ST. JOSEPH'S COLLEGE
JAKHAMA
(Autonomous status granted by UGC notification No.F.22-1/2017(AC) Dtd.11th Oct.2018)
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NAAC Grade A (CGPA: 3.12)

Sample for Course Objectives (COs) and Course Specific Objectives (CSOs)

NAME OF THE PAPER (CODE) : **ENVIRONMENTAL STUDIES (MDC1)**
Number of Credit : **4**
Number of Hours of Lecture : **45**

COURSE OBJECTIVES (COs)

The following are the Course Objectives (COs) for the paper Environmental Studies:

CO 1:	To make the students understand the concept of environmental studies and ecosystems.
CO 2:	To enable the students in understanding the significance of natural resources, their role in sustaining life and issues related to various resources.
CO 3:	To create an understanding among the students on biodiversity and conservation, and associated environmental services.
CO 4:	To acquaint the students about various environmental pollution, policies and practices.
CO 5:	To make the students aware about various interactions between human communities and the environment.

COURSE SPECIFIC OBJECTIVES (CSOs)

Unit & Title	Unit Contents	Course Specific Objective (CSOs)	Lecture Hours	Marks	LOs
UNIT 1 Introduction to Environmental Studies and ecosystems	• Definition, Scope and importance of environmental studies. Multi-disciplinary nature of environmental studies. • Components of the environment: the atmosphere, hydrosphere, lithosphere, biosphere. • Concept of sustainability and sustainable development. • Definition and concept of ecosystem, Structure (biotic and abiotic) and Function of an ecosystem: Energy flow (ecological pyramid), food chain, food webs and ecological succession.	**CSO 1.1:** to state the concept of environmental studies through definition, scope, and importance of the subject. (K) **CSO 1.2:** to discuss the multidisciplinary nature of environmental studies and how different disciplines can contribute to the understanding of the environment. (U) **CSO 1.3:** to explain the fundamental components that constitute our environment and the interactions among different components. (U) **CSO 1.4:** to understand sustainable practices and the importance of balancing human needs with environmental preservation. (U) **CSO 1.5:** to describe the intricacies of ecosystems and its structure including	8	15	Not to be filled-in

		both biotic and abiotic components. (K) **CSO 1.6:** to discuss the concepts of energy flow (ecological pyramid), food chains, food webs, and ecological succession, and how they affect the stability and diversity of ecosystems. (U)			
UNIT 2 Natural Resources	• Natural resources: Renewable and Non-Renewable Resources. • Land degradation, soil erosion and desertification. • Deforestation: Causes and its consequences. Impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. • Water resources: Uses of water and over-exploitation of surface and ground water. Conflicts over water sharing (international & inter-state - case studies). • Energy resources: use of alternate energy sources.	**CSO 2.1:** to define renewable and non-renewable resources. (K) **CSO 2.2:** to explore the causes and consequences of land degradation, soil erosion and desertification. (A) **CSO 2.3:** to elaborate the various causes and the consequences of deforestation. (U) **CSO 2.4:** to discuss the impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. (U) **CSO 2.5:** to explore the importance and challenges related to water resources such as over-exploitation of surface and ground water, conflicts over water sharing. (A) **CSO 2.6:** to identify alternate energy sources. (A)	9	20	Not to be filled-in
UNIT 3 Biodiversity and Conservation	• Definition, Levels of biological diversity: Genetic, species and ecosystem diversity; Bio geographic zones of India, Biodiversity hotspots. • India as a mega-biodiversity nation; Endangered and endemic species of India, IUCN Red list and its categories. • Threats to biodiversity: Habitat loss and fragmentation,	**CSO 3.1:** to define biodiversity. (K) **CSO 3.2:** to characterise genetic, species and ecosystem diversity. (U) **CSO 3.3:** to distinguish biogeographic zones of India. (A) **CSO 3.4:** to list biodiversity hotspots. (K) **CSO 3.5:** to illustrate India as a megadiversity nation. (A) **CSO 3.6:** to discuss endangered and endemic species of India. (U)	9	24	Not to be filled-in

	poaching of wildlife, man-wildlife conflicts, biological invasions. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity, keystone species. • Ecosystem and biodiversity services: Ecological, economic, social, ethical and aesthetic value, CEPA, option value.	**CSO 3.7:** to define IUCN red list and its categories. (K) **CSO 3.8:** to determine threats to biodiversity such as habitat loss and fragmentation, poaching of wildlife, man-wildlife conflicts, biological invasions. (A) **CSO 3.9:** to define conservation of biodiversity. (K) **CSO 3.10:** to explain in-situ and ex-situ conservation of biodiversity. (U) **CSO 3.11:** to define keystone species. (K) **CSO 3.12:** to identify ecosystem and biodiversity services *viz*., ecological, economic, social, ethical and aesthetic value, Communication, Education and Public Awareness (CEPA), option value. (A)			
UNIT 4 Environmental Pollution, Policies and Practices	• Environmental pollution: causes, effects and its control measures of Air, Water, Soil and Noise pollution, Solid waste and its management. • Climate change, global warming, ozone layer depletion, acid rain and its impacts. • Environment Laws: Environment Protection Act (1986); Air (Prevention & Control of Pollution) Act, 1981, Water (Prevention and control of Pollution) Act, 1974, Wildlife Protection Act (1972), Forest Conservation Act, 1980.	**CSO 4.1:** to describe environmental pollution. (K) **CSO 4.2:** to investigate causes, effects and control measures of air, water, soil, and noise pollution. (A) **CSO 4.3:** to characterise solid wastes and its management. (U) **CSO 4.4:** to explain climate change, global warming, ozone layer depletion, acid rain and its impact. (U) **CSO 4.5:** to describe environmental law. (K) **CSO 4.6:** to write about International Conventions on Environment: CITES, UNFCCC, Ramsar convention and Vienna convention, Montreal protocol, Kyoto protocol, and Convention on Biological	11	26	Not to be filled-in

	• International Conventions on Environment: CITES, UNFCCC, Ramsar convention and Vienna convention, Montreal protocol, Kyoto protocol, and Convention on Biological Diversity (CBD)	Diversity (CBD). (K)			
UNIT 5 Human Communities and the Environment	• Human population growth: Impacts on environment and human health. • Disaster management: floods, drought, earthquake, cyclones and landslides. • Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan, Narmada Bachao andolan. • Environmental communication and public awareness.	**CSO 5.1:** to explain human population growth. (U) **CSO 5.2:** to analyse its impact on environment and human health. (A) **CSO 5.3:** to define disaster management. (K) **CSO 5.4:** to explore floods, drought, earthquake, cyclones and landslides and its mitigation. (A) **CSO 5.5:** to discuss environmental movements. (U) **CSO 5.6:** to develop environmental communication and public awareness. (A)	8	15	Not to be filled-in

Field work\Outreach\Dissertation related activities (Internal Assessment–20 marks)

• Field visit to nearby polluted sites for assessing the impacts on environment and the lives and economy of the local people – solid waste study site, water pollution, air pollution, soil pollution and developmental project sites.

• Study of structure and function of ecosystems – field visit to a forest, river/streams, hill/mountains and grassland.

• Study and documentation of common plants, insects and animals species.

• Visit to a nearby village and educational institutions for environmental education and public awareness; interact with the local people, the problems faced and ways to solve the environmental issues.

Suggested readings

1. Agarwal, K.C. (2001). Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmadabad – 380 013, India, Email: mapin@icenet.net (R)
3. Bharucha Erach, Textbook of Environmental studies for Undergraduate Courses (3rd edition), Universities press (India) private limited, Himayatnagar, Hyderabad 500 029.

4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. (2001). Environmental Encyclopedia, Jaico Publ. House, Mumbai.
5. Heywood, V.H & Waston, R.T. (1995). Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
6. Jadhav, H & Bhosale, V.M. (1995). Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
7. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
8. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
9. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
10. Wanger K.D., (1998). Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p (M) Magazi
11. Climate Change: Science and Politics. (2021). Centre Science and Environment, New Delhi.
12. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. (2006). Principles of Conservation Biology. Sunderland: Sinauer Associates.
13. Mc Cully, P. (1996). Rivers no more: the environmental effects of dams (pp.29-64). Zed Books.
14. Nandini, N., Sunitha N., & Sucharita Tandon. (2019). A text book on Environmental Studies (AECC). Sapna Book House, Bengaluru.
15. Odum, E.P., H.T. & Andrews, J. (1971). Fundamentals of Ecology. Philadelphia: Saunders.
16. Pepper, I.L, Gerba, C.P. & Brusseau, M.L. (2011). Environmental and Pollution Science. Academic Press.
17. Rajit Sengupta and Kiran Pandey. (2021). State of India's Environment 2023: In Figures. Centre Science and Environment.
18. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. (2012). Environment. 8th Edition. John Wiley & Sons.
19. Rosencranz, A., Divan, S., & Noble, M. L. (2001). Environmental law and policy in India.
20. Sengupta, R. (2003). Ecology and economics: An approach to sustainable development. OUP.
21. Singh, J.S., Singh, S.P. and Gupta, S.R. (2014). Ecology, Environmental Science and
22. Conservation. S. Chand Publishing, New Delhi.