

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

INTRODUCTION TO MINING AND GEOLOGY (Code: 3332201)

Diploma Programme in which this course is offered	Semester in which offered
Mining Engineering	3 rd semester

1. RATIONALE

The Diploma holder in mining engineer will be responsible for locating economically viable mineral rich area by exploration, and managing mining operations in different hydro geological conditions. Mine operations include mine planning, drilling, blasting, excavation and transportation of ores. The content of this course includes basic concepts, various methods of exploration of various wealthier mineral resources, rock formation their importance. Thus this course introduces students to the mining industry. Students should therefore learn this course sincerely as a foundation course for mining industry.

2. COMPETENCY: (Programme Outcome according to NBA Terminology)

The course should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

- **Apply basic concepts of mining and geology in mine development, exploration and operations.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	100
2	0	0	2	70	30	-	-	

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; ESE - End Semester Examination; PA - Progressive Assessment

4. COURSE DETAILS

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA)	Topics and Sub-topics
Unit – I Introduction to Mining	1a. Describe need and importance of mining. 1b. Explain existence, kinds and uses of minerals. 1c. Compare open cast and underground mining. 1d. Explain various mining operations.	1.1 Mines- Need and importance. 1.2 Minerals- existence, kinds and uses. 1.3 Mining processes- Exploration, mining methods- (open cast and underground), and mining operations (Drilling, Blasting, Excavation, Transport of Minerals.).
Unit – II Mineral Exploration	2.a. Explain mineral exploration stages 2.b. Explain mineral exploration methods and use of instruments. 2.c. State the role and kinds of agencies in mine exploration.	2.1 Mineral Exploration: Stages, Geophysical methods and instruments, gravity, magnetism, electromagnetism, resistivity of rocks and a number of different other variables, Locating Outcrop, Drilling- Diamond core drilling, Pitting, Trenching, Sampling, Assaying. 2.2 Exploration Agencies
Unit – III Mineral Bodies	3a. Describe types of mineral bodies. 3b. Explain different approaches for mining.	3.1 Types of Deposits: Mineral Bodies- Out Cropping, Bedded, Veins, Hilly, Placer Deposits. 3.2 Define Incline, adit, Shafts and Approach Roads, In Surface Mines.
Unit – IV Introduction to Geology	4.a Describe need and importance of Geology. 4.b Describe geological processes for rock formations. 4.c Describe various types of rocks and its formations. 4.d Describe various geological disturbances and its effects.	4.1 Geology: Need and importance. 4.2 Geological processes: Erosion and Sedimentation, Weathering, Transportation, Deposition. 4.3 Rocks: Types, and its formations –Sedimentary, Igneous Deposits and Metamorphic Rocks. 4.4 Geological Disturbances and its effects: Fault, Fold, Dyke, Sill.

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (Theory)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Introduction to Mining	07	05	08	05	18
2	Mineral Exploration	06	04	07	04	15
2	Mineral Bodies	05	03	05	04	12
2	Introduction to Geology	10	06	10	09	25
Total		28	18	30	22	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised 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.

6. SUGGESTED LIST OF EXERCISES/PRACTICAL:

N/A

7. SUGGESTED LIST OF STUDENT ACTIVITIES

- i. Assignments on study of mineral deposits in Gujarat and in India as a whole.
- ii. Model/Sample Study
- iii. Group discussions about status of mining resources and mining industry in India.

8. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

- i. Visit to nearby mines
- ii. Video films on working of different type of mines from YouTube.
- iii. Demonstration of ore/rock samples in the class

9. SUGGESTED LEARNING RESOURCES**A) List of Books**

S. No.	Title of Books	Author	Publication
1	Elements of Mining Technology part I, II and III	D. J Deshmukh	Central Techno Publication Latest Edition
2	Mine Economics	Arvind Kumar	Lovely Prakashan, Dhanbad
3	A Study of Metalliferous Mining Methods	Y.P Chacharkar	Lovely Prakashan, Dhanbad
4	Universal Mining School-part I and II	T.A southern, H.W Halbourn	Universal Mining School
5	Coal Mining	B. Ghosh	Lovely Prakashan, Dhanbad

6	Open Cast Mining	B.Ghosh	Lovely Prakashan, Dhanbad
7	Economic Geology	Sen and Ghua	Modern Book Agency pvt.ltd.
8	Introduction to the Geology of coal and Indian coal fields	N.L Sharma and Ram K.S.V	Hindustan publishing Corporation
9	Geology of India and Burma	M.S Krishnan	CBS Publisher and Distributer

B) List of Major Equipment/Materials with Broad Specification

Models/Samples of different types of rocks.

C) List of Software/Learning Websites

- i. <http://geology.com/>
- ii. <http://cgm.ncode.in/SitePages/Home.aspx>
- iii. <http://mining.crusherplants.com/project/geology-equipment.html>
- iv. <http://emg.geoscienceworld.org/content/current>
- v. http://en.wikipedia.org/wiki/Mineral_exploration

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. S.G Srivastav**, I/c HOD, Department of Mining Engg., Govt. Polytechnic Bhuj.
- **Prof. P.Y Trivedi**, Lecturer, Department of Mining Engg, Govt. Polytechnic Bhuj.
- **Prof. M V Ramanuj**, Lecturer, Department of Mining Engg., Govt. Polytechnic Bhuj
- **Prof. R.G Prajapati**, Lecturer, Department of Mining Engg., Govt. Polytechnic Bhuj.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. P. Verma**, Professor and Coordinator for state of Chattishgarh
- **Dr. C.K Chugh**, Professor, Department of Mechanical Engineering