



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering

Level: UG

Branch: Mining Engineering

Subject Code: BE03022011

Course / Subject Name: Introduction to Mining

w. e. f. Academic Year:	2024-25
Semester:	3
Category of the Course:	PCC

Prerequisite:	Nil
Rationale:	Introduction to Mining is the first course on Mining Engineering. It studies the basics of mining, including its history, types, and importance. Help students recognize the significance of mining in modern society, including its contributions to economic development and technological advancements.

Course Outcome:

After Completion of the Course, the Student will be able to:

No	Course Outcomes	RBT level
1	Understand the fundamentals of mining and its importance in modern society.	Understand
2	Recognize the different types of mining and their associated methods.	Apply
3	Analyze the environmental, social, and economic impacts of mining.	Apply
4	Appreciate the role of mining in sustainable development.	Apply

Teaching and Examination Scheme:

Teaching - Learning Scheme (in Hours per Semester)					Total Credits = TH/30	Assessment Pattern and Marks					Total Marks
L	T	P	PBL*	TH		Theory		Tutorial / Practical			
						ESE (E)	PA (M)	PA/ (I)	PBL (I)	ESE (V)	
45	0	30	45	120	04	70	30	20	30	50	200

Where L = Lecture, T= Tutorial, P= Practical, TW/SL = Term-Work / Self-Learning, TH = Total Hours, ESE = End-Semester Examination, PA = Progressive Assessment

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction to Mining: - Mining history, Mineral resources of Gujarat, India, and the world, its importance, Classification and Comparison of Mining, Indian mining industries.	06	10



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2.	Mining Terminologies: Mining and minerals-related terms, Various terms used for open cast and underground mining, Mine entries, Geological terms and abbreviations. Stages of Mining: Reconnaissance; principles and types of prospecting and exploration method, ore reserves and their estimation; Brief on mine planning, exploitation, production, transportation, reclamation, restoration, and rehabilitation. Mine Closure: Basic concept of mine closure and its importance in surface and underground mines.	21	50
3.	Types of Mining Methods: Introduction to various mining methods such as Open Pit, Quarry, Open cast, Auger, Underground, Placer, In-situ, Deep Sea, and asteroid Mining.	12	30
4.	Administrative bodies associated with Mining: Introduction, objectives and functions of Ministry of Mines, Ministry of Coal, Ministry of Environment, Forest and Climate Change, Directorate General of Mines Safety (DGMS), Geological Survey of India (GSI), Introduction and functions Indian Bureau of Mines (IBM), Commissioner of Geology and Mining (CGM), Gujarat.	06	10
Total		45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	25	20	20	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Introduction to Mining by Howard L. Hartman and Jan M. Mutmanský, Wiley
2. Elements of Mining Technology by D. J. Deshmukh Part I, II & III, Denett
3. Universal Mining School (Part I and II) by T. A. Southern, H. W. Halbaum, UMS
4. Surface and Underground Excavations (2nd Edition) by Ratan Raj Tatiya, CRC Press.
5. Surface Mining Technology by S. K. Das, Lovely Prakashan
6. A Study of Metalliferous Mining methods by Y. P. Chacharkar, Lovely Prakashan

(b) Open-source software and website:



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1. https://www.youtube.com/watch?v=o3YdrDCpv4w&ab_channel=MarketingBusinessNetwork
2. https://www.youtube.com/watch?v=ax1h-YOyPJc&t=846s&ab_channel=visa2explore
3. <https://www.britannica.com/technology/main-entry>
4. <https://www.sec.gov/Archives/edgar/data/1165780/000116578003000001/glossary.htm>
5. <https://blog.dixonvalve.com/mining-101>

Suggested Project List:

1. Design a chart that depicts advancement in mining activities.
2. Design a model of open cast mining activity and transportation system.
3. Design a model of an underground mining method.
4. Craft any mine model.

Suggested Activities for Students:

1. Visit open cast and underground mines and prepare the report.
2. Prepare a presentation on any topic related to the subject.

• List of suggested activities for Problem Based Learning:

Sl. No.	Name of the activity	No. of hours	Evaluation Criteria
1.	Industry/Research laboratory visit	Visit = 5hrs., Report preparation = 5hrs. Total = 10hrs.	Based on report submitted. Report should contain observations and calculations based on industry/ lab data.
2.	Technical Video based learning related to the subject	Duration of video = 5hrs. Report preparation = 5hrs. Total = 10hrs.	Report /presentation based on the video learning outcomes.
3.	Assignment writing. Numericals based assignment is preferable.	5 assignments of 4hrs. each. Total = 20hrs.	Based on the correctness of submitted assignment.
4.	Problem solving/Coding using C, C++, MATLAB, Python, SCILAB, modeling and Analysis software or any other software	5 small coding-based assignment of 2hrs. each. Total = 10hrs.	Based on the coding solution submitted.
5.	Self-learning online	Minimum duration of the	Examination based



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	course	course should be 10hrs.	assessment at the end of course. Based on the certificate produced.
6.	Identification and solution of Complex problem	Maximum 2 problems. Study of the problem and solution finding, Total = 10hrs.	Based on the depth of the solution submitted.
7	Videos on Industrial safety/Disaster Management aspects based on subject	Duration of video = 5hrs. Report preparation = 5hrs. Total = 10hrs.	Based on quiz/report submitted
8	Technical paper reading and summarization of research papers based on relevant subject	5 research papers = 20 hrs.	Summarize research paper and evaluation critical parameters
9.	Poster/chart/power point preparation on technical topics	Duration = 6 hrs.	Based on poster/chart preparation and presentation skills
10	Working/non-working model on technical topics	Working = 12 hrs. Non- working = 8 hrs.	Based on inter department/external evaluation
11	Industrial exposure for 2-3 days to observe and provide tentative solutions on society/environment/health/sustainability/any other issue	Duration = 15 hrs. for industrial exposure Problem identification and tentative solution = 10 hrs. Total = 20 hrs.	Based on evaluation of critical problems and solutions
12	Group Discussion on emerging/trending technical topics based on subject	Duration = Min. 1 hr.per subject. Max. 3 hrs. per subject	Based on performance in group discussion, technical depth, knowledge etc.
13.	Real world case studies-based learning	Duration of data collection/study = 5hrs. Report preparation = 5hrs. Total = 10hrs.	Based on in-depth study, technical depth, data collected, fact finding, etc.
14.	Application/Software development	Duration = 10 hrs.	Depending on the complexity of the Application/Software
15.	Research paper publication	Duration = 10 hrs.	Based on submission of proof of publication
16.	Upgradation/Reverse	Duration 10 hrs.	Based on the performance of



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	engineering studies of existing equipment of the laboratory		the equipment
17.	Expert lecture/session	Duration 3 hrs. For attending the lecture/session– 2 hrs. and for report writing 1 hr.	Based on the proof of attendance and report submitted
18.	Annotated Video Explanation of Concept/Problem	10h (Preparation + Recording + Submission)	Based on accuracy of explanation, clarity, and presentation style.
19.	Patent Search and Innovation Gap Identification	10h (Search + Report)	Based on number of relevant patents analyzed and identification of innovation scope.

Note:

- All the suggested activity should be related to the subject.
- The number of hours are suggestive. Faculty can sub-divide the number of hours based on the activity. However, total number of hours is fixed.
- Rubrics for the evaluation can be prepared by the faculty.
- Subject teacher can add the relevant activities other than those listed above, with the consent of head of the department and DQAC.
- All records pertaining to the evaluation and assessment of self-learning activities must be properly maintained and preserved at the institute level. These records should be made available to the university upon request.
- Institutes are encouraged to utilize digital platforms, such as Microsoft Teams, for effective record-keeping and to ensure transparency in the evaluation and assessment of self-learning activities.

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