Course title: Principles of Geoinformatics				
Course code: NRE 172	**No. of credits:** 3	**L-T-P:** 25-03-28		**Learning hours:** 42
Pre-requisite course code and title (if any):				
Department: Energy and Environment				
Course coordinator(s):		**Course instructor(s):** Dr Nithiyanandam Yogeshwaran		
Contact details: nithiyanandam.y@terisas.ac.in				
Course type: Core		**Course offered in:** Semester 2		

Course description

The course is an introductory in remote sensing and image interpretation. Remote sensing and its kindred technologies *viz.*, geographical information system (GIS) and global position system (GPS) will be taught. The contents are designed as a compulsory course material for all the students undergoing M.Sc. (Environmental Studies and Resource Management and Climate Science & Policy) and pre-Ph.D. The course is not limited to the topics given below. The students are suggested to read different books, magazines and peer reviewed journals. The course is designed to serve as a foundation course in order to understand the fundaments of RS/GIS/GPS and their applications in various disciplines being offered various subsequent courses officered in M.Sc./Ph.D. program. The details of the sub fields will also be dealt in Elective offered in Semester III.

Course objectives

- To introduce to the importance of spatial dataset
- To develop awareness about the sources and types of spatial dataset
- To Introduce Remote Sensing, Geographic Information Systems and Global Positioning System

Course content

Module	Topic	L	T	P
1.	**Fundamentals of Maps** (Introduction, map reading, scale, types and sources, map co-ordinate systems and projections (Cylindrical, Conic, Azimuth), map preparation, visualization and guidelines of mapping)	4	0	4
2.	**Aerial Photographs** (Introduction, geometry, scale, measurements, relief displacement, parallax, stereo photographs, height determination, visual interpretation)	6	0	8
3.	**Introduction to Remote Sensing (RS)** (Introduction, physics of RS, EMR, platforms and sensors, resolution, multispectral, thermal, microwave (RADAR), LiDAR, hyperspectral, image interpretation)	6	2	8
4.	**Global Position System** (Introduction, basic concepts, functions, data collection)	2	0	2
5.	**Geographical Information System** (Introduction, concepts, features, data models, spatial data & non-spatial data, integration and analysis)	5	0	6
6.	**Applications of Remote Sensing and GIS** (Relevance in planning, Land use/land cover, forestry, agriculture, water resources, urban sprawl, environmental studies, disaster management)	2	1	0
	Total	**25**	**3**	**28**

Evaluation criteria

- Test 1:   10% [Test 1: modules covered till week_____]
- Test 2:   10% [Test 2: modules covered till week_____]
- Practical: 40% [The end]
- Test 3:   40% [Test 3: all modules]

Learning outcomes

Students can able to think specially and in able to handle Geospatial datasets.

- Basic principles of geoinformatics
- Importance of spatial thinking
- Usage of spatial dataset

Pedagogical approach

Lectures, case studies, handles on exercise and peer learning
Materials
Compulsory reading
1. Burrough P.A. and McDonnell R.A. (1998) *Principles of Geographical Information Systems,* Oxford University Press, Oxford.
2. *Campbell J.B. (2002) Introduction to Remote Sensing, 3rd ed., The Guilford Press.*
Additional readings
3. Heywood I., Cornelius S. and Carver S. (2006) *An Introduction to Geographical Information Systems,* Prentice Hall, 3rd edition.
4. *Jensen J.R. (2000) Remote Sensing of the Environment: An Earth Resource Perspective, Prentice Hall.*
5. Joseph G. (2003) *Fundamentals of Remote Sensing*, Universities Press, Hyderabad.
6. *Lillesand T.M., Kiefer R.W. and Chipman J.W. (2003) Remote Sensing and Image Interpretation, 5th ed., Wiley.*
7. Longley P.A., Goodchild M.F., Maguire D.J. and Rhind D.W. (2005) *Geographic Information Systems and Science*, Chichester, Wiley, 2nd edition.
Journals
1. International Journal of Geoinformatics
2. Journal of Indian Society of Remote Sensing
3. Remote Sensing of Environment
Advanced Reading Material
Additional information (if any)
Student responsibilities
The students are expected to submit assignments in time and come prepared with readings when provided.

Course Reviewers

The course is reviewed by the following experts.

1. Prof. P.S. Roy, Deputy Director (RS & GIS-AA), National Remote Sensing Agency, Balanagar, Hyderabad.
2. Prof. P.K. Garg, Department of Civil Engineering, Indian Institute of Technology Roorkee, Roorkee.
3. Dr Milap Punia, Associate Professor, CSRD, Jawaharlal Nehru University, New Delhi.