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| Course Title: Sustainable Natural Resource Management | | | | |
| Course code: UES 202 | No. of credits: 4 | L-T-P: 38-22-0 | Learning hours: 60 | |
| Pre-requisite course code and title (if any): None | | | | |
| Department: Natural and Applied Sciences | | | | |
| Course coordinator: | | Course instructor: | | |
| Contact details: | | | | |
| Course type: Major | | Course offered in: Semester 4 | | |
| Course Description This undergraduate course on Sustainable Natural Resource Management (NRM) focuses on the principles and practices of managing natural resources sustainably. The course will emphasize the integration of ecological, economic, and social factors in resource management, moving beyond mere conservation to encompass broader NRM principles. It aims to equip students from diverse academic backgrounds with the necessary skills and knowledge to effectively manage natural resources while considering ecological integrity, economic viability, and social equity. | | | | |
| Course objectives The course aims to build the following basic understanding among students: <ul style="list-style-type: none"> • Understand the fundamental principles of sustainable natural resource management. • Analyze the interactions between human activities and natural resources. • Develop strategies for effective and sustainable management of various natural resources. • Evaluate the socio-economic implications of natural resource management decisions. | | | | |
| Course content | | | | |
| Module | Topic | L | T | P |
| 1 | Introduction to Natural Resource Management | | | |
| | Being an introductory module, this builds a general foundation by highlighting the following basic concepts relevant to NRM: Brief introduction to natural resources and associated issues – renewable and non-renewable resources (forest resources, water resources, mineral resources, food resources, energy resources, land resources), overview of NRM concepts, Tragedy of the Commons, Ostrom’s eight principles for sustainable governance of Common-Pool Resources, importance of sustainability in resource management and roles of an individual, Human Development Index | 6 | 0 | 0 |
| 2 | Key Principles of Sustainable NRM | | | |
| | This module introduces the key principles of sustainable NRM, focusing on creating a balance between all dimensions. The contents of this module are as follows: Key principles of sustainable NRM: sustainability, equity, participation, adaptive management, precautionary principle, trusteeship of natural resources, collaboration and engagement, evidence-based decision making, long-term perspective, building resilience; Ecological principles: ecosystem functions and services; Biodiversity and its role in sustainability; 12 Principles of ecosystems approach to integrated management of resources highlighted by the Convention on Biological Diversity (CBD) | 8 | 0 | 0 |
| 3 | Economic Aspects and Social Dimensions of Sustainable NRM | | | |
| | This module introduces students to the economic aspects and social dimensions of NRM. The contents of this module are as follows: Resource economics fundamentals, renewable resources – optimal harvest, non-renewable resources – optimal depletion; Allocation of natural resources; Valuation of ecosystem services; Natural resource funds; Community involvement and stakeholder engagement; Social equity in resource distribution; Human rights and company-community agreements; Traditional Ecological Knowledge – global and Indian | 8 | 4 | 0 |

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|---|---|----|----|---|
| | perspectives; Community resource management practices; Conflict resolution in NRM: addressing conflicts over resource use | | | |
| 4 | Governance and Policy Frameworks for Sustainable NRM | | | |
| | This module introduces basic idea of governance models, strategies and policy frameworks for managing natural resources as covered under the following topics: Regulatory frameworks for NRM; Allocation of rights; Natural resources and the broader governance framework, international governance initiatives; Role of institutions in sustainable NRM; Transparency and accountability; Evidence-driven policy reforms; Resource Governance Index; Revenue sharing and decentralization; Legal and regulatory frameworks for extractive industries; State-owned enterprises: role and governance | 8 | 2 | 0 |
| 5 | Planning and Best Practices for Sustainable NRM | | | |
| | This module exposes students to the various planning aspects and some of the best practices for sustainable management of natural resources. The contents of this module are as follows: Integrated land use planning: strategies for land use optimization, balancing development and conservation needs; Water resource management: principles of sustainable water management, water scarcity and management strategies; Forest management practices: Sustainable forestry techniques, community-based forest management models; Sustainable management of bioresources; Soil conservation: importance of soil health in NRM, best practices for soil preservation and quality enhancement | 8 | 6 | 0 |
| 6 | Case Studies in Sustainable NRM | | | |
| | This module introduces global best practices and current efforts in bringing innovative practical applications of sustainable NRM principles in various environmental settings and scenarios. It also enables them to develop an understanding of the problems currently being faced during their implementation. Analysis of successful NRM initiatives globally, including Indian context and learnings; Case studies on global best practices for sustainably managing each resource type; Lessons learned from failures in resource management; Adaptation strategies for NRM under changing climatic regimes; Technological innovations, use of geospatial technologies for resource assessments; Data driven policy and decision support systems | 0 | 10 | 0 |
| | Total | 38 | 22 | 0 |
| Evaluation criteria | | | | |
| <ul style="list-style-type: none"> • Minor Test 1: Written test [at the end of teaching of modules 1 and 2] -- 15% • Minor Test 2: Written test [at the end of teaching of modules 3 and 4] -- 15% • Major Test: Written test [at the end of the semester, full syllabus] -- 40% • Assignment and Presentation -- 30% | | | | |
| Learning outcomes | | | | |
| Upon completion of the course, the students will be able to | | | | |
| <ul style="list-style-type: none"> • understand the basics of sustainable natural resource management and synthesize learnings from all the modules. [Minor Tests, Major Test] • think and develop holistic strategies for better management of natural resources [Tests, Assignment and Presentation] • developed skills to summarize and articulate the learnings from case studies. [Assignment and Presentation] | | | | |
| Pedagogical approach | | | | |
| <ul style="list-style-type: none"> • The course will be delivered through lectures, tutorials and discussion of case studies. • The course will also include guided assignments and associated student presentations. | | | | |
| Reading resources | | | | |
| <ul style="list-style-type: none"> • Anderson, D.A. (2024). <i>Environmental economics and natural resource management</i>. Routledge. • Conroy, M. J., & Peterson, J. T. (2013). <i>Decision making in natural resource management: A</i> | | | | |

structured, adaptive approach. Wiley-Blackwell.

- Dasgupta P. (2001) *Human well-being and the environment.* Oxford University Press.
- Jana, B.K., & Majumder, M. (Eds.). (2010). *Impact of climate change on natural resource management.* Springer.
- Kerr J.M., Marothia D.K., Singh K., Ramasamy C., Bentley W.M. (1997) *Natural resource economics: theory and applications in India.* Oxford and IBH Company Private Limited.
- Kumar, P., Singh, R. K., Kumar, M., Rani, M., & Sharma, P. (Eds.). (2022). *Climate Impacts on Sustainable Natural Resource Management.* John Wiley & Sons, Inc.
- Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W. (1972). *The limits to growth: A report for the club of Rome's project on the predicament of mankind.* Universe Books.
- Menon, A., Singh, P., Shah, E., Lele, S., Paranjape, S., & Joy, K. (2007). *Community-based natural resource management: Issues and cases in south Asia.* SAGE Publications.
- United Nations Conference on Trade and Development. (2020). *Natural resource management in the context of climate change.* UN. ISBN: 9789210047630

Student Responsibilities

The students are required to come prepared with readings that are suggested during the class and ensure timely submission of assignments. They are also expected to participate and further strengthen their understanding of concepts through classroom discussions and case studies.

Course Designed By:

- Dr Amit Singh, Department of Natural and Applied Sciences, TERI School of Advanced Studies, New Delhi

Course Reviewers

The course is reviewed by following reviewers:

- Dr Satyanarayan Shashtri, Associate Professor, School of Ecology and Environment Studies, Nalanda University, Rajgir, Nalanda, Bihar
- Dr Madhav Govind, Professor, Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University, New Delhi