

Course No:	NRG 175
Course Title:	<b>Principles of GIS and GPS</b>
Number of Credits:	4 (2.5-0.25-1.25)
No. of Lectures-Tutorial-Practical:	32-4-40
Course Coordinator:	Guest Faculty

### **Aim**

- To provide a firm understanding of the conceptual and technical issues that affects the use of GIS and GPS
- To think about and implement geographic data management and analysis for research and a variety of planning and management applications.

### **Course Outline**

It introduces participant to the fundamentals of GIS, GPS, data models, data sources, databases, cartography, introduction to Global Positioning Systems (GPS) and geospatial metadata. It prepares the candidate for the geospatial modeling and analysis

### **Pre-requisite**

No pre-requisite required

### **Evaluation Procedure**

- 2 minor tests: 10% each
- Practical: 40%
- Major exam: 40%

### **Details of course content and allotted time**

SNo	Topic	Time (Hrs)		
		L	T	P
1.	Concept and definition of GIS, History and development of GIS technology, applications of GIS in various sectors (case study examples)	2		
2.	GIS database (types, structures) and data model	4		
3.	Geographic information and spatial data types (map, attributes, image data)	2		2
4.	Data processing systems (inputs and output devices)	2		4
5.	Data entry and preparations (inputs, editing and attributing)	4		14
6.	Introduction to GPS, history of positioning system	2		
7.	GPS system description, error sources & receiver effects, applications and status	4		2
8.	GPS performance and policy (Accuracy, avail, integrity, SPS,	2		

	PPS DoD & DoT policy, anti-spoof (A-S)			
9.	GNSS and types (NAVSTAR, GLONASS, GALILEO) introduction to DGPS, wide area augmentation system (WAAS)	2	2	
10.	Spatial data analysis (Vector/raster geoprocessing); Overlays analysis-raster and vector based overlay and their applications	4		12
11.	Issues in spatial data quality; introduction to metadata and its importance	2	2	4
12.	GIS software, introduction to open source GIS	2		2
	<b>Total</b>	<b>32</b>	<b>4</b>	<b>40</b>

### **Textbooks**

1. Berry J.K. (1993) Beyond Mapping: Concepts, Algorithms and Issues in GIS, Fort Collins, CO, GIS World Books.
2. Bolstad P. (2005) GIS Fundamentals: A First Text on Geographic Information Systems, Second Edition, White Bear Lake, MN, Eider Press, 543 pp.
3. Burrough P.A. and McDonnell R.A. (1998) Principles of Geographical Information Systems, Oxford University Press, Oxford, 327 pp.

### **Suggested Readings**

1. Chang K. (2007) Introduction to Geographic Information System, 4th Edition, McGraw Hill.
2. Elangovan K. (2006) GIS: Fundamentals, Applications and Implementations, New India Publishing Agency, New Delhi, 208 pp.
3. Heywood I., Cornelius S. and Carver S. (2006) An Introduction to Geographical Information Systems, Prentice Hall, 3rd Edition.
4. Longley P.A., Goodchild M.F., Maguire D.J. and Rhind D.W. (2005) Geographic Information Systems and Science, Chichester, Wiley, 2nd Edition.
5. Maguire D.J., Goodchild M.F. and Rhind D.W. (1997) Geographic Information Systems: Principles and Applications, Longman Scientific and Technical, Harlow.
6. Ott T. and Swiaczny F. (2001) Time-integrative GIS, Management and Analysis of Spatio-temporal Data, Berlin/Heidelberg/New York, Springer.
7. Thurston J., Poiker T.K. and Moore J.P. (2003) Integrated Geospatial Technologies: A Guide to GPS, GIS and Data Logging, Hoboken, New Jersey, Wiley.
8. Tomlinson R.F. (2005) Thinking about GIS: Geographic Information System Planning for Managers, ESRI Press. 328 pp.
9. Wise S. (2002) GIS Basics, London, Taylor & Francis.
10. Worboys M. and Duckham M. (2004) GIS: A Computing Perspective, Boca Raton, CRC Press.

### **Magazines**

1. Coordinates
2. Geospatial today
3. GIM International

4. GIS World
5. GIS@development
6. GPS World

### **Journals**

1. Asian Journal of Geoinformatics
2. Geocarto International
3. International Journal of Geoinformatics
4. International Journal of Remote Sensing
5. ISPRS Journal of Photogrammetry and Remote Sensing
6. Journal of Indian Society of Remote Sensing
7. Remote Sensing of Environment