

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Diploma in Mining Engineering

### Semester: 3

**Subject Code**

**Subject Name** MINING GEOLOGY - I

Sr. No.	Course content
1.	<b>GENERAL GEOLOGY :</b> 1.1. Introduction : What is Geology ? Branches of Geology, Importance of studying Geology for Mining Engineering students. Brief introduction of solar system. 1.2. Origin of the earth : Classification of theories into Rotational type & Tidal type, Early theories:- Nebular Hypothesis by kant, Laplace's corrections over kant's hypothesis Plenetesimal hypothesis by Moulton & chamberling. Gaseous Tidal hypothesis by Jeans & Jeffereys. Name some very recent theories & their proponents. 1.3. Age of the earth: <ul style="list-style-type: none"><li>- From history &amp; organic evolution .</li><li>- From rate of sedimentation.</li><li>- From salinity of sea water.</li><li>- From rate of cooling.</li><li>- From radiometric dating .</li></ul> 1.4. Interior of the earth: <ul style="list-style-type: none"><li>- Crust, Mantle, Core.</li></ul>
2.	<b>PHYSICAL GEOLOGY :</b> 2.1. Weathering: <ul style="list-style-type: none"><li>- Physical &amp; Chemical Weathering.</li></ul> 2.2. Soil profile,soil types,like Residual and Transported soil. 2.3. Introduction to work of wind, work of stream, work of sea & Glaciers. 2.4. Introduction to volcanoes & Earth quakes.
3.	<b>PRIMARY STRUCTURE OR DEPOSITION TEXTURE &amp; STRUCTURES :</b> Definition, classification into Major & Minor types, significance of studying all such primary features, Why they are called Top & Bottom? Description of different important primary features.
4.	<b>ATTITUDE OF BEDS :</b> Define-strike, Dip, angle of dip, & direction of dip, initial dip, True dip & apparent dip. Relation between strike & direction at Dip.
5.	<b>SECONDARY STRUCTURES :</b> 5.1. Folds-what are folds; origin, categories of folds, parts of folds, Nomenclature of different folds, description with three dimensional diagrame.Recognition of folds in the field, on geological Map, Underground.

	<p>5.2 Joints:- What are joints, Definition of some important joints.</p> <p>5.3 Faults:- What are faults, Distinction between joints &amp; fault, origin, classification, Description of important faults with three dimensional figures.</p> <p>5.4 Unconformity:- Different types of Unconformity-Definition with three dimensional sketches.</p>
6.	<p><b>SECONDARY STRUCTURES:</b></p> <p>6.1 Folds-what are folds; origin, categories of folds, parts of folds, Nomenclature of different folds, description with three dimensional diagrame.Recognition of folds in the field, on geological Map, Underground.</p> <p>6.2 Joints:- What are joints, Definition of some important joints.</p> <p>6.3 Faults:- What are faults, Distinction between joints &amp; fault, origin, classification, Description of important faults with three dimensional figures.</p> <p>6.4 Unconformity:- Different types of Unconformity-Definition with three dimensional sketches.</p>
7.	<p><b>CRYSTALLOGRAPHY &amp; MINERALOGY:-</b></p> <p>7.1 Definition of crystal &amp; Mineral</p> <p>7.2 Classification of crystal systems &amp; classification of Minerals (Preliminary knowledge)</p> <p>7.3 Physical properties of Minerals</p> <p>7.4 Description of important Rock forming &amp; Economic Minerals in terms of their physical properties &amp; chemical composition.</p>
8.	<p><b>PETROLOGY:</b></p> <p>8.1 What are igneous, sedimentary, Metamorphic rocks (General definition)</p> <p>8.2 Mode of formation of Igneous rocks, classification of igneous rocks; Important forms of igneous rocks. Characteristic properties of igneous rocks, effect of igneous injections on sedimentary rocks like coalseams.</p> <p>8.3 Mode of formation of sedimentary rocks, Different classes of sedimentary rocks, characteristic properties of sedimentary rocks.</p> <p>8.4 Metamorphism &amp; Metamorphic rocks : Characteristic properties of metamorphic rocks</p> <p>8.5 Description of Important Igneous, sedimentary &amp; metamorphic rocks (Megascopic studies only) their uses of &amp; occurrence in India with particular reference to lignite, lime stone, Multi metal &amp; other major minerals occurring in Gujarat &amp; other major mineral deposits of India.</p>

### **LABORATORY EXPERIENCE :**

1. Study of Physical Properties of Minerals
2. Determining the Specific Gravity of Minerals by various methods
3. Megascopic studies of igneous Rocks with Tabular Classification
4. Megascopic studies of sedimentary Rocks with Tabular Clasification
5. Megascopic studies of Metamorphic Rocks
6. Study and Identification of important Rock forming Minerals in Hand Specimen
7. Study and Identification of important Economic Minerals in Hand Specimen
8. Study and Sketch of Model showing different types of Faults, Folds and their relations to photography

### **Reference Books:**

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|----------------------------------|-----------------|
| 1. General & Engineering Geology | Parbin Singh    |
| 2. Engineering Geology           | K. M. Banger    |
| 3. Engineering Geology           | R. S. Khurmi    |
| 4. Rutley elements of Minerology | H. H. Read      |
| 5. Principle of Petrology        | Tyrell          |
| 6. Physical Geolory              | Dutta           |
| 7. Textbook of Geology           | G.B.Mahapatra   |
| 8. Igneous & Metamorphic rocks   | Berry \ Mason   |
| 9. Structural Geology            | M. P. Billings. |