Inter Disciplinary - 2
Geo-Spatial Techniques

Couse Objectives:

1. To provide the basic understanding of GIS and GPS.
2. To make the students conversant with geographic mapping process with data representation techniques in GIS.
3. To give the know-how of various applications of GIS in Civil Engineering.
4. To make the students familiar with GPS accessories and its applications.

Course Contents:

1. Geo-informatics: Remote Sensing-Principles, Concepts, air-photo interpretation, Data acquisition, Basic concepts of GIS & GPS.
2. Structure of GIS: Cartography, Geographic mapping process, transformations, map projections, Geographic Data Representation, Storage, Quality and Standards, database management systems, Raster data representation, Vector data representation, Assessment of data quality, Managing data errors, Geographic data standards.
3. GIS Data Processing, Analysis and Modeling: Raster based GIS data processing – Vector based GIS data processing – Queries – Spatial analysis – Descriptive statistics – Spatial autocorrelation – Quadrant counts, and nearest neighbour analysis – Network analysis – Surface modeling – DTM. GIS Applications: Case studies.
4. GPS: Basic concepts, components, factors affecting, GPS setup, accessories, segments- satellites & receivers, GPS applications, Case studies

Practical work:

1. Map generation in GIS. Vectorization, Geo-referencing of map.
2. Creating point, line, polygon layers and removal of errors.
3. Attaching Raster based and Vector based data with map.
4. Queries and Spatial analysis.
5. Network analysis.
6. Surface modeling, generation of DTM, its applications.
7. Survey with GPS receivers, collection of data and its analysis.

References:

1. Lo, C.P. & Yeung A.K.W., *Concepts and Techniques of Geographic Information Systems*, Prentice Hall of India, New Delhi, 2002.
2. Anji Reddy, M., *Remote Sensing and Geographical Information Systems*, B.S.Publications, Hyderabad, 2001.
3. Burrough, P.A., *Principles of Geographical Information Systems*, Oxford Publication, 1998.
4. Clarke, K., *Getting Started with Geographic Information Systems*, Prentice Hall, New Jersy, 2001.
5. DeMers, M.N., *Fundamentals of Geographic Information Systems*, John Wiley & Sons, New York, 2000.
6. Kennedy M., *The Global Positioning System & GIS: An Introduction*, Ann Arbor Press, 1996