## DISCIPLINE SPECIFIC ELECTIVES (BOT-DSE-06)

**Credit distribution, Eligibility and Pre-requisites of the Course**

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| **Natural Resource Management**<br><br>**BOT-DSE-06** | 4 | 2 | 0 | 2 | Class XII pass with Biology/ Biotechnology | **Nil** |

**Learning Objectives:**

- Natural Resources are materials from earth which support life and significantly meet the needs of people. The paper aims to describe the different types of natural resources and their management. Students will study about the importance of each natural resource and how and why they are threatened in current times. They will also be taught about sustainably using our resources

**Learning outcomes:** At the end of this course, students will be able to:

13. understand the different resources available in nature
14. learn the importance of each resource along with the threats to these resources
15. gain an in-depth understanding of management of these resources and also restoration of natural ecosystems
16. study the importance of sustainable practices
17. gain an insight into various initiatives taken the world over to save our natural resources.
18. understand the concept of clean energy and management of waste

**Unit 1: Natural Resources** **01 Hours**
Definition, fundamental concepts and types

**Unit 2: Sustainable Utilization** **04 Hours**
Concept, goals, approaches (economic, ecological, socio-cultural)

**Unit 3: Land Resources** **06 Hours**
Forests (definition, threats, management); Agricultural practices and their impact; Soil degradation (causes, management and remediation/restoration strategies)

**Unit 4: Water Resources** **04 Hours**

Freshwater, Marine, Estuarine, Wetlands – Threats and Management

**Unit 5: Biological Resources** **03 Hours**
Biodiversity – Levels, Significance, Threats, Management

**Unit 6: Energy** **02 Hours**
Clean energy strategies – Solar, Wind, Hydro, Tidal, Geo-thermal, Bio-energy

**Unit 7: Climate Change** **04 Hours**
Impact, adaptation and mitigation (Land, Soil, Water, Biodiversity, Air)

**Unit 8: Contemporary practices** **04 Hours**
EIA, GIS, Energy Audits, Waste Management, Ecosystem Restoration, Carbon footprint

**Unit 9: National and International Initiatives** **02 Hours**
International Solar Alliance; Ramsar Convention; Basel Convention; Carbon Neutral Goals; Net-zero Coalition; Clean Development Mechanism; CAMPA (Compensatory Afforestation Fund Management and Planning Authority); Carbon Credits; REDD+ project, Renewable Energy Certificates

**Practicals** **60 hours**

5. Comparison of pH (pH meter) and salinity (Electrical Conductivity) of various soil samples.
6. Comparison of field capacity of various soil samples.
7. Comparison of pH (pH meter) and TDS (TDS meter) of various water samples.
8. Comparison of salinity (titrimetric method) of various water samples.
9. Calculation and comparison of BOD and COD of various water samples from given data.
10. Comparison of species diversity in various communities by Shannon-Wiener Index.
11. Measurement of dominance of woody species by DBH method in the college campus.
12. Project (any one of the following):
    6. Rainwater harvesting (site visit)
    7. Ecological restoration (site visit)
    8. Energy audit
    9. Seed germination and seedling growth in garden and contaminated soils
    10. Composting
    11. Any other
13. Field visit/s to any degraded ecosystem (landfill, polluted water body, invaded forest) or any ongoing restoration project site.

**Suggestive readings:**


- Vasudevan, N. (2006). Essentials of Environmental Science. New Delhi, India: Narosa Publishing House.
- Singh, J. S., Singh, S.P. and Gupta, S.R. (2006). Ecology, Environment and Resource

Conservation. New Delhi, India: Anamaya Publications.
- Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. New Delhi, India: Prentice Hall of India Private Limited.

**Additional resource:**

10. https://moef.gov.in/en/division/forest-divisions-2/campa/compensatory-afforestation-fund-management-and-planning-authority-campa/
11. https://www.un.org/en/climatechange/net-zero-coalition
12. https://www.recregistryindia.nic.in/
13. https://static.investindia.gov.in/National%20Policy%20on%20Biofuels.pdf
14. https://cri.nccf.in/
15. https://www.investindia.gov.in/team-india-blogs/carbon-financing-india
16. https://www.un-redd.org/
17. Ecosystem Restoration for People, Nature and Climate https://wedocs.unep.org/bitstream/handle/20.500.11822/36251/ERPNC.pdf
18. Managing Ecosystems In The Context Of Climate Change Mitigation: A review of current knowledge and recommendations to support ecosystem-based mitigation actions that look beyond terrestrial forests https://www.cbd.int/doc/publications/cbd-ts-86-en.pdf
19. Jordan III, W. R., Gilpin, M. E., Aber, J. D. (1987). Restoration Ecology: a synthetic approach to ecological research. Cambridge, Great Britain: Cambridge University Press.

**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**