

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN MINING ENGINEERING

SEMESTER: V

Subject Name: **Rock Mechanics**

Sr. No.	Course Content
1.	Rock Mechanics <ol style="list-style-type: none"> 1.1 Physico-Mechanical properties of rocks & soil. 1.2 Different stresses & strains. 1.3 Engineering Classification of rock masses. 1.4 Failure Mechanics & theories. 1.5 Rock of structural features & discontinuities in failures.
2.	Rock Pressure & Subsidence Due To Mining <ol style="list-style-type: none"> 2.1 Distribution of forces around narrow excavations. 2.2 Pressure Arch theory: Pressure arch in long wall workings. 2.3 Angle of draw, Subsidence factor: Critical area of extraction, Factors affecting subsidence & controlled subsidence. 2.4 Precautionary measures against damage due to subsidence :shaft pillar, Size of pillars in mine workings, Determination of their size, stability, of open pit slopes. 2.5 Subsidence survey plan & section.
3.	Rock Excavation Engineering <ol style="list-style-type: none"> 3.1 Methods of assessing cuttability of rocks index tests and abrasivity, Determination of shear strength by (a)double shear methods (b)Punch Methods, Test hammers for in situ strengths. 3.2 Mechanics of rock breakage & fractures, Rock fragmentation by explosive action, Cutting zipping & impacts. 3.3 Rock cutting by rocks, discs & roller cutters water-jet cutting. 3.4 Principles of rock cutting machines, road-headers, TBMs, coal- face machines, & bucket-wheel excavators. 3.5 Rock cutting tool materials.
4.	Rock Testing: <ol style="list-style-type: none"> 4.1 Introduction 4.2 Sampling and Sample preparation 4.3 Specimen 4.4 Universal compressive strength test 4.5 Tensile strength 4.6 Flexural strength test? 4.7 Shear strength test
5.	Rock Exploration: <ol style="list-style-type: none"> 5.1 Introduction 5.2 Object of exploration 5.3 Methods of rock exploration 5.4 Rock exploration by direct penetration <ul style="list-style-type: none"> - Core boring - Core recovery

	<ul style="list-style-type: none"> - Rock quality designation - Fracture frequency <p>5.5 Large diameter calyx hole</p> <p>5.6 Logging of core</p>
6.	<p>Drifting / Tunneling</p> <p>6.1 Operational system & use of machines.</p> <p>6.2 Mechanics of rock cutting blasting</p> <p>6.3 Vibration & damages criteria.</p> <p>6.4 Application and Methods of drift driving</p> <p>6.5 Size & shape of drivage</p> <p>6.6 Hole pattern & depth for maximum pull current</p> <p>6.7 Unseived problems and approach to solution.</p>

Laboratory Experiences:

1. To determine the Impact strength Index of coad.
2. To determine the PROTODYKONOV Strength Index (PSI) of given, specimen.
3. To Determine the TRI. AXIAL compressive strength of rock specimen
4. Study of Rock Quality Designation.
5. To determine the uniaxial compressive strength of a given specimen
6. To determine the Shear strength of the given specimen by punch shear
7. Determination of shear strength by shear box method
8. Determination of In-situ compressive stresses by Flate Jack test
9. Determination of Tensile strength of a rock sample by direct Method.
10. Determination of Tensile Strength of a rock specimen by Brazilian Method.

Reference Books:

1. Rock mechanics, B. P. Verma
2. The elements & Mechanics of Mining Ground (vol I & II) Dr, B. S. Verma.
3. Design Criteria for drill rigs equipments of drilling techniques, C. P. chugh
4. Ground control in Mining, S. K. Sarkar.