

B. Tech.-III Semester VI

Subject Name : Geo Referencing Techniques for Urban Planning

Subject Code: BTCL14605

Type of course : PEC - II

Prerequisite : Surveying (BTCL13304)

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				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Concepts and fundamentals: Introduction to integrate the system applications, basics of GNSS, applications of the tools in town planning, History of cartography, 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.	10	20%
2	Base data generation: Data structure and database management (DBMS and RDBMS), 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.	10	25%
3	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	13	30%

4	GIS Data Processing, Analysis and Modeling: Raster based GIS data processing – Vector based GIS data processing – Queries –Spatial analysis – Descriptive statistics – Spatial autocorrelation – Quadrant counts, and nearest neighbourhood analysis – Network analysis – Surface modeling – DTM. GIS Applications: Case	12	25%
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Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	40	30	5	5	10

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **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 Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Remote Sensing and image Interpretation	Lilliesand T.M. and Kiefer R.W	John Wiley and Sons, New York (ISBN: 978-1-118-34328-9)	2015	7 th
2	Geospatial techniques in urban planning	Zhenjiang Shen	Springer Heidelberg Dordrecht London Newyork (ISBN- 978-3-642-13559-0)	2012	1 st
3	Principles of Geographic Information Systems	Burrrough P.A and McDonnel R.A	Oxford university press (ISBN: 9780198742845)	2015	3 rd
4	Remote Sensing and Geographical information System	A.M. Chandra and S.K. Ghosh	Narosa Publishing House, New Delhi (ISBN : 9781842659700 1842659707)	2006	1 st
5	Remote Sensing and GIS	Bhatta B	Oxford University Press, New Delhi (ISBN: 9780198072393)	2011	2 nd

Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Observe, identify and define simple/ complex problems of day to day lives present in Industry/ Society where GIS and remote sensing applications can be useful. <i>(R, U, N cognitive level)</i>	20%
CO-2	Evaluate basic image interpretation and data image processing. <i>(R, U, A, E cognitive level)</i>	25%
CO-3	Integrate the existing data through various observations from various angles and layer creation. <i>(R, U, N, E cognitive level)</i>	15%
CO-4	Apply problem-solving methodologies to generate, evaluate and justify innovative solutions by designing and conducting/ analyzing and interpreting the data. <i>(R, U, A, E cognitive level)</i>	15%
CO-5	Demonstrate the ability to give solutions which can help communicate effectively for better interpretation. <i>(R, U, A, E cognitive level)</i>	25%

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	2	2	3	3	3	2	3	3	3	2	1	3	2	1	2
CO-2	2	2	2	2	2	1	1	2	2	1	2	3	2	2	2
CO-3	3	3	3	3	3	2	1	2	2	1	1	3	3	3	3
CO-4	3	3	3	3	3	2	2	2	2	2	1	3	2	2	2
CO-5	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2
Rationale *	12	12	13	13	13	9	9	11	11	8	8	15	11	10	11

Rationale*: The knowledge of the GIS and remote sensing applications and problem-solving methodologies satisfying majority of programme outcomes and at the end of programme, the specific objectives are also satisfied.

LIST OF PRACTICALS:

- Sources of image acquisition (Remote Sensing)
- Google earth pro data generation
- Obtaining shape files
- Georeferencing using Q-GIS
- Image Interpretation and recognition exercise
- Various tools in GIS

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- Database management tools
- Vectorization exercise (Raster to Vector)
- Analysis of vectors

Major Equipment:

1. Computers with higher configuration

List of Open Source/learning website:

- <http://gis.nic.in/>
 - Remote Sensing & Geographic Information System
- <http://www.nrsc.gov.in/>
 - National Remote Sensing Centre
- <http://www.isro.org/>
 - Indian Space Research Organization
- <http://www.iirs.gov.in/>
 - Indian institute of Remote Sensing
- http://en.wikipedia.org/wiki/List_of_geographic_information_systems_software
 - List of geographic information systems software

List of Open Source Software:

- JASP (Open Source software)
- SAS Planet (Open Source software)
- Q-GIS (Open Source software)
- SW maps
- Google Earth Pro
- Google SketchUp Pro
- ESRI City Engine (Transforms 2D GIS Data into 3D city models)
- Cad drafting tools, Google earth (free ware)
- Google SketchUp Pro for Nonprofits