GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Mining Engineering

Course / Subject Code: DI01022021

Course / Subject Name: Introduction to Mining

w. e. f. Academic Year:	2024-25
Semester:	1st
Category of the Course:	ESC-02

Prerequisite:	Nil
Rationale:	Mineral extraction was started from the ancient times in the history of first civilization and also it is the prime requirement for economic growth and development of any nation. In India, mining holds immense importance due to its significant contribution to the economy, infrastructure development, and technological advancements. This course is designed to help students to understand various mining methods and their social and economic importance to society, as well as the functions of various administrative bodies for safe and productive mining operations in India.

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes	RBT Level
01	Describe ancient mining history with importance of mining.	R
02	Define various mining terminology with sketch.	U
03	Describe different stages of mining.	U
04	Differentiate between different types of Mining methods.	U
05	Understand the functions of mining administrative bodies.	U

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	0	3	70	30	0	0	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Mining History:** Ancient Mining & Origin of mining and its need Different civilization and their approach towards mining Commencement of mining in India and Indian Mining Industry Importance of Mining: Socially and Economically	05	12
2.	**Mining Terminology:** Mining, Mine, Rock, Mineral, Ore, Gangue, Bed, Strata, Deposits - Outcrop, Stratified/Bedded, Vein & Massive, Drilling, Explosive, Blasting, Surface Mining, Underground Mining Surface Mining Terminology: Top soil, Overburden, Mineral Bed, Stripping ratio, Box cut and its objective and types, Bench formation, Waste and Mineral dump, Mine sump Underground Mining Terminology: Mode of entries: Adit, Incline, Shaft & Decline, Level, Dip & Strike, Pillar, Stope, Roof, Floor, Face, Goaf, Haulage, Ventilation, Mine sump	09	21
3.	**Stages of Mining:** Prospecting: Geochemical and Geophysical: Gravity survey, Electromagnetic survey, Electrical resistivity, Magnetic survey, Seismic method – reflection & refraction Exploration Development Exploitation	08	19
4.	**Methods of Mining:** Surface Mining: Open pit, Open cast, Quarry and Auger mining Underground Mining: Underground Coal Mining: Bord and Pillar, Longwall mining Underground Metalliferous Mining	16	38

	Mine Closure: Reclamation, Rehabilitation, Remediation, Restoration Advantages and disadvantages of surface and underground mining Placer and In-situ Mining		
5.	**Administrative bodies in Mining:** Mineral resources of Gujarat and India Commissioner of Geology and Mining-Gujarat (CGM): Introduction and Functions Directorate General of Mines Safety (DGMS): Introduction and functions Indian Bureau of Mines (IBM): Objective and functions	07	10
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**80**	**0**	**0**	**0**	**0**

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:

Deshmukh, D.J. Elements of Mining Technology (Volume 1). Central Techno Publication.
Hartman, H.L. Introductory to Mining Engineering. John Wiley & Sons.
Tatiya, R.R. Surface and Underground Excavations (2nd Edition). CRC Press

(b) Open-source software and website:

Commissioner of Geology and Mining, Gujarat (CMG, Gujarat)
https://cgm.gujarat.gov.in/introduction
Directorate General of Mines Safety (DGMS)
https://www.dgms.gov.in/
Indian Bureau of Mines (IBM)
https://ibm.gov.in/IBMPortal/pages/Functions
Surface Mining Technology (NPTEL)
https://nptel.ac.in/courses/123/105/123105007/
Underground Mining of Metalliferous deposits (NPTEL)
https://archive.nptel.ac.in/courses/123/105/123105006/

1] Rahul Dubey, "An Introduction to Internet of Things: Connecting Devices, Edge Gateway, and Cloud with Applications", Cengage India Publication
[2] Raj Kamal, "Internet of Things: Architecture and Design Principles, Mc Graw Hill Education
[3] Hanes et al "IoT Fundamentals", Cisco Press
[4] Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", Paperback, 2015.
[5] A. McEwen, H. Cassimally, "Designing the Internet of Things", Wiley, 2013.
[6] Yashwant Kanetkar, "21 Internet of Things Experiments", Kindle edition
[7] Adeel Javed, "Building Arduino projects for Internet of Things", Apress publication
[8] Donald Noris, "The Internet of Things: Do it yourself Projects with Arduino, Raspberry PI and Beagle Bone Black" Mc Graw Hill Publication
[9] Adrian McEwen & Hakim Cassimally, "Designing the Internet of things", Willey publication

Suggested Project List:

a. Build a Chart showing advancement in mining activity.
b. Open cast mining: Build a model of opencast mining.
c. Underground Mining: Build a model of underground mining.
d. Surf different websites related to new technologies in mining industry and make a report.
e. Prepare report visit to mining site.
f. Visit to nearby mine site and study various aspects related to environment and sustainable development.

Suggested Activities for Students:

a. Prepare specification table for different types of minerals and rocks.
b. Give presentation on any relevant topic.
c. Prepare report on various issues related to mining activity.

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