Marwadi University

Syllabus for Master of Technology

Civil Engineering (Geotechnical)

Geospatial Techniques

01GT0205 (PEC)

Objective of the Course:

The main objectives of offering this course in second semester of Master of Geotechnical engineering are as following:

1. To impart the fundamentals of GIS, RS & GPS
2. Enable student to read and interpret the GIS images
3. Introduce with the applications of GIS & RS to geotechnical engg

Credits Earned: 5

Students learning outcomes:

After successful completion of the course it is expected that student will be able to..

1. Read and interpreate the GIS/RS data/image
2. Analyse the land use and land cover area through mapping with GPS & GIS

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	CSE (M)	Internal (I)	Viva (V)	Term Work (TW)	
4	0	2	5	50	20	30	25	25	150

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Detailed Syllabus

Sr No.	Title of the unit	Number of hours
1	**Concepts and fundamentals**	
	Energy sources, energy interactions, ideal and real remote sensing systems, fundamentals of air photo interpretation, keys	3
	Elements of air photo interpretation for terrain evaluation	1
	Data acquisition, various remote sensing platforms, satellites, sensors, multi spectral scanners, microwave sensing	3
2	**Base data generation**	
	Data acquisition, various remote sensing platforms, satellites, sensors, multi spectral scanners, microwave sensing.	4
	Digital image processing, equipment used for remote sensing	2
	Some aspects of interpretation, ground truth.	2
3	**Structure of GIS**	
	Geographic Data Representation, Storage, Quality and Standards, database management systems	4
	Raster data representation, Vector data representation,	2
	Assessment of data quality, Managing data errors, Geographic data standards.	3
4	**GIS Data Processing, Analysis and Modelling**	
	Vector based GIS data processing , Queries, Spatial analysis, Descriptive statistics, Spatial autocorrelation, Quadrant counts and nearest neighbor analysis	6
	Raster based GIS data processing, Network analysis, Surface modeling, DTM, GIS Applications: Case studies.	5
5	**GPS**	
	Basic concepts, components, factors affecting, GPS setup, accessories, segments satellites & receivers,	3
	GPS applications, Case studies	2
	GIS and GPS, Engineering applications, land use/land cover mapping,	2
	Applications to urban and regional planning, Water resources, environmental studies, transportation engineering, other civil engineering fields.	2

Suggested Theory Distribution

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

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
10%	20%	20%	30%	20%	00%

Instructional Method and Pedagogy:

1. Use of Learning Management system like canvas
2. Demonstration through ppt and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

Recommended Study Material:

Reference Book:

1. Bolstad P. (2005) GIS Fundamentals: A First Text on Geographic Information Systems, Second Edition, White Bear Lake, MN, Eider Press
2. Elangovan K. (2006) GIS: Fundamentals, Applications and Implementations, New India Publishing Agency, New Delhi
3. Longley, P. A., Goodchild, M. F., Maguire, D. J., and Rhind, D. W., Geographic Information Systems and Science, 2nd Edition, John Wiley and Sons, 2005.
4. Burrough, P. A., and McDonnell, R. A., Principles of Geographical Information Systems, 2nd Edition, Oxford University Press, 1998

Web Resources

1. https://gis.harvard.edu/training/non-credit-training/virtual-training
2. https://www.futurelearn.com › ... › Maps and the Geospatial Revolution
3. http://nptel.ac.in/downloads/105102015/

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