

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MINING ENGINEERING (22)**  
 BASIC MINE SURVEYING  
**SUBJECT CODE: 2142202**  
 B.E. 4<sup>th</sup> SEMESTER

**Type of course:** Under Graduate level

**Prerequisite:** Nil

**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)		PA (V)		PA (I)	
				PA	ALA	ESE	OEP			
2	0	4	6	70	20	10	20	10	20	150

**Content:**

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	<b>Miners Dial :</b> Construction, use, tests and adjustment.	04	09 %
2	<b>Theodolite :</b> Various types of theodolites, temporary and permanent adjustments, measurement of horizontal and vertical angles. Tubular and through compass	05	11 %
3	<b>Traversing :</b> Theodolite traversing, traverse plotting, Closing error and its adjustment. Omitted measurements and their calculations.	05	11 %
4	<b>Levelling :</b> Levelling instruments, Fly levelling, measurement of depth of shaft; underground levelling, subsidence survey.	08	18 %

5	<b>Tacheometric Surveying :</b> Principle, additive and multiplying constants, determination of constants, Reduction of data by use of tacheometric table. Type of tacheometry General procedure for field work.	13	29 %
6	<b>Contouring:</b> Definitions, characteristics of contours, methods of contouring by level, tacheometer, Interpolation of contours.	04	09 %
7	<b>Triangulation Surveying :</b> Basic concept of triangulation surveying.	06	13 %

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
11	10	18	14	17

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate 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, S. Ghatak Vol. I & II
2. Surveying, Kantekar
3. U.M.S.

**Course Outcome:**

After learning the course the students should be able to:

1. Student will able to know the use of miners dial & theodolite in mine survey.
2. To know leveling and traversing methods used in mining field.
3. To get idea about contouring and triangulation surveying.

**List of Experiments:**

**Following experiments are suggested for Laboratory work**

1. Study of Miners Dial its constructional features & adjustments.
2. Theodolite traverses survey.
3. Close traversing by Theodolite & balancing by Bowditch rule & transit rule.
4. Study of measurement of Depth of a vertical shaft.
5. Study of measuring subsidence.
6. Determination of reduced levels using Tacheometer.
7. Drawing of contour map for a specified area.

**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 with alternate methods of measurements. At least 5 open ended problems are proposed for better understanding the subject and to apply 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 and levelling.
4. Experiment for depth measurements

**Major Equipment:**

1. Miners Dial
2. Theodolite
3. Other instruments, e.g measuring tape, magnetic compass, ranging rod, arrow, wooden peg, plumb bob etc.
4. Dumpy level.
5. Linear/Angular Measurements Equipments/Devices/Sensors
6. Resistive Potentiometer, Tachometers, Piezoelectric Accelerometer
7. Gears/Screw Threads Measurements Equipments/Devices/Sensors
8. 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>

**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 and different surveying practical work to groups of students which encompass the entire syllabus. The power-point slides should be put up on the web-site 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