



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: [3142202](#)

Semester- IV

Subject Name: Mine Surveying - I

Type of course: Under Graduate level

Prerequisite: Zeal to learn the subject

Rationale:

Basic mine surveying subject is designed to help the student in understanding the different difficulties occur during mine surveying, their probable causes and remedies for accurate surveying. Various practical are to be performed to help in understanding the problems of field. This course is helpful to solve the errors which are occurring during surveying, which is essentially expected from expert surveyor.

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)		
4	0	2	70	30	30	20	150	

Content:

Sr. No.	Topics	Teaching (Hrs.)	Weightage (%)
1.	Introduction : Basic definitions, objectives, divisions and importance of Surveying to Engineers; Classification and Principles of Surveying, Overview of Land Surveying; types and use of chain, tape, compass and plane table surveying, Surveying measurements and errors.	08	20
2.	Theodolite: Various types of theodolites, temporary and permanent adjustments, measurement of horizontal and vertical angles. Tubular and through compass	04	15



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3.	Traversing : Theodolite traversing, traverse plotting, Closing error and its adjustment, Omitted measurements and their calculations.	04	10
4.	Levelling: Introduction, Levelling instruments and types of levelling	05	07
5.	Contouring: Definitions, characteristics of contours, methods of contouring by level, tacheometer, Interpolation of contours.	06	10
6.	Tacheometric Surveying : Principle, additive and multiplying constants, determination of constants, Reduction of data by use of tacheometric table. Type of tacheometry General procedure for field work.	06	12
7.	Triangulation Surveying : Basic concept of triangulation surveying.	04	06
8.	Minor instruments and measurements of area and volumes Use of planimeter, Clinometers, box sextant, line ranger, optical prism, and Abney level. Measurement of area and volume by Trapezoidal and Simpson's rule. Construction, use, tests and adjustment of Miner's dial	08	20

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	15	10	10	10	10

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

1. Mine Surveying & Levelling by S. Ghatak Vol. I, II & III
2. Surveying by B.C. Punmia Vol. I, II & III
3. Surveying and Levelling by Kanetkar and Kulkarni
4. Surveying by S. K. Duggal
5. Surveying and Levelling by S. K. Husain, M.S. Nagaraj., Vol I & II



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Course Outcomes:

The student after undergoing this course will be able to:

1. Student will be able to handle the surveying equipments and take readings/ measurements.
2. Interpretation and data extraction from survey plans.
3. Prepare the survey plans.

List of Experiments:

Following experiments are suggested for Laboratory work

1. Introduction of the various surveying equipment and its use in the field.
2. To study and perform the plane table surveying in the field.
3. To do a traverse surveying using theodolite.
4. To study and perform the horizontal angle measurements.
5. To study and perform the vertical angle measurements.
6. Determination of reduced levels using levelling instrument.
7. To study and perform the profile levelling.
8. Drawing of contour map for a specified area.
9. Study of Miners Dial its constructional features & adjustments and its use.

Important Note:

80 % From above suggested laboratory work should be covered and remaining 20 % is as per facility available at Department.

Design based Problems (DP)/Open Ended Problem:

All above performance are to be carried out in the laboratory and students will prepare experiments and note down reading and conclusion. They can prepare for calibration and compare results with existing and alternate methods of measurements. At least 5 open ended problems are proposed for better understanding of subject and to apply in real life application. The projects are listed below:

1. Calibration of angular measuring instruments.
2. Setup preparation and experiments on linear and angular measurements
3. Setup preparation and experiments on traversing, leveling and contouring
4. Experiment for plane table and find area and volume.



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Major Equipmenst:

1. Plane table
2. Theodolite
3. Dump level
4. Total station
5. planimeter,
6. Clinometers,
7. Box sextant,
8. Line ranger,
9. Optical prism,
10. Abney level.
11. Miner's dial
12. Magnetic Compass
13. Resistive Potentiometer, Tachometers, Piezoelectric Accelerometer
14. Other instruments, e.g measuring tape, ranging rod, arrow, wooden peg, plumb bob, cross staff etc.
15. Miscellaneous measurements equipments

List of Open Source Software/learning website:

1. <http://en.wikipedia.org/wiki/Triangulation>
2. <http://www.youtube.com/watch?v=CBlhQ76LAyI>
3. <http://www.teara.govt.nz/en/modern-mapping-and-surveying/page-3>
4. <http://en.wikipedia.org/wiki/Tacheometry>
5. <http://surveying2012.blogspot.in/2013/08/tacheometry-surveying.html>
6. <http://nptel.ac.in/courses/105107122/modules/module11/html/38-4.htm>
7. <http://nptel.ac.in/courses/105107122/modules/module11/html/39-10.htm>
8. <http://www.youtube.com/watch?v=aHwg-1CGoTM>
9. <http://geosun.sjsu.edu/paula/285/285/marc.htm>



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Design based Problems (DP)/Open Ended Problem:

Visit to an underground mines and study & observe the various types of opening in mines. Stress concentration on opening and also study of various types of rocks.

Major Equipments:

List of Open Source Software/learning website:

1. <https://www.rocscience.com/>
2. <https://www.rockware.com/>
3. <https://www.plaxis.com/>
4. <https://www.ansys.com/>
5. <https://www.geostru.eu/>

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work. The faculty will allocate chapters/parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put upon the website of the College/Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be submitted to GTU.