

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**

**COURSE CURRICULUM  
COURSE TITLE: ELECTRICAL ENGINEERING FOR MINING  
(COURSE CODE: 3352205)**

<b>Diploma Programme in which this course is offered</b>	<b>Semester in which offered</b>
Mining Engineering	5 <sup>th</sup> Semester

### 1. RATIONALE

Mining diploma holders are responsible to take decisions about maintenance and application of various electrical appliances in mines suitable for a particular point and purpose. So that effective electric supply should be maintain in mines. After studying this subject they will be able to understand how power is supplied in underground and surface mines. This subject provides them basic knowledge of cables used in mines, earthing practices as well as operations and maintenance of various electrical instruments and general electricity rules as applied to mines.

### 2. LIST OF COMPETENCY

The course content should be taught with the aim to develop required skills in the students so that they are able to acquire following competency:

- **Use knowledge and skills of mine electrical engineering to adapt and maintain general and statutory requirements of electrical supply for a safe workplace.**

### 3. COURSE OUTCOMES

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

- Draw layout of power distribution in a surface mine.
- Illustrate construction and safety features of electrical appliances used in mines.
- Describe safety standards for using various equipment safely in mines.

### 4. TEACHING AND EXAMINATION SCHEME

<b>Teaching Scheme (In Hours)</b>			<b>Total Credits (L+T+P)</b>	<b>Examination Scheme</b>				
				<b>Theory Marks</b>		<b>Practical Marks</b>		<b>Total Marks</b>
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>ESE</b>	<b>PA</b>	<b>ESE</b>	<b>PA</b>	
3	0	2	5	70	30	20	30	

**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 Surface sub station</b>	1a. Explain Transmission Line from Power Company and distribution up to mining areas. 1b. Describe surface and underground substation for underground mines with distribution of power.	1.1 Transmission lines from Power Company and distribution up to mining areas. 1.2 Surface and underground substation for underground mines with distribution of power. 1.3 Substation and distribution of power in surface mines.
<b>Unit – II Principle of motor and generator.</b>	2a. Explain general principle of operation of motor and generator with constructional features 2b. Describe three phase power generation system, importance and use.	2.1 General Principle of operation of motor and generator system with constructional features. 2.2. Three phase power generation system its importance and use.
<b>Unit – III Mining Switch Gears:</b>	3a. Explain working construction and safety features of electrical appliances used in mines.	<b>Electrical appliances used in Mines</b> 3.1 General constructional and safety features of: Gate end box, pillar switch, Drill panel and circuit Breaker.
<b>Unit – IV Mining Cables and Earthing Practice:</b>	4a. Select a suitable type of cable for a particular job. 4b. Explain earthing practice used in mines.	4.1 Types of cables, Construction and Applicability, safety Features. 4.3 Type of earthing used in mines, Main features, applicability and Construction.
<b>Unit – V Miscellaneous:</b>	5a. Explain and maintain safety standards by using safe equipment for Various activities. 5b. Explain intrinsic safety with their main features. 5c. Describe maintaining signaling system in mines. 5d. Explain the use of pilot circuit with their advantage and applicability conditions at various situations in mine.	5.1 Flame proof enclosures their Constructional and safety features. 5.2 Intrinsically safety apparatus, their Main features. 5.3 Haulage and shaft signaling system. 5.4 Use of pilot circuit their advantage and applicability conditions.
<b>Unit-VI Indian Electricity Rules</b>	6a. Explain statutory provision of Indian electricity rules. 6b. State the safe voltage limits	6.1 Terms and definitions. 6.2 Voltage limits.

## 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
1	Surface sub-station	07	2	6	4	12
2	Principle of motor and generator	08	4	6	5	15
3	Mining switch gears	07	2	3	5	10
4	Mining cables and earthing practice	08	4	4	4	12
5	Miscellaneous	07	2	5	4	11
6	Indian electricity rules	05	4	2	4	10
<b>Total</b>		<b>42</b>	<b>18</b>	<b>26</b>	<b>26</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/course outcomes. Following is the list of practical exercises for guidance.

*Note: outcomes in psychomotor domain are listed here 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 members 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.
1	1	Prepare outline diagrams of Surface & U/g substation.	4
2	2	Demonstrate working principal of motor and generator.	4
3	3	Demonstrate safety features of Gate End Box.	4
4	3	Demonstrate safety features of Drill panels.	4
5	4	Identify different specimens of mining, Cables and demonstrate their features.	4
6	4	Demonstrate various earthing practice used in Mining industries.	4
7	5	Demonstrate Haulage and shaft signaling system.	4
<b>Total</b>			<b>28</b>

**8. SUGGESTED LIST OF STUDENT ACTIVITIES**

- i. Explore internet to study different electrical engineering technologies being used in different types of mines.

**9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)**

- i. Arrange visit to a nearby substation and ask students to prepare a report on it.
- ii. Arrange expert lectures on latest mine electrical engineering technologies.
- iii. Expert video lectures on mine electrical engineering technologies.

**10. SUGGESTED LEARNING RESOURCES****A. List of Books:**

S. No.	Title of Books	Author	Publication
1	Mine Electrical Engg	Dash	Lovely Prakashan
2	U.M.S.	-	Lovely Prakashan
3	Mine Electrical	Nil K Dutta	Lovely Prakashan
4	Indian Electricity Rules	-	Lovely Prakashan

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

- i. Projector.
- ii. Models.

**C List of Software/Learning Websites**

- i. Wikipedia.
- ii. www.youtube.com

**11. COURSE CURRICULUM DEVELOPMENT COMMITTEE****Faculty Members from Polytechnics**

- **Prof. S.G Srivastav**, (I/c HOD) Lecturer, G.P.Bhuj
- **Prof. M.V Ramanuj** Lecturer, G.P Bhuj

**Coordinator and Faculty Members from NITTTR Bhopal**

- **Dr. K .K Pathak**, Prof. Dept. of Civil & Environment Engineering
- **Prof. Peeyush Verma**, Professor, Department of Vocational Education & Entrepreneurship Development,