vogel's method. Network model for project analysis- PERT and CPM.

Text Books:

- ✓ *Gupta P. K., Hira D.S., "Operations Research", S Chand Publishers*

Reference Books:

- ✓ *V.K. Kapoor, Introduction to operational Research – Sultan Chand & Sons – New Delhi*
- ✓ *Aswathappa. K, Production and Operations Management, Himalaya Publishing House,*

Political Process in India

Course Objectives:

- To impart quality of knowledge about Political Theory.
- It helps the students to know about the Meaning and Theories of Democracy.
- To increase awareness among students about the Rights and Duties of a Citizen.

Course outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Demonstrate a broad and coherent body of knowledge with depth in the underlying principles and concepts.
- Integrate knowledge of the diversity of cultures and peoples
- Apply critical thinking, independent judgment, intercultural sensitivity and regional, national and global perspectives to identify and solve problems in the discipline of the Political Science
- Demonstrate capacity for reflection, planning, ethical decision making and inter -disciplinary team work indiverse contexts of community engagement.

Unit I

- Origin and Development of the Indian party system Nature and trends of Indian party system Regionalparties: role and significance in Indian federalism
- Political defection in India Coalition politics and parties
  Role of opposition parties in Indian parliamentary system
- Determinants of voting behaviour**:** Populism Caste as a determinant of voting behavior

Unit II

- Ethnicity Region & Language as determinants of voting behaviour
- Class as a determinant of voting behaviour Gender as a determinant of voting behaviour Voting behaviour of Rural-Urban India

- Religion and voting behaviour Determinants of voting behaviour:
- Cult/Charisma/Personality Regionalism in India: a conceptual analysis Regionalism and Indianfederalism

Unit III

- Accommodation of regional aspirations—Linguistic reorganization Regional aspirations: Case study of Northeast India Autonomy and secessionism: Case of Punjab and Nagaland Statehood and Sub-regionalmovements: Jharkhand, Chattisgarh, and Uttarakhand .
- Autonomy movements: Bodo homeland movement and the Gorkhaland movement Impact of globalization on regional movements: TelanganaExploring the nature of identity politics in India Meaning and nature of communalism
- Variants of communal politics in post independent India Factors responsible for the growth of communal politics in India Hindu nationalism: a historical analysis
- Rise of Hindutva politics in India: contemporary scenario

Unit IV

- Indian aspect of secularism Religion-State relationship: implications for right to equality Caste as an identity in India Dominant and entrenched caste and their role in Indian politics: a contemporary scenario Caste and Indian constitutional provisions
- Electoral politics and the changing nature of caste Political mobilization of caste identities in IndiaCaste and politics: a changing scenario

- Affirmative Action Policies in India: Sources, directions and implications for class, caste and tribes A case of Affirmative Action in favour of the Adivasis: The Forest Rights Act The Reservation Policy in India Affirmative Action for women

Text Books

- ✓ *Niraja Gopal Jayal & Pratap Bhanu Mehta, The Oxford Companion to Politics in India, Oxford University Press, New Delhi,2010.*
- ✓ *Rajni Kothari, Politics in India Orient Longman, Hyderabad, 1970*
- ✓ *Subrata K. Mitra, Politics in India: Structure Process and Policy, Routledge, New York, 2017*
- ✓ *Partha Chatterjee (ed.), State and Politics in India, Oxford University Press, New Delhi, 2002*

Organisational Behaviour

Course Objectives:

- To learn the basic concepts of Organizational Behaviour and its applications in contemporary organizations
- To understand how individual, groups and structure have impacts on the organizational effectiveness and efficiency.

- To appreciate the theories and models of organizations in the workplace
- To creatively and innovatively engage in solving organizational challenges

Course outcomes (COs)

- To understand the conceptual framework of the discipline of OB and its practical applications in the organizational set up
- To deeply understand the role of individual, groups and structure in achieving organizational goals effectively and efficiently
- To critically evaluate and analyze various theories and models that contributes in the overall understanding of the discipline
- To develop creative and innovative ideas that could positively shape the organizations

Unit I Organizational Behavior:

Learning objectives, Definition & Meaning, Why to study OB, An OB model, New challenges for OB Manager LEARNING: Nature of learning, How learning occurs, Learning, Theories of learning- Classical conditioning ,Operant conditioning, social learning, cognitive learning & OB Case Study Analysis

Unit II PERSONALITY:

Meaning & Definition, Determinants of Personality, Personality Traits, Personality & OB PERCEPTION: Meaning & Definition, Perceptual process, Importance of Perception in OB MOTIVATION: Nature & Importance, Herzberg's Two Factor theory, Maslow's Need Hierarchy theory, Alderfer's ERG theory Case Study Analysis.

Unit III

- **COMMUNICATION:** Importance, Types, Barriers to communication, Communication as a tool for improving Interpersonal Effectiveness GROUPS IN ORGANISATION: Nature, Types, Why do people join groups, Group Cohesiveness & Group Decision Making- managerial Implications, Effective Team
- **Building LEADERSHIP**:
  Leadership & management, Theories of leadership- Trait theory, Behavioural Theory, Contingency Theory, Leadership & Followership, How to be an Effective

- **Leader CONFLICT**:
  Nature of Conflict & Conflict Resolution TRANSACTIONAL ANALYSIS: An Introduction to Transactional Analysis Case Study Analysis

Unit IV Organizational Culture:

- Meaning & Definition, Culture & Organisational Effectiveness HUMAN RESOURCE MANAGEMENT: Introduction to HRM, Selection, Orientation, Training & Development, Performance Appraisal, Incentives ORGANISATIONAL CHANGE: Importance of Change,

Planned Change & OB Techniques .

- ORGANISATIONAL DEVELOPMENT: Pre-requisites for OD,OD interventions.

Text Books

- ✓ *Organisation Behaviour- K. Aswathappa- Himalaya Publisher*
- ✓ *Essential of Organisation Behaviour –Robins –PHP*

References

- ✓ *Organisation Theory and behavior - S KGupta& R.Joshi-Kalyani Publishers*

Elements of Economics

Course Objectives

- Students will demonstrate their knowledge of the fundamental and technical concepts of economics
- Students will apply the basic theories of economics in critical thinking and problem solving.
- Students will demonstrate an awareness of their role in the global economics environment
- Students will be able to make decisions wisely using cost-benefit analysis

Course outcomes (COs)

After completing this course satisfactorily, a student will be able to

- Understand how households (demand) and businesses (supply) interact in various market structures to determine price and quantity of a good produced.
- Understand the links between household behavior and the economic models of demand.
- Represent demand, in graphical form, including the downward slope of the demand curve and what shifts the demand curve.
- Understand the links between production costs and the economic models of supply
- Understand how different degrees of competition in a market affect pricing and output

Unit I

Nature, Scope, Basic problems of an economy, Micro Economics and Macro Economics. Demand- Meaning of demand, Demand function, Law of Demand and its exceptions, Determinants of demand, Elasticity of demand & its measurement (Simple numerical problems to be solved).

Unit II

Supply-Meaning of supply, Law of supply and its exception, Determinants of supply, Elasticity of supply, Determination of market equilibrium (Simple numerical problems to be solved). Production-Production function, Laws of returns: Law of variable proportion, Law of returns to scale.

Unit III

Cost and revenue concepts, Basic understanding of different market structures, Determination of equilibrium price under perfect competition (Simple numerical problems to be solved), Break Even Analysis-linear approach (Simple numerical problems to be solved). Banking -Commercial bank, Functions of commercial bank, Central bank, Functions of Central Bank. Inflation- Meaning of inflation, types, causes, measures to control inflation. National Income-Definition, Concepts of national income, Method of measuring national income.

Unit IV

Time value of money- Interest - Simple and compound, nominal and effective rate of interest, Cash flow diagrams, Principles of economic equivalence. Evaluation of engineering projects- Present worth method, Future worth method, Annual worth method, Internal rate of return method, Cost benefit analysis for public projects. Depreciation- Depreciation of capital assert, Causes of depreciation.

Text Books

- ✓ *Riggs, Bedworth and Randhwa, "Engineering Economics", McGraw Hill Education India*
- ✓ *Principles of Economics, Deviga Vengedasalam; Karunagaran Madhavan, Oxford University Press*
- ✓ *Engineering Economy by William G.Sullivan, Elin M.Wicks, C. Patric Koelling, Pearson*
- ✓ *R.Paneer Seelvan, " Engineering Economics", PHI*

References

- ✓ *Ahuja,H.L., "Principles of Micro Economics" , S.Chand & Company Ltd*
- ✓ *Macro Economics by S.P.Gupta, TMH*

Food and Nutrition

Course Outcome:

- The students will get basic knowledge on macro and micro nutrients and different types of foodand their nutritional contribution.
- The students will gain practical knowledge on market survey and locally available food stuffsfrom each food group.

Learning Outcome:

- The students will learn the basic concepts in food, nutrition, and health.
- The students will gain an insight into the classification, functions, dietary sources, anddaily of requirements various nutrients.
- The students will understand about different food groups and their nutritionalcontribution

Unit-I: Basic Concepts in Food and Nutrition

- Introduction to Food and Nutrition Science- Definitions (food, food science, food additive, fermented food, food fortification, functional food, nutrition, health, nutrients, nutritional status, optimal nutrition, nutrition security).
- Classification and Functions of Food- Physiological, psychological, and socio-cultural.
- Food Groups- Basic five and seven food groups, their nutritional contribution.
- Methods of Cooking- Different methods of cooking and their advantages and disadvantages: Dry methods - Frying, Sautéing, Parching, Roasting, Grilling/Broiling, Toasting, And Baking. Moist methods - boiling, steaming, stewing, simmering, poaching, blanching, pressure cooking. Combination method- braising.

Unit-II: Macro Nutrients

- Carbohydrates- Introduction, classification, functions, dietary sources, and daily requirement.
- Proteins- Introduction, classification, functions, dietary sources, and daily requirement.
- Lipids- Introduction, classification, functions, dietary sources, and daily requirement.

Unit-III: Micro Nutrients:

- Fat Soluble Vitamins (A, D, E and K)- Introduction, functions, dietary sources, daily requirement, and deficiency diseases.
- Water Soluble Vitamins (Thiamin, Riboflavin, Niacin, Folate, Vitamin B12 and VitaminC)- Introduction, functions, dietary sources, daily requirement, and deficiency diseases.

- Minerals (Calcium, Iron, Zinc, and Iodine)- Introduction, functions, dietary sources, daily requirement, and deficiency diseases.

Text Books:

- ✓ *Srilakshmi. B, Food Science, New Age International (P) Limited Publishers.*
- ✓ *Srilakshmi. B, Nutrition Science, New Age International Pvt. Ltd.*
- ✓ *N. Shakuntala Manay, M. Shadaksharaswamy, Foods Facts and Principles,New Age International (P) Limited Publishers.*
- ✓ *Swaminathan. M, Advanced Text-Book on Food and Nutrition, Volume 1 and 2, The Bangalore printing and publishing co. LTD.*

Reference Books:

- ✓ *Bamji MS, Krishnaswamy K. Brahman GNV. Textbook of Human Nutrition, Oxford and IBH publish Co Pvt. Ltd.*
- ✓ *Norman. N Potter, Joseph H. Hotchkiss, Food Science, 5th edition, CBS Publishers, and Distributors.*
- ✓ *Mudambi S.R and Rajagopal M.V, Fundamentals of foods and Nutrition, New Age International Pvt. Ltd.*
- ✓ *Gopalan, C. Rama Sastry, B.V., and Balasubramanian, S.C., Nutritive value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad.*

E-RESOURCES:

- http://www.nutrition.gov
- http://www.usda.gov
- http://egyankosh.ac.in
- http://ecourses.icar.gov.in

MODEL QUESTIONS

1. Name the fat-soluble vitamins. (**One word**)

2. Define Nutrition. **(Maximum 50 words)**
3. Discuss about the classification of carbohydrate. **(Maximum 250 words)**
4. Explain the classification and functions of food. **(Maximum 800 words)**

CHILD DEVELOPMENT

Course Outcome:

- Students will be able to understand the crucial aspects of child development.
- Students will understand about the developmental patterns of child development.

Learning Outcome:

- The students will gain an insight on scientific methods of studying child development.
- The students will be aware of the stages of prenatal development and factors affecting pre- natal development.
- The students will understand the developmental patterns during early childhood years (0- 5years).

Unit – I: Fundamentals of Child Development:

- Child Development- Meaning, definition, principles, stages, and methods of studying child development.
- Prenatal Growth and Development - Meaning, significance and stages of prenatal growth and development: Conception, period of ovum, period of embryo and period of fetus.

- Prenatal Environmental Influences- Maternal age, nutrition, drugs, irradiation, alcohol, smoking, maternal emotions, maternal health, Rh factor, diseases, and birth hazards.

Unit – II: Developmental Milestones (During First Five Years of Child's Life):

- Physical Development - Physical growth cycles, body size, body proportions, bones, teeth, muscles and fat, teeth, development of the nervous system.
- Motor Development – Meaning, principles and sequence of motor development.
- Speech Development – Meaning, pre-speech forms of communication, essentials in learning to speak, major tasks in learning to speak, speech disorders.

Unit – III: Developmental Milestones (During First Five Years of Child's Life):

- Emotional Development - Meaning, common emotional patterns, and characteristics of childhood emotions.
- Social Development – Meaning, process and importance of early social experiences. factors influencing social development.
- Cognitive Development - Meaning and importance, factors influencing cognitive development.

Text Books

- ✓ *Hurlock E.B. - Child Development; New Delhi; McGraw Hill.*
- ✓ *Hurlock E.B. - Developmental Psychology; New Delhi; McGraw Hill.*
- ✓ *Chowdhury, A - Text Book on Child Development and Family Relations, New Delhi: Academic Excellence.*
- ✓ *Panda K.C. - Elements of Child Development; Kalyani Publishers.*
- ✓ *Kuppuswamy B -Text Book of Child Behavior and Development; India; Konark Publishers Pvt. Ltd.*

Reference Books:

- ✓ *Jaya N., and Rajammal P.D. - A Text Book of Child Development. New Delhi: McMillan Publishers.*
- ✓ *Mussen P.H., Conger J.J, Kagan J. - Child Development and Personality; New York; Harpers and Row publishers.*
- ✓ *Weiner I.B., Elkind D. - Child Development: A Core Approach; John Wiley & Sons Inc.*

- ✓ *Papalia, Olds & Feldman - Human Development; McGraw Hill Humanities / Social Sciences/ Language.*

E RESOURCES:

- ✓ https://www.choc.org/primary-care/ages-stages/3-years/
- ✓ https://www.betterhealth.vic.gov.au/health/.
- ✓ https://raisingchildren.net.au/preschoolers/development/development.
- ✓ https://www.cdc.gov/ncbddd/childdevelopment/facts.html
- ✓ https://www.all4kids.org/news/blog/why-the-first-5-years-of-child

MODEL QUESTIONS:

1. Period of ovum lasts for _____days. **(One word)**

2. Explain about the Principles of child development)? **(Maximum 50 words)**

3. Discuss about the stages of prenatal development? **(Maximum 250 words)**

4. Discuss about the factors affecting the physical growth and development in children. **(Maximum 800 words)**

FAMILY RESOURCE MANAGEMENT

Course Outcome:

- Students will be oriented about the available human and non-human resources in the family and their management.
- Students will learn the importance of judicious management of resources and their conservation techniques for sustainability.

Learning Outcome:

- The students will gain an insight on Family Resource Management and its application.
- The students will be aware of the management process.
- The students will learn about judicious utilization of resources management for conservation and sustainability.

Unit-I: Resource Management in Family Setting:

- Family Resource Management- Concept, definition, and scope of family resource management.
- Resources- Meaning, classification, and characteristics of family resources, factors affecting utilization of resources.
- Decision making- Types of decisions, Steps of decision making.

Unit-II: Motivating Factors in Management and Management Process:

- Motivating Factors in Management- Motivation in management, Theories of motivation– Maslow's hierarchy of needs theory
- Motivating Factors- Values, goals and standards, interrelatedness of values, goals, and standards.
- Management Process- Definition and steps in management process -planning, organizing, controlling, and evaluating, qualities of a good home maker.

Unit-III: Resource Conservation:

- Money-Types of income, Supplementing family income.
- Time-Concept and steps in time management; Factors to be considered in making time and activity plan.
- Energy-Efforts, Fatigue, Work simplification techniques and Mundel's classes of change.
- Space – Meaning, Importance, Functional storage space management.

Text Books:

- ✓ *Seetharaman P., Batra S. and Mehra P., Family Resource Management, CBS Publishers & Distributors, New Delhi.*
- ✓ *Nickell, P and Dorsey, J.M., Management in family living, CBS Publishers, and Distributors.*
- ✓ *Gross I.H and Crandall E.W., Management for Modern Families.*
- ✓ *Home Management–Education Planning Group, Arya publishing house, Delhi.*

Reference Books

- ✓ *Vergese, Ogale and Srinivasan, Home Management.*
- ✓ *Mann M.K., Home Management for Indian Families.*
- ✓ *Mallick P., Text book of Home Science.*
- ✓ *Devdas and Jaya, Introduction to Home Science.*

E-RESOURCES:

- ✓ https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=8x0nJkh/R0vHkX1U70Z/CQ
- ✓ https://nios.ac.in/media/documents/srsec321newE/321-E-Lesson-10.pdf
- ✓ https://www.brainkart.com/article/Definition-and-Concept-of-Family-Resource-Management_33507/

MODEL QUESTIONS:

1. ---------- is the first process in the management process. **(one word)**
2. Write the meaning and types of decision making in a family. *(maximum 50 words)*
3. Describe the work simplification process. **(maximum 50 words)**
4. Discuss about the concept, definition, and scope of Family Resource Management. **(maximum 800 words)**

हिन्दी साहित्यिक पत्रकारिता

Course outcome:

Students interested to choose journalism as a profession they can have preliminary basic knowledge in this paper and proceed accordingly.

Learning Outcome:

- Acquire knowledge regarding the theories associated with journalism and its different forms. Gain knowledge about prominent Hindi journalists.
- Understand the origin, development and types of Hindi Journalism
- Gain knowledge about prominent Hindi newspapers and journals.
- Analyse the various modern techniques of journalism. Achieve the ideas about Interviews, Feature writing, Editorial writing

UNIT - I

पत्रकारिता: परिभाषा एवं स्वरूप, प्रमुख पत्रकार - भारतेंदु, महावीर प्रसाद - द्विवेदी, निराला, राजेन्द्र यादव |

UNIT - II

हिन्दी पत्रकारिता का उद्भव और विकास एवं भेद

UNIT - III

समकालीन प्रमुख पत्रिकाएँ: आलोचना, हँस, साहित्य अमृत नया ज्ञानोदय आदि

UNIT - IV

भेंटवार्ता, फीचर - लेखन, संपादकीय लेखन

सहायक ग्रंथ :

1. हिन्दी समाचार पत्रों का इतिहास - अम्बिका प्रसाद वाजपेयी

2. हिन्दी पत्रकारिता - राकेश दुबे, शबनम पुस्तक महल, कटक

3. हिन्दी पत्रकारिता - डॉ. कृष्ण बिहारी मिश्र

4. हिन्दी पत्रकारिता विविध आयाम - सं. वेद प्रदाप वैदिक

5. हिन्दी पत्रकारिता सिद्धान्त और स्वरूप - डा. सविता चड्ढा

विज्ञापन: अवधारणा और प्रयोजनमूलक आयाम

Course Outcome:

Students will develop their knowledge about advertisement. In this era making of advertisement has vital role in earning. So that students should know about marketing, brand making, printing and writing articles for radio, newspaper and television.

Learning Outcome:

After reading this paper, students should have :

- Know about the advertisement, marketing and brand making with sponsored programs.
- Know about various types of advertisement and advertisement writing for print media, radio and television.
- Know about the language and speciality of advertisement through hindi language.
- In making of advertisement they should learn how to write in print media, radio jingle and story book for television.

UNIT - 1

विज्ञापन : स्वरूप एवं अवधारणा

(i) विज्ञापन : अर्थ व परिभावा
(ii) विज्ञापन का महत्त्व
(iii) विज्ञापन के सामाजिक तथा व्यावसायिक उद्देश्यू, मार्केटिंग और ब्रांड निर्माण
(iv) विज्ञापन के नए संदर्भ (प्रायोजित कार्यक्रम)

UNIT - II

विज्ञापन : विविध माध्यम

(i) सामान्य परिचय
(ii) विज्ञापन माध्यम का चयन
(iii) प्रिंट, रेडियो एवं टेलीविजन के लिए कॉपी लेखन

UNIT - III

विज्ञापन की भाषा

(i) विज्ञापन की भाषा का स्वरूप
(ii) विज्ञापन की भाषागत विशेषताएँ
(ii) विज्ञापन की भाषा के विभिन्न पक्ष, सादृश्य विधान, अलंकरण, तुकांतता, समानांतरता, विचलन, मुहावरे, लोकोक्तियाँ, भाषा संकर

(iv) हिंदी विज्ञापनों की भाषा

UNIT-IV

विज्ञापन - निर्माण का अभ्यास

(i) प्रिंट माध्यमः वर्गीकृत एवं सजावटी विज्ञापन - निर्माण
(ii) रेडियो जिंगल लेखन
(iii) टेलीविजन के लिए स्टोरी बोर्ड निर्माण

सहायक ग्रंथ :

1. जनसंपर्क, प्रचार एवं विज्ञापन — विजय कुलश्रेष्ठ
2. जनसंचार माध्यम : भाषा और साहित्य — सुधीर पचौरी
3. डिजिटलयुग में विज्ञापन — सुधा सिंह, जगदीश बतुर्वेदी
4. आधुनिक विज्ञापन और जनसंपर्क — डा. तारेश भाटिया

हिन्दी साहित्य और सिनेमा

Course Outcome:

Hindi cinema plays a major role in our society. Through this paper creative abilities of the students will be developed in this specific branch.

Learning Outcome:

After reading this paper, student should have.

- To Know origin and development of Hindi cinema.
- To Know Theories regarding pre-independent Hindi cinema and contemporary Hindi Writers.
- To Know Inter-relationship between literature and cinema.
- To Know Role of Hindi Films in audio-visual medium.

UNIT - I

हिंदी सिनेमा का उद्भव और विकास

UNIT - II

स्वतंत्रता पूर्व हिन्दी सिनेमा और समकालीन हिन्दी लेखक

स्वतंत्रता पूर्व हिन्दी सिनेमा में नवजागरण और राष्ट्रीय भावना

२० वीं सदी में हिंदी सिनेमा की चमत्कारिता, उपलब्धि, प्रभाव

UNIT - III

हिन्दी फिल्मों में हिन्दी भाषा की परिकल्पना

साहित्य और सिनेमा में अंतसंबंध

UNIT - IV

दृश्य-श्रव्य माध्यम में हिंदी फिल्मों की भूमिका -

हिंदी फिल्मों की भाषा और संगति की सार्वभौमिकता

सहायक ग्रंथ :

1. नया दौर का नया सिनेमा - प्रियदर्शन, वाणी प्रकाशन, दिल्ली

2. कथाकार कमलेश्वर और हिन्दी सिनेमा - उज्ज्वल अग्रवाल, राजकमल प्रकाशन

3. सिनेमा के चार अध्याय - डॉ. टी. शशीधरण, वाणी प्रकाशन

4. फिल्म निर्देशन - कुलदीप सिन्हा, राधाकृष्ण प्रकाशन, दिल्ली

5. सिनेमा की संवेदना - विजय अग्रवाल, प्रतिभा प्रतिष्ठान, नई दिल्ली

6. कैमरा मेरी तीसरी आँख - रघु करमकार, राजकमल प्रकाशन

7. हिन्दी में पटकथा लेखन

जाकीर अली रजनीश, मानव संसाधन विकास मंत्रालय, लखनऊ

Human Rights Education

COURSE OUTCOMES (COs):

On completion of this course, the learners will be able to:

- Explain the concept and historical evolution of human rights.
- Understand relationship between rights and duties.
- Identify the major international declarations, treaties and covenants governing human rights.
- Summarize the constitutional provisions with regard to fundamental human rights and duties.
- Recognize the importance of various human rights documents
- Exhibit skills for human rights advocacy and lawful protests.

UNIT I: Human Rights and Duties

LO: *Understand human rights and duties.*

- Concept of human rights and duties, concepts of liberty, equality, fraternity and justice
- Classifications of human rights and duties
- Interrelationship of rights and duties.

UNIT II: Constitutional Perspective

LO: *Understand growth and evolution of human rights in both national and international perspectives.*

- Historical evolution of human rights.
- United Nations for Promotion of Human Rights- - Economic and Social Council, ILO, UNESCO, WHO, FAO.
- Human Rights and Duties in India- Fundamental Rights, Directive Principal of State Policy, Fundamental Duties.

UNIT III: Society and Human Rights

LO: *Understand special rights of women and children.*

LO: *Explain roles of NGOs and education in promoting human rights.*

- Rights of Women- physical assault and sexual harassment, domestic violence, violence at work place, remedial measures.
- Rights of Children- child labour, role of trade union in protecting the rights of labourers.
- Role of NGOs and mass media, role of education.

UNIT-IV: Transaction of Human Rights Education

LO: *Explain how human rights can be promoted.*

LO: *Sensitize to the needs of human rights through field visits.*

- Methods of teaching human rights-drama and role play, brainstorming, discussion, seminars and workshops, projects.
- Becoming peace teacher – acquisition of relevant knowledge, attitudes, values and skills.
- Visits to orphanage and old age home, celebration of international days, collecting and displaying human rights materials on bulletin board and organizing debate.

Sample Questions

1. What do you mean by Human Rights? (1 Mark)
2. Mention any two types of Human Rights. (2 Marks, Within 50 words)
3. Discuss the role of NGOs and Mass Media in promotion of human rights.(5 Marks, Within 300 words)
4. Give an account of Rights of women and violence at work place with suitable examples. (8 Marks, Within 500 to 800 words).

Mode of Course Transaction: Seminar, Team Teaching, Dialogue, Peer-Teaching, Collaborative and Cooperative Learning, Field Trip, Concept Mapping, Self-Learning

Suggested Activities

Each student will be required to prepare and submit a report on any one of the following**:**

- Review a secondary class textbook and find out chapters relating to human rights education. Prepare report.
- Organise an awareness in camp on any social issue and prepare report.
- Find out the Constitutional provisions on human rights and duties in India. Write a report by comparing it with other Constitutions.
- Identify a case of child labour/domestic violence or any other social issue in your locality and write a report.

Text Books

- ✓ *Sergio, B. and Ghosh, S. (2009).Teaching of Human Rights. New Delhi: Dominant Publishers and distributors.*
- ✓ *Das, A.K. and Mohanty, P.K.(2007). Human Rights in India. New Delhi: Sarup and Sons.*

Reference Books

- ✓ *Meena, P.K.(2008). Human Rights: Theory and Practice. New Delhi: Murali Lal and Sons.*
- ✓ *Nirmal, C. J. (2002, ed.), Human Rights in India: Historical, Social and Political Perspective. Oxford University Press.*
- ✓ *GUPTA, D.N. and Singh, S. (2003). Human Rights Acts, Statutes and Constitutional Provisions. Kalpaz Publications.*
- ✓ *Agarwal, H. O.(2018). Human Rights. Central Law Publications.*

Web Resources

- **https://www.tandfonline.com/journals/fjhr20#:~:text=The%20International%20Journal%20of%20Human%20Rights%20covers%20an%20exceptionally%20broad,%2C%20class%2C%20refugees%20and%20immigration.**
- **https://link.springer.com/journal/12142?gad_source=1&gclid=Cj0KCQjwudexBhDKARIsAI-GWYVe89d-w2M5Rx6rS6zd81AuBNIDZ7o2uCNox5wiC8v_baX_2QZxTe4aAtgyEALw_wcB**

Environmental Education

Course Learning Outcomes (CLOs)

On completion of the course, the students will be able to

- Understand the natural environment, different cycles related to Ecology & Ecosystem.
- Identity different causes of Environmental Pollution, Climate Change and need for Sustainable Development.
- Acquire comprehensive knowledge about Population Ecology, population Growth and Public Health.
- Learn about Environmental Movements and Laws.
- Acquire the knowledge about State pollution Control Board and Central pollution Control Board.

Unit-I: Introduction to Environment

Learning Outcomes

LO: *Understand basic concepts of Environment , Ecology, Eco-System and Biodiversity.*

- The Environment: Atmosphere, Hydrosphere, Lithosphere, Biosphere.
- Ecology, Ecosystem, major eco-system, Biogeochemical Cycle (Carbon Cycle, Nitrogen Cycle).
- Biodiversity-Values and Services, Global Environmental Issues.

Unit-II: Climate Change and Sustainable Development

Learning Outcomes

LO: *Identify factors of pollution and climate change.*

LO: *Learn basics of wild life conservation and Sustainable Development Goals.*

- Environment Pollution: Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Thermal Pollution, Radiation Pollution.
- Climate Change, causes and consequences, Natural Resources: Conservation of Natural Resources,Soil Erosion and Conservation.
- Management and Conservation of Wildlife, Sustainable Development and its Goals.

Unit-III: Population and Public Health

Learning Outcomes

LO: *Understand the correlation between population growth and issues of public health.*

LO: *Learn how to manage pandemic in modern times.*

- Population dividend and population liability.
- Population Ecology: Individuals, Species, role of different sector in managing health disaster.
- Population Growth and Control, Community, Urbanization and its effects on Society.
- Communicable Diseases, Non-Communicable Diseases, Transmission and its effects.

Unit-IV: Environmental Movements and Environmental Laws

Learning Outcomes

LO: *Trace environmental movements of India.*

LO: *Understand functions and role of Pollution Control Boards and know the basic laws of India relating to environment.*

- Environmental Movements in India: Grass root Environmental movements in India, Role of women, Environmental Movements in Odisha.
- State Pollution Control Board, Central Pollution Control Board.
- Environmental Laws: Water Act, 1974, Air Act, 1981, The Wildlife (Protection) Act,1972, Environment Protection Act 1986.

Sample Questions

1. What is meant by environment? (1 Mark)

2. Write any two causes of noise pollution. (2 Marks, Within 50 words))
3. Discuss the causes and consequences of climate change (5 Marks, Within 300 words))
4. Critically reflect on the importance and purpose of SDGs with reference to the contemporary society.(8 Marks, 500 to 800 words).

Transaction Mode:

Workshop, ICT-Lab Learning, Lecture method, Seminar, Team teaching, Tutoring, Peer group discussion, Mobile teaching, Self-learning, Collaborative learning, Co-operative learning.

Practical/ Activities

Each student is required to submit Practical/Project report/Assignments selecting any one of the following:

1. Investigation of Major sources of micro- plastic pollutants in urban habitats.
2. Detection and characterisation of major water pollutants in river water.
3. Impact of growing urbanisation on wildlife habitat.

* It will be evaluated by both internal and external examiners.

Text Books

- ✓ *Anubha Kaushik and CP Kaushik, "Perspectives in Environmental Studies", 5th edition,*
- ✓ *2016.*
- ✓ *Benny Joseph, "Environmental studies", 2nd edition, McGraw Hill Education, 2015.*
- ✓ *Basics of Environmental Studies by Dr. N. S. Varandani, Books India Publications.*
- ✓ *Disaster Management by MukeshDhunna, Vayu Education of India, Delhi Publication.*

Reference Books

- ✓ *Dr. M. Chandrasekhar, "A Text book of Environmental Studies", HI-TECH publications,2006.*
- ✓ *Dr. M. Anji Reddy, "A Text book of environmental science and Technology", B S Publications, 2008.*
- ✓ *Dr. K. Mukkanti, "A Text book of Environmental Studies", S.CHAND and Company Ltd, 2009.*
- ✓ *EHILRS and ST, "Text book of Municipal and Rural Sanitation", M.S Hill, 1998.*
- ✓ *C. S. Rao, Wiley Eastern Ltd, "Environmental Pollution Control Engineering", New Age International Ltd, 2001.*
- ✓ *Dr. M. Anji Reddy, "Introduction to Remote Sensing", BS Publications, 2004.*
- ✓ *EHILRS and ST, "Text book of Municipal and Rural Sanitation", M.S Hill, 1998.*
- ✓ *Dr. M. Anji Reddy, "Introduction to Remote Sensing", BS Publications, 2004.*

- ✓ *Environmental Studies by R. Rajagopalan, Oxford University Press Publication.*
- ✓ *Environmental Science by Richard T Wright & Bernard J Nebel, Prentice Hall India Publication.*
- ✓ *Environmental Science by Daniel B Botkin & Edward A Keller, Wiley Publications.*

Historical Bases of Indian Education

Course Outcomes (COs)

On completion of the course, the students will be able to:

- Understand the features of education during Vedic period.
- Know the relevance of Gurukal system.
- Enlist the features of education during medival period.
- Conceptualise the charter's Act (1813), Maculay's minute (1835) and other reports.
- Analyse the recommendations of committees and commissions in post-independence period.

Unit – I: Education during Ancient period

Learning Outcomes

- ✓ *Know the features , aims of education during Vedic period*
- ✓ *Understand the relevance of Gurukul System*

- Education in Vedic Period - Aims of Education, Curriculum, Method of Teaching, System of Admission, Role of Teacher. Types of Educational Institutions, Merits and limitations
- Education during Buddhist period, Concept of Buddhist Philosophy, features of Buddhist system of Education; Admission system, Aims of Buddhist Education, curricular method of Teaching, Role of the Teacher Discipline. Merits of Buddhist Education, Criticism of Buddhist Education.

Unit – II: Education during medieval Period

Learning Outcomes

- ✓ *Point out the features of education during medieval period*

- Education in medieval India - Aims of Education, Curriculum, method of Teaching, System of Admission, Role of Teacher, Medium of instruction,
- Types of Educational institutions, merits and demerits of Medieval Education.

Unit – III: Education during Colonial Period

Learning Outcomes

- ✓ *Conceptualise education during pre- independence period*

- Education in British India – Charter Act of 1813, Macaulay's Minute 1835, Woods Despatch of 1854, Hunter Commission Report – 1882, Sadler Commission – 1917, Hartog Commission Report – 1929 and Sargeant Plan – 1944.Wardha Scheme of Education -1937NEP-2020

Unit – IV: Education during Post-Independence Period

Learning Outcomes

- ✓ *Analyse the recommendations of committees and commissions during post-independence period*
- ✓ *Examine the impact of policies and programmes one education in the present context*

- Education in post-Independence India (1948-49), The University Education Commission, Secondary Education Commission (1952-53), Report of Kothari Commission (1964-66), National Policy on Education (1968), National Policy on Education 1986 and Its Revised policy 1992. NEP-2020

Sample Questions:

1. What is meant by Histroy? [1 Mark]
2. Write the aims of education during medival period. [2 Marks] [With in 50 Words]
3. Discuss the impact of woods despatch (1954) on Indian education. [3 Marks][Within 300 words]
4. Describe the contributions of Wardha scheme of Education -1937 towards Indian society. [8 marks] [within 500 to 800 words]

PRACTICAL

Study on implementation of NPE (1986) in respect for elementary level.

It will be evaluated by both Internal and External examiners.

Text Books

- ✓ *Aggrawal, J.C. (2010). Landmarks in the history of modern Indian education. New Delhi: Vikash Publishing Pvt. Ltd.*
- ✓ *Dash, B.N. (1911). Development of education in India. New Delhi: Ajanta Prakashan*
- ✓ *Das,K.K.(1993). Development of education in India. New Delhi: Kalyani Publishers*

Reference Books

- ✓ *Naik, J.P. & Narullah, S. (1996). A students's history of education in India. New Delhi: Mc Millan Indian Ltd*

- ✓ *Rawat, P.L. (1989) . History of Indian education New Delhi: Ram Prasad &Sons.*
- ✓ *Govt. of India.(1992,1998). National Policy on education, 1986(As modified in 1992). Retrieved from http://mhrd.gov.in/sites/uplaod_files/mhrd/files/NPE86mod92.pdf*
- ✓ *Keay, F.E. & Mitra, Sukumar (1978). A history of education in India. New Delhi: Oxford University Press.*
- ✓ *Ministry of Education (1966). Education and national development. New Delhi: Ministry of Education, Government of India*
- ✓ *Ministry of Human Resource Development (2004). Learning without Burden: Report of the National Advisory Cmmittee. New Delhi: Min of HRD.*
- ✓ *Mookharjee, R.K. (1989). The Gupta Empire. Delhi:Motilal Banarsi Dass Publishers Pvt. Ltd. Mukherji,S.M.,(1966). History of education in India. Vadodara:Acharya Book dept.*
- ✓ *Naik,J.P. and Syed,N.,(1974). A student's history of education in India. New Delhi: MacMilan*
- ✓ *Rawat,P.L.(1989). History of Indian education. New Delhi: Ram Prasad &Sons, Website, www.mhrd.gov.in*

Educational Thinkers of Modern India

Course Outcomes (COs)

On completion of this course, the learners will be able to:

- Gain insight into the fundamental ideologies of Indian philosophers.
- Develop understanding about the educational significance of philosophical ideas of Indian thinkers.
- Compare and contrast educational philosophies of modern Indian thinkers.
- Critically examine the contributions of great philosophers to the field of education.

- Relate Indian philosophy to present system of education.
- Appreciate and adopt philosophies of education in life.

UNIT-I: Contributions of Swami Dayanand Saraswati and Swami Vivekananda

Learning Outcomes

- ✓ *Develop an understanding of the contributions of Swami Dayanand Saraswati to the field of education.*
- ✓ *Analyze the educational* implication of Swami Vivekananda and Ramakrishna Mission to present education.

Part A

- Brief life sketch and philosophical orientation of Swami Dayanand Saraswati
- Contribution of Swami Dayanand Saraswati with reference to aims of education, methods of teaching, role of teacher.

Part B

- Brief life philosophy of Swam Vivekananda.
- Contribution of Swam Vivekananda with reference to aims of education, methods of teaching and role of teacher.

UNIT-II: Contributions of Mahatma Gandhi and Gopabandhu Das

Learning Outcomes

- ✓ *Critically analyze the teaching-learning practices of Satyabadi Bana Vidyalaya and its relevance to modern education.*
- ✓ *Understand the concept of Basic education of Mahatma Gandhi.*
- ✓ *Apply the principles of truth and non-violence in life.*

Part A

- Life philosophy of Mahatma Gandhi-Truth, Non-violence and Nai Talim.
- Contribution of Mahatma Gandhi with reference to Basic education, aims of education, methods of teaching, role of teacher.

Part B

- Life philosophy of Gopabandhu Das with reference to Satyabadi Bana Vidyalaya.
- Contribution of Gopabandhu Das with reference to aims of education, methods of teaching and role of teacher.

UNIT-III: Rabindra Nath Tagore and Sri Aurobindo

Learning Outcomes

- ✓ *Reflect on the educational precepts of Rabindra Nath Tagore.*
- ✓ *Understand the concept of integral education and relate it to life.*

Part A

- Brief life sketch and philosophies of education of Rabindra Nath Tagore.

- Contribution of Rabindra Nath Tagore with reference to aims of education, methods of teaching, role of teacher, Shantiniketan.

Part B

- Brief life sketch and philosophies of education of Sri Aurobindo.
- Contribution of Sri Aurobindo with reference to aims of education, methods of teaching, role of teacher.

UNIT-IV: Mahatma Jyotibarao Phule and Gijubhai Badheka

Learning Outcomes

- ✓ *Gain insight into the salient features of Mahatma Jyotibarao Phule's effort towards educational reformation.*
- ✓ *Understand the basic concept of children's education as perceived by Gijubhai Badheka*.

Part A

- Life philosophy of Mahatma Jyotibarao Phule.
- **Relevance of Jyotiba Raophule's educational philosophy** with reference to aims of education, methods of teaching, role of teacher and teacher-taught relationship.

Part B

- Life philosophy of Gijubhai Badheka.
- **Relevance of** Gijubhai Badheka**'s educational philosophy** with reference to aims of education, methods of teaching, role of teacher and Nutan Bal Shikshan Sangha.

Mode of Course Transaction: Team Teaching, Dialogue, Peer-Teaching, Peer Group Discussion, Collaborative and Cooperative Learning, Field Trip, Self-Learning.

Sample questions

1. Ramakrishna Mission was founded by----------. [1 mark]
2. Identify two aims of Arya Samaj. [2 Marks] [Within 50 Words]
3. Explain the fundamental principles of Basic education of Mahatma Gandhi. [3 Marks] [Within 300 words]
4. Critically analyse the educational implications of Gijubhai Badheka**'s philosophy.** [8 marks] [within 500 to 800 words]

Practicum/Activities

Each student will be required to prepare and submit a report on any one of the following**:**

- Write a report on the origin and growth of Satyabadi Bana Vidyalaya.
- Visit to a school run by RamKrishna Mission / DAV School/ Integral School/ Saraswati Sishu Mandir etc. prepare a report on their educational activities.
- Prepare an album of Indian philosophers and write their thoughts on education.

It will be evaluated by both internal and external examiners

Text Books

- ✓ *Agarwal, J.C. (2010). Theory and Practice of Education (13th Edition). Noida: Vikas Publishing House Pvt Ltd.*
- ✓ *Joshi, Sunitha. (2000). Great Indian Educational Thinkers. Delhi: Scholarly Books*
- ✓ *Taneja, V.R. (2000). Educational Thought and Practice. New Delhi: Sterling Publishers*

Pvt. Limited.
- ✓ *Theory and Practice of Integral Education- Dr. R.N. Pani-Ashish Publication*

Reference Books

- ✓ *Chakraborty, J. C. (2010). Modern Education: Its Aims and Principles. Kolkata: K. Chakraborty Publications.*
- ✓ *Gupta N.L. (2002). Mahatma Jyotiba Phule: An Educational Philosopher. New Delhi: Anmol Publications.*
- ✓ *Ravi, S. (2015). A Comprehensive Study of Education. Delhi: PHI Learning Pvt. Ltd.*
- ✓ *Joshi, S. (2000). Great Indian Educational Thinkers. Delhi: Scholarly Books.*
- ✓ *Parimala V. R. (2002) 'Educating Women—How and How Much: Women in the Concept of Tilak's Swaraj' In Sabyasachi Bhattacharya (ed), Education and the Disprivileged: Nineteenth and Twentieth Century India. Hyderabad: Orient Longman.*
- ✓ *Safaya, R.N. &Shaida, B.D. (2010). Modern Theory and Principles of Education. New Delhi: Dhanpatrai Publishing Company Pvt. Ltd.*
- ✓ *Wingo, G. M. (1975). Philosophies of education. New Delhi: Sterling Publisher Pvt. Limited.*

Web Resources

- http://www.iloveindia.com/spirituality/gurus/dayanand-saraswati.html
- https://icpr.in/journals/#:~:text=Journal%20of%20Indian%20Council%20of,year%201983%20with%20Professor%20D.P.
- http://www.springer.com/philosophy/journal/10781

Computer Fundamentals

Course Objectives:

- Introduce number systems and data representation
- Understand functional units and components of computer
- Introduce the emerging technologies

Learning Outcomes:

Upon completion of this course, students will be able to:

- Understand the basic organization of a computer and the number system
- Learn about the working of commonly used input-output and memory devices
- Understand the role of Operating system and Computer Networks
- Know about some of the emerging computing technologies and web services

UNIT-1:

Computer Basics: Simple Model of a Computer, Characteristics of Computers, Hardware and Software, working of a Computer, Stored Program Concept, Problem Solving with computer: Flowchart, Algorithms, Programming,
Computer Software: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware

UNIT-2:

Input/output Units: Input devices, Output devices, Computer Memory: Introduction, Read Only Memory, Serial Access Memory, Cache memory, primary memory, secondary storage devices, magnetic tapes, hard disks, SSD, optical drives, USB flash drivers, Memory cards, Mass storage devices, Memory Hierarchy.

UNIT-3:

Operating Systems: Definition, Batch Operating System, Multiprogramming Operating System, Time Sharing Operating System, Multiprocessing Operating System. Services of OS.
Computer Networks: Concepts of Networking-LAN, WAN, MAN, Network topologies. Internet and the World Wide Web.

UNIT-4:

Emerging Computing Environments: Peer to Peer Computing, Grid computing, distributed computing, Cloud Computing: Introduction, cloud services, cloud deployment models.
Email, video conferencing, e-Learning, e-Banking, UPI, e-commerce, e-Governance, social networking, emerging computer applications.

Text Book:

- ✓ *Fundamentals of Computers by V Rajaraman 6th edition PHI Learning Private Limited*

Reference Books:

- ✓ *A First Course in Computers by Sanjay Saxena, Vikas Publishing House.*
- ✓ *Computer Fundamentals by Anita Goel, Pearson pub*

Introduction to Web Technologies

Course Objectives:

- To learn the fundamentals of web designing.

- To design and develop standard and interactive web pages.

Learning Outcomes:
Upon completion of this course, students will be able to:

- Understand Internet, Internet Protocols, and World Wide Web
- Understand HTML and its tags
- Learn the design and development of web pages
- Learn the styles/layouts of web pages using CSS & client-side scripting using JavaScript

UNIT-1:

- Introduction to Internet, Internet Protocols, World Wide Web (WWW): Introduction, History, HTTP, Web Browser, Web Server with example, Web page, working principles of WWW. Web Development: Introduction, Front-end and Backend Development Technologies. Concepts of Client-Server communication.

- Introduction to HTML: Introduction, Characteristics, Advantages and Disadvantages of HTML, HTML Editors, Understanding elements in HTML, Container and empty elements, Basic Tags and Attributes: <!DOCTYPE>, <HTML>, <HEAD>, <TITLE>, <BODY>, <P>, Attributes of the basic tags. Creating a Simple HTML Web Page, running a web page in the browser.

UNIT-2:

- Working with HTML Tags: Headings, Break, Horizontal Line. Formatting Text with HTML Elements: Italic, Bold, Small, Subscript, Superscript and changing background color. Adding Comments in HTML. Working with Hyperlink, List, Table, Image, Video, and Frames in HTML.
- Creating Forms in HTML: Form Tag and its attributes. Creating Text box, Password box, Text area, Drop-down list, Checkbox, Radio button, Email, Color picker, Date-Time picker, Submit and Reset buttons.

UNIT-3:

- Cascading Style Sheets (CSS): Introduction, Benefits of using CSS, Understanding the Syntax, CSS Selectors, Using CSS: External, Internal Inline CSS. Comments in CSS,
- Basic CSS Properties: Color, Background, Text, Font, List, Display. CSS Box Model: Introduction, working with Margin, Border, and Padding. Working with CSS Navigation Bar and Drop-Downs.

UNIT-4:

- JavaScript: Introduction, Features, Benefits, Creating Simple JavaScript. Using JavaScript in HTML: Use in the Head, Body and as external script file. Exploring Popup Boxes: alert, confirm, prompt box. Display Possibilities: innerHTML, document.write(), window.alert(), console.log().
- Programming using JavaScript: Introduction to Data types, Variables, Operators, Expressions (Arithmetic, String, Logical), Comments. Control Statements: Selection Statements: if, if…else, nested if…else, else…if ladder, switch. Loops: while, do…while, for. Jump Statements: break, continue. Functions in JavaScript: built-in and user defined, Invoking a function, scope of a function, global vs local variables.

Text Book:

- ✓ *Web Technologies (Black Book), DreamTech Press*

Reference Books:

- ✓ Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP 4th Edition by Ivan Bayross.
- ✓ HTML, XHTML and CSS Bible, 5ed, Willey India-Steven M. Schafer.

Internet and Ethical Practices

Course Objectives:

- To learn about different Internet services
- To understand the security and ethical issues in the use of Internet

Learning Outcomes:

Upon completion of this course, students will be able to:

- Understand Internet and World Wide Web
- Understand about the security issues and use of cryptographic methods
- Know about the security challenges in e-commerce
- Know about the growing security concerns in the cyberspace and legal perspectives to ensure ethical use of Internet

UNIT-1:

Data Communication over Internet, connecting to the Internet, broadband, leased connection, WWW, Web browsers, URL, HTTP, Blogs, Search engines, e-mail services, teleconferencing, social networks, online services,

UNIT-2:

Network Security and Cryptography: Cryptography, Cryptography terminologies, CIA, Security goals, Attacks, Security services, Types of cryptography-symmetric and asymmetric key cryptography (basics only), Cryptanalysis, Steganography.

UNIT-3:

Security issues in E-Commerce: Types of E-Commerce models (B2B, B2C, C2B, C2C), EFT (Electronic Fund Transfer), Modes of EFT, Online Payment and The IT Act 2000, IPR in Cyberspace.

UNIT-4:

Security Challenges in Cyberspace: Hacking, Child Pornography, Cyber Stalking, Denial of service, Malware, Phishing, Classification of cyber-crimes, Common cyber-crimes, cyber-crime targeting computers and mobiles, cyber-crime against women and children, financial frauds, social engineering attacks, Legal perspective of cyber-crime, Organizations dealing with Cyber-crime and Cyber security in India.

Text Books:

- ✓ *Computer Fundamentals and Applications, Ashok Arora, Vikas Pubs.*
- ✓ *Cryptography and Network Security, Behrouz A. Forouzan, Debdeep Mukhopadhyay*

Reference Books:

- ✓ *Henry Chan, Raymod Lee and et al., "E-Commerce Fundamental and Applications", Wiley*
- ✓ *C. P. Pfleeger, S. L. Pfleeger, Security in Computing, Prentice Hall of India*.

HUMAN RIGHTS

Course Objectives:

The course on Human Rights aims to provide a comprehensive understanding of the concept, evolution, and theoretical foundations of human rights, emphasizing their significance in contemporary society. It explores the historical development of human rights and examines various theories, including Natural, Legal, Utilitarian, and Marxist perspectives, to enable students to make broad examination of issues and policies taking into account diverse perspectives. The course delves into the universality of human rights amidst cultural diversity and assesses key international human rights instruments such as the Universal Declaration of Human Rights and subsequent international covenants and protocols. The course seeks to enable students to critically analyse the role of major international institutions like the UN, UNHRC, and UNOHCHR and their functions in promoting and protecting human rights. The course addresses contemporary issues and multidimensional threats to human rights to sensitize students on human rights issues in the local contexts. In the Indian context, it highlights the foundational principles of human rights, the institutional frame works along with the role of NGOs and civil society in human rights movements. Through this course, students will gain critical insights and analytical skills necessary to understand and address human rights challenges globally and within India.

Expected Learning Outcome:

After the completion of this course, the students would be competent in following skills and acquire adequate knowledge on the issues of Human Rights.

Unit I: They would understand the significance of human rights and its evolution over the period of time. Also, they would learn different human right theories and connotation of human rights across cultures.

Unit II: This unit would make them familiarise with international covenants on Human rights; the changing dynamics of state and role of global organisations working for the cause of Human Rights.

Unt III: After learning this unit, they would be aware about the multidimensional nature of human rights violation.

Unit IV: This unit would enlighten the students on Indian perspective of Human rights drawing upon ancient philosophy, Human rights issues in contemporary India, the institutional framework to address the human rights issues.

Unit I: Understanding Human Rights

a) Connotation of 'Rights'; Meaning, Nature and Significance of Human Rights. Evolution and Historical Development of Human Rights.
b) Theories of Human Rights: Natural, Legal, Utilitarian and Marxist;
c) Universality of Human Rights and cultural diversity.

Unit II: International Human Rights

a) International Covenants on Human Rights: Universal Declaration of Human Rights; International Covenants: Civil and Political Rights-1966, Economic, Social and Cultural Rights 1966; Optional Protocols-1976 and 1989, World Conference on Human Rights: Tehran 1968 and Vienna 1993.
b) Institutional Framework: UN, UN Human Rights Council (UNHRC), UN office of the High Commissioner for Human Rights (UNOHCHR).
c) State sovereignty and Human Rights; Human rights activism and role of Global Human Rights Organisations.

Unit III: Contemporary issues and Multidimensional aspect of threats to Human Rights.

a) Atrocities against Women, Children, SCs, STs, Minorities, Differently abled people.

b) Impact of Globalisation on Human Rights; Environment and Human rights issue.
c) Refugee crisis and Migrations, Displacement, Bonded Labour, Custodial abuse, War crimes.

Unit III: Human Rights in India

a) Underlying Human rights Principles of Indian society: Dharma, Nyaya, Neeti, Ahimsa.
b) Institutional Framework: Constitutional provisions, NHRC, SHRC; Judicial Activism.
c) Human Rights Movements in India: Engagement of NGOs and Civil society in Protecting Human Rights.

Essential Readings:

1. Alan, B. (2017). Human rights and the environment: where next? In *Challenges in International Human Rights Law* (pp. 765-794). Routledge.
2. Barkin, J. S. (1998). The evolution of the constitution of sovereignty and the emergence of human rights norms. *Millennium*, *27*(2), 229-252.
3. Beitz, C. R. (2009). *The idea of human rights*. OUP Oxford.
4. Cerna, C. M. (1994). Universality of human rights and cultural diversity: Implementation of human rights in different socio-cultural contexts. *Hum. Rts. Q.*, *16*, 740.
5. Das, A. K., & Mohanty, P. K. (2007). *Human rights in India*. Sarup & Sons.
6. Donnelly, J., & Whelan, D. J. (2020). *International human rights*. Routledge.
7. Freeman, M. (2022). *Human rights*. John Wiley & Sons.
8. Gready, P. (2004). Conceptualising globalisation and human rights: boomerangs and borders. *The International Journal of Human Rights*, *8*(3), 345-354.
9. Gudavarthy, A. (2008). Human rights movements in India: State, civil society and beyond. *Contributions to Indian Sociology*, *42*(1), 29-57.
10. Henkin, L. (1989). The universality of the concept of human rights. *The Annals of the American Academy of Political and Social Science*, *506*(1), 10-16.
11. Henkin, L. (1995). Human rights and state sovereignty. *Ga. J. Int'l & Comp. L.*, *25*, 31.
12. Ishay, M. (2008). *The history of human rights: From ancient times to the globalization era*. Univ of California Press.
13. Kennedy, D. (2002). International human rights movement: Part of the problem?. *Harv. Hum. Rts. J.*, *15*, 101.

14. Kurki, M. (2011). Human Rights and Democracy Promotion: reflections on the contestation in, and the politico-economic dynamics of, rights promotion. *Third World Quarterly*, *32*(9), 1573-1587.
15. Langlois, A. J. (2002). Human rights: the globalisation and fragmentation of moral discourse. *Review of International Studies*, *28*(3), 479-496.
16. Merry, S. E. (2009). *Human rights and gender violence: Translating international law into local justice*. University of Chicago Press.
17. Ray, A. K. (2003). Human rights movement in India: A historical perspective. *Economic and Political Weekly*, 3409-3415.
18. Shelton, D. (2006). Human rights and the environment: what specific environmental rights have been recognized. *Denv. J. Int'l L. &Pol'y*, *35*, 129.
19. Sripati, V. (2000). India's National Human Rights Commission: A Shackled Commission. *BU Int'l LJ*, *18*, 1.

Additional Readings:

1. Cole, W. M. (2005). Sovereignty relinquished? Explaining commitment to the international human rights covenants, 1966-1999. *American sociological review*, *70*(3), 472-495.
2. Nyamu, C. I. (2000). How should human rights and development respond to cultural legitimization of gender hierarchy in developing countries. *Harv. Int'l. LJ*, *41*, 381.
3. Oestreich, J. E. (2017). *Development and Human Rights: rhetoric and reality in India*. Oxford University Press.
4. Schmitz, H. P. (2014). Non-state actors in human rights promotion. *The SAGE Handbook of Human Rights*, *1*, 352-71.

Internet Sources

1. Human Rights Course study materials in MA Political science. https://www.distanceeducationju.in/pdf/404%20HUMAN%20RIGHTS.pdf
2. International Human Rights document, charters etc available at https://csometer.info/international-human-rights-documents
3. Defining Human Rights: Harper Lecture, The University of Chicago. https://youtu.be/2nYdTV9wuGI?si=EbZBuZvHR5gg4Ql5
4. Reflections on the Origins of Human Rights (Talal Asad Lecture), Berkeley Centre https://youtu.be/Vd7P6bUKAWs?si=KIeG2rwRqvgxjCh6

Activities to Do

1. Students should be encouraged and facilitated to visit NHRC or SHRC office to learn the functioning of the commission.
2. Conduct lecture on contemporary issues on Human rights in India.
3. Arrange a movie session for the students on issues of Human Rights. Movies like 13th (2016), The Whistleblower (2010), Mandela: Long Walk to Freedom (2013), Jai Bhim (2021).
4. Conduct community outreach programmes to spread awareness on Human Rights Day.

UNDERSTANDING GANDHI AND AMBEDKAR

Course objectives:

The primary objective of this course is to offer a thorough understanding of the lives and philosophies of Mahatma Gandhi and Dr. B.R. Ambedkar. Students will gain insight into the political and social ideologies of both leaders, allowing for a deeper appreciation of their contributions to Indian society and thought. The course aims to critically analyze Gandhi and Ambedkar's perspectives on crucial issues such as caste and religion, highlighting their differing approaches and solutions. Additionally, it will explore Gandhi's concept of Swadeshi and his critique of modern industrial civilization, providing a comprehensive overview of his vision for a self-sufficient and ethical society. Through this course, students will develop a nuanced understanding of these influential figures and their lasting impact on contemporary social and political discourse.

Expected Learning Outcomes:

Unit I: The purpose of this unit is to make students understand the basic philosophy of Mahatma Gandhi. The philosophical principles of Mahatma Gandhi need to be understood in a proper context. Students will also have a detailed understanding of the lives of Gandhi and Ambedkar, which will aid in comprehending their philosophies.

Unit II: Students will be familiarised with the ideas of Amebedkar starting from caste to democracy.

Unit III: Students will be able to explain the political and social ideas of Gandhi and Ambedkar.

Unit IV: Students will be able to articulate the ideas of Gandhi and Ambedkar and will be able to analyse why Gandhi favoured Swadeshi and his critique of modern industrial civilization

Unit I: Key points of Gandhian philosophy

a) Truth and Non-violence
b) Satyagraha
c) Hind Swaraj
d) Swadeshi
e) Critique of modern civilization

Unit II: Ideas of Ambedkar

a) Ambedkar's view on democracy
b) Socialism vs. Social Justice
c) Views on Caste

Unit III: Gandhi and Ambedkar's view on caste

a) Dalit vs Harijan.
b) Varna Vs Caste

c) Possibility of change in Hindu social order

d) Poona Pact

Unit IV: Gandhi and Ambedkar's views on Politics and religion

a) Gandhi's views on Hindu, Muslim, and Christianity

b) Ambedkar's views on Hindu, Muslim, and Buddhism

c) Planning & Development

d) Land & Labour

e) Women's Question

Essential Readings:

1. Ambedkar, B. R. (1945). *What Congress and Gandhi have done to the Untouchables*. Thacker.
2. Gandhi, M. K. (1938). *Hind Swaraj or Indian Home Rule*. Navajivan Publishing House.
3. Jaffrelot, C. (2005). *Dr. Ambedkar and Untouchability: Fighting the Indian Caste System*. Columbia University Press.
4. Kumar, A. (2015). *Radical Equality: Ambedkar, Gandhi, and the Risk of Democracy*. Stanford University Press.
5. Parekh, B. (2001). *Gandhi: A Very Short Introduction*. Oxford University Press.
6. Parel, A. J. (Ed.). (1997). *Gandhi: 'Hind Swaraj' and other writings*. Cambridge University Press.
7. Rodrigues, V. (2011). Reading Texts and Traditions: The Ambedkar-Gandhi Debate. *Economic and Political Weekly*, 56-66.
8. Rodrigues, V. (Ed.). (2002). *The Essential Writings of B. R. Ambedkar*. Oxford University Press.
9. Roy, A. (2017). *The doctor and the saint: Caste, Race, and Annihilation of caste: The Debate between B. R. Ambedkar and MK Gandhi*. Haymarket Books+ ORM.
10. Thakur, R. (2022). *Gandhi and Ambedkar: Understanding Their Relations.* Aakar Books

Additional Readings:

1. Barua, A. (2019). Revisiting the Gandhi–Ambedkar debates over 'Caste': the multiple resonances of varṇa. *Journal of Human Values*, *25*(1), 25-40.

2. Bayly, C. A. (2011). *Recovering Liberties: Indian Thought in the Age of Liberalism and Empire*. Cambridge University Press.
3. Omvedt, G. (2004). *Ambedkar: Towards an Enlightened India*. Penguin Books.
4. Ranjan, R. (2015). Gandhi and Ambedkar on Human Dignity. *Bombay Sarvodaya Mandal & Gandhi Research Foundation, Adapted from'Gandhi Marg*, *37*(2).
5. Singh, A. (2014). Gandhi and Ambedkar: Irreconcilable Differences?. *International Journal of Hindu Studies*, 18(3), 413-449.

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. Gandhi Heritage Portal. *Collected Works of Gandhi*. www.gandhiheritageportal.org
2. Columbia University lecture on Ambedkar. www.columbia.edu/cu/lweb/indiv/southasia/cuvl/Ambedkar.html
3. Gandhi Serve Foundation. www.gandhiserve.org
4. Ambedkar Foundation. www.ambedkarfoundation.nic.in

Activities to do:

1. **Lectures and Discussions:** In-depth lectures on Gandhi's and Ambedkar's philosophies, followed by group discussions are to be organised.
2. **Documentary Screenings:** Watching documentaries and biopics related to Gandhi and Ambedkar could be conducted. For instance: "MAHATMA – Life of Gandhi 1869-1948" - full version available at https://www.youtube.com/watch?v=uibI7s5URiU ; Gandhi movie: https://www.youtube.com/watch?v=9BEU8A_JZPU ; Special documentary on Dr. B.R Ambedkar: https://www.youtube.com/watch?v=JrEjcNI60tk ; Bhimrao Ambedkar's iconic interview from 1955: https://www.youtube.com/watch?v=Wf3VJCpNMqI .
3. **Critical Essays:** Writing essays analyzing specific aspects of Gandhi's and Ambedkar's thoughts.
4. **Debates:** Organizing debates on topics such as Swadeshi vs. Modern Civilization and Socialism vs. Social Justice.

5. **Presentations:** Students will give presentations on selected topics such as the Poona Pact, Dalit vs. Harijan, and Gandhi's and Ambedkar's views on religion.
6. **Field Visits:** Visiting places of historical importance related to Gandhi and Ambedkar, such as Sabarmati Ashram and Ambedkar Memorial.

GENDER AND POLITICS

Course Objectives:

This course intends to study politics from the perspective of gender by examining the ways in which women shape and are shaped by politics. This begins with theoretical understanding of gender and deconstruction of 'Gender' as an identity. Then, it goes on to reflect on the conscious attempt to redefine the political space which has been historically entrenched within patriarchal structure. The course intends to evaluate women as political actors by reflecting upon the changing contours of women participation in politics and their relationship with the state. It attempts to analyse women's political rights and politics of representation situating them in electoral politics and beyond. The course also incorporates human rights, in its attempt to understand Women's rights through the prism of human rights. It studies the international organisations and international agreements/conventions for their pertinent role in protecting women rights.

The learners will critically assess participation of women in terms of electoral politics, development initiatives as well as socio-political movements. The course provides for women participation in the grassroot institutions, highlighting the pivotal role catalysed by 73rd and 74th Constitutional Amendments in reshaping political leadership and also delves into the issues and challenges emanating from political engagements of women in different spheres. Further, to examine the actual functioning of women leadership, gender norms, participation of women in implementation of the policies and programmes, this course envisages active learning by the learners through conducting empirical studies on various local governance practices at the ground level. This course endeavours to equip learners with the necessary knowledge and analytical tools to understand and explain the nuanced interrelationship of gender and politics and propose ways to overcome challenges faced by women due to gender disparity.

Expected Learning Outcomes:

On completion of the course, learners would attain the following competencies.

Unit-I: This unit would provide the learners a conceptual understanding of gender from political perspective, the redefining of political space. Learners could reflect on women as political actors, their participation in politics as well their changing relationship with the state.

Unit- II: Learners would be able to understand politics of representation from feminist perspective, and could reflect on the emerging issues and challenges. They would also be aware about the international organizations, international agreements/conventions protecting women's rights.

Unit- III: Student could assess the differences made by the women leaders with their participation in electoral politics as legislator and the development initiatives led by them. They would be competent to evaluate the transforming impact of women leadership in the local governance after the enactment of 73rd and 74th constitutional amendment.

Unit- IV: The learners are expected to actively undertake empirical studies on topics given in this unit to gain practical insights on women as political leaders, their participation in formal and informal politics, women centric welfare policies.

Course Content:

Unit-I: Introducing Gender and Politics

a) Concept, Meaning and scope of Gender; Women, Civic activity, and Construction of Identity, Redefining the Political.
b) Women as Political Actors: Politics, and political participation, Women's political participation in 19th and early 20th century, Feminist Perspective on Political Participation.
c) Gender and State; Gendering the Welfare State.

Unit-II: Women's Political Rights and International Conventions

a) Women in electoral politics, Women Political parties and Electoral Representation, Issues of Representation in politics.
b) Concept of Human Rights and women, Universal Declaration of Human Rights, Women's Rights as Human Rights.
c) International Organizations and Women's Rights; International Women's Bill of Rights: Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), Beijing Action Plan.

Unit-III: Women and Governance

a) The Impact of Women on Political Outcomes: Women as political leader; Women's participation in Legislature; Women led movements; Women led development initiatives.
b) Women participation in local self-government; 73rd and 74th Constitutional Amendment.
c) Women in Grassroot Institutions: Issues and challenges.

Unit-IV: Empirical findings on selected topics

a) Women's political behaviour during elections
b) Women's participation in Gram Sabha

c) Evaluation of Women centric welfare policies
d) Women's participation in Self-Help Groups
e) Women's participation in policy-implementation
f) Women's participation in local protest movements

Essential Readings:

- ✓ *Akerkar, S. (1995). Theory and Practice of Women's Movement in India: A Discourse Analysis. Economic and Political Weekly.30(17). WS2–WS23. http://www.jstor.org/stable/4402686*
- ✓ *Hans, A., Patel, A., Mohanty, B., & Tripathy, S. (2021). Women Reinventing Development. Routledge.*
- ✓ *Jayal, N.G. & Mehta, P. B. (2010). Oxford Companion to Politics in India. Oxford University Press.*
- ✓ *Klein, E. (1984). Gender Politics. Harvard University Press, USA.*
- ✓ *Mazumdar, V. (1994). Women's Studies and the Women's Movement in India: An Overview. Women's Studies Quarterly.22(3/4). 42–54. http://www.jstor.org/stable/40004254.*
- ✓ *Menon, N. (2008) 'Gender'. In R. Bhargava and A. Acharya (Eds), Political Theory: An Introduction. Pearson. pp. 224-233.*
- ✓ *Menon, N. (2001). Gender and Politics in India. Oxford University Pres.*
- ✓ *Rath, N. and Majumdar, G. (2016). Women in Indian Politics: Traditions, Transitions and Transformations. Mittal Publication.*
- ✓ *Reingold, B., Haynie, K. L., & Widner, K. (2021). Race, Gender, and Political Representation. Oxford University Press.*
- ✓ *SIRD&PR (2018). Gender & Development: Perspective to Practice. Government of Odisha. https://sirdodisha.nic.in/download/Genderdevelopment.pdf*

Additional Readings:

- ✓ *Agnihotri, I. and Mazumdar, V. (1997). Changing the Terms of Political Discourse: Women's Movement in India, 1970s-1990s. Economic and Political Weekly.30 (29). pp. 1869-1878.*
- ✓ *Beauvoir, S. de. (2015). The second sex. Vintage Classics.*

- ✓ *Gandhi, N. and Shah, N. (1992). The Issues at Stake: Theory and Practice in the Contemporary Women's Movement in India. South Asia Books.*
- ✓ *Pateman, Carole (1983). Feminist Critiques of the Public/Private Dichotomy. In S. Benn and G. Gaus (eds.) Public and Private in Social Life. Croom Helm. 281-303*
- ✓ *Paxton, P. M., & Hughes, M. M. (2017). Women, Politics and Power. CQ Press.*
- ✓ *Phillips, A. (1998). The Politics of Presence. Oxford.*
- ✓ *Wilson, M. S., & Clerkin, C. (2017). Elevating Women's Leadership in India: Issues and Insights. NHRD Network Journal.10(4). 55-65. https://doi.org/10.1177/0974173920170412*

Internet Sources:

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. Gender (Unit -8). IGNOU. https://egyankosh.ac.in/handle/123456789/53967
2. Engles, F. (1902). The Origin of the Family, Private Property and the State. C. H. Kerr & Company. http://readingfromtheleft.com/PDF/EngelsOrigin.pdf
3. Gaur, Rashmi. Contextualizing Gender. SWAYAM. https://onlinecourses.nptel.ac.in/noc22_hs51/preview
4. Harvard University. (2017, March 11). *Jennifer Finney Boylan. Gender, Politics, and Imagination.Radcliffe Institute*. YouTube.https://www.youtube.com/watch?v=R3z4143mA9s
5. ICWA (2023). Pushing the Frontiers of Women-led Development. ICWA. https://www.icwa.in/pdfs/IndiasG20PresidencyWeb.pdf
6. Krishnamurthy, Mathangi. Feminism: Concepts and Theories. SWAYAM. https://onlinecourses.nptel.ac.in/noc22_hs26/preview#:~:text=This%20course%20will%20evaluate%20the,mandate%2C%20and%20its%20contemporary%20import
7. Millet, K. (1968). Sexual Politics. http://www.marxists.org/subject/women/authors/millett-kate/sexual-politics.htm
8. Rahman,Anisur & Tarannum, Shahla. Gender/Women Studies. SWAYAM. https://onlinecourses.SWAYAM2.ac.in/arp19_ap54/preview

Activities to do:

1. Conduct sessions on movie/documentary (e.g., *Becoming, Suffragette, Knock down the house, The Devine Order, Lapata Ladies*) portraying stories of women leaders, women led movements, development initiatives led by women.
2. Watch Documentary: *100 Years of Women's Voting Rights*. Available at https://youtu.be/hnKuDIp09UY?si=FrwJE3a1-podKDrJ

3. Attend Gram Sabha in your locality to observe the participation of women leaders at the grassroot level.
4. Interact with members of Women led Self Help Groups and write a report on their achievement and issues they confront.

Media & Information Literacy

Course Description: The Media & Information Literacy course is designed to empower students with the essential skills and knowledge needed to critically analyze, evaluate, and create media content. This course explores the role of media in society, the process of information dissemination, and the impact of media messages on public perception and behavior. Through a combination of theoretical frameworks and practical applications, students will learn to navigate the complex media landscape, develop a nuanced understanding of media ethics, and become responsible consumers and producers of information.

Course Objectives

- To equip students with the tools to critically analyze various forms of media and their content.
- To develop practical skills in creating ethical and responsible media content.
- To foster an understanding of the processes involved in media production, dissemination, and consumption.
- To enhance students' ability to locate, evaluate, and use information effectively.
- To prepare students to effectively use digital tools and platforms for media consumption and production.

Learning Outcomes: *Upon successful completion of this course, students will be able to*

- Critically evaluate media messages and their impact on different audiences.
- Create informed, ethical, and engaging media content using various formats and technologies.
- Assess the credibility and reliability of information sources across different media platforms.
- Apply ethical principles in the consumption and production of media and information.
- Effectively use digital tools to research, analyze, and produce media content.

Unit I

Introduction to Media & Information Literacy, Concepts and Applications of Media & Information Literacy, What is Information? What is Media? How Media & Information affects communication, Digital Information Literacy, identifies the similarities and differences of media literacy, information literacy, and technology literacy, Understanding the News, Media and Information Ethics.

Unit II

News Literacy, who control your information? Socio-Cultural and Political Dimensions of Media, Political Economy of Media, Confronting Confirmation Bias, Young People in the Virtual World, Challenges and Risks in the Virtual World, How social media is affecting teens, Digital Divide, Addiction, and Bullying, Privacy & Surveillance, Copyright & Intellectual Property.

Unit III

The Information Cycle , Locating, Accessing, Assessing, Organizing, and Communicating Information, Information Ecology & Information Disorder: Concept, Meaning and definition, Fake News Vs Fake Content, Brief History of Fake News, Infodemic: Mis-information, Dis-information & Mal-information, Types of Mis-information or Dis-information, Impact of Information Overloaded.

Unit IV

Judging the Credibility of News in The Digital Age, "Fake or Real? How to Self-Check the News and Get the Facts, Evaluating Sources for Credibility, Fight the Fake & Debunk the Fake News, Debunk Techniques & Tools, Image Verification Tools, Video Verification Tools, Identifying Digital Footprints and Timestamps, How media made changes to its search algorithm that unintentionally made it vulnerable to the spread of fake news, Cheap Fake Vs Deep Fake, Ethical and legal considerations of digital manipulation of media content.

Suggested Books

- ✓ *Media and Information Literacy: An Integrated Approach for the 21st Century by Marcus Leaning*
- ✓ *Paradoxes of Media and Information Literacy: The Crisis of Information by Jutta Haider and Olof Sundin*
- ✓ *Fake News and Alternative Facts: Information Literacy in a Post-Truth Era by Nicole A. Cooke*
- ✓ *Information Literacy and Information Skills Instruction by Nancy Pickering*
- ✓ *Concise Guide to Information Literacy by Scott Lanning*
- ✓ *Information Literacy and Information Skills Instruction: Applying Research to Practice in the 21st Century by Lori L. Franklin, Nancy Pickering Thomas, and Sherry R. Crow*
- ✓ *Literacy in the New Media Age by Gunther Kress*
- ✓ *Master the Media: How Teaching Media Literacy Can Save our Polarised World by Julie Smith*
- ✓ *Media Literacy by James W. Potter*
- ✓ *Media and information literacy handbook by Rachel E. Khan*

Media, Culture & Society

Objective: The course aims to provide students with a comprehensive understanding of the complex interrelationships between media, culture, and society. The course will explore key concepts and debates in media studies, including media representation, media industries, media effects, globalization, media ethics, and the role of media in social change. This course also aims to empower students to become informed and engaged citizens who can navigate and contribute meaningfully to an increasingly mediated world.

Unit I

Culture: definition & process, Culture as a social institution value system, Eastern and western perspective, Intercultural communication: definition & process, Cultural symbols in verbal and non-verbal communication.

Unit II

Mass media as vehicles of intercultural communication, Barriers in inter-cultural communication, Religious, political and economies pressures, Intercultural conflicts and communication, impact of new technology on culture, globalization effects on culture and communication.

Unit III

Culture, communication and folk media character, Popular culture and Mass media, UNESCO'S efforts in the promotion of intercultural communication and other organizations-code of ethics.

Unit IV

Relationship between Media and Society, Role and importance of Media in Democracy, Diversity in media, Pressure group and Dynamic of Interest, Relationship between Media and Society, Media and Societal needs, Concept of Public Sphere, Public Sphere in different Media.

Suggested Readings:

- ✓ "*Media and Society: A Critical Perspective" by Arthur Asa Berger*
- ✓ *"Media Studies: The Basics" by Angharad N. Valdivia and Radhika Gajjala*
- ✓ *"Media, Culture and Society in 21st Century India: Perspectives and Practices" edited by Biswajit Das and Anjali Gera Roy*
- ✓ *"Media, Culture and Society: An Introduction" by Paul Hodkinson*
- ✓ *"Understanding Media Cultures: Social Theory and Mass Communication" by*

Nick Stevenson

- ✓ *"Media and Society: Critical Perspectives" by Graeme Burton and Nick Stevenson*
- ✓ *"Media, Society, World: Social Theory and Digital Media Practice" by Nick Couldry and Joseph Turow*
- ✓ *"Indian Media: Global Approaches" edited by Shakuntala Rao*

Media, Conflicts and Disasters

Course Description: This course will focus on critique of media coverage of armed conflicts and natural disasters in India. It will equip the students to take a critical look at the current state of conflict and disaster reporting in the country – its practices, shortcomings and challenges. Analysis of the nature and extent of impact the media coverage of crises has on governments and general public will be encouraged. A section will introduce students to skills required as journalists to prepare and report on military combats and disasters.

Course Objective:

- Give an understanding of how conflicts and disasters are covered by mainstream media.
- Students will be able to read text, comprising shots, sound bites and words in reports on conflict and disaster and assess the purpose of these components.
- Students will be able to critically look at the economics and structure of news organizations and analyses in what way they facilitate or hinder adequate coverage of issues related to crises.
- Give the ability to comparatively analyze resources offered to journalists by international media and Indian news organizations.
- Introduce practical tips and skills required to cover conflicts and stay safe in conflict and disaster zones.

Learning Outcomes: after completion of this course, student will able to

- Understand mainstream media's approach to covering conflicts and disasters in India.
- Analyze media reports to discern their purpose and messaging in crisis situations.
- Critically examine the economic and structural influences on crisis reporting by news organizations.
- Compare resources available to Indian journalists with those of international media.
- Gain practical skills for safe and effective reporting in conflict and disaster zones.

Unit I

Conflicts: meaning, definition & types, Disasters: meaning, definition, types, Role of media during conflict and disaster, Conflict Reporting, Disaster Reporting: process and stages, reporting cases of conflict has direct and immediate impact on people’s lives.

Unit II

Case studies of news coverage of ongoing and recent conflict situations and disasters, Journalistic ethics of dealing with victims and survivors.

Unit III

Social media playing an active role in the reportage of conflict, how social media betters and complicates coverage, The need for newsrooms to invest in new skills for journalists to cover conflicts and disasters.

Unit IV

Resources available to international and national journalists for reporting on natural and manmade disasters, Review of coverage by a channel or publication of any armed conflict / disaster.

Practicals:

1. A critical review of coverage of an armed conflict by either a news channel or a print/online publication.
2. Each student will read two critical readings on media coverage of natural disasters/armed conflict and make a comprehensive presentation in class.

Suggested Readings:

- ✓ *Covering and Explaining Conflict in Civil Society – Edited by Nalini Rajan, Orient Blackswan, 2014*
- ✓ *Placing The Poor In The Flood Path: Post-Disaster Slum Resettlement In Chennai – By Karen Coelho, The Caravan, 4 January 2106*
- ✓ *Should the media rethink how they cover disasters? – By Yvonne Roberts and Charlie Beckett, The Guardian, 28 March 2015*
- ✓ *"Murdochisation" of the Indian Media – By Paranjoy Guha Thakurta, Frontline, 30 July – 12 August 2011*
- ✓ *India's Middle-Class Hungers for Undemocratic Change – By Salil Tripathi, The Wall Street Journal, 21 April 2011*
- ✓ *Models of Online Activism and their Implications for Democracy and Climate Change – By Sally Hill, Foundation for Democracy and Sustainable Development, April 2010*
- ✓ *Indian media in quake-hit Nepal: Grace, empathy thrown to the winds – By Krittivas Mukherjee, Hindustan Times, 9 May 2015*
- ✓ *#GoHomeIndianMedia: a Reporter Covering Nepal Weighs In – By Vishnu Som, ndtv.com, 5 May 2015*

Principles of Human Resource Management

Course Objectives:

- Understand HRM Fundamentals
- Master Recruitment and Selection
- Excel in Training and Development

Learning Outcomes:

- Students will articulate the fundamental concepts and scope of HRM.
- Students will demonstrate proficiency in job analysis and description.
- Students will effectively utilize recruitment methods and sources.
- Students will implement diverse training methods and techniques.

Unit I: Introduction to HRM:

Definition, Meaning, Objective and Scope of HRM, Historical Evolution ofHRM, Role of HRM in Organizational Success, HRM Trends and Challenges.

Unit II: Recruitment and Selection:

Job Analysis and Description, Recruitment Methods and Sources,Selection meaning, process, Techniques and Interview process and its limitations**.**

Unit III: Training and Development:

Meaning, Objectives, Importance Training Needs Analysis, TrainingMethods and Techniques, Employee Development Programs, Evaluating Training Effectiveness

Unit IV: Performance Management:

Meaning, Objectives, Importance, Methods of Performance AppraisalSystems, Challenges and best practices in Performance appraisal.

Books Recommended:

- ✓ **T.V. Rao**: A pioneering figure in the field of HRM in India, T.V. Rao has authored several books including "Handbook of Indian Psychology" and "The Future of HRD: Strategies andPractices".
- ✓ **P. Subba Rao**: Author of "Essentials of Human Resource Management and Industrial Relations", Subba Rao's work focuses on HRM practices in the Indian context.
- ✓ **V.S.P. Rao**: Known for his book "Human Resource Management: Text and Cases", V.S.P. Rao's work provides a comprehensive overview of HRM practices with a focus on Indian casestudies.
- ✓ **P. C. Tripathi and P. N. Reddy**: Authors of "Principles of Management", this book covers various management principles including HRM concepts applicable in Indian organizations.

- ✓ **Dipak Kumar Bhattacharyya**: Known for his book "Human Resource Management: Text andCases", Bhattacharyya's work provides insights into HRM practices in Indian organizations through case studies and theoretical frameworks.
- ✓ **N. K. Jain**: Author of "Personnel Management and Human Resource Management", Jain's work explores the evolution of HRM practices in India and their impact on organizational effectiveness.

Model Questions

1. What is HRM?
2. Define job analysis.
3. What is recruitment?
4. Explain the purpose of performance appraisal.
5. Define employee turnover.
6. What is a job description?
7. Define employee engagement.
8. What is the purpose of training programs?

Long Questions

1. Define Human Resource Management and explain its significance in modern organizations.
2. Describe the process of recruitment and its importance in building a capable workforce.
3. Explain the concept of job analysis and its role in effective HRM practices.
4. Discuss the significance of employee training and development in organizational success.
5. Outline the steps involved in the performance appraisal process and its impact on employeeperformance.

Green Human Resource Management

Course Objectives:

- Understand the concept and scope of Green Human Resource Management (GHRM) and itssignificance in organizational sustainability.
- Analyses strategies for integrating environmental sustainability into various HR functions,including recruitment, training, performance management, and employee engagement.
- Evaluate the legal framework governing environmental compliance and the role of HR inensuring organizational adherence to environmental regulations.

Learning Outcomes:

- Devise strategies for incorporating sustainability into HR practices, including recruitment, training, performance management, and employee engagement, to drive organizational sustainability.
- Identify relevant environmental laws and regulations impacting organizational operations, demonstrate HR's responsibilities in ensuring compliance, and acquire skills in conducting environmental audits and reporting on organizational environmental performance.
- Evaluate the impact of leadership on driving sustainability initiatives, cultivate a culture of sustainability within organizations, and navigate ethical dilemmas in Green HRM.

Unit 1: Introduction to Green Human Resource Management:
Overview of Human Resource Management (HRM), Understanding Environmental Sustainability, Introduction to Green Human Resource Management (GHRM), Importance and Benefits of GHRM, Environmental challenges and their impact on organizations, Importance of sustainable development.

Unit 2: Integration of Environmental Sustainability into HR Practices

Recruitment and Selection: Green Talent Acquisition Strategies, Training and Development: Environmental Awareness and Skill-building, Performance Management: Setting Green Goals and Metrics, Compensation and Rewards: Incentivizing Green Behavior, Employee Engagement: Fostering Environmental Responsibility.

Unit 3: Environmental Compliance and Regulations in Organisation:
Understanding Environmental Laws and Regulations, Compliance Requirements for Organizations, Role of HR in Ensuring Environmental Compliance, Auditing and Reporting Environmental Performance.

Unit 4: Sustainable Leadership and Organizational Culture
Green Leadership: Role of Leaders in Promoting Sustainability, Building a Sustainable Organizational Culture, Stakeholder Engagement and Relationship Management, Ethical Considerations in GHRM, Future Trends and Challenges in GHRM**.**

Books recommended:

- ✓ ***"Green HRM: A Review, Process Model, and Research Agenda"*** *by Tahir N. Bhatti and Ansar Ali Rajput*
- ✓ ***"Green Human Resource Management: Policies and Practices"*** *by Ganesh Shermon, Sanjeev Verma, and Sandeep Kumar*
- ✓ ***"Sustainable Human Resource Management in India"*** *by Subhasis Ray and S. L. Gupta*
- ✓ ***"Greening People: Human Resource Management and the Environmental Agenda"*** *by Rajagopal*
- ✓ ***"Strategic Green HRM: A Facilitator of Sustainable Innovation"*** *by Dibyendu Bhattacharya*

1 Mark Questions:

1. Define Green Human Resource Management (GHRM) in one sentence.
2. Name one benefit of integrating environmental sustainability into HR practices.
3. What does ISO 14001 refer to in the context of environmental compliance?
4. State one key principle of sustainable leadership.
5. Give an example of an ethical consideration in Green HRM.

2 Marks Questions:

1. Explain the importance of Green HRM in fostering organizational sustainability.
2. Discuss two strategies for integrating environmental sustainability into recruitmentprocesses.
3. Outline two benefits of conducting environmental audits for organizations.
4. Describe two ways in which HR can foster employee engagement in sustainability initiatives.
5. Compare and contrast internal and external stakeholders in the context of stakeholderengagement for sustainability.

4 Marks Questions:

1. Analyze the role of HR in ensuring compliance with environmental regulations withinorganizations.
2. Discuss four key components of a sustainable organizational culture.
3. Evaluate the impact of leadership on driving sustainability initiatives within organizations,citing examples.
4. Explain how HR can align performance management practices with environmentalsustainability goals, providing relevant metrics.
5. Critically assess the challenges organizations may face when integrating sustainability intoHR practices, proposing solutions for each challenge.

8 Marks Questions:

1. Discuss the evolution of Green Human Resource Management (GHRM) and its significance inthe modern business environment.
2. Evaluate the effectiveness of different recruitment strategies for attracting and selectinggreen talent, considering their impact on organizational sustainability.
3. Design a comprehensive training program for employees to enhance their environmentalawareness and skills, outlining objectives, methods, and evaluation criteria.
4. Develop a sustainability-focused performance management system for an organization,including goal-setting, feedback mechanisms, and performance evaluation criteria.
5. Propose a strategic plan for fostering a culture of sustainability within an organization, addressing leadership involvement, employee engagement, and communication strategies.

Corporate Social Responsibility

Course Objectives:

- The course aims to define CSR and explore its significance, theoretical foundations, and role in promoting sustainable business practices.

- By integrating CSR into organizational operations, students will develop strategic skills to implement sustainable practices that create value for both the organization and society.

Learning Outcomes:

- By exploring CSR's ethical, social, and economic implications, students will develop a holistic understanding of its importance in fostering corporate responsibility and long-term business success.
- By implementing CSR initiatives that create shared value for the organization and society, students will develop leadership abilities and contribute to building sustainable, resilient businesses.

Unit 1:

Introduction to Corporate Social Responsibility: Definition and Concept of Corporate Social Responsibility (CSR), Historical Evolution of CSR, Importance and Benefits of CSR for Businesses.

Unit 2:

CSR Strategy and Implementation in Organisation: Developing a CSR Strategy: Setting Goals and Objectives, Stakeholder Engagement and Management in CSR, Integration of CSR into Business Operations, Corporate Governance and Ethics in CSR

Unit 3:

CSR Initiatives and Best Practices: Environmental Sustainability Initiatives (e.g., Sustainable sourcing, Renewable energy adoption), Social Impact Initiatives (e.g., Community development programs, Employee volunteering), Ethical Business Practices (e.g., Fair labour practices, Anti-corruption measures), Corporate Philanthropy and Charitable Giving

Unit 4:

CSR Reporting and Accountability: Transparency and Disclosure in CSR Reporting, Global Reporting Initiatives (GRI) Standards, Assurance and Verification of CSR Reports, Stakeholder Communication an Engagement through CSR Reporting

Books recommended

- ✓ ***"Corporate Social Responsibility: Indian Perspectives"*** *by Sanjay K. Agarwal*
- ✓ *"Corporate Social Responsibility in India: Cases and Developments After theLegal Mandate" by Pushpa Sundar*
- ✓ ***"Corporate Social Responsibility in India: An Evaluation"*** *by C. B. Mamoria and Preeti Mamoria*
- ✓ ***"Corporate Social Responsibility: A Case Study Approach"*** *by Satya Ranjan Acharya and Gauri Shankar Gupta*
- ✓ ***"Corporate Social Responsibility: Strategy, Communication, Governance"*** *by André Habisch, Jan Jonker, and Martina Wegner*

- ✓ ***"Strategic Corporate Social Responsibility: Sustainable Value Creation"*** *by David Chandler and William B. Werther Jr.*

- ✓ ***"Corporate Social Responsibility: Readings and Cases in a Global Context"*** *editedby Andrew Crane and Dirk Matten*

- ✓ ***"Business Ethics and Corporate Governance"*** *by A.C. Fernando*

1 Mark Questions:

1. Define CSR in one sentence.
2. Name one theoretical framework of CSR.
3. What is the significance of CSR for businesses?
4. State one principle of CSR reporting.
5. What does GRI stand for in CSR reporting?

2 Marks Questions:

1. Explain the importance of CSR in promoting sustainable business practices.
2. Discuss two stakeholders involved in CSR initiatives.
3. Compare and contrast ethical considerations and corporate governance principles in CSR.
4. Name two benefits of transparent CSR reporting.
5. Briefly explain two emerging trends in CSR reporting.

4 Marks Questions:

1. Analyze the role of CSR in enhancing corporate reputation and brand image.
2. Evaluate the effectiveness of CSR strategies in addressing societal challenges.
3. Discuss four components of an effective CSR reporting framework.
4. Explain how CSR initiatives can create shared value for both organizations and society, providing examples.
5. Critically assess the challenges organizations may face when implementing CSR strategies, proposing solutions for each challenge.

8 Marks Questions:

1. Discuss the evolution of CSR and its theoretical foundations, emphasizing its significance in modern business practices.

2. Evaluate the role of stakeholders in influencing CSR strategies and outcomes, citing examples from real-world cases.
3. Design a comprehensive CSR strategy for a multinational corporation, including goal-setting, stakeholder engagement, and implementation plans.
4. Analyze the impact of CSR reporting on organizational transparency, accountability, and stakeholder trust, providing examples.
5. Propose recommendations for enhancing the effectiveness of CSR reporting practices, considering emerging trends and best practices in the field.

DISCRETE MATHEMATICS

Course Objectives:

The main objectives of this course are to introduce topics and techniques of counting principles, combinatorics, and graph theory to understand problems in almost all areas of knowledge.

Learning Outcomes: On the completion of this course, students will be able to

- Learn core ideas in logic and relations.
- Know the concept of the Pigeon-hole principle and solve recurrence relations.
- Learn lattices and Boolean algebra.
- Get a good knowledge of the basics of Graph theory.

UNIT-I

Propositional logic, proportional equivalences, predicates and quantifiers, nested quantifiers, rules of inference, methods of proof, relations and their properties, n- ary relations and their applications.

UNIT-II

The basic counting principle, The Pigeon-hole principle, generalized permutations and combinations, recurrence relations, counting using recurrence relations, solving linear homogeneous recurrence relations with constant coefficients, generating functions, solving recurrence relations using generating functions.

UNIT-III

Partially ordered sets, Hasse diagram of partially ordered sets, maps between ordered sets, duality principle, lattices, Boolean algebra .

UNIT-IV

Graphs, basic concepts and graph terminology, representing graphs and graph isomorphism, distance in a graph, cut vertices and cut edges, connectivity, Euler and Hamiltonian path, shortest-path problems, planar graphs and graph coloring.

Books Recommended:

- ✓ *Kenneth H. Rosen, Discrete Mathematics and Applications (Sixth Edition), Tata McGraw Hill Publications, 2007.*
- ✓ *Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics with Graph Theory (2nd Edition), Pearson Education (Singapore) Pte. Ltd., Indian Reprint 2003.*

Books for Reference:

- ✓ *1. B A. Davey and H. A. Priestley, Introduction to Lattices and Order, Cambridge University Press, Cambridge, 1990.*
- ✓ *2. Rudolf Lidl and Gnter Pilz, Applied Abstract Algebra (2nd Edition), Undergraduate Texts in Mathematics, Springer (SIE), Indian reprint, 2004.*
- ✓ *3. Kevin Ferland-Discrete Mathematical Structures, Cengage Learning India Pvt. Ltd.,2009.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

Linear Programing

Course Objective:

The objective of this course is to familiarize industrial problems to students with various methods of solving linear programming problems, transportation problems, assignment problems and their applications. Also, students will know the application of linear programming method in Game theory.

Learning Outcomes: On the completion of this course, students will be able to

- Know how to solve the two dimensional problems graphically and learn algorithms for higher dimensional problems.
- Know fundamental theorem of duality, dual simplex method and revised simplex algorithm.
- Solve the transportation problems in business sectors and job oriented assignment problems. Also, students will be aware of game theory with different problems and formulation of solutions.
- Design the programing for the linear programing problems which are essential in industrial sectors.

UNIT-I

Introduction to linear programming problems(LPP), solution of LPP by graphical method, canonical forms, theory of simplex method, optimality and unboundedness, the simplex algorithm, simplex method in tableau format, two-phase method, Big-M method.

UNIT-II

Duality, formulation of the dual problem, primal-dual relationships, examples, fundamental theorem of duality, dual simplex method, revised simplex method with examples.

UNIT-III

Transportation problem and its mathematical formulation, methods for initial basic feasible solution. Vogel approximation algorithm for solving transportation problem, assignment problems and its mathematical formulation, Hungarian method for solving assignment problem, game theory, formulation of two person zero sum games, solving two person zero sum games, games with mixed strategies, graphical solution procedure and LPP method.

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:

1) Graphical method
2) LPP method

3) Two-phase method
4) Primal-dual problem
5) Dual simplex method
6) Revised simplex method
7) Vogel's approximation method
8) Hungarian method for assignment problem
9) Two-person zero-sum game
10) Graphical method for (*2 x m*) and (*n x 2*) games
11) LPP method for (*m x n*) game.

Books Recommended:

- ✓ *Kanti Swarup, Operations Research, Sultan Chand & Sons, New Delhi. Books.*
- ✓ *Hamdy A.Taha, Operations Research: An Introduction (10th edition), Pearson*, 2017

Books For Reference:

- ✓ *Mokhtar S.Bazaraa, John J.Jarvis and Hanif D.Sherali, Linear Programming and Network Flows (2nd edition), John Wiley and Sons, India, 2004.*
- ✓ *Hillier and G.J. Lieberman, Introduction to Operations Research-Concepts and Cases (9th Edition), Tata Mc Graw Hill, 2010.*
- ✓ *G. Hadley, Linear Programming, Narosa Publishing House, New Delhi, 2002.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

PROGRAMING IN C++

Course Objective:

The objective of the course is to learn the basics about C++ programming language such as variables, data types, arrays, pointers, functions and classes etc. On successful completion this course, students will acquire a good understanding about the concept of object-oriented programming using C++ and be able to write and read basic C++ code.

Learning Outcome: On the completion of this course, students will be able to

- Learn to understand different types of data by C++ language.
- Learn different symbols used in the programming language representing the text variables and constants.
- Learn to develop various operators, loops and nested control statements.
- Learn to generate functions, local and global variables, 1D and 2D array in C++ programe.

UNIT-I

Introduction to structured programming: data types- simple data types, floating data types, character data types, string data types, arithmetic operators and operators precedence.

UNIT-II

Variables and constant declarations, expressions, input using the extraction operator >>and cin, output using the insertion operator << and cout, preprocessor directives, increment (++) and decrement (--) operations.

UNIT-III

Creating a C++ program, input output, relational operators, logical operators and logical expressions, if and if-else statement, switch and break statements, for, while and do-while loops, continue statement, nested control statement.

UNIT-IV Functions, value returning functions, value versus reference parameters, local and global variables, one dimensional array, two dimensional array, pointer data and pointer variables.

Books Recommended

- ✓ *D. S. Malik: C++ Programming Language, Course Technology, Cengage Learning, India Edition, 2009.*
- ✓ *E. Balaguruswami: Object oriented programming with C++, fifth edition, Tata Mc Graw Hill Education Pvt. Ltd., 2008*

Books For Reference

- ✓ *R. Johnsonbaugh and M. Kalin-Applications Programming in ANSI C, Pearson Education.*

- ✓ *S. B. Lippman and J. Lajoie, C++ Primer, 3rd Ed., Addison Wesley, 2000.*
- ✓ *BjarneStroustrup , The C++ Programming Language, 3rd Ed., Addison Welsley, 2010.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

INTRODUCTION TO MACHINE LEARNING

Course Objective:

- Differentiate between supervised, unsupervised machine learning approaches
- Ability to choose appropriate machine learning algorithm for solving a problem
- Design and adapt existing machine learning algorithms to suit applications
- Understand the underlying mathematical relationships across various machine learning algorithms
- Design and implement machine learning algorithms to real world applications

Learning Outcomes: On the completion of this course, students will be able to

- Learn to understand the concept of machine learning and its application.
- Learn software for Machine Learning to plot data oriented vectors, matrices and their properties using the MATLAB tool.
- Learn to develop various types of data oriented regressions with one and multiple variables.
- Learn to develop some advanced data oriented regressions with one and multiple variables.

UNIT-I

Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier

UNIT-II

Software's for Machine Learning and Linear Algebra Overview: Plotting of Data, Vectorization, Matrices and Vectors: Addition, Multiplication, Transpose and Inverse using Available Tool such as MATLAB.

UNIT-III

Linear Regression: Prediction using Linear Regression, Gradient Descent, Linear Regression with one Variable, Linear Regression with Multiple Variables, Polynomial Regression, Feature Scaling/Selection.

UNIT-IV

Logistic Regression: Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one Variable and with Multiple Variables .Regularization and its Utility: The problem of Overfitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Varia

Books Recommended

- ✓ *Ethem Alpaydin, "Introduction to Machine Learning"2nd Edition, The MIT Press, 2009.*
- ✓ *Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.*
- ✓ *Christopher M.Bishop, "Pattern Recognition and Machine Learning" by Springer,2007.*
- ✓ *Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

MATHEMATICAL FINANCE

Course Objective:

The objective of this course is to learn the mathematical tools used for understanding the financial dynamics and stock exchange with a numerical analysis background.

Learning Outcomes: A student well versed in this course learns good statistical methods, computing and simulation methods and is able to pursue courses in computational finance later.

- This course has market value helping a student in employment as well as daily life dealings.
- Knowledge in marketing will lead to understand the floating rate and immunization.
- A student will get to know about the random returns which is vital in business sectors upon money investment.

UNIT-I

Basic principles: Comparison, arbitrage and risk aversion, interest (simple and compound, discrete and continuous), time value of money, inflation, net present value, internal rate of return (calculation by bisection and Newton-Raphson methods),

UNIT-II

- Comparison of NPV and IRR. Bonds, bond prices and yields. Floating-rate bonds, immunization.
- Asset return, short selling, portfolio return, (brief introduction to expectation, variance, covariance and correlation),

UNIT-III

Random returns, portfolio mean return and variance, diversification, portfolio diagram, feasible set, Markowitz model (review of Lagrange multipliers for 1 and 2 constraints).

Books Recommended:

✓ *David G. Luenberger, Investment Science, Oxford University Press, Delhi, 1998.*
✓ *John C. Hull, Options, Futures and Other Derivatives, 6th Ed., Prentice-Hall India, Indian reprint, 2006.*
✓ *Sheldon Ross, An Elementary Introduction to Mathematical Finance, 2nd Ed., Cambridge University Press, USA, 2003.*
✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

MATHEMATICAL MODELLING

Course Objective:

The course is designed to impart knowledge on application of differential equations in different physical problems like, electric circuit problem, conduction of heat in solids, vibrating string, etc. To promote the students opt for more modelling courses using stochastic process, Optimization methods, finite elements, wavelets learning techniques etc.

Learning Outcomes: On the completion of this course, students will be able to

- Know the basic ideas about the mathematical modelling and modelling through the first order ordinary and system of equations.
- Learn more mathematical modellings on system of differential equations.
- Know about more mathematical modellings on linear motions, planetary motions and conduction of heat.
- Expose about the ideas of discrete mathematical modelling including fractals.

UNIT-I

Techniques, classification and characteristics of mathematical modeling. mathematical modeling through first order ODE: Linear and nonlinear growth and decay model, Prey-Predator model, modelling on population dynamics.

UNIT-II

Applications of differential equations: Art forgery problem, explaining Tacoma bridge disaster radioactive decay problem, mixture problems, epidemic model, compartment models, models in arms race and battles.

UNIT-III

Free damped motion, forced motion, resonance phenomena, vibrating string, vibrating membrane, conduction of heat in solids, gravitational potential and conservation laws.

UNIT-IV

Basics of discrete dynamics, fixed points, periodic points, orbits, repelling points, attracting points, hyperbolic dynamics, bifurcation, Logistic maps, modeling problems involving logistic maps, fractals.

Books Recommended:

- ✓ *Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984.*
- ✓ *Brown M, Differential equation,.Narosa (Springer)*
- ✓ *Tyn Myint U, Partial differential equations in Mathematical physics, Elsevier*
- ✓ *Holmes, Discrete dynamical system, Springer*

Books For Reference

- ✓ *J. N. Kapur, Mathematical Modelling, Wiley Eastern Limited, New Age International Ltd. New Delhi.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*

- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*

INTRODUCTION TO PROGRAMING WITH MATLAB

Course Objective:
The objective of this course is to encourage the students for computer programing using MATLAB. This training will help students to see the mathematical problems physically before proceeding for simulation. Knowledge in MATLAB is a tool in research not only in Mathematics but also in science & engineering.

Learning Outcomes: Completing this course, a student will

- Understand the fundaments of procedural and functional programming;
- Understand MATLAB data types and structures;
- Be able to set up simple real- life numerical problems such that they can be solved and visualized using basic codes in MATLAB
- Be ready to use advanced coding in MATLAB in their subsequent studies

UNIT 1

Introduction to MATLAB programming-basics of MATLAB programming, array operations in MATLAB, loops and execution control, working with files: Scripts and functions, plotting and program output ,approximations and errors-defining errors and precision in numerical methods, truncation and round-off errors, error propagation, global and local truncation errors.

UNIT II

Linear equations-Linear algebra in MATLAB, Gauss elimination, LU decomposition and partial pivoting, Iterative methods: Gauss Siedel method

UNIT III

Regression and Interpolation-Introduction, linear least squares regression (including lsq curve fit function), functional and nonlinear regression (including*lsq nonlin* function), interpolation in MATLAB using spline and *pchip*

UNIT IV

Nonlinear equations-single variable, MATLAB function fzero in single variable, fixed-point iteration in single variable, Newton-Raphson in single variable, MATLAB function *fsolve* in single and multiple variables, Newton-Raphson in multiple variables.

Books Recommended:

- ✓ *FausettL.V.(2007) Applied Numerical Analysis Using MATLAB,2nd Ed.,Pearson Education*
- ✓ *Essential MATLAB for Engineers and Scientists,6th Edition, Brian Hahn; DanielT. Valentine, Academic Press,WebISBN-13:978-0-12-805271-6.*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*

Numerical Methods

Course Objective:

Calculation of error and approximation is necessity in all real life, industrial and scientific computing. The objective of this course is to acquaint students with various numerical methods of finding solution of different type of problems, which arises in different branches of science like locating roots of equations, finding solution of nonlinear equations, systems of linear equations, differential equations, Interpolation, differentiation, evaluating integration.

Learning Outcomes: Completing this course, a student will be able to

- Learn different techniques to find the zeros of algebraic and transcendental equations, numerical solutions of system of equations.
- Get the idea to find the numerical solutions of polynomial equations
- Learn to find the numerical differentiation by means of different operators.
- Learn to find numerical integration which will help to find the numerical solution of ODE and PDE

UNIT-I

Algorithms, convergence, Bisection method, false position method, fixed point iteration method, Newton's method, Secant method. Gauss elimination and Gauss Jordan methods, LU decomposition, Gauss-Jacobi, Gauss-Siedel.

UNIT-II

Lagrange and Newton interpolation: linear and higher order, finite difference operators.

UNIT-III

Numerical differentiation: forward difference, backward difference and central difference operators.

UNIT-IV

Integration: trapezoidal rule, Simpson's rule, Euler's method, Runge-Kutta methods of orders two and four.

Books Recommended:

- ✓ M.K. Jain, S.R.K. Iyengar and R.K. Jain, *Numerical Methods for Scientific and Engineering Computation*, 5th Ed.

Books For Reference:

- ✓ *S.S. Sastry, Introductory method for Numerical Analysis, PHI New Delhi, 2012.*
- ✓ *S.D. Conte and Carl De Boor, Elementary Numerical Analysis, Mc Graw Hill,*
- ✓ *e-Learning Source http://ndl.iitkgp.ac.in ; http://ocw.mit.edu ; http://mathforum.org*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*

Statistical Methods for Scientists And Engineers

By Prof. Somesh Kumar (NPTEL)

Course Objectives:

- The overall course objective is to understand basic concepts of probability and statistics and to be able to use them to solve engineering problems.
- Understand basic techniques for data summary and data presentation.
- Understand and be able to use basic probability rules and common probability distributions.
- Be able to estimate population parameters from random samples and perform error analyses.
- Be able to understand and apply the basic concepts of statistical inference, confidence limits and hypothesis testing.
- Be able to develop empirical linear models from data and evaluate their statistical properties.
- Be able to understand and apply the concepts of design of experiments and analysis of variance.
- Understand the theory and practice of statistical quality control and quality control charts.

UNIT-I

Review of Probability and Distributions: Rules for probability, random variables and their distributions, moments, special discrete and continuous distributions, laws of large numbers and central limit theorem, sampling distributions.

UNIT-II

Parametric Methods: Point estimation — unbiasedness, consistency, UMVUE, sufficiency and completeness, method of moments, maximum likelihood estimation and method of scoring. Bayes, minimax and admissible estimators. Interval estimation - confidence intervals for means, variances and proportions. Testing of Hypotheses - tests for parameters of normal populations and for proportions, goodness of fit test and its applications.

UNIT-III

Multivariate Analysis: Multivariate normal, Wishart and Hoteling's T 2 distributions and their applications in testing of hypotheses problems. Classification of observations, principal component analysis, canonical correlations and canonical variables.

UNIT-IV

Nonparametric Methods: Empirical distribution function, asymptotic distributions of order statistics, single sample problems, problems of location, prediction intervals, Kolmogorov Smirnov one sample statistics, sign test, Wilcoxon signed rank statistics, two sample problems, Mann-Whitney-Wilcoxon tests, scale problems, Kolmogorov Smirnov two sample criterions

Text Books

- ✓ *An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md.E.Saleh.*
- ✓ *Modern Mathematical Statistics by E.J. Dudewicz& S.N. Mishra*
- ✓ *Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross*
- ✓ *An Introduction to Multivariate Analysis by T. W. Anderson*
- ✓ *Nonparametric Statistical Inference by J.D. Gibbons & S. Chakraborti*

Suggested Readings

- ✓ *Statistical Inference by G. Casella &R.L.Berger*
- ✓ *Applied Multivariate Statistical Analysis by R.A. Johnson & D.W. Wichern*
- ✓ *Nonparametric Inference by Z. Govindarajulu*

For details please visit:

https://nptel.ac.in/courses/111105077

Survival Analysis and Biostatistics

Course Outcomes

- Understand survival data and censoring and truncation mechanisms
- Estimate survival curves for censored survival data
- Fit survival models using the Cox proportional hazards model
- Evaluate the validity of assumptions underlying the Cox model and modify the Cox model to accommodate time-dependent variables and multiple outcomes
- Understand how to accommodate competing risks and determine the power and sample size requirements for a survival analysis study

Learning Outcomes

This course emphasizes concepts and applications used in public health studies. The product limit estimator, the Cox proportional hazard model, and parametric models will be discussed. Censoring and truncation patterns will also be studied. Model building and checking will be discussed throughout.

UNIT-I

- Survival Analysis: Functions of survival times, survival distributions and their application,Gamma, Weibull, Rayleigh, lognormal, death density function for a distribution having bath-tub shaped hazard function.
- Censoring Schemes: Type I, Type II and progressive or random censoring withbiological examples. Estimation of mean and median survival time and variance of the estimator for Type I and Type II censored data with numerical examples. Non-parametric methods: Actuarial and Kaplan-Meier methods for estimating survival function and variance of the Estimator.

UNIT-II

Competing Risk Theory: Indices for measurement of probability of death under competing risks and their inter-relations. Estimation of probabilities of death using maximum likelihood principle and modified minimum Chi-square methods. Theory of independent and dependent risks. Bivariate normal dependent risk model.

UNIT-III

Stochastic Epidemic Models: Simple epidemic models, general epidemic model definition and concept (without derivation). Duration of an epidemic.

UNIT-IV

Statistical Genetics: Introduction, concepts-Genotype, Phenotype, Dominance, Recessiveness, Linkage and Recombination, Coupling and Repulsion. Mendelian laws of Heredity, Random mating, Gametic Array, relation between genotypic array and gametic array under random mating. Distribution of genotypes under random mating. Clinical Trials: Planning and design of clinical trials, Phase I, II and III trials. Single and double blind experiments.

Text books

- ✓ *Lee, E.T. and Wang, J.W. (2003): Statistical Methods for Survival data Analysis, 3rd Edition, John Wiley and Sons.*
- ✓ *Biswas, S. (2007): Applied Stochastic Processes: A Biostatistical and Population Oriented Approach, Reprinted 2ndCentral Edition, New Central Book Agency.*

Suggested Readings

- ✓ *Kleinbaum, D.G. (1996): Survival Analysis, Springer.*
- ✓ *Chiang, C.L. (1968): Introduction to Stochastic Processes in Biostatistics, John Wiley and Sons.*
- ✓ *Indrayan, A. (2008): Medical Biostatistics, 2nd Edition Chapman and Hall/CRC.*

List of Practicals

1. To estimate survival function
2. To determine death density function and hazard function
3. To identify type of censoring and to estimate survival time for type I censored data
4. To identify type of censoring and to estimate survival time for type II censored data
5. To identify type of censoring and to estimate survival time for progressively type I censored data
6. Estimation of mean survival time and variance of the estimator for type I censored data
7. Estimation of mean survival time and variance of the estimator for type II censored data
8. Estimation of mean survival time and variance of the estimator for progressively type I censored data
9. To estimate the survival function and variance of the estimator using Non-parametric methods with Actuarial methods
10. To estimate the survival function and variance of the estimator using Non-parametric methods with Kaplan-Meier method

11. To estimate Crude probability of death
12. To estimate Net-type I probability of death
13. To estimate Net-type II probability of death
14. To estimate partially crude prob.

Applied Multivariate Statistical Modeling (NPTEL)

Data driven decision making is the state of the art today. It spreads across all sectors of human civilization. Engineers today gather huge data and seek meaningful knowledge out of these for interpreting the process behavior. Scientists do experiments under controlled environment and analyze them to confirm or reject hypotheses. Managers and administrators use the results out of data analysis for day to day decision making. Data collection and storage is an easy task today. Data-driven decision making now is the way of life. The aim of this course is therefore to build confidence in the students in analysing and interpreting multivariate data. The course will help the students by:

1. Providing guidelines to identify and describe real life problems so that relevant data can be collected,
2. Linking data generation process with statistical distributions, especially in the multivariate domain,
3. Linking the relationship among the variables (of a process or system) with multivariate statistical models,
4. Providing step by step procedure for estimating parameters of a model developed,
5. Analyzing errors along with computing overall fit of the models,
6. Interpreting model results in real life problem solving, and
7. Providing procedures for model validation.

For details please visit:

https://archive.nptel.ac.in/content/syllabus_pdf/110105060.pdf

PROBABILITY AND STOCHASTICS FOR FINANCE (NPTEL)

This course provides the minimum mathematical requirements to study mathematical finance or more precisely the pricing of financial derivatives.

UNIT - I

Basic Probability, Interesting problems in probability, Random variables, distribution functions and independence, Chebyshev inequality, Borel-Cantelli lemmas and related issues, Law of Large Numbers and Central Limit Theorems

UNIT - II

Conditional Expectation, Martingales, Brownian Motion

UNIT - III

Deterministic vs random differential equation, Stochastic Integrals, Ito Calculus

UNIT - IV

Stochastic Differential Equations: Definitions and Examples, Properties of the solution of stochastic differential equations

For Details please see:

https://archive.nptel.ac.in/content/syllabus_pdf/111104089.pdf

Machine Learning

Course Outcomes

- Develop and apply pattern classification algorithms to classify multivariate data
- Develop and apply regression algorithms for finding relationships between data variables
- Develop and apply reinforcement learning algorithms for learning to control complex systems.
- Write scientific reports on computational machine learning methods, results and conclusions.

Learning Outcomes

This course covers fundamental concepts and methods of computational data analysis, including pattern classification, prediction, visualization, and recent topics in deep learning. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered. After completion a student can understand pattern classification algorithms to classify multivariate data and implement the genetic algorithms. Can gain gain knowledge about Q-Learning and create new machine learning techniques.

UNIT I

BASICS Learning Problems Perspectives and Issues Concept Learning Version Spaces and Candidate eEliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search

UNIT II

- NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network
- Representation Problems Perceptions Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms Hypothesis Space Search– Genetic Programming – Models of Evolutions and Learning.

UNIT III

- BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem Concept Learning Maximum Likelihood Minimum Description Length Principle Bayes Optimal Classifier Gibbs Algorithm Naïve Bayes Classifier Bayesian Belief Network EM Algorithm Probability Learning Sample Complexity.
- Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV

- **INSTANT BASED LEARNING**: K- Nearest Neighbor Learning Locally weighted Regression Radial Bases Functions — Case Based Learning.
- **ADVANCED LEARNING**: Learning Sets of Rules Sequential Covering Algorithm Learning Rule Set, First Order Rules Sets of First Order Rules Induction on Inverted Deduction Inverting Resolution, Analytical Learning Perfect Domain Theories Explanation Base Learning — FOCL Algorithm -Reinforcement Learning Task Learning Temporal Difference Learning

Text Books

- ✓ *Tom M. Mitchell, "Machine Learning", McGraw-Hill, 2010*
- ✓ *Bishop, Christopher. Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995*

Suggested Readings

- ✓ *Ethem Alpaydin, (2004) "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press*
- ✓ *T. astie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer(2nd ed.), 2009*

List of Practicals

1. Decision Tree learning
2. Neural Network Representation Problems
3. Genetic Algorithms
4. Mistake Bound Model
5. K- Nearest Neighbor Learning
6. Inverted Deduction Inverting Resolution
7. Reinforcement Learning

Important Remarks:

1. While preparing the detailed syllabus, the Board of Studies shall have to recommend the text books along with the specification of Chapter, Section and Subsections in detail to be covered in each paper for clarity on coverage both by the instructor and learner.
2. ***A learner has to attend the NPTEL courses from NPTEL web site (https://nptel.ac.in/). However, he/she can submit course completion certificate from NPTEL or can opt for an examination by the concerned University / Autonomous College as conducted for other (non-NPTEL) papers.***

Library and Society

Course Outcome:

Upon successful completion of the course, students will be able to:

- Understand the origin and development of libraries.
- Appreciate the five laws and their implications in ICT era.
- Understand different types of national/international library organisations.
- Comprehend professionalism and professional ethics.

Unit I

- Libraries: Definition, Origin and History, Historical Development of Libraries in India, Committees and Commissions on Libraries in India,
- Types of Libraries – Academic, Public, Special and National, Library Public Relation and Extension Activities.

LearningOutcome

- Learn the historical development of libraries through different periods of its evolution
- Classify libraries, identify the features, functions and services of different types of libraries

Unit II

Contributions of Dr. S. R. Ranganathan to Library Profession in India; Five Laws of Library Science; Librarianship as a Profession,Professional Skills and Competences; Professional Ethics; Library and Information Science Education in India.

Learning Outcome

- Know contributions of Dr. S. R. Ranganathan and understand Five Basic Laws of Library Science and their implications
- Comprehend the nuances of librarianship- skills, competencies and ethics.

Unit-3

Professional Associations - National – ILA, IASLIC, IATLIS; International – IFLA, ALA, CILIP, ASLIB, SLA; Role of UGC, RRRLF, UNESCO, National Knowledge Commission, and National Mission on Libraries in the Promotion and Development of Libraries.

LearningOutcome

- Knowledge of professional associations at national and international level, their formation, objectives and activities
- Highlight the role of important organizations contributing towards development of libraries and librarianship

Unit-4

- Recent Developments in Libraries: Electronic Library- Concept, Features and Functions, Digital Library- Concept, Features and Functions,
- Green Library- Concept, Features and Functions, Human Library- Concept, Features and Functions.

Role of Libraries in the Society-Concepts of Information Society and Knowledge Society.

LearningOutcome

- Recognise the latest development of libraries
- Analyse the role of libraries in information society and knowledge society.

Text Books

- ✓ *Khanna, J. K. (1984). Fundamentals of Library Organization. New Delhi: Ess EssPublications*
- ✓ *Ranganathan, S. R. (2006). Five Laws of Library Science. (Reprint). New Delhi: Ess EssPublications.*
- ✓ *Kumar, P. S. G. (2003). Foundation of Library and Information Science.New Delhi: BR*
- ✓ *Publishing.*

Reference Books

- ✓ ***https://egyankosh.ac.in/bitstream/123456789/35226/5/Unit-4.pdf***
- ✓ ***https://egyankosh.ac.in/bitstream/123456789/34898/1/Unit-2.pdf***
- ✓ ***https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=9JW4FTxyrU+Wsr8xl8vgiw==***
- ✓ ***https://ebooks.inflibnet.ac.in/eadhyayan/site/genre?id=Library%20and%20Information%20Science***

Management of Libraries

Course Outcome

- Understand basic management principles applied in Libraries
- Know different library housekeeping operations and their flow of work
- Learn management practices with regard to human and financial resources.

Unit-1

Management - Principles, Functions and Schools of thought. Book Selection Tools and Principles, Library Authority and Committee and its role and functions

LearningOutcome

- Understand principles and functions of management
- Apply principles in library operations and administration

Unit-2

- Library House Keeping Operations - Library Acquisition, Technical Processing, Circulation, Serial Control, Maintenance and Stock Verification;
- Preservation and Conservation; Hazards and Control Measures of Library Materials.

LearningOutcome

- Explore different housekeeping operation of the library
- Understand the functions of different functional units of the library

Unit-3

Human Resources Libraries – Library staff- job positions and nature of job, career development of library professionals- UGC regulations; Financial resources in libraries- sources of revenue and expenditure, Library budget- concept and methods of budgeting, Annual Reports and Statistics

LearningOutcome

- Understand the types, structure and functions of library staff
- Know financial resources of libraries and its management.

Unit-4

Automated Library Management- Concept of automation, Library Automation Systems- features, functional modules, and software; Basics of Barcode and RFID technology applications.

LearningOutcome

- Understand management of libraries through automation
- Learn technology applications in automated libraries

Text Books

- ✓ *Narayana, G. J.Fundamentals ofLibrary Management. New Delhi:Prentice Hall.*
- ✓ *Mittal, R.L.(1984). Libraryadministration: Theory & practice. NewDelhi: Metropolitan.*
- ✓ *Krishna Kumar(1991). LibraryOrganization. New Delhi:Bikash Publish House.*

Reference Books

- ✓ **https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=9JW4FTxyrU+Wsr8xl8vgiw==**
- ✓ **https://egyankosh.ac.in/handle/123456789/32992**
- ✓ **https://ebooks.inflibnet.ac.in/eadhyayan/site/genre?id=Library%20and%20Information%20Science**

LibraryResources and Services

Course Outcome

- To Know different types of primary, secondary and tertiary information sources
- To understand, identify and explore the use of different types library services

Unit I

Types of Library resources- Primary, Secondary and Tertiary; Documentary and Non-Documentary, Print and Electronic resources; Primary Information Sources (Print & Electronic) - Journals, Conference Proceedings, Patents, Standards, Theses & Dissertations, Trade Literature.

Learning Outcomes

- Know about different sources of information and their types
- Assess the features and forms information from different sources
- Understand secondary and tertiary sources of information

Unit II

Secondary Information Sources (Print and Electronic) - Dictionaries, Encyclopedias, Bibliographies, Biographies, Indexing & Abstracting periodicals, Statistical sources, Handbooks and Manuals; Tertiary Information Sources (Print and Electronic)- Directories, Year Books,Almanacs

LearningOutcome

- Understand secondary and tertiary sources of information
- Identify major types of secondary and tertiary information

Unit III

Library services – Types- Circulation service, Reading room service, Reference service, reprographic service, bibliographical services, Translation services, Current awareness Service, Selective Dissemination of Information

LearningOutcome

- Understand the generic concept of library services
- Identify major types of services provided in different libraries

Unit IV

Library Extension Services: Community Information Service, services for children and adults, services for people with disabilities, services forprisoners, Mobile libraries, ICT based library services

LearningOutcome

- Know library extension services
- Identify major types of library extension services and ICT based services

Text Books

- ✓ Singh G. (2013). Information Sources, Services and Systems.PHI Learning Pvt.
- ✓ Kumar, P S G. (2004). "InformationSources and Services". Delhi; B.R.Publishing Corporation. Kaul, H K (1999).
- ✓ "Library ResourceSharing and Networks". New Delhi; Virgo Publications

Reference Books

- ✓ ***https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=9JW4FTxyrU+Wsr8xl8vgiw==***
- ✓ ***https://egyankosh.ac.in/handle/123456789/32997***
- ✓ ***https://ebooks.inflibnet.ac.in/eadhyayan/site/genre?id=Library%20and%20Information%20Science***

Biochemistry

Course Objectives:

The objective of this course is to familiarize the student with various biomolecules interacting with metal ions, biomolecular catalysis, and to get knowledge about the metabolism of various biomolecules.

Course Outcomes

- Imparting knowledge on various metal ions involved in biological processes.
- Understanding the principle of catalysis and energetics in complex biochemical reactions.
- Understanding of various enzymes and their functions in biology.
- Gaining knowledge on metabolism of dietary and endogenous bio-macromolecules.

Unit-I: Metal ions in biology

General introduction to important metal ions (Na, K, Mg, Ca, Cu, Fe, Zn, Co and Mo) and their functions, passive and active transport processes, Na+ /K+ pump, calcium pump, ionophores. Storage and transport of iron copper and zinc. Siderophores, ferritin and transferrin in regard to iron-storage and transportation. Chemistry of porphyrin, iron porphyrins (heme proteins): hemoglobin (Hb), myoglobin (Mb) and their behavior as oxygen carrier, O2 affinity, cooperativity and Bohr's effect, heme protein as electron carrier with particular reference to cytochrome-c and cytochrome-450, and cytochrome oxidase. Non-heme iron-sulphur protein as electron carrier (rubredoxins and ferredoxin). Non-heme oxygen uptake protein (hemerythrin and hemocyanin). Chemistry of chlorophyll: Photosynthesis, the light and dark reaction.

Unit-II: Biomolecular Catalysis

Metal-activated enzyme and metalloenzyme. Biological significance and mechanistic aspects of carboxypeptidase, carbonic anhydrase, blue-oxidases, non-blue oxidases, superoxide dismutase, Catalases, peroxidases, structure and biological functions of molybdenum nitrogenase.

Unit-III: Basic Bioorganic chemistry

- Basic considerations, proximity effects in organic chemistry, molecular adaptation- Bio-isosterism, molecular recognition at the supra molecular level. Examples of some typical enzyme mechanism: chymotrypsin, ribonuclease, lysozyme. Cofactors as derived from vitamins, coenzymes, prosthetic groups, apoenzymes. Structure and biological functions of coenzyme A, Thiamine pyrophosphate, pyridoxal phosphate, NAD^+, $NADP^+$, FMN, FAD,

lipoic acid, Vitamin B_{12}.

- Mechanism of reactions catalyzed by cofactors. A Nucleophilic displacement on a phosphorous atom, multiple displacement reaction and coupling of ATP cleavage to endergonic processes, transfer of sulphate, addition and elimination reactions, enolic intermediates in the isomerization reactions, β cleavage and condensation, isomerization, rearrangement, carboxylation, decarboxylation.

Unit-IV: Metabolism of biomolecules

Nutritive roles of carbohydrates, lipids, amino acids and proteins and their sources in various foods. Digestion, absorption, transportation and metabolism of carbohydrates (glycolysis, citric acid cycle, glycogenesis, glycogenolysis, gluconeogenesis, hexose monophosphate pathway, Blood sugar level and equilibrium), lipids (oxidation of fatty acids, fatty acid synthesis), proteins (transamination and deamination of protein, urea cycle, nitrogen balance, biosynthesis of proteins) Importance of cholesterol, phospholipids and lipoproteins in human health. Energy metabolism energy requirement, respiratory quotient, calorific value of food, standard calorific content of food types.

Textbooks

- ✓ *A. Das, A. K. Das, Mahua Das, Bioinorganic Chemistry, Books and Allied Pvt. Ltd., 2017.*
- ✓ *P. S. Kalsi and J. P. Kalsi, Bioorganic, Bioinorganic and Supramolecular Chemistry, New Age Publications 3rd Edition 2017*
- ✓ *Bio-organic Chemistry, Harish Kumar and Parmjit S. Panesar, published by Narosa Publishing House Pvt. Ltd., New Delhi, 2012.*

Reference Books:

- ✓ *John E. McMurry and Tadhg P. Begley, The Organic Chemistry of Biological Pathways, 2nd Editions*
- ✓ *Kurt Faber, Bio-transformations in Organic Chemistry, 7th Edition, Springer*
- ✓ *An Introduction to Medicinal Chemistry- Vth Edition Graham L Patrick (Qxford 2013).*
- ✓ *Burger's Medicinal Chemistry & Drug discovery, Vol 1-3, 15th Ed, 2014.*
- ✓ *Bioorganic Chemistry, A chemical Approach to Enzyme action, Hermann Dugas and C. Penny Springer Verlag*

Environmental Chemistry

Course Objectives:

The objectives of a course in environmental chemistry typically aim to provide students with a deep understanding of the chemical processes occurring in the environment and their impacts on ecosystems, human health, and the planet as a whole with a comprehensive understanding of the components and processes of environmental systems, including the atmosphere, hydrosphere, lithosphere, and biosphere, and their interactions. Investigation of the chemical composition of environmental compartments, including the atmosphere (air pollutants), hydrosphere (water pollutants), and lithosphere (soil pollutants), and the sources, fate, and transport of pollutants in these compartments. To examine the chemical properties and toxicological effects of environmental pollutants on ecosystems and human health, including acute and chronic toxicity, bioaccumulation, biomagnification, and risk assessment.

Course outcomes:

- Gain a comprehensive understanding of the chemical processes occurring in the environment, including the sources, fate, and transport of pollutants
- Develop analytical skills in environmental chemistry, and apply a range of analytical techniques for the detection, and characterization of environmental pollutants.
- Aware of global environmental issues and challenges such as climate change, pollution, biodiversity loss, and resource depletion.
- Apply the principles of environmental chemistry for mitigating environmental pollution, promoting environmental conservation, and contributing to the development of environmentally friendly technologies and policies.

UNIT I

Environment Introduction, Composition of atmosphere, vertical temperature, heat budget of the earth atmospheric system, vertical stability atmosphere, Biogeochemical Cycles of C, N, P, S and O. Biodistribution of elements. Hydrosphere Chemical composition of water bodies-takes, streams, rivers and wet lands etc. Hydrological cycle. Aquatic pollution-inorganic, organic, pesticide agricultural, industrial and sewage, detergents, oil spills and oil pollutants. Water quality parameters- dissolved oxygen, biochemical oxygen demand, solids, metals, content of chloride, sulphate, phosphate, nitrate and mocro-organisms. Water quality standards, Analytical methods for measuring BOD, DO, COD, F, oils, metals (As, Cd, Cr, Hg, Pb, Se etc) residual chloride and chlorine demand. Purification and treatment of water.

UNIT II

Soils composition, micro and macro nutrients, pollution-fertilizers, pesticides, plastics and metals, waste treatment Atmosphere Chemical composition of atmosphere-particles, ions and radicals and their formation. Chemical and photochemical reactions in atmosphere, smog formation, oxides of N, C, S, O and their effect, pollution by chemicals, petroleum, minerals, chlorofluorohydrocarbons. Greenhouse effect, acid rain, air pollution controls and their chemistry. Analytical methods for measuring air pollutants. Continuous monitoring instruments.

UNIT III

Industrial Pollution Cement, Sugar, distillery, drug, paper and pulp, thermal power plants, nuclear power plants, metallurgy. Polymers, drugs etc. Radionuclide analysis. Disposal of wastes and their management.

UNIT IV

Environmental Toxicology, Chemical solutions to environmental problems, biodegradability, principles of decomposition.

Text Books

- ✓ *Environmental Chemistry, A. K. De, Wiley Eastern*
- ✓ *Environmental Chemistry, S.E. Manahan, Lewis Publishers*
- ✓ *Environmental Chemistry with Green Chemistry, A. K. Das, Books & Allied (P) Ltd., Kolkata, 1st Edn, 2010*

References Books

- ✓ *Environmental Chemistry, S.E. Manahan, Lewis Publishers*
- ✓ *Environmental Chemistry with Green Chemistry, A. K. Das, Books & Allied (P) Ltd., Kolkata, 1st Edn, 2010*
- ✓ *Environmental Toxicology, Ed. J. Rose, Gordon and Breach Science Publication*
- ✓ *Erach Bharucha. Textbook of Environmental Studies, Universities Press, 2005*

Biophysical Chemistry

Course Objectives:

To provide students with an Understanding Molecular Interactions, to learn quantitative techniques and methods for studying biomolecular systems, Thermodynamics and Kinetics of Biological Processes, Structural Biology, Membrane Biophysics, to explore the applications of biophysical chemistry in various fields such as drug discovery, protein engineering, biotechnology, and medical diagnostics.

Course outcomes:

- The students will acquire knowledge of structure and biological functions of proteins and enzyme.
- Students will acquire knowledge The structure of nucleic acids and their interaction with proteins.
- Acquire the firm knowledge of the antibody generation and drug discovery approach.
- The will also provide students an opportunity to know about the principles and applications of latest methods used to analyse amino acid and proteins.

Unit I: Fundamentals of Biological Macromolecules

Structure and physical properties of amino acids, classification, structure, function, and folding of proteins, internal rotational angle, conformations of proteins: Ramachandran plot, secondary, tertiary and quaternary structure. Structures of nucleic acids, Properties of nucleosides and nucleotides; composition of nucleic acids, Stabilizing interactions in biomolecules.

Unit II: Molecular Interaction, thermodynamics, and kinetics of biological systems

Intermolecular interactions, Review of biomolecular structure and function. Recombinant DNA technology and protein purification, Molecular recognition, Techniques to probe binding interactions, Allostery and cooperativity, Protein-protein interactions, Modular interactions in cell signaling, Kinases: activation and regulation, thermodynamics and kinetics as they apply to biological systems, study of equilibrium constants, reaction rates, and the energetics of biochemical reactions.

Unit III: Antibodies and Cell signaling

Drug discovery approach, Antibodies and generation of synthetic antibodies, NMR spectroscopy: structure and dynamics, Magnetic resonance imaging, Protein folding and techniques to probe folding, intrinsically disordered proteins, Folding in cells: chaperones, Biophysics of cell membranes and membrane proteins, Cell signaling through GPCRs, Molecular transport; application to single molecule FRET.

Unit IV: Biophysical techniques for the Structural and Conformational Analysis

General principle and qualitative treatment of the techniques to understand the structure and characteristics of enzymes, protein and nucleic acid: X-ray crystallography – protein crystals, myoglobin, nitrogenase, pepsinogen; NMR spectroscopy-NMR spectra of amino acids, UV- vis absorption spectroscopy, Fluorescence spectroscopy and Vibrational spectroscopy. Determination of protein structures by spectroscopic methods (FTIR, NMR), thermodynamics of protein folding by spectroscopic methods, protein conformational study by NMR and fluorescence spectroscopy. Methods for the separation of biomolecules: General principles, including Chromatography; Sedimentation, Moving Boundary Sedimentation, Electrophoresis, Isoelectric focusing.

Text Books:

- ✓ *Lesk, A.M., Introduction to Protein Science: Architecture, Function, and Genomics, 2nd edition, 2010, Oxford University Press.*
- ✓ *Cantor, C.R. and Schimmel, P.R., Biophysical Chemistry, 1980, Freeman.*
- ✓ *Van Holde, K.E., Johnson, W.C. and Ho, P.S., Principles of Physical Biochemistry, 2nded, 2006, Pearson Education.*

Reference Books:

- ✓ *Harding, S.E. and Chowdhry, B. Z. Protein-Ligand Interactions, Oxford University Press.*
- ✓ *Principles of Biochemistry, Lehninger, 8th edition, W H Freeman & Co*
- ✓ *Biochemistry by Stryer, 9th edition, W H Freeman & Co*
- ✓ *Molecular Cell Biology, Harvey Lodish, 9th edition, W H Freeman & Co 5. Fundamentals of Biochemistry Voet and Voet, 6th Edition Wiley*

Watershed Development and Management

Unit I:

LO: *Identify and analyze watershed characteristics and understand the integrated approach for management.*

Watershed Development: Concept and Objectives; Need for watershed development in India; Characteristics of Watershed: Size, Shape, Physiography, Slope, Climate, Drainage, Land use, Vegetation, Hydrology and Socioeconomic aspects; Watershed Hierarchy - Macro, Meso and Micro Regimes; Integrated and multi-disciplinary approach for watershed management.

Unit II:

LO: *Plan and implement effective watershed management techniques including farming, irrigation, and erosion control.*

Watershed Management: Planning of activities, people's participation and administrative Requirements; Techniques of Watershed Management: Farming and Irrigation Techniques; Management of Arid and Semiarid Watersheds; Dams and River Projects; Measures to control Erosion; Concept of Water Harvesting.

Unit-III:

LO: *Apply practical skills in watershed delineation, mapping, soil erosion estimation, water harvesting, and erosion control techniques***.**

1. Delineation of Watershed
2. Mapping of Watershed Characteristics
3. Estimation of soil loss due to erosion - Universal Soil Loss Equation (USLE)
4. Practical demonstration of water harvesting techniques
5. Field exercises on erosion control practices
6. Practical Record/ Report and Viva-Voce

Text Books:

- ✓ *Murty, J. V. S. (2017).* Watershed Management *(2nd ed.). New Age International Publishers.*
- ✓ *Wurbs, R. A., and James, W. P. (2002).* Water Resources Engineering *(3rd ed.). Prentice Hall of India.*

Reference Books:

- ✓ *Murthy, V. V. N., and Jha, M. K. (2019).* Land and Water Management Engineering *(7^{th} ed.). Kalyani Publishers.*
- ✓ *Majumdar, D. K. (2013).* Irrigation Water Management *(2^{nd} ed.). Prentice Hall of India.*
- ✓ *Black, P. E. (1991).* Watershed Hydrology. *London: Prentice Hall.*
- ✓ *Purandare, A. P., and Jaiswal, A. K. (1995).* Watershed Development in India. *Hyderabad: National Institute of Rural Development.*
- ✓ *Singh, R. V. (2000).* Watershed Planning and Management. *Bikaner: Yash Publishing House.*

Planning and Development of Smart Cities

Unit 1

LO *Differentiate the relevance of holistic and comprehensive plans against project-based plans*

Concept of planning, types of planning: master plan, development plan, structure plan, district plan, action area plan. Hierarchy of plans: Regional plan, sub-regional plan, sectoral plans and spatial plans; planning missions: JNNURM, Amrut, Smart city; Smart cities: Meaning, relevance, characteristics and components, History of Smart city in India.

Unit II

LO *Will be able to explore the opportunities and hindrances for a sustainable future in an urban development.*

Classification of smart structures: infrastructure and buildings, transportation, energy, health care, smart environment and technology; smart city design: Challenges and opportunities, Scope of smart cities, Worldwide Policies for Smart City. 100 Smart Cities of India; Policy and smart city mission, Case Studies of Smart Cities: Bhubaneswar and Prayagraj smart city.

Unit III

LO: *Can understand the reasons for lack of implementation of urban plans including smart city missions*

- Find out the criteria fixed in selecting smart cities in India.
- How the Internet of things in smart cities is important?
- Why Big data is required to understand in smart city mission?
- Explore the status of implementation of smart city mission in India.

Suggested readings

- ✓ *Al Nuaimi, E., Al Neyadi, H., Mohamed, N. et al. Applications of big data to smart cities. J Internet Serv Appl* ***6****, 25 (2015). https://doi.org/10.1186/s13174-015-0041-5*
- ✓ *Fateh Belaïd, Anvita Arora. 2024. Smart Cities: Social and Environmental Challenges and Opportunities for Local Authorities. Springer Cham.*
- ✓ *IGNOU. Introduction to smart city. eGyanKosh: Block-1 Introduction to Smart City.*
- ✓ *Krishna Kumar, Gaurav Saini, Duc Manh Nguyen, Narendra Kumar, Rachna Shah. 2022. Smart Cities: Concepts, Practices, and Applications. Routledge.*
- ✓ *Nirupama Bajpai and John Briberman. December 2021. India's Smart City Program: Challenges and Opportunities. ICT India working paper 62. Centre for sustainable Development, Earth Institute, Columbia University.*
- ✓ *NIUA: Part C: Urban Infrastructure. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://niua.in/intranet/sites/default/files/2863.pdf*
- ✓ *Poonam sharma and Swati Rajput (eds.). 2023. Sustainable smart cities in India: challenges and future perspectives. Springer.*
- ✓ *Saraju P. Mohanty et al. 2016. Everything You Wanted to Know About Smart Cities. IEEE consumer electronics magazine.*
- ✓ *United Nations University. Big data in smart cities. https://ourworld.unu.edu/en/what-big-data-means-for-smart-cities.*
- ✓ *Y. Mehmood, F. Ahmad, I. Yaqoob, A. Adnane, M. Imran and S. Guizani, "Internet-of-Things-Based Smart Cities: Recent Advances and Challenges," in* IEEE Communications Magazine, *vol. 55, no. 9, pp. 16-24, Sept. 2017, doi: 10.1109/MCOM.2017.1600514.*
- ✓ Y. Qian, D. Wu, W. Bao and P. Lorenz, "The Internet of Things for Smart Cities: Technologies and Applications," in *IEEE Network*, vol. 33, no. 2, pp. 4-5, March/April 2019, doi: 10.1109/MNET.2019.8675165.

- ✓ Zaheer Allam, Zaynah A. Dhunny. 2019. On big data, artificial intelligence and smart cities, Cities, Volume 89, Pages 80-91. https://doi.org/10.1016/j.cities.2019.01.032
- ✓ Zaigham Mahmood. 2018. Smart cities: Development and governance framework. Springer.

Geography of Gender

Unit-I:

LO. *An understanding of the contested, contextual, and contingent notion of 'seeing', 'knowing', and understanding. And explore the debates and issues surrounding the construction of sexed/gendered identity*

Social construction of the feminine and masculine, Development of and theoretical approaches to the study of Gender in geography; emergence of patriarchy and capitalism and post-modern feminist movement, Gender based demographic structure; Gendered environments, gendered access to and experience of space; spatial variations in the construction of gender.

Unit-II

LO. *An understanding of how sexed/gendered identities are expressed through a wide range of cultural media, such as literature, art, film, and music and the cultural politics of men and women in relationship to debates concerning identity, place, and belonging.*

Patriarchy, Matriarchy, Matriliny and Matrilocality, Gender and social values; Social space and gender, creation of gendered space and reproduction of gendered space, Gender gaps in social and public life: education, wage differentials in economic activities, health care and nutrition, Gender and Neo-liberalization Policies in India, Gender Policy and practice in India; Problems of empowerment of women in India Gender and development

Unit-III: Practical

LO. *An understanding of current work in feminist geography, especially as a critique of normative social science as a masculinist discourse.*

1. Measurements of Gender gaps in infant mortality rates; maternal mortality rate; female infanticide; gender and longevity gap- their spatial variations, GEM and GDI
2. Viva-Voce

Text Books:

- ✓ *Gillian, Rose. (1993). Feminism and Geography: the limits of geographical knowledge. Minnesota: University of Minnesota Press*
- ✓ *McDowell, Linda. (1999). Gender, identity and place: Understanding feminist geographies. Minnesota: University of Minnesota Press*

Reference Books:

- ✓ *Raju, Saraswati. (2011). Gendered Geographies: Space and Place in the South Asia, (ed.). New Delhi: Oxford University Press.*
- ✓ *Raju, Saraswati, and Kuntala Lahiri-Dutt. (2011). Doing gender, doing geography: emerging research in India, (ed.). London: Routledge*
- ✓ *Nongbri, Tiplut. (2003). Development, ethnicity and gender: select essays on tribes in India. Jaipur: Rawat Publications*

Demography

Unit-1:

LO. *Understand of key concepts of demography as a discipline*

Introduction: Demography - Its Definition, Nature and Scope; Relationship with other disciplines; Demographic Balancing Equation; Sources of Demographic Data in India: Salient Features of Census, Civil Registration System, National Sample Survey, National Family Health Survey; Population Distribution and Growth – Measures and Determinants; Concepts of Rate, Ratio and Proportion.

Unit -II:

LO . *Examine population dynamics and resultant socioeconomic issues and problems.*

World Population Growth; Doubling time; Population Growth in India; Population Dynamics: Fertility, Mortality and Migration - Measures, Determinants and Implications; Theories of Population - Malthusian Theory and theory of Demographic Transition, Population policies and programmes in India.

Unit-III: Practical

LO. *Compare and relate population growth and distribution of developed and developing countries*

1. Arithmetic and Geometric Projection - Calculation and Graphical display;
2. Construction of population pyramid,
3. Construction of Lorenz Curve
4. Calculation and presentation of Population Growth Rate, Crude Birth Rate, Age-Specific Fertility Rate, Infant and Neonatal Mortality Rate, Maternal Mortality Ratio Based on Supplied Data.
5. Practical Record and Viva-Voce.

Text Books:

- ✓ *Chandna, R. C. (2015). An Introduction to Population Geography, Kalyani Publishers.*
- ✓ *Hassan, M.I (2020). Population Geography: A Systematic Exposition, Routledge, London and New York.*

Reference Books:

- ✓ *Bhende, A. and Kanitkar T. (2000). Principles of Population Studies, Himalaya Publishing House.*
- ✓ *Pathak, K.B and F. Ram (2016). Techniques of Demographic Analysis, Himalaya Publishing House, Mumbai.*
- ✓ *Srinivasan, K (1998). Basic Demographic Techniques and Applications, Sage Publications, New Delhi.*

Agricultural Geography

Unit I:

LO: To understand role and determinant of agricultural sector with reference to the nature of Indian agriculture.

Definition and Importance- Agriculture for food security, employment, industrialization and others basic human needs; Factors affecting agricultural diversity in India; Salient feature Indian agriculture *vis-à-vis* developing countries of the world. Types of agriculture with reference to India; Green Revolution and Ever Green Revolution; Agro-climatic regions of India.

Unit II

LO: *To explore the commercialization and climate resilience of agriculture, impacts of climate change and rural-urban migration in India, while examining global best practices for sustainability in the agricultural sector.*

Agricultural Commercialization; Climate Resilient Agriculture; Impact of Climate change in India on various sectors like agriculture and other primary activities; Impacts of rural-urban migration in agriculture; Best practices in Agriculture sector across world for sustainability.

Unit III Practical

LO: To familiarize and develop a nuanced understanding of agricultural communities, associated challenges and problem-solving skills.

Delimit different agricultural regions of Odisha using techniques (the normative technique, the empirical technique, the single element technique, and statistical technique) and prepare suitable maps.

Identify an agriculture-based village to explore the crop diversity, level of mechanization, and commercialization among the farming households. Further, investigate the major problems associated with farming and solution suggested by the farmers to prepare a brief report.

Text Books:

- ✓ *Bhalla, G. S. (2007). Indian Agriculture Since Independence, National Book Trust, New Delhi.*
- ✓ *Husain, M. (2004). Systematic Agricultural Geography. Rawat Publication, Jaipur.*

Reference Books:

- ✓ *Singh, J. & SS Dhillon. (2000). Agricultural Geography. Tata McGraw-Hill publishing, New Delhi.*
- ✓ *Khullar, D.R. (2006). India: A Comprehensive Geography. Kalyani Pub., New Delhi.*
- ✓ *Goh Cheng Leong and Gillian C. Morgan. (1999). Human and Economic Geography. Oxford University Press.*
- ✓ *Dreze, J. & Sen A. (ed.) (1996). India's Economic Development and Social Opportunity. Oxford University Press, New Delhi.*
- ✓ *Kundu A. and Raza, M. (1982). Indian Economy: The Regional Dimension. Spectrum Publishers, New Delhi.*

Climate Science

Unit-1:

LO: *Acquaint with the overview of the fundamental concepts of Earth's climate and weather system.*

Definition of weather and climate; meteorology and climatology; elements, types of classification systems empirical, applied and genetic systems ,Koeppen classification system,: three basic climate groups: low latitude, mid-latitude, high latitude ; Aridity index, drought, Holdridge life zones system: global bioclimatic scheme for the classification of land areas. ; Weather and climate change, Geological time scale, ice ages, record of past 1000 years, human influences, ; Internal forcing mechanisms and external forcing mechanisms, Solar variation

Unit-2:

LO: *Understand the basic thermodynamic concepts for the atmosphere related to atmospheric stability and LOud formation, and to be able to explain weather phenomena*

Measurement of various climate indices, aridity index; Seismic activity, Remote sensing data for temperature and precipitation; Formation, structure, types and impacts of Cyclone, Thunderstorms, winter storms, summer storms, Tornadoes and Hurricanes; Formation, structure, types and impacts of Floods, droughts, precipitation, Elnino and arctic circulation, Heat waves, Wild fires, Health effects, Heinrich events and Daansgard-Oeschger (D-O) events

Unit-IV: Practical

LO: *Equipped with relevant skills in the field of ocean and atmospheric sciences, along with a critical thinking of the established theories, latest developments, and ability to use modern state-of-the-art techniques for observations and analyses*

Measurement of weather elements using analogue instruments: Mean daily temperature, air pressure, relative humidity, rainfall; Construction and interpretation of hythergraph and

climograph (G. Taylor); Construction and interpretation of wind rose; Construction and interpretation of rating curves

Text Books:

- ✓ *Critchfield, H. J. (2010). General Climatology. Prentice Hall India Ltd.*
- ✓ *Lal, D.S. (2013) Climatology and Oceanography. Sharda Pustak Bhawan, Allahabad*.

Reference Books:

- ✓ *J. Oliver and J. Hidore (2001): Climatology-An Atmospheric Science (second edition).*
- ✓ *M. Maslin (2004): Global Warming- A very short introduction, Oxford publication.*
- ✓ *Climate Change: What it means for us, our children and our grandchildren by Joseph F.C. DiMento and Pamela Doughman, MIT press*
- ✓ *IPCC Third Assessment Report (2001)*
- ✓ *Climate and Global Environmental Change by L.D. Danny Harvey, Prentice Hall publication*
- ✓ *Climate Change- An Indian Perspective by S.K.Das , Foundation books*
- ✓ *Global Warming- A very short introduction by Mark Maslin, Oxford publication*
- ✓ *http://www.physicalgeography.net/fundamentals/contents.html*
- ✓ *Climatology-An Atmospheric Science (second edition) by John Oliver & John Hidore– Indian edition*
- ✓ *Climate and Global Environmental Change by L.D. Danny Harvey, Prentice Hall publication*
- ✓ *Global Warming: the complete briefing by John Theodore Houghton*
- ✓ *Climate change: Biological and Human aspects by Jonathan Cowi*
- ✓ *Anonymous: http://unfccc.int/resource/docs/publications/infokit_2002_en.pdf*

Medical Geography

Unit-I:

LO. *Explore the basic concepts, principles, and methods that are widely used in medical geography studies*

Nature, Scope and Recent Trends in Medical Geography, Contemporary Concepts in Medical Geography, Human Ecology of disease, Medical Geography and Epidemiology, Climate and Health, W.H.O. Classification of Diseases, Geographical distribution of major diseases in India (communicable and non-communicable), Epidemics and Pandemics with special reference to COVID-19.

Unit-II

LO. *Investigate health problems with spatial analysis skills.*

Impact of Geographical factors in Health Delivery Systems, Structure of health care services in India, Health inequality, Health Policy in Pre-independence & Post Independence India, Health financing in India, Human health behaviour, Spatial disparity of health.

Unit-III: Practical

LO. *Apply geographic information system techniques for medical studies using real-world data; provide the background necessary for upper-level courses of medical geography.*

1. Food security, nutrition and hunger index, Anthropometric health outcome and its pattern in India: malnutrition, Demographic health outcomes in India: mortality and life expectancy, HDI, PQLI
2. Viva-Voce

Text Books:

- ✓ *Emch, M., Root, E. D., & Carrel, M. (2017). Health and medical geography (4th ed.). New York, NY: The Guilford Press*
- ✓ *Gatrell, A. C. and Elliott, S. J. (2014). Geographies of Health: An Introduction (3rd ed.). John Wiley & Sons*
- ✓ *Pacione, M. (1986) : Medical Geography : Progress and Prospects ; Edited, Croam, Helm London.*

Reference Books:

- ✓ *Elliott, P., Wakefield, J., Best, N., and D. Briggs, Spatial Epidemiology: Methods and Applications, Oxford University Press, 2000*
- ✓ *Kalipeni, E., Craddock, S., Oppong, J.R., Ghosh, J., ed), HIV and AIDS in Africa: Beyond Epideminology, Blackwell Publishing Ltd, Oxford, 2004*
- ✓ *Naidoo, J., Wills, J., Introduction To Health Studies, Pal grave New York, 2001*
- ✓ *Phillips, D.R., Varhasset, Y. eds), Health and Development, Routledge, London, 1994*
- ✓ *Shannon, G.W. and Dever, G.E.A.(1973) : Health Care Delivery, Special Perspectives, N*

TRIBAL GEOGRAPHY

Unit I

***LO**: To understand role and determinant of agricultural sector with reference to the nature of Indian agriculture.*

General and Specific characteristics of tribe vis a vis non tribe social structure; Definition: Tribe, Scheduled Tribe, De-notified tribe, Primitive Tribe, Indigenous People, Criminal tribes in India, Particularly Vulnerable Tribal Group; Geographical distribution of tribes in India: demographic and linguistic; Concept of common property resources.

Unit II:

***LO**: To understand the diverse tribal livelihoods, cultural practices, and the impacts of industrialization and mining on the economy, ecology, and society of selected tribes in Odisha.*

Tribal livelihoods (hunting & gathering, shifting cultivation, sedentary agriculture, pastoralism, fishing, forestry, agro-forestry, and the recent changes); Occupation, religion, festival, dress, society and tradition of selected tribes (Bonda Poraja, Bhunjia, Dharua, Kharia, Lodha) of Odisha; Economic, Ecological and Social implication of Industrialization and Mining activities in tribal areas.

Unit III Practical

LO: *To understand the tribes and their knowledge system in relation to their cultural and natural setting and develop appropriate skills for its documentation and communication.*

- Explore the indigenous knowledge systems of a selected tribe, particularly in areas like medicine, agriculture, and environmental management. Compare these with modern practices.

- Conduct ethnographic research to document the festivals, traditional dress, and rituals of a selected tribe. Create a multimedia presentation or documentary to showcase your findings.
- Compare and contrast the social structures of a specific tribe with a neighboring non-tribal community. Focus on aspects like family hierarchy, social roles, and community governance.

Text Books:

- ✓ *Mohanty,P.K "Encyclopedia of Scheduled Tribes in India"5 Vols.(2006),Eastern Book Corporation, Delhi.*
- ✓ *Ahmad, A. 1999. Social Geography. Rawat Publication, Jaipur.*

Reference Books:

- ✓ *Beteille, Andre, 1977: "The Definition of Tribe" in Thapar Romesh (ed.), Tribe, Caste and Religion in India, The Macmillan Co. of India Ltd., Delhi.*
- ✓ *Patnaik, N. 2005. Primitive tribes of Orissa and their development strategies. University of Michigan.*
- ✓ *Ray, B.C. & Raya, B.C. 1989. Tribals of Orissa: The Changing Socio-economic Profile. University of Michigan.*
- ✓ *Pati, B. 2019. Tribals and Dalits in Orissa: Towards a social History of Exclusion. Oxford University Press, New Delhi.*
- ✓ *Ghatak, N. K. (2003), "The Scheduled Tribes of India in the New Millennium: Constitutional Aspect of Identification of Scheduled Tribe in India", TheJournal of the Anthropological Survey of India, vol. 52, no. 1, March, p.89*
- ✓ *Xaxa, V, 1999: "Transformation of Tribes in India: Terms of Discourse", Economic and Political Weekly, No. XXXIV, Volume. 24*

Sustainable Tourism

Unit-I:

LO. *Define sustainable tourism, its essence, emergence and issues. They also understand the roles of key actors in promoting sustainable tourism.*

Defining Sustainable Tourism, Emergence and Significance of Sustainable tourism, Key actors (WTO, WTTC, UN, PATA) and major Issues of Sustainable Tourism, Managing Sustainable Tourism in 21st Century.

Unit II LO. *Differentiate types, factors and trends of tourism at local and global context.*

- Types of Tourism (Nature tourism , ecotourism, cultural tourism, adventure tourism, medical tourism, pilgrimage, Space tourism, international, national), Factors Affecting the Growth of Tourism , Recent Trends of Tourism: International and Regional, Domestics (India)

- Impact of Tourism on Economy, Environment and Society; Tourism in India: Tourism Infrastructure and hospitality Industry, National Tourism Policy, Ecotourism with Reference to Odisha

Unit-III: Practical

LO. *Analyse the impacts of tourism on geographical, environmental and socio-cultural aspects along with national tourism policies of India. create a project report on local/regional/national tourism and its challenges and future prospects and develop presentation skills.*

1. Preparation-cum-presentation of a Project report on present status, key challenges and future prospects of eco-torism in Odisha.
2. Viva-Voce.

Text Books:

1. Boniface, B. and Cooper, C (2005). *The Geography of Travel and Tourism*. Butterworth.
2. Fennell, David A. (2020). *Sustainable Tourism: Principles, Contexts and Practices*, Channel View Publications.

Reference Books:

- ✓ *Alan, A. Lew, (2017). New Research Paradigms in Tourism Geography. Routledge.*
- ✓ *Dhar, P.N. (2006). International Tourism: Emerging Challenges and Future Prospects. New Delhi, India: Kanishka*
- ✓ *Edgell, D. L. Sr. (2020) Managing Sustainable Tourism: A Legacy for the Future, NY, Routledge.*
- ✓ *Hall, M., and Stephen, P. (2006). Geography of Tourism and Recreation – 85 Environment, Place and Space. London, UK: Routledge.*
- ✓ *Harris, R., Griffin, T. and Williams (2002, Ed.) Sustainable Tourism: A global perspective. Great Britain, Elsevier, Butterworth Heinemann.*

- ✓ *Kamra, K. K., and Chand, M. (2007). Basics of Tourism: Theory, Operation and Practise. Pune, India: Kanishka Publishers.*

- ✓ *Milton, D. (1993). Geography of World Tourism. NY, USA: Prentice. Hall.*

- ✓ *Nelson, V. (2017): An Introduction to the Geography of Tourism. NY, USA: Rowman & Littlefield.*

- ✓ *Nigel, D. (2007). Morpeth Religious Tourism and Pilgrimage Festivals Management: An International perspective by CABI. USA: Cambridge.*
- ✓ *Page, S. J. (2011). Tourism Management: An Introduction. USA: Butterworth Heinemann.*
- ✓ *Ritchie, J R Brent and Crouch, Geoffrey I (2003). The competitive destination: a sustainable tourism perspective. CABI Pub*
- ✓ *Robinson, H. A. (1996). Geography of Tourism. London, UK: Macdonald and Evans.*
- ✓ *Weaver, D. (2006) Sustainable Tourism: Theory and Practice. Great Britain, Elsevier*