Sankalchand Patel University

Faculty of Engineering and Technology
Bachelor of Technology Sem –IV (Civil Engineering)
In Effect from Academic Year 2017-18

Subject Code :1ET1060404	Subject Title : ADVANCED SURVEYING
Pre-requisite Subject	Elementary course on surveying

Course Objective : Civil Engineer has to be conversant with all the measurement techniques to know the ground topography and he should be able to use the modern survey equipments and be able to use different software applications in surveying.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (T+P)
3	-	2	4	70	30	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	**Tacheometric Surveying** : Introduction, purpose, principle, instruments, stadia constants, methods of tacheometry, anallatic lens,subtense bar, field work in tacheometry, reduction of readings, errors and precisions.	07	15
2	**Geodetic Surveying-** Principle and Classification of triangulation system-Selection of base line and stations- Orders of triangulation- Triangulation figures- Station marks and signals- marking signals- Extension of base, Reduction of Centre, Selection and marking of stations	07	15
3	**Theory of Errors** : Introduction, types of errors, definitions, laws of accidental errors, laws of weights, theory of least squares, rules for giving weights and distribution of errors to the field observations, determination of the most probable values of quantities.	07	15
4	**Field Astronomy:** Introduction, purposes, astronomical terms, determination of azimuth, latitude, longitude and time corrections to the observations.	06	10
5	**Aerial photogrammetry** : Introduction, Principle, Uses, Aerial camera, Aerial photographs, Definitions, Scale of vertical and tilted photograph,, Ground Co-ordinates, Displacements and errors, Ground control, Procedure of aerial survey, Photomaps and mosaics, Stereoscopes, Parallax bar.	06	10
6	**Modern Surveying Instruments**: Introduction, Electromagnetic spectrum, Electromagnetic distance measurement, Total station, Digital self-leveling levels , scanners for topographical survey.	02	10
7	**Remote Sensing-** Introduction, Principles of energy interaction in atmosphere and earth surface features, Image interpretation techniques, visual interpretation, Digital image processing, Global Positioning system	04	15
8	**Geographical Information System-** Definition of GIS, Key Components of GIS, Functions of GIS, Spatialdata,spatial information system Geospatial analysis, Integration of Remote sensing and GIS,and Applications in Civil Engineering.	03	10

Course Outcome :

After studying this subject students will be able to:

1. Conduct tacheometry and geodetic survey.
2. Apply principles of theory of errors for correction of measurements.
3. Apply knowledge of astronomy for solving civil engineering problems.
4. Explain use of aerial camera, aerial photographs and procedure of aerial survey.
5. Utilize total station and other modern survey instruments.
6. Apply GIS in solving engineering problems

List of Experiments:

1. Determination of multiplying and additive constants of a Tacheometer
2. Use of (i) Tacheometer, (ii) Total Station for determination of reduced levels and Horizontal distances.
3. Interpretation of RS maps using image browser
4. Local survey using GPS
5. GIS Software and their application in surveying.

Project Work:

Students shall perform the tachometry survey project at the hilly region.

Term Work:

(1) Students will prepare contour map by manual calculation of horizontal distances and reduced levels from the field observations made at the project site, also the students shall desirably use the software for preparing three dimensional map of the ground and shall compare the contour map prepared by them with the ground view prepared by software.

(2) Students shall complete all assignments given to them.

Design based/open ended problem

1. For depressed terrain:

Determine the water storage capacity in case of probable storage site assuming the height of barriers located at selected places

2. For Rough terrain:

Determine the optimal alignment for the site giving minimum cross drainage works and decide the proper gradient giving equal quantity of cutting and filling

3. In surveyed terrain, planning of small colony and road networks, water supply & drainage system.

Major Equipments:

1. Tacheometer
2. Total Station
3. Digital self leveling level

Reference Books:

1. Surveying Vol. I, II and III by Dr. B.C. Punamia, Laxmi Publishers. New Delhi
2. Surveying and Levelling Vol. I and II by T.P Kanetkar and S.V Kulkarni, Pune Vidhyarthi Gruh
3. Surveying Vol. I, II and III by Dr. K.R. Arora, Standard Book House. New Delhi
4. Surveying Vol. I and II by S. K. Duggal, Tata Mcgraw Hill, New Delhi
5. Surveying and Levelling by N.N. Basak, Tata Mcgraw Hill, New Delhi
6. Surveying and Levelling by R. Agor, Khanna Publishers, New Delhi
7. Advanced Surveying by R. Agor, Khanna Publishers, New Delhi
8. Fundamentals of Surveying by Roy, S.K., Prentice Hall India, New Delhi
9. Surveying and Leveling by Subramanian, R., Oxford University Press, New Delhi
10. Remote Sensing and GIS by B Bhatia, Oxford University Press, New Delhi.
11. Remote sensing and Image interpretation by T.M Lillesand,. R.W Kiefer,. and J.W Chipman, 5th edition, John Wiley and Sons India
12. Surveying theory and practice 7th Edition by James M Anderson and Adward M Mikhail Tata McGraw Hill Publication.