

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VII MINING ENGINEERING

Subject Name: **Rock Engineering (Department Elective-I)**

Subject Code: **172206**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Design and Stability of Structures in Rock: Initial rock pressure due to narrow and wide excavations. Theories of ground movement, criteria for design and support of underground excavations; design of single and multiple openings in massive, stratified and jointed rock mass; mine pillars and their classification, pillar stresses, pillar design, stability analysis of pillars.	8
2.	Subsidence: Causes and impacts of subsidence; mechanics of surface subsidence, Vertical and lateral movements and their estimation; angle of fracture, angle of draw; factors affecting subsidence, discontinuous and continuous subsidence; monitoring, prediction.	8
3.	Caving of Rock mass: Caving characteristics of rocks; capability index, subsidence control protection of surface structures, design of protection pillars including shafts pillars.	10
4.	Rock burst: Phenomenology of rock bursts; prediction and control of rockroses; bumps and gas outbursts.	8
5.	Introduction to Methods of Stress Analysis: Predictive methods for mine design; principles of classical stress analysis closed form solutions for simple excavation shapes; introduction to computational methods of stress analysis finite element, boundary element, distinct element methods and hybrid computational schemes.	8

6.	Monitoring Rock mass Performance: Purpose and nature, monitoring systems including seismic and micro-seismic methods.	8
7.	Mechanics of Fragmentation: Mechanism of rock cutting by picks, disc and roller-cutters; water-jet cutting; mechanics of blasting; methods of assessing cut-ability.	6

Text Books/ Reference Books:

1. A handbook of Surface Mine Technology- Samir Kumar
2. Rock Engineering- John A Franklin & Maurice B. Dusseault
3. Rock Engineering- Evert Hoek