

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**

**COURSE CURRICULUM  
COURSE TITLE: MINING MACHINERY-II  
(Code: 3342204)**

<b>Diploma Programme in which this course is offered</b>	<b>Semester in which offered</b>
Mining Engineering	4 <sup>th</sup> Semester

### 1. RATIONALE

The mining engineers are generally responsible for the mine developments, mining activities supervision etc. In this process they have to use different machines and hence are expected to know about all types of machinery used in mining industries and their applications, operational parameters, safety features etc. The course provide students basic knowledge and skill about various types of ropes ,winding system, u/g machineries, loading and hauling machine, hoisting machine and various safety devices used in mines their installation operation and safety feature of all the machines .

### 2. COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that student is able to acquire following competency.

- **Supervise appropriate and safe use and maintenance of different mining machinery.**

### 3. CORSE OUTCOMES (COs)

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Describe the purpose and working principles of various types of underground Machineries
- Explain manufacturing, types, splicing, capping, and load of wire ropes
- Follow safety measures to operate hoisting and transport System

### 4. TEACHING AND EXAMINATION SCHEME

<b>Teaching Scheme (In Hours)</b>			<b>Total Credits (L+T+P)</b>	<b>Examination Scheme</b>				
<b>L</b>	<b>T</b>	<b>P</b>		<b>Theory Marks</b>		<b>Practical Marks</b>		<b>Total Marks</b>
			<b>C</b>	<b>ESE</b>	<b>PA</b>	<b>ESE</b>	<b>PA</b>	
4	0	2	6	70	30	20	30	<b>150</b>

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

## 5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
<b>Unit – I : Underground Face Machineries</b>	1a. Describe the purpose and working principles of various types of underground Machineries.	1.1 Board & Pillar coal cutting machines. 1.2 Coal drills. 1.3 Long wall machines.
<b>Unit – II : Mechanical Loaders</b>	2 a. Describe various types of loading and hauling used in underground mine, with their Applicability conditions.	2.1 Rocker shovels. 2.2 Gathering arm loader. 2.3 Scrapper. 2.4 Load haul and dump machines. 2.5 Construction and application of shuttle car.
<b>Unit – III : Hosting Machineries</b>	3a.Explain main working components of hoisting and Transport system. 3b.Follow safety measures to operate hoisting and transport System.	3.1 Constructional Details of head gear frame. 3.2 Constructional features of winding drum, Cage and skip, winder drives. 3.3 Safety devices used in winding system 3.4 Single and multi rope friction winding- Multilevel winding. 3.5 Pit top and Pit bottom circuits.
<b>Unit – IV : Wire Ropes</b>	4a.Explain manufacturing, types, splicing, capping, and load Calculations of wire ropes.	4.1 Manufacturing Process of Wire Ropes. 4.2 Types of wire ropes. 4.3 Calculation based on wire ropes. 4.4 Care and maintenance of wire ropes. 4.5 Rope capping. 4.6 Rope splicing.

## 6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Underground Face Machineries	12	5	4	3	12
II	Mechanical Loaders	10	6	3	5	14
III	Hosting Machineries	18	10	6	8	24
IV	Wire Ropes	16	10	4	6	20
<b>Total</b>		<b>56</b>	<b>31</b>	<b>17</b>	<b>22</b>	<b>70</b>

**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.

## 7. SUGGESTED LIST OF EXERCISES/PRACTICAL:

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies / programme outcomes. Following is the list of practical exercises for guidance.

*Note: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.*

*Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.*

S. No.	Unit No.	Practical/Exercise (Outcomes' in Psychomotor Domain)	Approx. Hrs. Required
1	I	Draw and explain the constructional and working feature of Coal Cutting machines.	04
2	I	Draw and explain Coal Drill Construction working & Maintenance.	04
3	I	Draw and explain Constructional features of Shearer.	04
4	II	Draw and explain constructional features of Road headers.	02
5	III	Draw and explain Winding Drum.	02
6	III	Draw and explain Winding Engine Brakes.	02
7	III	Draw and explain Safety Hooks.	02
8	III	Draw and explain different types of Pit Top & Bottom Circuits for Cage windings.	02
9	IV	Draw and explain different types of wire ropes used in mine.	02
10	IV	Draw and explain Splicing of Haulage Ropes.	04
Total Hours			28

## 8. SUGGESTED LIST OF STUDENT ACTIVITIES:

- i. Prepare report on features and specifications of different machines used in mines with the help of internet.
- ii. Visit to nearby underground mine to observe working of various types of underground machineries.

## 9. SPECIAL INSTRUCTIONAL STRATEGIES (If Any):

- i. Video/animation film on working and maintenance of mining machineries.
- ii. Group Discussion on selection and use of machinery for different purposes.
- iii. Demonstration on models of mining machineries.

## 10. SUGGESTED LEARNING RESOURCES

### A. List of Books:

S. No.	Title of Books	Author	Publication
1.	Elements of mining Technology VO-II,III	D.J.Deshmukh	Lovely prakashan
2.	U.M.S		Lovely prakashan

### B. List of Major Equipment/Materials:

- i. Models of various machines.
- ii. Working models of all safety devices.

### C List of Software/Learning Websites

- i. <http://www.joy.com/>
- ii. [http://en.wikipedia.org/wiki/Underground\\_mining\\_\(hard\\_rock\)](http://en.wikipedia.org/wiki/Underground_mining_(hard_rock))
- iii. <http://www.mtu-online.com/mtu/applications/mining/underground-mining-machines/>
- iv. <http://www.greatmining.com/Underground-Mining.html>
- v. YouTube

## 11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

### Faculty Members from Polytechnics

- **Prof. S.G Srivastav**, (I/c HOD) Department of Mining Engineering G.P.Bhuj
- **Prof. R.G Prajapati**, Lecturer, Department of Mining Engineering, G.P.Bhuj

### Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. K .K Jain**, Professor and Dean, Department of Mechanical Engineering.
- **Dr. C. K. Chug**, Professor Department of Mechanical Engineering.