Marwadi University
Marwadi Chandarana Group

Bachelor of Technology

Civil Engineering

Advance Surveying

01CI1516

Objective of the Course:

- The students of Civil Engineering department should be conversant with all the measurement techniques to understand the ground topography and they should be able to use the modern survey equipments and be able to use different software applications in surveying.

Credit Earned: 03

Prerequisite: Surveying

Student's learning outcomes:

After successful completion of the course, it is expected that students will be able to,

1. Conduct tacheometry and geodetic survey.
2. Apply principles of theory of errors for correction of measurements in field observations.
3. Apply knowledge of astronomy for solving civil engineering problems.
4. Explain use of aerial camera, aerial photographs and the procedure of aerial survey.
5. Integrate total stations and other cutting-edge survey equipment.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
02	00	02	03	50	30	20	25	25	150

Detailed Syllabus

Sr. No	Topic Name	Hours
1	**Geodetic Surveying**	**6**
	1.1 Principle of triangulation system and its classification	2
	1.2 Base line and stations Selection	1
	1.3 Orders of triangulation-triangulation figures	1
	1.4 Station marks and signals, marking signals	1
	1.5 Base extension, center reduction, stations selection and its marking	1

2	**Theory of Errors**	**6**
	2.1 Errors- Introduction and its types, Rules of accidental errors, Rules for weights	2
	2.2 Concept of least squares , guidelines for giving weights and distribution of errors in the field observations	2
	2.3 Determine most likely values of quantities	2
3	**Field Astronomy**	**6**
	3.1 Introduction & purpose of field astronomy, Terminologies of field astronomy	2
	3.2 Time Conversion, Azimuth determination	2
	3.3 Latitude and longitude	2
4	**Modern Surveying Instruments**	**5**
	4.1 Introduction and various types of modern surveying instruments, Electromagnetic spectrum,	2
	4.2 Total Station - Introduction, Electronic Distance Measurement, angle measurements horizontal and vertical, setting up the total station, various field applications of total station surveying, data transfer, processes, and advantages.	1
	4.3 Digital self-leveling levels, scanners for topographical survey	1
	4.4 Drone Survey (visual, LIDAR, multispectral & Thermal), DGPS survey, hydrographic survey.	1
5	**Aerial Photogrammetry**	**5**
	5.1 Introduction, Principle, Uses, Aerial camera, Aerial photographs, Definitions, Scale of the vertical and tilted photograph,	3
	5.2 Ground Co-ordinates, Displacements and errors, Ground control, Procedure of aerial survey, Photomaps and mosaics, Stereoscopes, Parallax bar.	2
	Total	**28**

List of Experiments

1. Extension of Baseline using Theodolite
2. Analysis of the Geodetic Survey
3. Calculation of horizontal and vertical angles utilizing Total Station.
4. Calculation of area and perimeter utilizing Total Station.
5. Identification of Latitude and longitude of various locations.
6. Examples on the Triangulation adjustments
7. Examples on the Theory of Error
8. Stereoscope and parallax bar and their applications
9. Use of different Software for surveying

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 an effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	10%	35%	30%	15%	5%

Instructional Method and Pedagogy:

1. At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
2. Lectures will be taken in class room with the use of multi-media presentations, white board– mix of both.
3. Attendance is compulsory in lectures and laboratory which carries a 5% component of the overall evaluation.
4. Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation
5. Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5%.
6. Surprise tests/Quizzes will be conducted which carries 5% component of the overall evaluation.
7. The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures. Minimum 8 experiments are planned based on the course content.

Recommended Study Material

1. Surveying Vol. I & II by Duggal, S. K., Tata McGraw Hill Publication, New Delhi.
2. Surveying & Levelling by Subramanian, R., Oxford University Press, New Delhi.
3. Surveying and Levelling Vol. I & II by Kanetkar, T.P. and Kulkarni, S.V., Pune Vidhyarthi Gruh.
4. Surveying Vol. I, II & III by Arora, K.R., Standard Book House, New Delhi.
5. Surveying and Levelling by Basak, N.N., Tata Mcgraw Hill, New Delhi.
6. Surveying and Levelling by Agor, R., Khanna Publishers, New Delhi.
7. Advanced Surveying by Agor, R., Khanna Publishers, New Delhi.
8. Fundamentals of Surveying by Roy, S.K., Prentice Hall India, New Delhi.
9. Surveying Vol. I, II & III by Punamia, B.C., Laxmi Publications.
10. Principles of Geographical Information systems, Burrough P, Oxford University Press, 1998
11. Introduction to Geographic Information Systems, Chang,K , Tata McGraw-Hill Publishing Co. Ltd, 2008
12. Fundamentals of Remote Sensing, George Joseph, University Press, 2003.