

DISCIPLINE SPECIFIC ELECTIVE (DSE-EVS-12): ECOSYSTEM STEWARDSHIP

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 | | |
| DSE-EVS-12: ECOSYSTEM STEWARDSHIP | 4 | 2 | 0 | 2 | Class XII pass | NA |

Learning objectives

The Learning Objectives of this course are as follows:

- Introduce the principles and practices of ecosystem stewardship for valuing ecosystems from the perspective of ecology, society, and economy
- Explore the challenges and opportunities of managing ecosystems in a changing world.
- Provide hands-on experience in ecosystem management through practical exercises and case studies
- Foster communication and collaboration skills for engaging with stakeholders in ecosystem stewardship

Learning outcomes

After the course, students will be able to:

- Demonstrate an understanding of the key principles and practices of Ecosystem Stewardship
- Identify and describe the ecological, social, and economic values of ecosystems
- Apply practical tools and techniques for ecosystem management, including stakeholder engagement, biodiversity assessment, and habitat restoration
- Analyze and interpret data on ecosystem health and identify strategies for ecosystem restoration and conservation
- Develop effective communication and collaboration skills for engaging with stakeholders in ecosystem stewardship

SYLLABUS OF DSE-EVS-12

Theory (02 Credits: 30 lectures)

UNIT – I Introduction to Ecosystem Stewardship (2½ Weeks) (5 lectures)

Concept of Ecosystem Stewardship, Ecological Principles of Ecosystem Stewardship, Historical and Contemporary Perspectives, Role of stewardship in conservation, Ethics and Values in Ecosystem Stewardship, Importance of Ecosystem Services, Ecosystem Resilience and Sustainability, Ecosystem Restoration and Rehabilitation

UNIT – I Ecosystem Management (2 Weeks) (4 lectures)

Principles of Ecosystem Management, Ecosystem Management Planning and Implementation, Multiple Use Management, Ecosystem-Based Management, Adaptive Management, Stakeholder Engagement and Collaboration, Legal and Institutional Frameworks for Ecosystem Management, Economic Valuation of Ecosystem Services

UNIT – I Ecosystem Restoration (2 Weeks) (4 lectures)

Principles of Ecosystem Restoration, Restoration Planning and Implementation, Ecological Succession and Restoration, Restoration Techniques and Strategies, Restoration of Degraded Landscapes, Restoring Biodiversity and Ecosystem Functioning, Community-Based Restoration, Monitoring and Evaluation of Ecosystem Restoration

UNIT – IV Biodiversity Conservation and Ecosystem Services (3 Weeks) (6 lectures)

Biodiversity: importance of conservation, threats, link with ecosystem services; Conservation Planning and Implementation, Protected Areas and their Management, Habitat Restoration and Management, Wildlife Conservation, Invasive Species Management, Community-Based Conservation, Ecosystem Services: types, economic valuation, ecological and social drivers; Trade-offs and Synergies in Ecosystem Services, Payments for Ecosystem Services, Green Infrastructure and Ecosystem Services, Case studies of Ecosystem Services

UNIT – V Human Dimensions of Ecosystem Stewardship (2½ Weeks) (5 lectures)

Human-nature relationship and its impact on Ecosystems, Social-Ecological Systems and their Resilience, Indigenous and Local Knowledge Systems, Community-Based Management and Decision Making, Conflict Management and Resolution, Environmental Justice, Public Participation and Environmental Governance, Cultural Diversity and Ecosystem Stewardship

UNIT – VI Emerging Issues in Ecosystem Stewardship (3 Weeks) (6 lectures)

Influence of Climate Change on: natural ecosystems, agriculture, and urban ecosystems; Integrated watershed management, energy and natural resources, Linking technology with ecosystem stewardship, Ecosystem-based disaster risk reduction, Policy and legal frameworks, Stakeholder participation, Decentralized governance and community-based management, Future directions in ecosystem stewardship.

Teaching and learning interface for theoretical concepts

To achieve the course objectives and match with the contents, a wide range of teaching and learning tools will be employed, including (a) Formal lectures; (b) Interactive sessions using visual aid; (c) Case study analyses; (d) Hypothetical scenario building; (e) Group discussion on key topics; and (f) documentary screening and critical analyses.

Practicals/Hands-on Exercises – based on theory (02 Credits: 60 hours)

1. Conduct a baseline assessment of a local ecosystem, including identifying key ecological features, ecosystem services, and human impacts
2. Develop a management plan for a local ecosystem, including setting objectives, identifying management actions, and monitoring progress
3. Conduct a stakeholder analysis for an ecosystem management project, including identifying stakeholders, assessing their interests and needs, and developing strategies for engagement
4. Identify and map habitats in a local ecosystem, including key species and their ecological roles
5. Develop a restoration plan for a degraded ecosystem, including identifying restoration objectives, selecting appropriate restoration techniques, and monitoring progress
6. Assess the economic value of ecosystem services in a local ecosystem, including identifying beneficiaries, estimating the economic value of services, and developing strategies for payment
7. Carry out a social impact assessment of an ecosystem management project, including identifying and assessing potential social impacts, and developing strategies for mitigating negative impacts and enhancing positive impacts
8. Develop a community-based ecosystem management project, including identifying and engaging stakeholders, developing a collaborative management plan, and evaluating project outcomes
9. Develop a climate adaptation plan for a local ecosystem, including identifying vulnerable species and ecosystems, developing adaptation strategies, and monitoring progress
10. Evolve a payment for ecosystem services (PES) project for a local ecosystem, including identifying beneficiaries, estimating the economic value of services, and developing a PES scheme
11. Conduct an ecosystem-based disaster risk reduction project, including identifying vulnerable ecosystems, developing strategies for risk reduction, and monitoring progress
12. Develop a water resources management project within your institute or residential area, including identifying and addressing water scarcity, improving water quality, and developing water governance mechanisms
13. Plan an urban ecosystem management project, including identifying green infrastructure, improving air quality, and enhancing biodiversity in urban areas

Teaching and learning interface for practical skills

To impart training on technical and analytical skills related to the course objectives, a wide range of learning methods will be used, including (a) laboratory practicals; (b) field-work exercises; (c) customized exercises based on available data; (d) survey analyses; and (e) developing case studies; (f) demonstration and critical analyses; and (h) experiential learning individually and collectively.

Essential/recommended readings

- Baggio, J. A., Barnett, A. J., Perez-Ibarra, I., & Rubiños, C. (Eds.). (2021). *Governance for ecosystem stewardship: An institutional perspective*. Routledge.
- Chapin III, F. S., Carpenter, S. R., Kofinas, G. P., Folke, C., Abel, N., & Clark, W. C. (2010). *Ecosystem stewardship: sustainability strategies for a rapidly changing planet*. Springer.
- Hobbs, R. J., Higgs, E. S., & Hall, C. M. (Eds.). (2019). *Ecosystem stewardship: Principles and practices for sustainability and resilience*. CRC Press.
- Kareiva, P., & Marvier, M. (2012). *Conservation science: Balancing the needs of people and nature*. Roberts & Company.
- Peterson, G. D., & Cumming, G. S. (2013). *Scenario planning: a tool for conservation in an uncertain world*. The University of Chicago Press.

Suggestive readings

- Berkes, F. (2017). *Sacred ecology*. Routledge.
- Brown, K., & Westaway, E. (2011). *Agency, capacity, and resilience to environmental change: Lessons from human development, well-being, and disasters*. Routledge.
- Côté, I. M., & Darling, E. S. (2021). *Conservation in the Anthropocene ocean*. Oxford University Press.
- Kareiva, P., & Marvier, M. (2020). *Conservation science: Balancing the needs of people and nature*. Roberts & Company.
- Peterson, G. D., Cumming, G. S., & Carpenter, S. R. (Eds.). (2021). *Scenario planning for conservation and management*. Springer.

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