Course title: Landscape Ecology			
Course code: NRE 169	**No. of credits:** 3	**L-T-P:** 24-04-28	**Learning hours:** 42
Pre-requisite course code and title (if any): A good knowledge of principles of geoinformatics, ecology, biodiversity and conservation is expected from each of the student attending this course work. Interests in spatial data and applications will help. Fundamentals of computers, statistics and different packages are expected for the practical component of the course work.			
Department: Department of Natural Resources			
Course coordinator: Dr. Neeti	**Course instructor:** Dr. Neeti		
Contact details:			
Course type: Elective	**Course offered in:** Semester 3		

Course Description

This course will synthesize the dominant themes of landscape ecology; familiarize students with current research trends in the field and explore applications of the landscape approach. The course will be offered to M.Sc. (Environmental Studies and Resource Management, Climate Science & Policy, Geoinformatics) and pre-Ph.D. students. Students from other programs are also encouraged to attend this. The course work expected to be useful to students perusing career in natural resources, ecology, conservation biology, landscape architecture, land use planning etc. The course will serve as foundation for decision-making and problem solving in applied fields such as conservation biology, land-use management and urban planning and development.

Course objectives

Course content

SNo	Topic	L	T	P
1.	**Introduction and Concepts** (Introduction to Landscape ecology; Scope of LE; concepts of scale & hierarchy, resolutions: extent and mapping units; Landscape elements: patch; Pattern and processes; Gradient concept of landscapes)	6	1	4
2.	**Landscape Data and Analysis** (RS and GIS; Quantifying patterns; concept of landscape metrics and interpretation; calculation of metrics and issues of multiple metrics; Spatial statistics: scale detection using semi-variograms and auto-correlograms; Introduction to landscape models)	6	0	10
3.	**Causes and Consequences of Landscape Pattern** (Agents of patterns: Physical and biotic processes, disturbances; Temporal pattern dynamics, causes: LULCC, social and cultural processes; Effects: Fragmentation, edge effects, connectivity, invasion, human-wildlife conflicts; application of landscape metrics and (multivariate) statistics)	6	1	10
4.	**Prediction and Management** (LULC prediction: Markov (LCM)/Agent based modeling (CA); Ecological modeling: GARP/MaxEnt/Random forest, Biodiversity and Landscape Management, Fragmentation (roads, edges), Applications, Operational level initiatives)	6	2	4

	Total	24	4	28

Evaluation criteria

- 2 minor tests: 20%
- Tutorials: 10%
- Practical: 30%
- Major test: 40%

Learning outcomes

Pedagogical approach

Practical

Practical will be conducted from the book:
Gergel, S. E., & Turner, M. G. (Eds.). (2006). *Learning landscape ecology: a practical guide to concepts and techniques*. Springer Science & Business Media.

The course is reviewed and commented by the following experts

1. Prof. J.S. Singh, Banaras Hindu University, Varanasi.
2. Prof. P.S. Roy, Deputy Director (RS & GIS-AA), National Remote Sensing Agency, Balanagar, Hyderabad.

Materials

Textbooks

1. Turner, M. G., Gardner, R. H., & O'neill, R. V. (2001), *Landscape ecology in theory and practice* (Vol. 401). New York: Springer.
2. Gergel, S. E., & Turner, M. G. (Eds.). (2006), *Learning landscape ecology: a practical guide to concepts and techniques*. Springer Science & Business Media.

Suggested Readings

1. Frohn R.C. (1998) *Remote Sensing for Landscape Ecology: New Metric Indictors for Monitoring*, Modeling and Assessment of Ecosystems, Lewis Publishers, Florida.
2. *Jensen J.R. (2000) Remote Sensing of the Environment: An Earth Resource Perspective, Prentice Hall.*
3. Longley P.A., Goodchild M.F., Maguire D.J. and Rhind D.W. (2005) *Geographic Information Systems and Science*, Chichester: Wiley, 2nd edition.
4. *Roy P.S. (2003) Geoinformatics for Tropical Ecosystems*, Bishen Singh Mahendra Pal Singh, Dehradun.
5. Sanderson J. and Harris L.D. (2000) *Landscape Ecology: A Top Down Approach*, Lewis Publishers. USA.
6. Turner G.M., Gardner H.R. and O'Neill V.R. (2001) *Landscape Ecology in Theory and Practice: Pattern and Processes*, Springer, New York.
7. Busi J.D. and Turner LR. (1977) *Landscape Ecology in Theory and Practices: Pattern and Process*, Springfield, NTIS.
8. *Forman R. and Gordon M. (1986) Landscape Ecology, New York, J. Wiley.*

Journals

1. Ecological Modeling
2. Forest Ecology and Management

3. Landscape and Urban Planning 4. Landscape Ecology
Additional information (if any)
Student responsibilities Attendance, feedback, discipline, guest faculty etc.