Course Type	Course Code	Name of the Course	L	T	P	Credits
DC2	NMNC510	Geographical Information System	3	1	0	4

Objective: The course will provide a basic knowledge of GIS and engineering applications followed by an in-depth examination of spatial data formats, spatial data analysis, and geoprocessing.

Learning outcomes: Students will learn the principles of Geographic Information Systems (GIS), Apply basic graphic and data visualization concepts such as color theory, symbolization, and use of white space, give examples of interdisciplinary applications of Geospatial Information Science and Technology, apply GIS analysis to address geospatial problems and/or research questions.

Unit No.	Topics to be covered	Lecture Hours + Tutorials	Learning Outcomes
I	Introduction, Basin concepts about Spatial information and Terminology, Historical evolution and need for spatially based resource information system, Utility of GIS.	6L+0T	Students will have knowledge on GIS current status, history of cartography and uses of GIS in various applications.
II	Essential Components of GIS: hardware software requirement of GIS, Various GIS packages and their salient features, Data acquisition through scanners and digitizers	5L+0T	Students will understand the various components of GIS and available package and their silent features.
III	Raster and Vector Data: Introduction, Representation of real world via vector and raster representation model, topology and spatial relationships, Raster to Vector conversion, Data storage verification and editing	7L+2T	Students will be able to understand the concepts of various GIS models like Raster and Vector models.
IV	Data input and Quality verification: Data input, data verification, and Correction and storage data output; data user interfaces.	4L+1T	Students will be able to understand the data inputs, corrections and editing techniques
V	Data pre-processing, Georeferencing, Data compression and reduction techniques, Runlengthencoding, Interpolation of data, Database Construction, Data Output	4L+3T	Students will be able to understand the Georeferencing of various maps, interpolation techniques and database construction in GIS
VI	Database construction, database structure, Hierarchical data, Network systems, Relational database, Database management, Data manipulation and analysis	5L+2T	Students will be able to understand the importance of DBMS
VI	Spatial and mathematical operations in GIS, Overlay, Query based, Measurement and statistical modelling, Buffers, Spatial Analysis, Statistical Reporting and Graphing	4L+4T	Students will be able to analyse the GIS data through overlay operations and buffer zonation.
VII	Programming languages in GIS, Web GIS	2L+2T	Students will understand the GIS programming languages
VIII	Application of GIS to various engineering problems	5L+0T	Students will learn the applications of GIS in various domains.

	Total:	**42L+14T (56)**	

Text Books:

1. Burrough, P.A. and Mc Donnel, R.A.(1998), "Principles of Geographic Information System"
2. Kang-Tsung Chang. (2002), "Introduction to Geographic Information System"