INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)**
SEMESTER	**7**
COURSE TITLE	**GEOSPATIAL TECHNIQUES IN CIVIL ENGINEERING**
COURSE CODE	**01CI0721**
COURSE CREDITS	**3**

Objective:

1 To Understand about GIS, Data Models, Data Formats and Data Quality
2 To Analyze Advanced spatial data analysis techniques
3 To apply the spatial analysis technique for real problem solving

Course Outcomes: After completion of this course, student will be able to:

1 Identify spatial data formats and standards.
2 Analyze and connect various concepts of Geographic Information System.
3 Interpret the data models and apply the spatial analysis for real problems.
4 Evaluate the role of GIS in real world problems.

Pre-requisite of course: Surveying, Fundamentals of GIS

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction to GIS** GIS definition, Components, Functionalities, Coordinate systems, Datum, Projection, Maps – Types., Cartography – generalization – Symbolization, Spatial – Nonspatial data	6
2	**Data Representation and Data Quality** Vector data and Raster data format, Data Quality, Topology, Data Sources, Input methods, Data Accuracy, data standards, Vector data model – Georelational model – coverage data model – shape file – TIN	9
3	**Data Structure** Raster data model - Elements, Raster data structure – Run length encoding, Cell by cell encoding – Block Encoding – QuadTree, DEM – Types, Sources- DTM - DSM	10

DR. ANKUR CHANDRAKANT BHOGAYATA
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Contents : Unit	Topics	Contact Hours
4	**Spatial Data Analysis** Terrain Analysis – Slope – Aspect – Shaded relief maps - Contour, Viewshed analysis, Query – Types- spatial query – attribute query, Buffering, Vector Overlay Operations- point on polygon, line on polygon, polygon on polygon, Raster Overlay	10
5	**Advanced Techniques and Case Study** Reclassification, Measurements - vector and raster, Interpolation – Local – Global, Spatial Models – Cartographic models – Spatiotemporal models - Cell based Models, Multi-Criteria analysis case study, Site suitability case study, Change detection study	7
Total Hours		**42**

Textbook :

1 Remote Sensing and GIS, Chandra. A. M. and Ghosh S. K, Narosa Publishing House, New Delhi, 2000

References:

1 GIS Fundamentals: A First Text on Geographic Information Systems, GIS Fundamentals: A First Text on Geographic Information Systems, Paul Bolstad, Eider Press, Minnesota, 2016

2 Principles of Geographical Information System for Land Resources Assessment, Principles of Geographical Information System for Land Resources Assessment, Burrogh. P.A, Oxford Publications, 1986

3 Introduction to Geographical Information System, Introduction to Geographical Information System, Kang Tsung Chang,, Tata McGraw Hill, 2019

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
5.00	10.00	25.00	30.00	20.00	10.00

Instructional Method:

1 Prerequisite of the course and its pattern shall be discussed on the commencement of the course

2 Lectures shall be conducted in class room using various teaching aids

3 Presence in all academic sessions is mandatory which shall carry 5% marks of the total internal evaluation

DR. ANKUR CHANDRAKANT BHOGAYATA
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Instructional Method:

4 At the end of each unit/topic an assignment based on the course content shall be given to the students which shall carry 5% weightage for timely completion and submission of the assigned work

Supplementary Resources:

1 https://archive.nptel.ac.in/courses/105/107/105107206/

2 https://onlinecourses.nptel.ac.in/noc20_ce58/preview

DR. ANKUR CHANDRAKANT BHOGAYATA
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)