

Pool of DSE

DISCIPLINE SPECIFIC ELECTIVE COURSE –DSE-4 :

Course title& Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Natural resources and their Sustainable Utilization(BS-DSE-4)	4	2		2	Class XII pass with Biology and chemistry	NA

Learning Objectives:

Natural Resource Management (NRM) is an integrated and multidisciplinary approach combining Earth- Science, Life-Science, Environmental Science and Social Science to manage and restore natural resources and ecosystems. This paper takes an objective view of the nature of Earth's resources, how and where they are generated, how they are extracted and used, and how these activities impact Earth's environment. It also addresses sustainability by looking into different ways of conservation of the natural resources and their management. Natural Resource Management helps to balance the needs of people and the economy with protecting the ability of ecosystems to support soil, water, forests, biodiversity, recreation and other resources

Learning Outcomes:

On successful completion of the course, a student will:

- Define and differentiate between biological and physical natural resources
- Appreciate the role of natural resources in ecological, economic and socio-cultural activities
- Understand the effect of anthropogenic interference on natural resources
- Understand the laws and policies associated with resource management and conservation

SYLLABUS for DSE-4

Course Contents – Theory

Unit 1: Natural Resources and Sustainable Utilization

No. of hours: 3

Definition and types of Natural resources. Concept of sustainable utilization and approaches (economic, ecological and socio-cultural), ecotourism

Unit 2: Land and Water**No. of hours: 6**

Land resources and land use patterns and changes: Land as a resource, land degradation, landslides (natural & man-induced), soil types of India, soil erosion and desertification. Water resources (Fresh water (rivers, freshwater lakes, salt lakes, groundwater, aquifers, watershed); Marine; Estuarine), Use and over-exploitation of surface and ground water, floods, drought. Effects of climate change on water and land.

Unit 3: Biological Resources**No. of hours: 5**

Importance of Biological Resources in Human welfare. Threats; Management strategies; Bioprospecting;

IPR (Intellectual Property Rights); CBD (Convention on Biological Diversity); National Biodiversity

Action Plan, National Green Tribunal (NGT) and its role.

Unit 4: Forests and Energy**No. of hours: 8**

Forests & forest resources of India: Use and over-exploitation, Major and minor Forest products. Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, impact of growing energy needs and energy crisis- remedial measures.

Unit 5: Contemporary practices in Resource Management**No. of hours: 8**

Environment Impact Assessment (EIA), Geographical Information System (GIS), Participatory Resource Appraisal, Ecological Footprint with emphasis on carbon footprint, Resource Accounting; Types of waste and their management. National and international efforts in resource management and conservation

PRACTICALS**CREDITS: 2****TOTAL HOURS: 60**

1. Estimation of solid waste generated by a domestic system (biodegradable and non-biodegradable) and its impact on land degradation.
2. Collection of data on vegetation/ forest cover of specific city/state (any two) and correlate with conservation and socio economic practices.
3. Measurement of dominance of woody species by DBH (diameter at breast height) method.
4. Calculation and analysis of ecological footprint.
5. Estimation of soil organic carbon by Walkley and Black's method.
6. Ecological modeling.
7. Estimation of dissolved carbon-dioxide in different water samples.
8. Soil Analysis for water holding capacity, pore-space, cation-exchange capacity
9. Visit to landfill sites/ mining area/ sewage treatment plant.

Essential Readings:

1. Craig, J.R., Vaughan, D.J. Skinner, B.J. (1996). Resources of the Earth: Origin, Use, and Environmental Impact (2nd ed). Prentice Hall, New Jersey.
2. Klee, G.A. (1991). Conservation of Natural Resources. Prentice Hall Publ. Co., New Jersey
3. Owen, O.S, Chiras, D.D. and Reganold, J.P. (1998). Natural Resource Conservation – Management for Sustainable future, (7th Edn.), Prentice Hall.
4. N. Vasudevan, Essentials of Environmental Science, Narosa Publishing House, (New Delhi), 2006
5. Vasudevan, N. (2006). Essentials of Environmental Science. New Delhi: Narosa Publishing House.
6. Sharma, P. D. (2017). Ecology and Environment. Meerut: Rastogi Publications

Additional Resources

1. J. S. Singh, S.P Singh and S. Gupta, Ecology, Environment and Resource Conservation, Anamaya Publications, (New Delhi), 2006
2. An P.P Rogers, K.F Jalal and J.A Boyd, Introduction to Sustainable Development, Prentice Hall of India Private Limited (New Delhi), 2008