Geographic Information System

1.1 Course Number: CS363

1.2 Contact Hours: 3-0-0 Credits:9

1.3 Semester-offered: 5th Year-Odd

1.4 Prerequisite: Basic computer programming

1.5 Syllabus Committee Member: Dr. Susham 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
		Total	**40**

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