

Jodhpur National University

M.Phil. Ecology & Environmental Biology Syllabus

First Semester

Paper I

RECENT ADVANCE IN ENVIRONMENTAL SCIENCE

1. Global Scenario of Environment :

Our solar system, Earth as the only suitable habitat for the living organism, changes in the environment caused by man and his activities, pre and post industrial development, technological development and its impact on thinking and style of living of man, human population explosion vis-à-vis erosion of ecosystem, natural resources depletion, compromise in quality, recent trends in thinking and implementation.

2. Impact on Health :

First level health, second level effect on comfort, convenience and aesthetics, third level effects on ecosystems and natural balance, Emergence of general awareness, norms, laws, and legislation through world public platform and world summit and world bodies, quality of environment and resource management, Recent trends.

3. Natural Process :

Recent trends and endeavor in achieving balance, study of ecosystems and assessment of balance, forests, aquatic and ocean bio-geocycles, ecology of population interaction, Energy in ecosystem. Stability, monoculture vs species diversity, impact and assessment.

4. Trends and measure in conservations :

Recent trends in conservation of wild life, and genetic resources, gene pool and endangered species and their conservation and protection, culturing as conservation of species, national parks and animal in captivity, socio-psychological impact on them, biochemical changes as reflected by behavioral changes of wild animals, breeding in captivity of endangered animals sperm bank.

Tissue culture measures and conservation and preservation of biodiversity in plant species, data base and recent trends of preserving endangered species, Devarais as conservation method of forests. World trends and programme in conservation of biodiversities, legislation against poaching and hunting and their implementation some word examples of national parks.

5. Recent trends in energy studies :

Present state, Prospects and problems alternative measures, Energy from biomes, energy plantation, fast growing trees and environmental problems, plantation for clean environment and ecological balance, biogas, wind mills and rural energy supply, city garbage and domestic wastes and their recycling for energy and fertilizer, minihydel projects vs major hydel projects, cost benefit ratio in terms of ecological conservation future plans, and possible means.

6. Water supply :

Present and past status and needs of urban and rural society, impact of industrialization and socio-economic transformation in urban structures, supply and demand ratio of water and sources. Need to diffuse urbanization and implementation of recycling system of waste water biological methods and chemical methods, revamping of sewage disposal system and need to recycle, water requirement of rural community, agro industries and socio-economic transformation and its impact on water supply, remedial measures in recharging of ground water, metrological problems and fluctuation in water resources, Integrated approach to the problem of short range and long range nature.

7. Recent trends in organic waste conversion:

Agricultural wastes as fertilizer and feed stuff, Brewery and distillery waste and their utilization, utilization of wastes from fermentation industry, wastes from paper factory and related cellulose wood and bark wastes as feed stuff and fertilizer. Recent trends in use of fish canning industries, trend in utilizing tannery waste.

8. Recent trend in eco-toxicology :

Manual and methods of studying toxicology, animal agent in toxicology, evaluation method, toxicity test, statistical concept or LD₅₀, Dose effect and dose response. Relations ships, biological and chemical factors that influence toxicity response of ecosystems to chemical stress, recent trends in study and monitoring, pollution and evolution.

9. Environmental management of inorganic solid and liquid wastes :

Trends of research assessment and study of movement at subsoil level in water bodies, mines and quarries agricultural practices, and fertilizer and pesticide use and their movement, chemical approach, biological approach to the problem of Genetic engineering and its application in production of microorganisms and their use in garbage decomposition.

Reference books :

1. Salomons W. And Forstner U. (Ed) Environmental management of solid wastes Spinger V.
2. Bewick M. W. M. : (Ed.) Hand book of organic waste Conservation, V. N. Reinhold.
3. Levin S. A. Harwell M. A., Kelly J. R., Kuuball K. D. (Ed.) Ecotoxicology : Problems and Approach, Spinger V.
4. Bergon M. , Fitter A. H. and Mc Faybyen A. (Ed.) Advance in Ecological Research.
5. Text book of Environmental Engineering : P. Venugopala Rao, Prentice – Hall of India Pvt. Ltd. Delhi

Paper – II : WILD LIFE STUDIES

1. **Wild life studies:** Global status, significance and scope with particular reference to India.
2. **Wild life distribution and value :** Global distribution, Indian wild fauna, Wildlife byproducts and trade, Ethical value, Scientific value, medicinal value, game and recreation value, ecological value, wild life as natural resource in India.
3. **Wild life extinction :** Natural endangered species, cause of extinction, causes of accelerating rate of extinction. Species endangered due to human induced environmental change. Vulnerable species, threatened species, greatly endangered species, extended species from India.
4. **Wild life conservation :** Historical background, Need of conservation projects in India.
5. **Wild life conservation movements :** Global and National Zoos, National parks, Dangerous animals and man, Human reactions to danger our animal conservation.
6. **Wild life Management :** Biological and ecological basis of wild life management, Principles of wild life management. Comparative studies on global and national wild life management, Management of game species, aquatic animals, reptiles and big mammals. Zoo management.
7. **Wild life and Tourism :** Role of wild life in tourism, Global and Indian status of wild life in relation to tourism, Impact of Tourism on protected wild life. Ecological impact of wild land.
8. **Organisations :** National and International, Government and Non Government organizations of conservation and management of wild life.
9. **Wild life and legislation :** Constitutional provisions, National and International laws, Effectiveness of wild life protection act – 1992.

References :

1. Global Biodiversity Assesment , V.H.Heywood & Watson , R.T.
2. Singh, Samar, 1986. conserving India's Natural Heritage. Natraj Publisher, Dehradun.
3. Hunter, Malcolm L. Jr. 1990. Wildlife, forests and Forestry : Principles of Managing Forests for Biodiversity, Englewood Cliffs. N. J., Prentice Hall.
4. INDP 1992. Global Biodiversity Strategy, Washington, DC, World Resource Institute.
5. WCMC 1992. Global biodiversity : Status of the Earth;s Living Resources, Chapman and Hall.
6. Wilson E.O. (Ed.) 1988. Biodiversity, Washigton, D. C. National Academy Press.
7. Wildlife Demography - Analysis of Sex, Age, and Count Data John Skalski, Kristin Ryding and Joshua Millspaugh Academic press, November 2005.
8. Wildlife Study Design (2nd edition) Edited by Morrison, M.L., Block, W.M., Strickland, M.D., Collier, B.A., Peterson, M.J. Springer, 2008.

Paper – III : ENVIRONMENT AND HEALTH

1. Concept of Environment and Health.

- Geographic approach
- Ecological approach
- Biological approach
- Clinical approach

2. Natural calamities and disease epidemiology.

Earth atmosphere system and global health changes.

- Exogenous – endogenes and anthropogenic.
- Disease epidemiology in environmental hazards.
- Disaster management in relation to human health and survival.

3. Environmental health hazards.

- Health hazards of the Physical Environment.
- Health hazards of the Chemical Environment
- Health hazards of the Biological Environment.
- Health hazards of the Human Environment.

4. Environmental health assessment, monitoring and protection :

- Health surveillance by medical examination.
- Monitoring exposure levels of toxic agents.
- Risk assessment and safety and occupational epidemiology.

5. Environmental health protection programme :

- Health protection programme.
- Health services and administration
- Integrated health care.

6. Improvement in environment health conditions :

- A community base approach.
- Urbanization environmental health and related problems.

7. Statutory provisions on environmental health and safety.

8. Needs and priorities of improvement of environmental health.

References:

1. Environmental Geology, K. Valdia, Tata McGraw Hill Publishing House.
2. Lal D.S., Climatology, Parag Pustak Bhavan, Allahabad.
3. Moeller, Dave, W. 1992. Environmental Health. Cambridge, Mass : Harvard University Press.
4. Kathryn Hilgenkamp Environmental Health: Ecological Perspectives , Jones And Bartlett Publishers (Sep 2005).
5. K. Park., Preventive and Social Medicine, Banarsidas Bhanot Publishers, Jabalpur.
6. May J.M., The Ecology of Human Disease, M. D. Publications, New York.

Paper – IV : INDUSTRIAL POLLUTION

1. Present status of industrial pollution in India :

Nature of general neglect of safety measures and its ecological ill effects, Size and issues of the problem, Economics of pollution measures, legal provisions for industrial pollution control, land, river and air pollution in major industrial cities in India, Health and occupational hazards.

2. Chemical analysis of Pollutants :

Sampling of air, water and soil, analysis of gas, water and soil by using national and international standard recommended methods, detailed study of particulate matters, biological and biochemical techniques.

3. Industrial wastewater treatment :

Extension of aerobic and anaerobic methods to industrial effluents, recovery of pollutants by various physico-chemical methods like precipitation, solvent extraction, chemical conversion and biodegradable or less hazardous products, economics, ultimate use of pollutants, process plant designs.

4. Treatment of industrial gaseous discharges :

Process plant designs for gas and vapor treatments recovery economics.

5. Pollution control in heavy industries :

Nature and composition of effluents, treatment methods presently applied, development of process for bringing down the pollutant levels to allowed levels and zero level, Recovery and recycle economics, Process plant designs in (a) fertilizer industry, (b) Petroleum refineries and petrochemical industries, (c) sugar and byproduct industries, (d) textile industries, (e) ferrous and non ferrous metallurgy, (f) Paper and pulp industries, (g) electroplating and metal finishing (h) production of heavy chemicals and (i) tanning industry.

6. Strategies for developing pollution free industrial process :

Need for developing alternative safe technologies, chemical methods involving elimination of highly corrosive and toxic reagents like H_2SO_4 , Cl_2 etc. Use of functional polymers, their synthesis and application in development of safe industrial processes, Use of less hazardous pathways for synthesis, Elimination of objection chemicals residues like pentachlorophenol, pesticide residues, microorganisms forming export quality consumer goods.

References :

1. Mahajan S. P. : Pollution control In Process Industries Tata Mc Graw-Hill pb. 1991.
2. Metcalf and Eddy : Waste water Engineering : Treatment, Disposal and Reuse, Tata McGraw Hill, 1999
3. Eckenfelder Jr. W. W.: Principles of water Quality Management EBI Boston, 1980.
4. Environmental Pollution Control, C.S. Rao, Wiley Eastern Ltd.,1993
5. Air Pollution Control and Engineering, De Nevers, Mc Graw Hills, 1993
6. Fundamentals of Environmental Pollution, Krishnan Khannan S.Chand & Company Ltd.,1994.
7. Environmental Chemistry, A.K.De., New Age Intl. pub Co, New Delhi, 1990.
8. .Environmental Pollution Anlysis- Khopkar

Second Semester

DISSERTATION

The candidate shall submit the dissertation on problem connected with any one disciplines of his papers.