

## Geographic Information System

- 1.1 Course Number: CS481
- 1.2 Contact Hours: 3-0-0 Credits: 9
- 1.3 Semester-offered: 4<sup>th</sup> Year-Odd
- 1.4 Prerequisite: Basic computer programming
- 1.5 Syllabus Committee Member: Dr. Sushum Biswas, Dr. Daya Sagar Gupta & Dr. Gargi Srivastava

2. **Objective:**

To introduce the fundamentals and components of Geographic Information System  
 To provide details of spatial data structures and input, management and output processes.

3. **Course Content:**

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	FUNDAMENTALS OF GIS	Introduction to GIS - Basic spatial concepts - Coordinate Systems - GIS and Information Systems – Definitions – History of GIS - Components of a GIS – Hardware, Software, Data, People, Methods – Proprietary and open source Software - Types of data – Spatial, Attribute data-types of attributes – scales/ levels of measurements.	12
2	SPATIAL DATA MODELS	Database Structures – Relational, Object Oriented – ER diagram - spatial data models – Raster Data Structures – Raster Data Compression - Vector Data Structures - Raster vs Vector Models- TIN and GRID data models - OGC standards - Data Quality.	8
3	DATA INPUT AND TOPOLOGY	Scanner - Raster Data Input – Raster Data File Formats – Vector Data Input –Digitiser –Topology - Adjacency, connectivity and containment – Topological Consistency rules – Attribute Data linking – ODBC – GPS - Concept GPS based mapping.	8
4	DATA ANALYSIS	Vector Data Analysis tools - Data Analysis tools - Network Analysis - Digital Education models - 3D data collection and utilisation.	5

5	APPLICATIONS	GIS Applicant - Natural Resource Management - Engineering - Navigation - Vehicle tracking and fleet management - Marketing and Business applications - Case studies.	7
		<b>Total</b>	<b>40</b>

#### 4. Readings

##### 4.1 Textbook:

- Kang – Tsung Chang, Introduction to Geographic Information Systems, McGraw Hill Publishing, 2nd Edition, 2011.
- Ian Heywood, Sarah Cornelius, Steve Carver, Srinivasa Raju, An Introduction Geographical Information Systems, Pearson Education, 2nd Edition, 2007

##### 4.2 Reference books:

- Lo.C.P., Albert K.W. Yeung, Concepts and Techniques of Geographic Information Systems, Prentice-Hall India Publishers, 2006

- 5 Outcome of the Course:** This course equips the student to
- Have basic ideas about the fundamentals of GIS.
  - Understand the types of data models.
  - Get knowledge about data input and topology.
  - Gain knowledge on data quality and standards.
  - Understand data management functions and data output