

TAMIL NADU PUBLIC SERVICE COMMISSION

SYLLABUS

Code No.168

SUBJECT: ENVIRONMENTAL SCIENCE (DEGREE STANDARD)

UNIT I : Scope and Importance of Environmental Science

Definition; multidisciplinary nature of environmental science, scope and importance; global environmental problems; components of environment: biotic, abiotic (Lithosphere, Hydrosphere and Atmosphere).

UNIT II : Ecological Concepts

Ecosystem definition, structure and function; energy flow, food chain and food web; ecological pyramids Biogeochemical cycles (Carbon, Nitrogen and Phosphorus); Hydrological cycle; ecosystem types: ponds, ocean, river, cropland, wetland, desert, forests and grassland; ecological succession; primary, secondary and tertiary producers.

UNIT III : Environmental resources

Water – supply, demand ; soil – structure, formation, erosion, conservation; land use; plant and animal resources; resource management; conservation; forest management, multipurpose dams, sustainable agriculture, mineral resources, conventional and non-conventional energy resources, food resources.

UNIT IV : Biodiversity and Conservation

Definition : Types of biodiversity; genetic, Species and ecosystem biodiversity; Cultural values, importance of biodiversity; hot spots of biodiversity; India as a megadiversity centre; threats to biodiversity: rare, endangered, threatened and endemic species ; biogeographical distribution of species; biodiversity conservation – *in-situ* , *ex-situ* and agrobiodiversity conservation, national parks and sanctuaries; wildlife conservation ; Red data book ; medicine ; sustainability , Intellectual Property Right (IPR).

UNIT V : Human Population and Environment

Concept ; Population characteristics , growth, dynamics ; age pyramids ; Malthus theory; population explosion ; environmental impact on human health ; population regulation, Anthropogenic influence on the quality of environment; developmental projects, human displacement and rehabilitation, Tribal population and welfare

schemes, women and child Welfare; social issues connected with communicable diseases; HIV and AIDS.

UNIT VI : Natural catastrophes and Disaster Management

Causes and effects of natural catastrophes – earthquakes, floods, cyclones, hurricanes, storms, landslides, drought, famine, tsunami and epidemics ; pre-disaster and post -disaster management, risk assessment, role of administrators – scientists, planners, volunteers; early warning system and forecasting.

UNIT VII : Environmental Pollution

Definition of pollution and pollutants; types of pollution; causes of pollution, major pollution- air, water, soil, noise, thermal, nuclear; effects of pollution and control measures; liquid and solid waste management.

UNIT VIII : Environmental Management and Legislation

Environmental Impact Assessment (EIA) : Objectives, Principles of Process, screening of projects, methodologies, checklist and documentation, prediction methodologies, public participation, limitation of EIA ; Environmental Protection Acts in India : air, water, biodiversity, wildlife, forest; Lake and River action programmes; coastal zone management; pollution control boards, Management plans using Geographic Information System (GIS) and Remote Sensing (RS) tools.

UNIT IX : Environmental Organisations and Agencies

International Organisations : United Nations Environment Programme (UNEP), International Union for Conservation of Nature and Natural Resources (IUCN), International Panel on Climate Change (IPCC), International Panel on Oceans (IPO), Earth Summit, Convention on Biological Diversity (CBD), World Wildlife fund (WWF), National Organisations : Man and Biosphere Programme (MAB), Ministry of Environment and Forests (MoEF), Ministry of Earth Sciences (MoES), Role of NGOs.

UNIT X : Global Climate Change

Introduction – Measurement of Climate Change , Earth's Natural Greenhouse Effect – The Greenhouse Gases – CO₂ Emissions – The Earth's Carbon Reservoirs – Carbon Cycling: Examples – Climate and Weather – Global Wind Systems – Clouds, Storms and Climates – Global Ocean Circulation – Climate through the last 1000 years – Determining Past Climates – Causes of Millennial Scale change – Climate and CO₂ in the Atmosphere – Recent Global Warming – Climate Change in the Political Realm – The Link to the Ozone Problem – Disease and society – Designing Policy Responses.

References:

1. A text book of Environment, Agarwal, K. M., Sikdar, P.K. and Deb, S.C., (2002), Mac Millan Indian Ltd, Kolkatta.
2. Fundamental and Environmental Ecology, III Edition, (1971) Odum, E.P., Prentice Hall.
3. Environmental Chemistry, De A.K. Wiley Eastern Ltd.
4. Environmental Science Systems & Solutions, McKinney, M.I. & Schock, R.M. 1996. Web enhances edition..
5. Environmental Science, Miller, T.G.Jr., Wadsworth Publ.Co. (TB).
6. Waste Water treatment, Rao M.N. and Datta, A.K. 1987. Oxford & IBH Publ. CO. Pvt. Ltd.
7. Down to Earth, Centre for science and Environment (R).
8. Environmental Science, (Principles and Practice). Das, R.C., and Behera, D.K. (2008) Prentice-Hall of India, Pvt. Ltd.
9. Essentials of Environmental studies, Kurian Joseph., and Nagendran, R., (2004). Pearson Education (Singapore) Pte, Ltd.
10. Environmental Studies, V. Balu, Sri Venkateswara Publications, Chennai 2007.
11. Environmental Biology, P.D. Sharma, Rastogi Publications, Meerut 2003.
12. Ecology, Environment and Resource Conservation, J. S. Singh., S.P. Singh and S.R. Gupta, Anamaya Publications, New Delhi.
13. Pollution Control Legislation, Volume I and II, Tamil Nadu Pollution Control Board (1999). TNPC Board, Chennai.
14. An Advanced Testbook on Biodiversity – Principles and Practice, Krishnamurthy, K.V. (2003). Oxford and IBH Publishing, New Delhi.
15. Principles of Environmental Science 2007: Inquiry and Applications by Cunningham and Cunningham, 2nd Edition.
16. Websites :
 1. Ministry of Environment & Forests, Government of India, NewDelhi.
 2. Ministry of Earth Sciences, Government of India, New Delhi.
 3. Ministry of Tribal Welfare, Government of India, New Delhi.
 4. Natural Biodiversity Authority of India, Chennai.
 5. Pollution Central Board, Chennai.

