



# GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code 3724803

Semester – II

Subject Name: Geospatial Techniques and Planning

**Type of course:** Program Elective - III

**Prerequisite:** Understanding on survey techniques, coordinate systems, statistics, geographic features, operations using CAD tools and worksheets

**Rationale:** The course helps developing skills among students towards using the software based analysis and planning for urban areas – various tools of GIS. Subject helps orienting students to a very emerging, useful and important field of geo-spatial world wherein scopes for professional career are endless.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Concepts and fundamentals</b> Energy sources, energy interactions, ideal and real remote sensing systems, fundamentals of air photo interpretation, keys, elements of air photo interpretation for terrain evaluation, Data acquisition, various remote sensing platforms, satellites, sensors, multi spectral scanners, microwave sensing.	8
2	<b>Base data generation</b> Data acquisition, various remote sensing platforms, satellites, sensors, multi spectral scanners, microwave sensing. Digital image processing, equipment used for remote sensing; other aspects of interpretation, ground truth.	12
3	<b>Structure of GIS</b> Cartography, Geographic mapping process, transformations, map projections, Geographic Data Representation, Storage, Quality and Standards, database management systems, Raster data representation, Vector data representation, Assessment of data quality, Managing data errors, Geographic data standards.	14



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4	<b>GIS Data Processing, Analysis and Modelling</b> Raster based GIS data processing – Vector based GIS data processing – Queries – Spatial analysis – Descriptive statistics – Spatial autocorrelation – Quadrant counts, and nearest neighbour analysis – Network analysis – Surface modelling – DTM. GIS Applications: Case	12
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## Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	20	20	20	15	10

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Reference Books:

1. Lo, C. P. & Yeung A. K. W., "Concepts and Techniques of Geographic Information Systems", Prentice Hall of India, New Delhi, 2002.
2. Anji Reddy, M., "Remote Sensing and Geographical Information Systems", B.S. Publications, Hyderabad, 2001.
3. Burrough, P.A., "Principles of Geographical Information Systems", Oxford Publication, 1998.
4. Clarke, K., Getting Started with Geographic Information Systems, Prentice Hall, New Jersey, 2001.
5. De Mers, M. N., "Fundamentals of Geographic information Systems", John Wiley & Sons, New York, 2000.
6. Kennedy M., "The Global Positioning System & GIS: An Introduction", Ann Arbor Press, 1996.
7. Basudeb Bhatta; "Remote Sensing and GIS"; Second Edition; Oxford University Press (ISBN: 9780198072393)
8. Cristopher D. Lloyd; "Spatial Data Analysis (An Intro for GIS Users)"; Oxford University Press (ISBN: 978-0-19-955432-4)

