



**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

| 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 |
| Computer Fundamentals | Comp. Sc/BCA | 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 |
| Environmental Education | Bot./Chem./Edn./ Env. | 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 |
| Environmental Chemistry | Chemistry | 3 | 100 | 60 | 40 |

SEMESTER-I (Credit-3) **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

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.
- Identify 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 Mukesh Dhunna, 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.

SEMESTER-III (Credit-3) **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- lakes, 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 micro-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, chlorofluorocarbons. 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