**CT 785 07**

**Course Objective:**  
The student will gain the knowledge about basics of GIS with spatial data modelling and database design, capturing the real world, spatial analysis and visualization

1. **Introduction[4 hours]**
   1. Overview, History and concepts of GIS
   2. Scope and  application areas of GIS
   3. Purpose and benefits of GIS
   4. Functional components of GIS
   5. Importance of GPS and remote sensing data in GIS

1. **Spatial data modeling and database design[10 hours]**
   1. Introduction to geographic phenomena
   2. Geographic fields and objects
   3. Geographic boundaries
   4. spatial relationships and topology
   5. scale and resolution
   6. vector, raster and digital terrain model
   7. Spatial database design with the concepts of geodatabase.

1. **Capturing the real world[12 hours]**
   1. Different methods of data capture
   2. Map elements, map layers, map scales and representation
   3. Coordinate system
   4. Spatial referencing: ITRS, ITRF
   5. Different classes of Map projections
   6. Datum and Datum Transformation
   7. GPS& Remote Sensing
   8. Data preparation, conversion and integration
   9. Quality aspects of spatial data

1. **Spatial analysis and visualization[10 hours]**
   1. Functional Components of GIS
   2. Analysis of spatial and attribute data
   3. Vector and Raster overlay operators
   4. Buffering
   5. Concepts of Spatial Data Mining
   6. Qualitative and Quantitative data visualization
   7. Map outputs and its basic elements

1. **Spatial data infrastructure[5 hours]**
   1. SDI concepts and its current trend
   2. The concept of metadata and clearing house
   3. Critical factors around SDIs

1. **Open GIS[4 hours]**
   1. Introduction of open concept in GIS
   2. Open source software for spatial data analysis
   3. Overview of OpenStreetMap
   4. Web Based GIS system

**Practical**  
The lab should cover the chapters 3, 4, 5 and 6 by using the GIS tools like ArchView/ArchGIS

1. Tutorial on ArchView/ArchGIS with real world map
2. Digitization and Map Layering practice
3. Linking to Databases, Data Analysis and Visualization
4. Building of your own GIS system.

**Reference:**

1. Principles of geographic information systems: An introductory textbook, international institute for Geo-information science and Earth observation, the Netherlands- By rolf De By, Richard A. knippers, yuxian sun
2. ESRI guide to GIS analysis Andy Mitchell, ESRI press, Red lands
3. GIS Cook BOOK

**Evaluation Scheme:**  
The questions will cover all the chapters of the syllabus. The evaluation scheme witll be as indicated in the table below:

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| --- | --- | --- |
| **Chapters** | **Hours** | **Marks Distribution\*** |
| 1 | 4 | 10 |
| 2 | 10 | 18 |
| 3 | 12 | 18 |
| 4 | 10 | 18 |
| 5 | 5 | 10 |
| 6 | 4 | 6 |
| **Total** | **45** | **80** |

\*Threre may be Minor deviation in marks distribution.