

**MAHARAJA SRIRAM CHANDRA BHANJA DEO UNIVERSITY, BARIPADA**

Multidisciplinary Courses under NEP, 2020

(Credit-9)

**LIST OF SUBJECTS BASED MULTIDISCIPLINARY COURSES**

**A student can choose one paper from the basket of seven for each semester given in the table. However, students are to be encouraged to opt for courses outside their discipline/faculty/subject**

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| **SEMESTER-I (Credit-3)** |
| **Paper-I (Any one Subject from the list)** | **Subject teachers to teach (preferably) or any other teacher competent to teach** | **Credit** | **Full** **Mark** | **End** **Sem** | **Mid****Sem** |
| 1. Entrepreneurship Development
2. Computer Fundamentals
3. History of Education in Modern India
4. Tissue Culture and Plants
5. Human Rights
6. Bio Physics
 | Commerce/EconomicsComp. Sc/BCAHistory/EducationBotany/Biotech.Pol. Sc/Pub. AdmnPhysics | 3 | 100 | 60 | 40 |
| **SEMESTER-II (Credit-3)** |  |
| **Paper-II (Any one from the list)** | **Subject teachers to teach (preferably) or any other teacher competent to teach** | **Credit** | **Full Mark** | **End Sem** | **Mid Sem** |
| 1. Environmental Education
2. Vector Borne Diseases and Epidemiology
3. Political Process in India
4. Professional Writing
5. Fundamentals of Entrepreneurship and E-Commerce
6. Indian Economy and Society
 | Bot./Chem./Edn./ Env. Sc./ZoolZoologyPolitical Sc.EnglishCommerce/EconomicsEconomics/Sociology | 3 | 100 | 60 | 40 |
| **SEMESTER-III (Credit-3)** |  |
| **Paper-III (Any one from the list)** | **Subject teachers to teach (preferably) or any other teacher competent to teach** | **Credit** | **Full Mark** | **End Sem** | **Mid Sem** |
| 1. Entrepreneurship Development and Start-up
2. Population and Society
3. Numerical Methods
4. Understanding Gandhi and Ambedkar
5. Critical Thinking and Applied Reasoning
6. Environmental Chemistry
 | Commerce/EconomicsEcon/Soc/Anth.MathematicsPolitical Sc./ Hist.Philosophy/MathChemistry | 3 | 100 | 60 | 40 |

**SEMESTER-I (Credit-3)**

**Entrepreneurship Development**

**Course description**

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

**Course Outcomes:**

To understand the basic concept of Entrepreneurship and the common myths of becoming an entrepreneur.

To appreciate the functions of entrepreneurs and the challenges faced by them.

To gather knowledge about the scope of becoming an entrepreneur and the steps to a venture business plan.

To get acquainted with the issues concerning the sustainability of a business plan.

**Module I**

Meaning, Definition, and concept of entrepreneur, entrepreneurship and entrepreneurship development. The entrepreneurial development mind set, Entrepreneurship categories, Entrepreneurship challenges, Ethics and Entrepreneurship, Corporate Entrepreneurship, Social responsibility in Entrepreneurship, Entrepreneurship Ecosystem

LO: This module shall impart knowledge of the different concepts related to Entrepreneurship.

**Module II**

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

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

**Module III**

Developing a business plan: Environmental Scanning and SWOT analysis and The business plan as an entrepreneurial tool, Business planning process: elements of business planning, preparation of project plan, Components of an Ideal Business plan-market plan, Financial plan, operational plan, and feasibility Analysis-aspects and methods: Economic analysis, Financial analysis, Market and technological feasibility

LO: Students will become capable of developing a business plan and launching new ventures after studying this module.

**Module IV**

The practice of sustaining and growing: Evolution of a startup, Collaboration, Networking, Intellectual property, Innovation for Business Growth, Entrepreneurial growth strategies, Franchising, Stalling, Sickness and Revival, Exiting the venture, Social Entrepreneurship, Rural Entrepreneurship, Women and Entrepreneurship.

LO: This module will educate the students about some of the sustainable business management strategies.

**Basic Reading List**

Charantimath, P. M. (2018): Entrepreneurship Development Small Business Enterprises, Pearson Education publication

Roy, R. (2020): Entrepreneurship, 3rd Ed, Oxford publication

Desai, V: Small -Scale Industries and Entrepreneurship, Himalaya Publishing House

**Reference Book**

 Kumar, S. A., Poornima, S. C., Abraham, M. K., and Jayashree, K: Entrepreneurship Development. New Age Publication;

Bhatt, A. K. (2023): Innovation and Entrepreneurship, Laxmi Publication

**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*

# History of Education in Modern India

**Course Objectives**

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

### Course Outcome:

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

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

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

### Unit II: Before and After Macaulay:

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

### Unit III: Education between Command, Commissions and National Alternatives

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

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

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

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

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

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

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

### Select Readings:

* *Dharampal (ed.), The Beautiful Tree: Indigenous Education in the Eighteenth Century, Biblia Impex, New Delhi, 1983.*
* *J.P. Naik and Syed Nurullah, A Students’ History of Education in India, (1800-1973), Macmillan India Ltd, Delhi, First Published 1945, Sixth Revised Edition 1974, Reprinted 2004.*
* *Joseph Dibona, (ed.), One Teacher One School, Biblia Impex, New Delhi, 1983.*
* *Mahatma Gandhi, Educational Reconstruction, Wardha, Hindustani Talimi Sangh, 1938.*
* *Mushirul Hasan (ed.), Knowledge, Power and Politics: Educational Institutions in India, Roli Books, 1998.*
* *Sabyasachi Bhattacharya, Joseph Bara and Chinna Rao Yagati (ed.), Educating the Nation: Documents on the Discourse of National Education in India (1880-1920), Kanishka, 2003.*
* *Sabyasachi Bhattacharya, Joseph Bara and Chinna Rao Yagati (eds.), Development of Women's Education in India: A Collection of Documents (From 1850 to 1920), Kanishka, New Delhi, 2001.*
* *William Hunter, Report of the Indian Education Commission, Superintendent of Government Printing, Calcutta, 1884. 9. Michael Dodson, Orientalism, Empire, and National Culture: India, 1770-1880. (Basingstoke & New York: Palgrave Macmillan, 2007) (New Delhi: Foundation Books, 2009)*
* *Agrawal, J.C. (1984). Landmarks in the History of Modern Indian Education: New Delhi: Vikas Publishing House, Pvt. Ltd*
* *Rao, Parimala V, Beyond Macaulay, 1780-1860, Routledge, 2020*
* *Ghosh, Suresh Chandra, The History of Education in Modern India, 1757-2012, Orient Blackswan, 2000.*
* *Singh, Sahana, The Educational Heritage of Ancient India, 2017.*
* *Aldrich, Richard, An Introduction to the History of Education, London, Hodder and Stoughton, 1982*
* *Bell, Andrew, An Analysis of the Experiment in Education, Made at Egmore, Near Madras, London,T. Bensley, 1807*
* *Carnoy, Martin, Education as Cultural Imperialism, New York, Longman, 1974*
* *Kopf, David, British Orientalism and Bengal Renaissance: The Dynamics of Indian Modernisation 1773– 1835, Berkley, University of California Press, 1960.*
* *Kumar, Krishna, Political Agenda of Education: A Study of Colonialist and Nationalist Ideas, New Delhi, Sage Publication, 1991*
* *Kumar, Nita, Lessons from Schools, History of Education in Banaras, New Delhi, Sage Publication, 2000.*
* *Majumdar, Bhagaban Prasad, First Fruits of English Education: 1817–1857, Calcutta, Bookland, 1972*
* *Metcalf, Thomas R., Ideologies of the Raj, Cambridge, Cambridge University Press, 1995*
* *Paranjape, M.R. (ed.), A Source Book of Modern Indian Education, Bombay, Pal-grave Macmillan, 1938.*
* *Trevelyan, Charles E., On the Education of the People of India, London, Longman, Orme, Brown, Green and Longmans, 1838.*

### Internet Resources

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

### Activities to Do

1. Students will collect and compile all the reports of various education commissions and committees since 1947.
2. Students will collect and compile the profiles of prominent educationists and policy makers in the field of education.

**Tissue Culture of Plants**

**Course Objectives:**

To know the about the plant tissue culture techniques and its practical applications.

To understand the requirement for setting up a tissue culture laboratory.

To know the commercial aspects of plant tissue culture.

**Course Outcomes:**

On completion of the course the students shall

Have ability to understand the basic of plant tissue culture methods.

Have knowledge to develop a startup facility using tissue culture techniques.

Be able to understand the economics of the process and know its potential.

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

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

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

Micropropagation: Micropropagation by mature nodal explants, surface sterilization, stages of microprop

agation, selection of plants and explants, proliferation of shoot, rooting of shoots, acclimatization; organogenesis, environment inside the culture room.

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

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

Practical:

Sterilization of plasticwares, glass wares and use of autoclaves or its alternatives.

Preparation of tissue culture medium (e.g., MS medium).

Readiness of Laminar air flow cabinet for aseptic culture work (Demonstration).

Demonstration of in vitro sterilization and inoculation methods using nodal explants of any plant species as per available.

Over all study of micro propagation by photographs.

Study of anther culture through photographs.

Preparation of synthetic seeds.

**Text Books:**

*Chawla, H. S. (2010). Introduction to Plant Biotechnology. Oxford &amp; IBH Publishing Co. Pvt. Ltd.,*

*New Delhi.*

*Purohit S.D. (2013) Introduction to Plant Cell, Tissue and Organ Culture. PHI Learning Private Ltd., Delhi*

Reference Books:

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

* *Singh, B. D. (2018). Plant Biotechnology Kalyani Publishers, New Delhi.*
* *Gupta, P. K. (2017). Plant Biotechnology, Rastogi Publication, Meerut.*

**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**

Connotation of ‘Rights’; Meaning, Nature and Significance of Human Rights. Evolution and Historical Development of Human Rights.

Theories of Human Rights: Natural, Legal, Utilitarian and Marxist;

Universality of Human Rights and cultural diversity.

**Unit II: International Human Rights**

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.

Institutional Framework: UN, UN Human Rights Council (UNHRC), UN office of the High Commissioner for Human Rights (UNOHCHR).

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.**

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

Impact of Globalisation on Human Rights; Environment and Human rights issue.

Refugee crisis and Migrations, Displacement, Bonded Labour, Custodial abuse, War crimes.

**Unit IV: Human Rights in India**

Underlying Human rights Principles of Indian society: Dharma, Nyaya, Neeti, Ahimsa.

Institutional Framework: Constitutional provisions, NHRC, SHRC; Judicial Activism.

Human Rights Movements in India: Engagement of NGOs and Civil society in Protecting Human Rights.

**Essential Readings:**

*Alan, B. (2017). Human rights and the environment: where next? In Challenges in International Human Rights Law (pp. 765-794). Routledge.*

*Barkin, J. S. (1998). The evolution of the constitution of sovereignty and the emergence of human rights norms. Millennium, 27(2), 229-252.*

*Beitz, C. R. (2009). The idea of human rights. OUP Oxford.*

*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.*

*Das, A. K., & Mohanty, P. K. (2007). Human rights in India. Sarup & Sons.*

*Donnelly, J., & Whelan, D. J. (2020). International human rights. Routledge.*

*Freeman, M. (2022). Human rights. John Wiley & Sons.*

*Gready, P. (2004). Conceptualising globalisation and human rights: boomerangs and borders. The International Journal of Human Rights, 8(3), 345-354.*

*Gudavarthy, A. (2008). Human rights movements in India: State, civil society and beyond. Contributions to Indian Sociology, 42(1), 29-57.*

*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.*

*Henkin, L. (1995). Human rights and state sovereignty. Ga. J. Int'l & Comp. L., 25, 31.*

*Ishay, M. (2008). The history of human rights: From ancient times to the globalization era. Univ of California Press.*

*Kennedy, D. (2002). International human rights movement: Part of the problem?. Harv. Hum. Rts. J., 15, 101.*

*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.*

*Langlois, A. J. (2002). Human rights: the globalisation and fragmentation of moral discourse. Review of International Studies, 28(3), 479-496.*

*Merry, S. E. (2009). Human rights and gender violence: Translating international law into local justice. University of Chicago Press.*

*Ray, A. K. (2003). Human rights movement in India: A historical perspective. Economic and Political Weekly, 3409-3415.*

*Shelton, D. (2006). Human rights and the environment: what specific environmental rights have been recognized. Denv. J. Int'l L. &Pol'y, 35, 129.*

*Sripati, V. (2000). India's National Human Rights Commission: A Shackled Commission. BU Int'l LJ, 18, 1.*

**Additional Readings:**

*Cole, W. M. (2005). Sovereignty relinquished? Explaining commitment to the international human rights covenants, 1966-1999. American sociological review, 70(3), 472-495.*

*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.*

*Oestreich, J. E. (2017). Development and Human Rights: rhetoric and reality in India. Oxford University Press.*

*Schmitz, H. P. (2014). Non-state actors in human rights promotion. The SAGE Handbook of Human Rights, 1, 352-71.*

Internet Sources

Human Rights Course study materials in MA Political science. <https://www.distanceeducationju.in/pdf/404%20HUMAN%20RIGHTS.pdf>

International Human Rights document, charters etc available at <https://csometer.info/international-human-rights-documents>

Defining Human Rights: Harper Lecture, The University of Chicago. <https://youtu.be/2nYdTV9wuGI?si=EbZBuZvHR5gg4Ql5>

Reflections on the Origins of Human Rights (Talal Asad Lecture), Berkeley Centre <https://youtu.be/Vd7P6bUKAWs?si=KIeG2rwRqvgxjCh6>

Activities to Do

Students should be encouraged and facilitated to visit NHRC or SHRC office to learn the functioning of the commission.

Conduct lecture on contemporary issues on Human rights in India.

Arrange a movie session for the students on issues of Human Rights. Movies like 13th (2016), The Whistleblower (2010), Mandela: Long Walk to Freedom (2013), Jai Bhim (2021).

Conduct community outreach programmes to spread awareness on Human Rights Day.

# Bio Physics

### Course Outcomes

* Basic fundamentals of living organism and its interactions in domains of Physics in
* Biology
* Understating of heat transfer in biomaterials and its mechanism
* Diversifying of thermal, statistical physics in biological domain.
* Understating fluid mechanisms in living organism in the domain of Physics

### UNIT I

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

### UNIT II

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

### UNIT III

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

### UNIT IV

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 synthesis in 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 &amp; Bartelett Publishers
2. Aspects of Biophysics, Hughe S W, John Willy and Sons.
3. Essentials of Biophysics by P Narayanan, New Age International Introduction to Spectroscopy

**SEMESTER-II (Credit-3)**

**Environmental Education**

**Course Learning Outcomes (CLOs):**

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

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

**Unit-I: Introduction to Environment Learning Outcomes**

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

The Environment: Atmosphere, Hydrosphere, Lithosphere, Biosphere.

Ecology, Ecosystem, major eco-system, Biogeochemical Cycle (Carbon Cycle, Nitrogen Cycle).

Biodiversity-Values and Services, Global Environmental Issues.

**Unit-II: Climate Change and Sustainable Development**

**Learning Outcomes**

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

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

Environment Pollution: Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Thermal Pollution, Radiation Pollution.

Climate Change, causes and consequences, Natural Resources: Conservation of Natural Resources, Soil Erosion and Conservation.

Management and Conservation of Wildlife, Sustainable Development and its Goals.

**Unit-III: Population and Public Health**

**Learning Outcomes**

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

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

Population dividend and population liability.

Population Ecology: Individuals, Species, role of different sector in managing health disaster.

Population Growth and Control, Community, Urbanization and its effects on Society.

Communicable Diseases, Non-Communicable Diseases, Transmission and its effects.

**Unit-IV: Environmental Movements and Environmental Laws**

**Learning Outcomes**

***LO:*** *Trace environmental movements of India.*

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

Environmental Movements in India: Grass root Environmental movements in India, Role of women, Environmental Movements in Odisha.

State Pollution Control Board, Central Pollution Control Board.

Environmental Laws: Water Act, 1974, Air Act, 1981, The Wildlife (Protection) Act,1972, Environment Protection Act 1986.

**Sample Questions**

What is meant by environment? (1 Mark)

Write any two causes of noise pollution. (2 Marks, Within 50 words))

Discuss the causes and consequences of climate change (5 Marks, Within 300 words))

Critically reflect on the importance and purpose of SDGs with reference to the contemporary society. (8 Marks, 500 to 800 words).

**Transaction Mode:**

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

Practical/ Activities

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

Investigation of Major sources of micro- plastic pollutants in urban habitats.

Detection and characterisation of major water pollutants in river water.

Impact of growing urbanisation on wildlife habitat.

It will be evaluated by both internal and external examiners.

**Text Books**

*Anubha Kaushik and CP Kaushik, "Perspectives in Environmental Studies", 5th edition,*

*2016.*

*Benny Joseph, "Environmental studies", 2nd edition, McGraw Hill Education, 2015.*

*Basics of Environmental Studies by Dr. N. S. Varandani, Books India Publications.*

*Disaster Management by MukeshDhunna, Vayu Education of India, Delhi Publication.*

**Reference Books**

*Dr. M. Chandrasekhar, "A Text book of Environmental Studies", HI-TECH publications,2006.\*

*Dr. M. Anji Reddy, "A Text book of environmental science and Technology", B S Publications, 2008.*

*Dr. K. Mukkanti, "A Text book of Environmental Studies", S.CHAND and Company Ltd, 2009.*

*EHILRS and ST, "Text book of Municipal and Rural Sanitation", M.S Hill, 1998.*

*C. S. Rao, Wiley Eastern Ltd, "Environmental Pollution Control Engineering", New Age International Ltd, 2001.*

*Dr. M. Anji Reddy, "Introduction to Remote Sensing", BS Publications, 2004.*

*EHILRS and ST, "Text book of Municipal and Rural Sanitation", M.S Hill, 1998.*

*Dr. M. Anji Reddy, "Introduction to Remote Sensing", BS Publications, 2004.*

*Environmental Studies by R. Rajagopalan, Oxford University Press Publication.*

*Environmental Science by Richard T Wright & Bernard J Nebel, Prentice Hall India Publication.*

*Environmental Science by Daniel B Botkin & Edward A Keller, Wiley Publications.*

# 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 of epidemiology. Students will gain the in-depth knowledge on epidemiological parameters like
* 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).*

**Political Process in India**

### Course Objectives:

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

### Course outcomes (COs):

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

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

### Unit I

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

### Unit II

* + Ethnicity Region & Language as determinants of voting behaviour
	+ Class as a determinant of voting behaviour Gender as a determinant of voting behaviour Voting behaviour of Rural-Urban India
	+ Religion and voting behaviour Determinants of voting behaviour:
	+ Cult/Charisma/Personality Regionalism in India: a conceptual analysis Regionalism and Indianfederalism

### Unit III

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

### Unit IV

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

and politics: a changing scenario

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

### Text Books

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

**Professional Writing**

**Course Objectives**

* The course aims at teaching students to write grammatically correct, clear, effective prose and applies it to writing for the workplace.
* Its objective is to help students develop writing skills and acquire the knowledge to apply these skills in standard workplace document formats.
* It includes a study of writing in a variety of professional contexts with an emphasis on assessing rhetorical situations and crafting messages to inform and persuade diverse audiences in a variety of forms and formats.

**Unit-1**

Writing: Definition and Requirement

Writing Process: Prewriting, Writing and Post writing Basic Writing Skills

Plain English

**Unit-2**

Genres of Writing: Persuasive, Expository, Narrative, Descriptive and Argumentative

**Unit-3**

Basic forms: Letters, Application, Memo, Notices and Minutes Raising the Bar: Presentations, Proposal, and Report

**Unit-4**

The Elements of Style: Grammar, Usage, and Mechanics

Prescribed Texts

*The Craft of Professional Writing*, Second Edition by Michael S. Malone

*Literature and Art of Communication*. Parhi, Pati, Mohol et al. Cambridge University Press, 2019.

*Professional Writing Skills: A Write It Well Guide* by Natasha Terk

Suggested Readings

*Huddleston R., and Geoffrey K. Pulia, eds. A Student’s Introduction to English Grammar. CUP.2005*

*MLA Handbook for Writers of Research Papers. Eighth edition. Modern Language Association of America. 2021*

*Excellence In Business Communication by John V. Thill and Courtland L. Bovee* *On Writing Well by William Zinsser* <https://communicationprogram.wharton.upenn.edu/library/>

<https://www.osou.ac.in/eresources.php>

# Fundamentals of Entrepreneurship and E-Commerce

**Course Objectives:**

The course aims to

* + Understand the basic concepts and theories of entrepreneurship.
	+ Identify and evaluate business opportunities in the digital economy.
	+ Develop skills in creating effective business plans and strategies.
	+ Gain knowledge of e-commerce platforms and technologies.
	+ Learn digital marketing techniques for online businesses.
	+ Understand the legal and ethical considerations in e-commerce.
	+ Develop critical thinking and problem-solving skills relevant to entrepreneurship and e-commerce.

### Course Outcomes

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

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

### Unit-1: Introduction to Entrepreneurship

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

### Unit-2: Business Planning

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

### Unit-3: Introduction to E-Commerce

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

### Unit-4: E-Commerce Logistics and Fulfilment

Order processing and fulfilment, Inventory management, Shipping and delivery options, Returns and customer

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

### Case Studies: Analysis of successful e-commerce ventures

**Suggested Readings**

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

**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:
	1. 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
	2. Mazumdar, Vina (1983), Women, Work and Employment: Struggle for a Policy, ICSSR, New Delhi
	3. Borjas, George J. Labor Economics. 5th ed. Boston, MA: McGraw-Hill/Irwin, 2010
	4. 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

**SEMESTER-III (Credit-3)**

**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*

# 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. Meaning of population, Genesis and Growth of Population Studies
	2. Scope and Importance of Population Studies
	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

* 1. Malthusian Theory
	2. Optimum Theory of Population
	3. Theory of Demographic Transition
	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

* 1. Fertility
	2. Migration
	3. Mortality
	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

* 1. National Family Planning Programme 1952
	2. National Population Policy 1976
	3. National Population Policy 2000
	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 StudiesMeaning of | Theory class andTutorial class | 15 | Bhende, A. A., & Kanitkar, T.(2011). *Principles of population* |
|  | population, Genesis and Growth of Population Studies Scope andImportance of Population Studies Population & Society relationship Population trends- World and India |  |  | *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 PopulationTheory ofDemographic 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 FertilityMigration MortalityMeasures 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: WadsworthPublishing Company. |
| IV | Population Policies and Programmes National Family PlanningProgramme-1952 National Population Policy- 1976 National PopulationPolicy-2000 | Theory class and Tutorial class | 15 | Bhende, A. A., & Kanitkar, T. (2011). *Principles of population studies*. New Delhi: Himalaya Publishing House. |
|  | 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)

1. is the main proponent of demographic transition theory.

### Part-II

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

* 1. Define fertility.

### Part -III

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

* + 1. Briefly discuss the causes of declining fertility rate of India.

### Part-IV

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

* + - 1. Critically analyze the population control measures taken by government of India.

**Numerical Methods**

**Course Objectives:**

Calculation of error and approximation is necessity in all real life, industrial and scientific computing. The objective of this course is to acquaint students with various numerical methods of finding solution of different type of problems, which arises in different branches of science like locating roots of equations, finding solution of nonlinear equations, systems of linear equations, differential equations, Interpolation, differentiation, evaluating integration.

**Learning Outcomes:** Completing this course, a student will be able to

* + Learn different techniques to find the zeros of algebraic and transcendental equations, numerical solutions of system of equations.
	+ Get the idea to find the numerical solutions of polynomial equations
	+ Learn to find the numerical differentiation by means of different operators.
	+ Learn to find numerical integration which will help to find the numerical solution of ODE and PDE

### UNIT-I

Algorithms, convergence, Bisection method, false position method, fixed point iteration method, Newton’s method, Secant method. Gauss elimination and Gauss Jordan methods, LU decomposition, Gauss-Jacobi, Gauss-Siedel.

### UNIT-II

Lagrange and Newton interpolation: linear and higher order, finite difference operators.

### UNIT-III

Numerical differentiation: forward difference, backward difference and central difference operators.

### UNIT-IV

Integration: trapezoidal rule, Simpson’s rule, Euler’s method, Runge-Kutta methods of orders two and four.

### Books Recommended:

* M.K. Jain, S.R.K. Iyengar and R.K. Jain, *Numerical Methods for Scientific and Engineering Computation*, 5th Ed.

### Books For Reference:

* *S.S. Sastry, Introductory method for Numerical Analysis, PHI New Delhi, 2012.*
* *S.D. Conte and Carl De Boor, Elementary Numerical Analysis, Mc Graw Hill,*
* *e-Learning Source* [*http://ndl.iitkgp.ac.in*](http://ndl.iitkgp.ac.in/) *;* [*http://ocw.mit.edu*](http://ocw.mit.edu/) *;* [*http://mathforum.org*](http://mathforum.org/)
* *Suggested digital platform: NPTEL/SWAYAM/MOOCs*

### UNDERSTANDING GANDHI AND AMBEDKAR

**Course objectives:**

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

### Expected Learning Outcomes:

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

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

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

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

### Unit I: Key points of Gandhian philosophy

1. Truth and Non-violence
2. Satyagraha
3. Hind Swaraj
4. Swadeshi
5. Critique of modern civilization

### Unit II: Ideas of Ambedkar

1. Ambedkar's view on democracy
2. Socialism vs. Social Justice
3. Views on Caste

### Unit III: Gandhi and Ambedkar's view on caste

1. Dalit vs Harijan.
2. Varna Vs Caste
3. Possibility of change in Hindu social order
4. Poona Pact

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

1. Gandhi's views on Hindu, Muslim, and Christianity
2. Ambedkar's views on Hindu, Muslim, and Buddhism
3. Planning & Development
4. Land & Labour
5. Women’s Question

### Essential Readings:

* Ambedkar, B. R. (1945). *What Congress and Gandhi have done to the Untouchables*. Thacker.
* Gandhi, M. K. (1938). *Hind Swaraj or Indian Home Rule*. Navajivan Publishing House.
* Jaffrelot, C. (2005). *Dr. Ambedkar and Untouchability: Fighting the Indian Caste System*. Columbia University Press.
* Kumar, A. (2015). *Radical Equality: Ambedkar, Gandhi, and the Risk of Democracy*. Stanford University Press.
* Parekh, B. (2001). *Gandhi: A Very Short Introduction*. Oxford University Press.
* Parel, A. J. (Ed.). (1997). *Gandhi: ‘Hind Swaraj’ and other writings*. Cambridge University Press.
1. Rodrigues, V. (2011). Reading Texts and Traditions: The Ambedkar-Gandhi Debate.

*Economic and Political Weekly*, 56-66.

1. Rodrigues, V. (Ed.). (2002). *The Essential Writings of B. R. Ambedkar*. Oxford University Press.
2. Roy, A. (2017). *The doctor and the saint: Caste, Race, and Annihilation of caste: The Debate between B. R. Ambedkar and MK Gandhi*. Haymarket Books+ ORM.
3. Thakur, R. (2022). *Gandhi and Ambedkar: Understanding Their Relations.* Aakar Books

### Additional Readings:

1. Barua, A. (2019). Revisiting the Gandhi–Ambedkar debates over ‘Caste’: the multiple resonances of varņa. *Journal of Human Values*, *25*(1), 25-40.
2. Bayly, C. A. (2011). *Recovering Liberties: Indian Thought in the Age of Liberalism and Empire*. Cambridge University Press.
3. Omvedt, G. (2004). *Ambedkar: Towards an Enlightened India*. Penguin Books.
4. Ranjan, R. (2015). Gandhi and Ambedkar on Human Dignity. *Bombay Sarvodaya Mandal & Gandhi Research Foundation, Adapted from'Gandhi Marg*, *37*(2).
5. Singh, A. (2014). Gandhi and Ambedkar: Irreconcilable Differences?. *International Journal of Hindu Studies*, 18(3), 413-449.

### Internet Resources:

The internet resources include online articles and e-contents published on websites, blogs, e- Newspaper, online magazines, or scholarly journals, digital repositories, Audio- Visual contents.

1. Gandhi Heritage Portal. *Collected Works of Gandhi*. [www.gandhiheritageportal.org](http://www.gandhiheritageportal.org/)
2. Columbia University lecture on Ambedkar. [www.columbia.edu/cu/lweb/indiv/southasia/cuvl/Ambedkar.html](http://www.columbia.edu/cu/lweb/indiv/southasia/cuvl/Ambedkar.html)
3. Gandhi Serve Foundation. [www.gandhiserve.org](http://www.gandhiserve.org/)

# Ambedkar Foundation. [www.ambedkarfoundation.nic.in](http://www.ambedkarfoundation.nic.in/)

**Critical Thinking and Applied Reasoning**

**Introduction:**

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

**Course Outcomes:**

Attaining a proper understanding of the method of analysis, evaluation, and interpretation in critical thinking and the primacy of critical thinking in philosophical pursuit.

Attaining an ability to understand different arguments and identify the logical /semi-logical fallacies in the arguments.

Attaining the knowledge of analogical reasoning and its applicability in the legal and moral domains.

**Learning Outcome**

**Unit I** When One is acquainted with critical thinking, he/she must explore new ideas and try to distinguish between non- relevant data from the relevant ones...

**Unit II** In our everyday life, It is necessary to form a valid argument, which justifies our opinion about something. & this unit teaches how to form an argument, for which Our mental activities & thinking capacity have been developed. and to make clear the structure of logical arguments, We identify the Premises & Conclusion.

**Unit III the** study of fallacies provides a base or foundation to evaluate & analyze the error or defect in the argument.

**Unit IV** Reasoning plays a very important role in making a good & strong decision, which builds our life with peace & positivity. & some types of reasoning like analogical reasoning ( It helps us gain new knowledge by comparing one entity with another), Moral reasoning ( It justifies a person's intentions behind his actions), Legal reasoning ( It gives us a major outlook or models by which We can righteously do our duty).

Unit I:

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

Unit II:

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

Unit III :

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

Unit IV:

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

Prescribed Books: -

*Hurley, Patrick. J.- A Concise Introduction to Logic, 12th Ed.*

*Sen, Madhuchhanda- An Introduction to Critical Thinking, Pearson India Ltd.*

**Reference Books:**

[*David Kelley*](https://www.google.co.in/search?hl=en&q=inauthor)*, Art of Reasoning: An Introduction to Logic and Critical Thinking,* [*W. W. Norton,*](https://www.google.co.in/search?hl=en&q=inpublisher)[*Incorporated.*](https://www.google.co.in/search?hl=en&q=inpublisher)

[*Alec Fisher,*](https://www.google.co.in/search?hl=en&q=inauthor) *Critical Thinking; An Introduction,* [*Cambridge University Press*.](https://www.google.co.in/search?hl=en&gbpv=1&dq=critical%2Bthinking%2Band%2Bapplied%2Breasoning&printsec=frontcover&q=inpublisher)

**E- Recourses**

[https://youtube.com/playlist?list=PLtKNX4SfKpzX\_bhh4LOEWEGy3pkLmFDmk&si=\_pchcRWwvg](https://youtube.com/playlist?list=PLtKNX4SfKpzX_bhh4LOEWEGy3pkLmFDmk&si=_pchcRWwvgMp4hzO) [Mp4hzO](https://youtube.com/playlist?list=PLtKNX4SfKpzX_bhh4LOEWEGy3pkLmFDmk&si=_pchcRWwvgMp4hzO)

[https://open.library.okstate.edu/criticalthinking/chapter/ unknown -](https://open.library.okstate.edu/criticalthinking/chapter/__unknown__-2/#%3A~%3Atext%3DThinking%20clearly%20and%20systematically%20can%2Cnot%20just%20having%20new%20ideas) [2/#:~:text=Thinking%20clearly%20and%20systematically%20can,not%20just%20having%20new%20](https://open.library.okstate.edu/criticalthinking/chapter/__unknown__-2/#%3A~%3Atext%3DThinking%20clearly%20and%20systematically%20can%2Cnot%20just%20having%20new%20ideas) [ideas.](https://open.library.okstate.edu/criticalthinking/chapter/__unknown__-2/#%3A~%3Atext%3DThinking%20clearly%20and%20systematically%20can%2Cnot%20just%20having%20new%20ideas)

<https://youtu.be/zFfSf2nska8?si=Ez6hB0LhIDyfYQgr>

[https://open.library.okstate.edu/criticalthinking/chapter/ unknown /](https://open.library.okstate.edu/criticalthinking/chapter/__unknown__/)

<https://youtu.be/vEkxq636_gc?si=UjJsr6yekOj0ltcY>

<https://iep.utm.edu/fallacy/>

<https://youtu.be/yAjkQ1YqLEE?si=RZDdRejljarLJre6>

<https://www.indeed.com/career-advice/career-development/types-of-reasoning>

Sample Questions: 1 for Part- I Objective; Part- II Very Short Type (in 50 Words); Par-III Short Type (in 250 Words); Par-IV Long Type (in 800 Words);

Unit I

What is Critical Thinking?

How critical thinking is related to applied reasoning?

Explain the Standards of Critical Thinking.

Elaborate the Benefits and Limitations of critical thinking.

Unit II

What is an argument?

What do you mean by the construction of an argument?

Differentiate between Premises and Hidden Premises

How argument plays a significant role in critical thinking.

Unit III

Violation of any rules is known as .

What are Fallacies of Relevance, give an example.

What are Fallacies in Ordinary Language?

Explain Fallacies of Presumption with examples

Unit IV

What is Reasoning?

What are the Types of Reasoning?

Difference between Science &Superstition.

Define Analogical, Legal, and Moral reasoning

**Environmental Chemistry**

**Course Objective:**

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*