Model Curriculum for Three/Four Year Degree Course

(With Multiple Entry/Exit Option)

Base on NEP-2020

Odisha State Higher Education Council,

Bhubaneswar

Government of Odisha

MAA MANIKESHWARI UNIVERSITY, BHAWANIPATNA

Upgraded KU Estd 01/09/2020
Renamed MMU 01/01/2024

Courses of Studies for : Multidisciplinary Courses (MDC)

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Semester-I (MDC)	Semester-II (MDC)
1. Bio physics 2. Biochemistry 3. Discrete Mathematics 4. Computer Fundamentals 5. Biofertilizers and Biopesticides 6. Vector Borne Diseases and Epidemiology 7. Science, Technology and Society 8. Indian Economy and Society 9. Human Rights Education 10. Demography 11. History of science, Technology and Medicine in India 12. Human Rights 13. Population and Society 14. Library and Society 15. Social Psychology 16. Writing to Mass Media 17. ତୁଳନାତ୍ମକ ସାହିତ୍ୟ 18. Business Economics 19. Marketing for Beginners	1. Spectroscopy 2. Environmental Chemistry 3. Linear Programming Problem 4. Introduction to Web Technology 5. Herbarium Preparation 6. Vermitechnology 7. Anthropology for Social Workers 8. Educational Thinkers of Modern India 9. Climatology 10. History of Environment and Ecology in modern India 11. Indian Administration 12. Media Culture and Society 13. Management of Libraries 14. Educational Psychology 15. Gender and Human Rights 16. ବିଜ୍ଞାନ ବିଷୟ ଓ ସାହିତ୍ୟ 17. Entrepreneurship Development and Start-up 18. Financial Literacy

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

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*

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*

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*

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.*

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).*

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.

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

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

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.*

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

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

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.

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***

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*

Writing for Mass Media

Course Objectives

- The aims of this course are to enable students to understand the social institution known as the Mass Media and how they can develop writing skills for the mass media in order for it to achieve its role in society.
- Though this course students will be introduced to the basic concepts of writing for the Mass Media
- Students will be able to highlight the various principles of effective media writing and demonstrate how these can be applied for the various media. They would also expose themselves to writing as a way of earning a living.

Unit-1

What is media writing? History of media writing in India, brief history of journalism in English in India, history of English in India, English for media, communication with the society, market and government agencies.

Unit-2

Writing for the Print Media: News Stories, Features, Editorials

(The teacher is required to cite examples and use material from mass media)

Unit-3

Writing for the Electronic Media, advertisement caption writing and taglines (print and electronic), email, blogs, social networking, Internet Journalism, podcasting

Unit-4

Use of technology in media: AI, IT, and ICT etc.

Prescribed Texts

- ✓ Rangaswamy Parthasarathy, *Journalism in India: From the Earliest Times to the Present Day*, Sterling.
- ✓ *Media and Communication: A Handbook of Students* by Tulsi and Madan
- ✓ Parhi, Asima Ranjan, *Indian English through Newspapers*, Concept, New Delhi, 2008.
- ✓ *Modern Mass Communication: Concepts and Processes* by Deepak Nayar
- ✓ *Mass Communications and Media Studies* by Peyton Paxson
- ✓ Raja Rao, Preface to *Kanthapura* and 'The Caste of English' (Awakened Consciousness: Studies in Commonwealth Lit. ed. C.D. Narasimhaiah).

Suggested Readings

- ✓ *Stepehen McLaren, Easy Writer*
- ✓ *G L Labru, Indian Newspaper English, B R Publishing House.*
- ✓ *Vinod Dubey, Newspaper English in India, Bahri Publications.*
- ✓ *Dutta and Parhi, 'Prospect of Electronic Media as Curriculum in Non-Native Contexts', I-Manager's Journal on English Language Teaching,2014. https://files.eric.ed.gov. pdf*
- ✓ *Aijaz Ahmed: 'Disciplinary English: Third-Worldism and Literature'.*
- ✓ *Narasimhaiah; C.D. (ed.): Awakened Consciousness: Studies in Commonwealth Literature, New Delhi: Sterling.*
- ✓ *Parhi, A. R.'Towards the Anti-Canon: A Brief Focus on Newspaper English in India', SHSS (Studies in Humanities and Social Sciences, UGC Care), Ed. T.R. Sharma, IIAS (Indian Institute of Advanced Study), Shimla, Vol. XIII, No.1, Summer 2006, pp.143-155. http://14.139.58.200, iias.ac.in. journals*
- ✓ *Omkar N. Koul: English in India: Theoretical and Applied Issues. New Delhi: Creative Publishers.*

ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ା
Multidisciplinary Course
ପ୍ରଥମ ପତ୍ର
ତୁଳନାତ୍ମକ ସାହିତ୍ୟ

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

ବିବିଧ ଭାଷାର ସାହିତ୍ୟ ମଧ୍ୟରେ ତୁଳନାତ୍ମକ ଅଧ୍ୟୟନ ସାମ୍ପ୍ରତିକ ସମୟର ଏକ ପ୍ରାସଙ୍ଗିକ ବିଷୟ । ଏହାଦ୍ୱାରା ବିଶ୍ୱ ପରିପ୍ରେକ୍ଷୀରେ ସାହିତ୍ୟିକ ସମ୍ପର୍କ ବୃଦ୍ଧିପାଏ ଓ ବିଶ୍ୱ କଲ୍ୟାଣ ସାଧିତହୁଏ । ସ୍ନାତକଶ୍ରେଣୀର ବିଦ୍ୟାର୍ଥୀମାନେ ତୁଳନାତ୍ମକ ସାହିତ୍ୟ ଅଧ୍ୟୟନ ମାଧ୍ୟମରେ ବିବିଧଭାଷା ଓ ସାହିତ୍ୟର ଜ୍ଞାନ ଆହରଣ କରିପାରିବେ । ତେଣୁ ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ାରେ ତୁଳନାତ୍ମକ ସାହିତ୍ୟ ଅତ୍ୟନ୍ତ ଉପାଦେୟ ହେବ ।

Unit wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ତାତ୍ତ୍ୱିକଦିଗ ଉପରେ ଛାତ୍ରଛାତ୍ରୀ ଏଠାରେ ଅବଗତ ହୋଇପାରିବେ । ବିଶେଷତଃ ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ବିବିଧରୂପ ଜାଣିପାରିବେ ।

୨ୟ ଏକକ : ସଂସ୍କୃତ ହେଉଛି ଭାରତର ସର୍ବପ୍ରାଚୀନ କାବ୍ୟଭାଷା । ସଂସ୍କୃତ ସାହିତ୍ୟର ବିଖ୍ୟାତ କବି ଓ ନାଟ୍ୟକାର କାଳିଦାସଙ୍କ ସୁପ୍ରସିଦ୍ଧ 'ଅଭିଜ୍ଞାନ ଶାକୁନ୍ତଳମ୍' ନାଟକ ଓ ଆଧୁନିକ ଓଡ଼ିଆ କାବ୍ୟକାର ଗଙ୍ଗାଧରଙ୍କ 'ପ୍ରଣୟବଲ୍ଲରୀ'ର ତୁଳନାତ୍ମକ ଅଧ୍ୟୟନ କରିବାପାଇଁ ଏହି ଏକକରେ ସୁଯୋଗ ରହିଛି ।

୩ୟ ଏକକ : ହିନ୍ଦୀ ଭାରତର ରାଷ୍ଟ୍ର ଭାଷା । ଏହି ଭାଷାର ବିଖ୍ୟାତ ଲେଖକ ପ୍ରେମଚାନ୍ଦଙ୍କ ଗୋଦାନ ଉପନ୍ୟାସ ଓ ବିଶିଷ୍ଟ ଓଡ଼ିଆ କଥାକାର ଫକୀରମୋହନଙ୍କ 'ଛମାଣ ଆଠଗୁଣ୍ଠ'ର ତୁଳନାତ୍ମକ ସମୀକ୍ଷା ବେଶ୍ ଗୁରୁତ୍ୱ ରଖେ । ଏହି ଏକକରୁ ବିଦ୍ୟାର୍ଥୀମାନେ ତୁଳନାତ୍ମକ ଜ୍ଞାନ ଅର୍ଜନ କରିବେ ।

୪ର୍ଥ ଏକକ: ନୋବେଲ ପୁରସ୍କାର ପ୍ରାପ୍ତ The Waste Land ଗ୍ରନ୍ଥଟି ବିଶ୍ୱବ୍ୟାପୀ ପ୍ରଭାବବିସ୍ତାର କରିଛି । ତାହା ସହିତ ଯଶସ୍ୱୀ ଆଧୁନିକ କବି ଗୁରୁପ୍ରସାଦଙ୍କ କାଳପୁରୁଷର କିପରି ସାମଞ୍ଜସ୍ୟ ବା ତାରତମ୍ୟ ରହିଛି , ଛାତ୍ରଛାତ୍ରୀ ତାହା ଏଠାରେ ଅନୁଶୀଳନ କରିବେ ।

ପାଠ୍ୟ ବିଷୟ

୧ମ ଏକକ : ତୁଳନାତ୍ମକ ସାହିତ୍ୟ: ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ

୨ୟ ଏକକ : ସଂସ୍କୃତ ଓ ଓଡ଼ିଆ : ଅଭିଜ୍ଞାନ ଶାକୁନ୍ତଳମ୍ ଓ ପ୍ରଣୟବଲ୍ଲରୀ

୩ୟ ଏକକ : ହିନ୍ଦୀ ଓ ଓଡ଼ିଆ

ଗୋଦାନ - ପ୍ରେମଚାନ୍ଦ ଓ ଛମାଣ ଆଠଗୁଣ୍ଠ-ଫକୀରମୋହନ ସେନାପତି

୪ର୍ଥ ଏକକ : ଇଂରାଜୀ ଓ ଓଡ଼ିଆ: The Waste Land– T.S.Eliot ଓ କାଳପୁରୁଷ- ଗୁରୁପ୍ରସାଦ ମହାନ୍ତି

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧.ସାହିତ୍ୟ ତତ୍ତ୍ୱ : ପ୍ରାଚ୍ୟ ପାଶ୍ଚାତ୍ୟ – ଜ୍ୟୋସ୍ନାମୟୀ ପ୍ରଧାନ, ଫେଣ୍ଡସ୍ ପବ୍ଲିଶର୍ସ, କଟକ

୨.ପାଶ୍ଚାତ୍ୟ ସାହିତ୍ୟ ଓ ସମୀକ୍ଷା ତତ୍ତ୍ୱ - ସଂ. କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ପ୍ରାଚୀ ସାହିତ୍ୟ ପ୍ରତିଷ୍ଠାନ, କଟକ

୩.ସାମ୍ପ୍ରତିକ ପାଶ୍ଚାତ୍ୟ ସମାଲୋଚନା ତତ୍ତ୍ୱ – ଚିତ୍ତ ରଞ୍ଜନ ମିଶ୍ର, ଗ୍ରନ୍ଥ ମନ୍ଦିର, କଟକ

୪.ପାଶ୍ଚାତ୍ୟ ସମାଲୋଚନା ତତ୍ତ୍ୱ – ଜିତେନ୍ଦ୍ର ନାରାୟଣ ପଟ୍ଟନାୟକ

୫.ତୁଲ୍ୟ କଷଟି – ସନ୍ତୋଷ ତ୍ରିପାଠୀ, ଏଥେନା, କଟକ

୬.ଗବେଷଣା ଅନୁବାଦ ଓ ସମ୍ପାଦନାକଳା – ନାରାୟଣ ସାହୁ, ସତ୍ୟ ନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧.କାହାକୁ ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ପିତା ବୋଲି କୁହାଯାଏ ? (୧ ମାର୍କ)

୨.ବିଶ୍ୱର କେଉଁ ଦୁଇଜଣ ପ୍ରସିଦ୍ଧ କବି ତଥା ନାଟ୍ୟକାରଙ୍କ ଉପରେ ମାୟାଧର ମାନସିଂହ ତୁଳନାତ୍ମକ ଗବେଷଣା କାର୍ଯ୍ୟ କରିଛନ୍ତି? (୨ ମାର୍କ)

୩. ଗୋଦାନ ଓ ଛମାଣ ଆଠଗୁଣ୍ଠର ପାଞ୍ଚୋଟି ସାମଞ୍ଜସ୍ୟ ଲେଖ । (୫ ମାର୍କ)

୪.ଦୁଷ୍ମନ୍ତ ଚରିତ୍ରକୁ ଚିତ୍ରଣ କରିବାରେ କାଳିଦାସ ଓ ଗଙ୍ଗାଧରଙ୍କ ଦୃଷ୍ଟିକୋଣର ତୁଳନା କର । (୮ ମାର୍କ)

Multidisciplinary Courses (MDC)
For 2nd Semester

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

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*

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*

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.*

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.

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.*

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*

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

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.

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.

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*

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*

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**

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*

Gender and Human Rights

Course Objectives

- The course aims to create basic awareness about equality of opportunity and access to public services, to sensitize and create better understanding about equality of opportunity in the access to justice, to create awareness regarding civic and social rights and responsibilities, to create awareness regarding consumer rights, to enhance understanding and sensitivity towards issues related to violence and to create awareness and sensitize towards identity (Linguistic, Cultural, Ethnic and Religious)
- This course is intended to make students aware of the ways in which gender is learned, the implications of gender in our lives, and prospects for change so far as men and women are able to combine and/or reject elements of traditional gender roles.
- The course will look at gender within the context of different social institutions and look at ways in which gender roles are maintained by these institutions, and/or effectively learned through socialization.

Unit-1

Meaning and Concept of Human Rights

Classification of Rights: Natural, Moral and Legal Rights

Universal Declaration of Human Rights: An Overview

Unit-2

Human Rights in Indian Context

Role of National Human Rights Commission

Human Rights of the Marginal and Vulnerable Groups

Unit-3

Meaning and Concept of Gender Studies

Theoretical Approaches: Liberal, Marxist, and Radical

Gender and Law, Legal Rights of Women

Unit-4

Gender and Society: Religion, Caste and Ethnicity

Gender and the Nation: Representation in the decision-making process

Gender and Economy: Land Rights and Workplace

Prescribed Texts

- ✓ *A World of Equals: A Textbook on Gender Edited by: Susie Tharu; A. Suneetha; Uma Maheswari Bhrugubanda*

- ✓ *Introduction to Women, Gender, Sexuality Studies by Miliann Kang, Donovan Lessard, Laura Heston, Sonny Nordmarken*
- ✓ *Battered Women and Feminist Lawmaking and the Struggle for Equality by Elizabeth M. Schneider*

Suggested Readings

- ✓ *Jaswal, P.S. and Nishtha Jaiswal. 2010. Human Rights and the Law. New Delhi: A.P.H. Publishing Corporation.*
- ✓ *Lauterpacht. 1968. International Law and Human Rights. Continent: Show String Prince Inc. Agarwal, H.O, Human Rights: Central Law Publications, Allahabad*
- ✓ *Chandra, U. Human Rights Allahabad Law Agency Publications*
- ✓ *Yasin, AdiI-UI & Archana Upadhyay (ed)) Human Rights Akansha Publishing House, New Delhi,2004*
- ✓ *Bhasin, Kamala. (2000). Understanding Gender. New Delhi: Kali for Women.*
- ✓ *Geetha, v. (2000). Theorising Feminism Gender. Kolkata: Bhatkal& Sen.*
- ✓ *Lips, Hilary M. (2014). Gender: The Basics. New York: Routledge.*
- ✓ *Menon, Nivedita. (2012). Seeing Like A Feminist. New Delhi: Penguin Books.*
- ✓ *Yadav, C.P. (ed.) (2007) Encyclopedia of Women's Problems and their remedies. New Delhi: Aninol Publications.*

ବହୁମୁଖୀ ପାଠ୍ୟଖସଡ଼ା
Multidisciplinary Course
ତୃତୀୟ ପତ୍ର
ବିଜ୍ଞାନ ବିଷୟ ଓ ସାହିତ୍ୟ (Science and Literature)

Course Outcome (ପାଠ୍ୟପତ୍ର ଫଳଶ୍ରୁତି):

କଳା ଓ ବିଜ୍ଞାନ ପରସ୍ପର ପରିପୂରକ । ସାହିତ୍ୟ କଳା ଅନ୍ତର୍ଭୁକ୍ତ ବିଷୟ ହେଲେ ମଧ୍ୟ ତହିଁରେ ବୈଜ୍ଞାନିକ ଦୃଷ୍ଟିକୋଣର ଅଭାବ ନାହିଁ। ବିବିଧ ବିଜ୍ଞାନ ବିଷୟ ସହିତ ସାହିତ୍ୟର କିପରି ସମ୍ପର୍କ ରହିଛି, ସେ ସମ୍ପର୍କରେ ଜ୍ଞାନ ଅର୍ଜନ କରିବାପାଇଁ ଶଂସିତ ପତ୍ର ସହାୟକ ହେବ ।

Unit Wise Learning Outcome (ପ୍ରତି ଏକକର ଅଧ୍ୟୟନ ଫଳଶ୍ରୁତି):

୧ମ ଏକକ : ସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ ଯଥାକ୍ରମେ କଳ୍ପନା ଓ ବାସ୍ତବତା ଉପରେ ଅଧିରୂଢ଼ ବୋଲି କୁହାଯାଏ । ତା ସତ୍ତ୍ୱେ ଏ ଉଭୟର ସମ୍ପର୍କ କିଛି କମ୍ ନୁହେଁ । କଳ୍ପନା ହେଉଛି ବାସ୍ତବତାର କଳାତ୍ମକ ରୂପାୟନ। ପ୍ରତ୍ୟେକ ବାସ୍ତବତାକୁ ସରସ ପ୍ରକାଶ କରିବାପାଇଁ ମଧ୍ୟ କଳା ଜ୍ଞାନ ଆବଶ୍ୟକ । ଏହି ଏକକରେ ଛାତ୍ରଛାତ୍ରୀ ତାହା ଉପଲବ୍ଧି କରି ପାରିବେ।

୨ୟ ଏକକ : ପରିବେଶ ସଚେତନତା ଆଜି ସମୟର ସବୁଠୁ ବଡ ଆହ୍ୱାନ। ପରିବେଶ ବିଜ୍ଞାନକୁ ଆଧାରକରି ସାହିତ୍ୟରେ ମଧ୍ୟ ପ୍ରକାଶପାଏ ସଚେତନତା । ତାହା ଏହି ଏକକର ଅଧିତବ୍ୟ ବିଷୟ ।

୩ୟ ଏକକ : ମନୁଷ୍ୟ ସମେତ ସମଗ୍ର ଜୀବଜଗତ ସାହିତ୍ୟର କେନ୍ଦ୍ରବିନ୍ଦୁ । ଜୀବନର କଲ୍ୟାଣ ହିଁ ଜୀବବିଜ୍ଞାନ ଓ ସାହିତ୍ୟ ଉଭୟର ଲକ୍ଷ୍ୟ । ପଶୁପକ୍ଷୀ, କୀଟପତଙ୍ଗ ମଧ୍ୟ ସାହିତ୍ୟର ଆଧାରଭୂମି । ସୁତରାଂ ଜୀବବିଜ୍ଞାନ ଓ ସାହିତ୍ୟର ଅନ୍ତଃସମ୍ପର୍କ ବିଷୟରେ ଛାତ୍ରଛାତ୍ରୀ ଏହାଦ୍ୱାରା ଅବଗତ ହୋଇପାରିବେ ।

୪ର୍ଥ ଏକକ : ଆମ ପୁରାଣ ସାହିତ୍ୟରେ ଅନେକ ବିଜ୍ଞାନଭିତ୍ତିକ ତଥ୍ୟ ପରିଦୃଷ୍ଟ ହୋଇଥାଏ। ତାହାକୁ ଆକଳନ କରି ବିଜ୍ଞାନର ଯଥେଷ୍ଟ ଅଗ୍ରଗତି ହୋଇନଥିବା ସମୟରେ ପୁରାଣକାରମାନେ ସାହିତ୍ୟରେ କିପରି ବିଜ୍ଞାନଧର୍ମୀ ଅନୁଚିନ୍ତା ପ୍ରକଟ କରିଛନ୍ତି, ତାହା ବିଦ୍ୟାର୍ଥୀମାନେ ଜାଣିବା ସମୀଚୀନ ।

ପାଠ୍ୟ ବିଷୟ

ପ୍ରଥମ ଏକକ : (କ)ସାହିତ୍ୟ ଓ ବିଜ୍ଞାନ: ସମ୍ପର୍କ ଓ ପାର୍ଥକ୍ୟ
(ଖ) ସାହିତ୍ୟରେ ବୈଜ୍ଞାନିକ ଦୃଷ୍ଟିଭଙ୍ଗୀ

ଦ୍ୱିତୀୟ ଏକକ : ସାହିତ୍ୟ ଓ ପରିବେଶ ବିଜ୍ଞାନ

ତୃତୀୟ ଏକକ : ସାହିତ୍ୟ ଓ ଜୀବବିଜ୍ଞାନ

ଚତୁର୍ଥ ଏକକ : ପୁରାଣରେ ବିଜ୍ଞାନର ସଂକେତ

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (Book of references):

୧. ପ୍ରାଣୀ ବିଜ୍ଞାନ ପରିଚୟ - ବସନ୍ତ କୁମାର ବେହୁରା, ଉପେନ୍ଦ୍ର ଚନ୍ଦ୍ର ପଣ୍ଡା, ଓଡ଼ିଶା ରାଜ୍ୟ ପାଠ୍ୟ ପୁସ୍ତକ ପ୍ରଣୟନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୨. ଆମ ପରିବେଶ (ପ୍ରଦୂଷଣ ଓ ସୁରକ୍ଷା) - ଡକ୍ଟର ବିଶ୍ୱନାଥ ସାହୁ, ବିଶ୍ୱ କୁସୁମ ପ୍ରତିଷ୍ଠାନ, ସୂର୍ଯ୍ୟ ନଗର,ଭୁବନେଶ୍ୱର

୩. ପରିବେଶ ନାରୀବାଦ ଓ ହୃଷୀକେଶ ପଣ୍ଡାଙ୍କ କଥା ସମ୍ଭାର - ବବ୍ରୁବାହନ ମହାପାତ୍ର, ବିଜୟିନୀ ପବ୍ଲିକେଶନ୍, କଟକ

୪. ବିଜ୍ଞାନର ରୂପ - ଦେବକାନ୍ତ ମିଶ୍ର, ଜଗନ୍ନାଥ ରଥ, ବିନୋଦ ବିହାରୀ କଟକ

୫. ଓଡ଼ିଆ ଶିଶୁସାହିତ୍ୟ ଓ ଓଡ଼ିଆ ବିଜ୍ଞାନ ଭିତ୍ତିକ ସାହିତ୍ୟ - ନିରୋଦ କୁମାର ମନ୍ତ୍ରୀ, କଲ୍ୟାଣୀ ପବ୍ଲିକେସନ, କଟକ

ନମୁନା ପ୍ରଶ୍ନ (Sample Questions) :

୧.ପରିବେଶ ବିଜ୍ଞାନ ଉପରେ ଆଧାରିତ ଗୋଟିଏ ପୁସ୍ତକର ନାମ ଲେଖ ? (୧ ମାର୍କ)

୨. ଓଡ଼ିଆ ସାହିତ୍ୟର ଦୁଇଟି ମାନବେତର ଗଳ୍ପର ନାମ ଲେଖ । (୨ ମାର୍କ)

୩. ସାହିତ୍ୟର କଳ୍ପନା ପଛରେ କିପରି ବାସ୍ତବତା ଲୁଚ୍କାୟିତ ଥାଏ, ବୁଝାଇ ଦିଅ। (୫ ମାର୍କ)

୪. ପୁରାଣ ସାହିତ୍ୟରେ ନିହିତ ବୈଜ୍ଞାନିକ ଦୃଷ୍ଟିଭଙ୍ଗୀ ଉପରେ ଆଲୋକପାତ କର। (୮ ମାର୍କ)

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*

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.***