Course title: Geoinformatics for Resource Management			
Course code: NRE 175	**No. of credits:** 4	**L-T-P:** 28-06-44	**Learning hours:** 56

Pre-requisite course code and title (if any): A good knowledge of principles of geoinformatics is expected from each of the student attending this course work. Interests in spatial data and applications will help. Fundamentals of computers and different packages are expected for the practical component of the course work.

Department: Department of Energy and Environment

Course coordinator:	**Course instructor:** Dr Neeti
Contact details:	
Course type: Elective	**Course offered in:** Semester 3

Course Description

The course is conceptualized to provide competency in remote sensing (RS), geographic information systems (GIS), global positioning system (GPS), and related technologies. The course is designed as an elective to take up research work (at M.Sc./M.Phil/Ph.d. level) in the sub- fields of environmental studies, resource management and climate change studies. This elective course will be offered to students of M.Sc. (Environmental Studies and Resource Management and Climate Science & Policy) and pre-Ph.D. Students from other programs are also encouraged to attend this. This course is extension of the Principles of Geoinformatics. It is to develop skills of the students in field of RS/GIS/GPS. The course is not limited to the topics given below. The students are suggested to read different books, magazines and peer reviewed journals.

Course objectives

- Understanding digital image processing
- Understand the characteristics of spatial databases (raster and vector)
- Understand unlined principles of spatial data analysis

Course content

SNo	Topic	L	T	P
1.	**Geoinformatics for NRM** (Vegetation, water, urban landscape, soils, mineral, geomorphology)	4	0	4
2.	**Digital Image Processing** (Rectification, enhancements, classification–unsupervised, supervised, hybrid, accuracy assessment)	8	0	14
3.	**Geographical Information System** (Introduction, Data and Data Entry, Data Structure, Data Compression, Remote Sensing and GIS, Spatial Modeling, Terrain Modeling, Mobile GIS, Web Based GIS)	6	2	14
4.	**Applications of Remote Sensing (Case Studies)** National Initiatives (NNRMS/NRDMS, ISRO-DOS), Forest Cover/ Type Mapping, Degradation, Biomass estimation, Habitat Analysis, Biodiversity Characterization, Environmental Monitoring, Geo-hazard Assessment, Urban Sprawl, Solid Waste Management, Water Resources (flow direction & accumulation), Runoff and Soil Erosion Modeling, Sea Surface Temperature, Earth Observation Programme)	10	4	12
	Total	**28**	**6**	**44**

Evaluation criteria

- 2 minor tests: 20%
- Practical: 40%
- Major exam: 40%

Learning outcomes

Pedagogical approach

Materials

Required text
Burrough, P.A. and McDonnell, R.A. (1998) *Principles of geographical information systems*. Oxford University Press, Oxford, 327 pp.
Campbell, J.B. (2002) Introduction to remote sensing, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.

Suggested readings
Heywood I., Cornelius S. and Carver S. (2006) *An Introduction to Geographical Information Systems*, Prentice Hall, 3rd edition.
Jensen J.R. (2000) Remote Sensing of the Environment: An Earth Resource Perspective, Prentice Hall, ISBN 0-13-489733-1.
Joseph G. (2003) ***Fundamentals of Remote Sensing,*** Universities Press, Hyderabad.
Lillesand T.M., Kiefer R.W. and Chipman J.W. (2003) Remote Sensing and Image Interpretation, 5th ed., Wiley. ISBN 0-471-15227-7.
Longley P.A., Goodchild M.F., Maguire D.J. and Rhind D.W. (2005) *Geographic Information Systems and Science*, Chichester: Wiley, 2nd edition.
Malczewski J. (1999) *GIS and Multicriteria Decision Analysis*, New York, John Wiley and Sons.

Case studies
Websites

Journals
Advances in Water Resources
Agricultural and Forest Meteorology
Asian Journal of Geoinformatics
Ecological Modelling
Geocarto International
International Journal of Geoinformatics
International Journal of Remote Sensing
ISPRS Journal of Photogrammetry and Remote Sensing
Journal of Indian Society of Remote Sensing
Remote Sensing of Environment

Additional information (if any)
Magazines
Coordinates
GIM International
GIS World
GIS@development
Goespatial today
GPS World

Student responsibilities
The students are expected to submit assignments in time and come prepared with readings when provided.

Course Reviewers