

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: Mining Engineering
SUBJECT NAME: ROCK SLOPE ENGINEERING
SUBJECT CODE: 2172205
B.E. 7th SEMESTER

Type of course: Mining

Rationale:

The course is designed to help the student in understanding the different approaches to design a mine Layout depending upon different geotechnical properties of rock and conditions and to select a suitable methods of working for exploitation of ore body economically and safely. This course is helpful in grasping process of mine planning and also to gain knowledge about the various technical and economical issues to be considered in mine designing.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Role of slope stability in economic design and operation of open pit mines.	4	10 %
2	Type and mechanics of Slope failure : Type of Slope failure (Plain, Circular, Wedge, and Toppling), mechanics of slope failure.	8	20 %
3	Factors affecting Slope Stabilities : Geological factors, Slope Geometry, Ground Water, Equipment Loading, Dynamic Loading and effect of Time.	14	20 %
4	Slope Stability Analysis: Methods of Slope stability analysis, Safety factor, Deterministic and probabilistic approaches	12	20 %
5	Field instrumentation and monitoring: Field instrumentation and monitoring of Slopes, Slope stabilization and Strengthening of slopes methods	10	20 %
6	Design of Waste Dump and Tailing Damps: Statutory norms and technical features, case studies of various mines,	8	10 %

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
64 %	18 %	12 %	2 %	2 %	2 %

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:

Sr. No.	Author	Title of Books	Publication
1	T.Ramamurthy	Engineering in Rocks for Slopes Foundation and Tunnel_3 rd Edition	PHI Learnibg Pvt.Ltd.New Delhi
2	E Hoek & J Bray	Rock Slope Engineering -3 rd Edition	Spone Press New Yark
3	Duncan C Wyllie & Christopher W Mah	Rock Slope Engineering -4 th Edition	Spone Press New Yark
4	Obert abd Duvall	Rock Mechanics	Wiley
5	By Goodman	Rock Mechanics	Wiley
6	B.S. Verma	Rock Mechanics	Khanna Publikation

Course Outcome:

After learning the course the students should be able to:

- i. Prepare and design a mine layout depending upon various geotechnical conditions of rock.
- ii. Select suitable mining methods depending upon the economical and safe conditions.
- iii. Explain various technical parameters related with mine designing.
- iv. Follow the safe and economic working procedure for mining.

List of Experiments:

Sr. No	Practical /Exercise	Approx. Hours Required
1	Derivation of expression for determination of factor of safety for Plane Slope failure under following conditions. (i) Joint only. (ii) A tensile crack in dry condition. (iii) A tensile crack in presence of water pressure. (iv) Using bolts.	8
2	Preparation of a case study of a Slope failure in O/C mines.	4
3	Determination of factor of safety for Plane failure and preparation of a report based on Rock plane Software.	6
4	Determination of factor of safety for Circular failure and preparation of a report based on Slide Software.	6
5	Study of different Slope stabilization techniques.	4
Total		28

Major Equipment:

- i. Various mining models.
- ii. Various charts of Bench Geometry.
- iii. Rock plane Software.
- iv. Slide Software.

List of Open Source Software/learning website:

- i. www.researchgate.net
- ii. www.min.eng.com
- iii. www.journal.elsevier.com
- iv. www.mdpi.com/journal/mineral

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.