Course title: Introduction to Geographic Information System (GIS)				
Course code: MEU 175	**No. of credits:** 1	**L-T-P**: 9-0-12	**Learning hours**: 15	
Pre-requisite course code and title (if any): None				
Department: Energy and Environment				
Course coordinator: Dr Nithiyanandam Yogeswaran		**Course instructor**: Dr Nithiyanandam Yogeswaran		
Contact details: nithiyanandam.y@terisas.ac.in				
Course type: Core		**Course offered in**: Semester 1		

Course description

Geographic information system is one the major component of Geo-spatial technologies. Spatial data are becoming crucial and being part of everyday life, GIS help to collect, manage, analyse and produce output from spatial data in an efficient way. Today, GIS technology is not limited to mapping as before, and used in various fields for visualisation, spatial analysis, machine learning (including artificial intelligence), and decision making.

This course is to introduce Geographic Information System and its applications to first semester students to apply knowledge of GIS in other courses offered.

Objectives

This course aspires to:

- Introduce basic concepts in GIS
- Provide exposure to basic tools and techniques in GIS software
- Introduce applications of GIS in relevant areas

Course content

Module	Topic	L	T	P
1	Evolution of cartography, Geographic Information System – definition, history, current trends and future, concepts and components of GIS, Big data in GIS, and other geospatial technologies.	3	0	2
2	Spatial data: Definition, VS Nonspatial data, types (raster and vector), characteristics, sources (including Bhuvan Geo-portal), creation, topology, and standards, Introduction to spatial data analysis. National level initiatives for creating spatial data infrastructure in India.	4	0	6
3	Applications of GIS in urban: energy, environment and planning; case studies.	2	0	4
	Total	9	0	12

Evaluation criteria

Test 1:   25%
Test 2:   50%
Practical: 25%

Learning outcomes

Upon completion of this course, a fully engaged student will be able to:

- Know the basic concepts in GIS
- Work with basic tools in GIS software
- Understand and manage spatial information
- Apply GIS tools and techniques in related applications

Pedagogical approach

Lectures, case studies discussion, hands-on exercises, and peer learning.

Materials

Books

1. Bhatta, B. (2011) Remote Sensing and GIS. OUP India.
2. Burrough, P. A., McDonnell, R. A. and Lloyd, C. D. (2015) Principles of Geographical Information Systems. OUP Oxford.
3. Chang, K. (2015) Introduction to Geographic Information Systems. McGraw-Hill Education.
4. Ian, H. (2010) An Introduction to Geographical Information Systems. Pearson Education.
5. Longley, P. A. et al. (2010) Geographic Information Systems and Science. John Wiley & Sons.
6. Weng, Q. (2011) An Introduction to Contemporary Remote Sensing. McGraw-Hill Education.

Journals references
1. Annals of GIS
2. GeoInformatica
3. International Journal of Digital Earth
4. International Journal of Geographical Information Science
5. Journal of Geographical Systems
6. Journal of Spatial Science

Magazines
1. Coordinates
2. Geospatial world
3. GIM International
4. GIS development
5. GIS World

Others
1. Other online materials including case studies to be provided in due course of time.

Additional information (if any)

Student responsibilities
The students are expected to read supplementary materials provided along with the course to get holistic knowledge about the subject. Further expected to complete practical exercises and assignments on time.

List of practicals

1. An Introduction to commonly used tools in ArcGIS software.
2. Working with Spatial data: Raster and vector data creation and importing spatial data.
3. Spatial data conversion and map making.
4. Working with Bhuvan – Indian Geo platform of ISRO.
5. Base map creation.
6. Preparing thematic layers for urban planning.

Course Reviewers

The course is reviewed by the following experts.

1. Prof Qihao Weng, Director, Centre for Urban and Environmental Change; Professor, Department of Earth & Environmental Systems, Indiana State University, USA.

2. Prof Iyyanki, Raja Ramanna, DRDO Distinguished Fellow, India; Professor of Excellence, Chiba University, Chiba, Japan; Adjunct Professor, Asian Institute of Technology.
3. Prof Nusret Demir, Deputy Dean, Faculty of Science, Akdeniz University, Turkey.