Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NCEC534	Geoinformatics in Civil Engineering	3	1	0	4

Course Objective
The course aims at familiarizing the students with the basic concepts in Geoinformatics and its applications.
Learning Outcomes
Upon successful completion of this course, students will be able to: ● Understand the concepts involved in Remote Sensing and Digital Image Processing. ● Know the basics of Geographic Information System and GPS. ● Integration of Remote Sensing and GIS ● Understand the various applications of Geoinformatics in Civil Engineering.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	**Remote Sensing:** Introduction, Application and importance of Remote Sensing, Electromagnetic spectrum, Energy interactions with Earth's surface features, Spectral signatures. **Remote Sensing Platforms and Satellites:** Ground, Airborne and Satellite based platforms, Types of satellite products. **Sensors:** Passive and Active Sensors, False Colour Composite, Characteristics of Sensor.	7L+2T	Understand the concepts of Remote Sensing, Sensors, Satellites.
2	**Photogrammetry:** Aerial Photography, Elements of Visual Image Interpretation. **Digital Image Processing:** Digital Image Structure, Remote Sensing data format. **Image Processing functions:** Preprocessing, Image Registration, Enhancement, Transformation, Classification and Analysis, Image interpretation strategies.	9L+2T	Know the basics of Photogrammetry, Digital Image Processing and functions.

3	**Geographic Information System:** Introduction, Technology and concepts, components, developments, data types, Georeferencing of data, Raster and vector data models, modeling, analysis, DEM/DTM, Spatial operations, Map integration, Multi-criteria evaluation.	9L+3T	Understand the concepts of GIS, modeling and analysis using GIS
4	**Global Positioning System:** Introduction, components and applications, Map projections, **Overview of Softwares:** Arc GIS, QGIS and ERDAS IMAGINE **Integration of Remote Sensing and GIS:** Preparation of thematic maps, Overlay analysis.	8L+3T	Know the basics of GPS, overview of various software, preparation of maps
5	**Applications of Geoinformatics in Civil Engineering:** Mapping of Flood Prone Zones, Groundwater Potential Zones, Demarcation of groundwater Contamination Zones, Landslide susceptibility zones, Watershed delineation and management, Identification of wasteland sites, Location of sites for artificial recharge, Site selection for waste land, Identification of sites for transport facilities, selection of suitable locations for infrastructure development, Resources Information Systems, Case studies.	9L+4T	Understand the applications of Geoinformatics in Civil Engineering by various Case studies
	Total Contact Hours	**42 L+14 T**	

Text Books:

1. Lillesand, T.M. and R.W. Kiefer (2000), "Remote Sensing and Image Interpretation", John Wiley.
2. Burrough, P.A. and Mc Donnel, R.A. (2000), "Principles of Geographic Information System", Oxford University Press.
3. Arora, M.K. and Badjatia, R.C. (2011), "Geomatics Engineering", Nemchand & Bros.

Reference Books:

1. Basudeb B. (2011), "Remote Sensing and GIS", Oxford University Press.
2. Chandra, A.M. and Ghosh, S.K. (2006), "Remote Sensing and Geographical Information System", ASI Ltd.
3. Anji Reddy, M. (2006), "Textbook of Remote Sensing and Geographical Information Systems", B.S. Publications.
4. Lo, C.P. and Yeung, A.K.W., "Concepts and Techniques of Geographical Information System", Prentice Hall India.
5. Dixon, B. and Uddameri, V. (2016), "GIS and Geocomputation for Water Resource Science and Engineering", Wiley.