

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CIVIL (TOWN & COUNTRY PLANNING) (48) GEOSPATIAL TECHNIQUES AND PLANNING

**SUBJECT CODE: 2724803**

**SEMESTER: II**

**Type of course:** Major Elective - II

**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)			
					ESE	OEP	PA	RP		
3	2#	2	5	70	30	20	10	10	10	150

### Content:

Sr. No.	Content	Total Hrs	% weightage
<b>1</b>	Concepts and fundamentals 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	15
<b>2</b>	Base data generation 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	22
<b>3</b>	Structure of GIS 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	26
<b>4</b>	GIS Data Processing, Analysis and Modelling 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	22

	studies.		
5	<b>GPS</b> Basic concepts, components, factors affecting, GPS setup, accessories, segments satellites & receivers, GPS applications, Case studies. Applications of remote sensing, GIS and GPS, Engineering applications, land use/land cover mapping, applications to urban and regional planning, Water resources, environmental studies, transportation engineering, other civil engineering fields.	8	15

**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. Christopher D. Lloyd; “Spatial Data Analysis (An Intro for GIS Users)”; Oxford University Press (ISBN: 978-0-19-955432-4)

**Course Outcome:**

After learning the course the students should be able to:

Sensitization towards certain importance and use of geo spatial techniques and implementation in urban as well as regional planning.

**List of Experiments/ Studio (Practical):**

1. Sources of image acquisition (Remote Sensing)
2. Image Interpretation and recognition exercise
3. Various tools in GIS
4. Database management tools
5. Vactorization exercise (Raster to Vector)
6. Analysis of vectors

**Assignment work (Tutorial):**

1. Students shall refer the books and reference materials and prepare answers to the assignment problems including the topics of syllabus.
2. Students prepare a “Graduate Report” including different incidents; Innovative Technique and Practice and submit the same with presentation.
3. Students will study a case wherein GIS is used as planning tool, refer to relevant documents and prepare brief report which shall be presented.

**Research Paper (RP):**

Each students shall study at least two research papers from the listed journals on GTU portal. Each paper shall be studied – students shall prepare brief report on paper and present the findings. The same shall be presented among all students and submit to university.

**Open ended questions (OEP):**

1. Why GIS application is important in planning?
2. What are the difficulties, challenges and issues related to deployment of GIS for planning? How a ULB may overcome such?
3. What are latest innovative products launched having GPS functions?
4. What is latest practice for an urban area adopted using GIS?

**Major Equipment:**

Computers with higher configuration and internet, server.

**List of Open Source Software/learning website:**

- Cad drafting tools, Google earth (free ware)
- Google SketchUp Pro for Nonprofits  
(<https://www.google.com/earth/outreach/grants/software/sketchup.html>)
- Remote Sensing & Geographic Information System (<http://gis.nic.in/>)
- National Remote Sensing Centre (<http://www.nrsc.gov.in/>)
- Indian Space Research Organisation (<http://www.isro.org/>)
- Indian institute of Remote Sensing (<http://www.iirs.gov.in/>)
- List of geographic information systems software  
([http://en.wikipedia.org/wiki/List\\_of\\_geographic\\_information\\_systems\\_software](http://en.wikipedia.org/wiki/List_of_geographic_information_systems_software))
- Google books on GIS and Remote Sensing  
([https://www.google.co.in/search?q=Urban+Planning+Techniques&btnG=Search+Books&tbn=bks&tbo=1&gws\\_rd=ssl#q=GIS+Remote+Sensing&tbn=bks](https://www.google.co.in/search?q=Urban+Planning+Techniques&btnG=Search+Books&tbn=bks&tbo=1&gws_rd=ssl#q=GIS+Remote+Sensing&tbn=bks))

**Review Presentation (RP):** The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website