# GUJARAT TECHNOLOGICAL UNIVERSITY

**MINING ENGINEERING**
ADVANCE MINE SURVEYING
**SUBJECT CODE:** 2152205
B.E. 5th SEMESTER

**Type of course:** Undergraduate

**Prerequisite:** Mine surveying

**Rationale:**
The course is designed to help the student in understanding the different difficulties occur during mine working, planning and designing, their probable causes and remedies by accurate surveying. Various practical are to be performed to help in understanding the problems of mining 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 | Examination Marks | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| L | T | P | C | Theory Marks | | | Practical Marks | | | |
| | | | | ESE (E) | PA (M) | | ESE (V) | | PA (I) | |
| | | | | | PA | ALA | ESE | OEP | | |
| 4 | 0 | 4 | 8 | 70 | 20 | 10 | 20 | 10 | 20 | 150 |

**Content:**

| Sr. No. | Content | Total Hrs | % Weightage |
|---|---|---|---|
| 1 | **Curve Ranging:** Definition, different methods of setting out curves (apex accessible and apex inaccessible). Elements of compound curves, Methods of setting out. | 08 | 14 |
| 2 | **Correlation:** Methods of correlation of surface and underground surveys through inclines, One or two vertical shafts, Steeply inclined shafts, Correlation by magnetic needle, Precautions and accuracy, Use of Gyroscope. | 14 | 25 |
| 3 | **Stope and Face Surveying:** Use of Miner's dial, Hanging compass with clinometer and theodolite in stop surveying, Tape triangulation, Traversing, Radiation and other methods, Planimeter and its use. | 08 | 13 |
| 4 | **Mine Plans and Sections:** Legal requirements as to mine plans in India, preparation and preservation of plans and section, Representation of geological and other features in mine plans and sections, Tridimensional drawing, Enlargement of plans, Use of ediograph and pentagraph preparation of mine modes. | 08 | 13 |
| 5 | **Photogrammetry:** Introduction to photogrammetry, Scale of a vertical photograph, Photograph versus maps, Application of phtogrammetry in mining. | 10 | 16 |

| | | | |
|---|---|---|---|
| **6** | **Dip & Fault problems.** | **10** | **16** |
| **7** | Application of GIS, GPS and other information Technology tools in surveying and computations. | **02** | **03** |

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

| **Distribution of Theory Marks** | | | | | |
|---|---|---|---|---|---|
| R Level | U Level | A Level | N Level | E Level | C Level |
| **12** | **15** | **18** | **10** | **10** | **05** |

**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 and leveling (Vol I,II,III), S.Ghatak.
2. Surveying, Kanetkar.
3. U M S


**Course Outcome:**

After learning the course the students should be able to:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

1. Carry out the triangulation survey and also analyze their various problems and corrections.
2. Carry out the tachometric survey and also analyze their various problems and corrections and also rectify the errors in booking.
3. Setting out a curve for underground mine and calculation of its numerical.
4. Correlate the surface and underground features by mine survey.
5. Find true meridian by astronomical survey.
6. Understand the statutory provisions for mine plans and their maintenance including survey instruments.

**List of Experiments:**

1. Setting out of simple circular curves by linear method.
2. Correlation survey by Co-planning method.
3. Correlation survey by Weiss batch triangle method - Survey practices.
4. Correlation survey by Weiss Quadrilateral method - Survey practices.
5. To study photogrammetry
6. To study application of GIS and GPS.

**Design based Problems (DP)/Open Ended Problem:**

Visit to survey section of mines. Study of various plans and section and also survey practices at different locations.

**Major Equipment:**

1. Theodolite
2. Other Instruments like measuring tape, magnetic compass, ranging rod, arrow, wooden peg, plumb-bob, etc.

**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
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

**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 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. The best three works should submit to GTU.