Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : MINING MACHINERY - I
Subject Code : M207

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	0	0	100	80	20	26	40	3 Hrs.

*Duration of year is considered 28 weeks

A large number of mining machineries are used in the mine right from the winding of men and material through shafts, transport of material, wire, power for drilling, cutting and loading of coal on the faces. Pumping operations are also essential to deal with accumulation of water in underground workings. A mining engineer should be aware of the types of machineries available for these operations, their principles of operations and suitability of these equipments under different conditions, so that they can supervise the selection, installation and day-to-day operation and elementary maintenance of these equipments.

COURSE OUTCOMES:

After undergoing the course of study the student shall be able to

1. Have general knowledge of electrical supply system
2. Understand basic principles of motors, transformers, instruments etc.
3. Connect above equipments to supply.
4. Understand and implement different units and standards of measurements.
5. Understand the working of I.C. Engines
6. Understand the working of different types of compressors.
7. Select appropriate engineering materials required for various machines components.
8. Supervise installation, maintenance of ropes and attachments; safe operation and understand the methods of dealing with breakdowns.

Unit	Content	Contact Hours	Marks
1.	**Electric Circuit** **Resistance, Current, Voltage, Work, Power and Energy Ohm's Law** **AC Current – Three phase & Single phase** **Storage Batteries- Constructing & working**		
2.	**Electrical Machine** **DC Machine: Construction & principles of operating, Magnetization and load characteristics of series, shunt and compound generators and motors. Motor starter, speed control and their field of applications.** **AC Motors: Construction and principles of operation , types of transformers, Efficiency and Regulations, Auto transformer** **Single phase Transformer: Construction and principles of operation , types of transformers, Efficiency and Regulations, Auto transformer**		
3.	**Power Supply System** **Transmission & distributing of Electrical power by overhead lines and cables Types of cables, layout of underground cables, shaft cables protection system and switchgear for mines like Relays, circuit breaker and fuses.** **Earthling and types of earthling Indian Electricity Rules General and with special reference to mines.**		
4.	**Engineering Materials** **Chemical composition, properties and uses of following ferrous Metals: Cast iron, steel, Wrought iron, manganese steel, nickel steel, chromium steel, nickel- chromium steel, stainless steel.** **Nonferrous: Aluminium, copper, nickel, bronze, brass, copper nickel alloys, Aluminium alloys etc.**		
. 5	**Electronic Components, Fundamental of Semi conductor, P & N Types, P N Juction, Diodes & their Applications, Special Diodes, Transistor, Amplifiers**		
6	**Machines** **Internal Combustion Engine: Classification, Otto cycle, Diesel cycle. Two stroke & four stroke petrol engine. Two stroke & four stroke Diesel engine. Different systems like fuel injection, fuel ignition for petrol & diesel engines.** **Air compressor: Classification, Definitions of different terms such as inlet pressure, discharge pressure, capacity, theoretical power, break power, free air delivery.** **Compressor efficiencies, Working of reciprocating Compressor. Single stage & multistage. Linter**		

cooling, After cooling, Conditions of maximum efficiency, Uses of compressed air (no derivation

	and proof of formula.) Rotary compressor: Roots blower, vane type blower, screw compressor, turbo blower, turbo compressor, centrifugal & axial flow compressor (no derivation of formula.) **Brakes & Clutches: Breaks : Classification, Construction & working of block brakes, internal expanding brakes, hydraulic brakes, vacuum brakes (no numerical problems)** **Clutches : Construction & working of plate clutches, cone clutches, centrifugal clutch, claw clutch (no numerical problems)** **Hydraulics & Hydraulic machines: Properties of fluid, components of hydraulic circuits and their symbols, constructional details and working of hydraulic of shaper and hydraulic press.** **Types of pumps. Working principle of centrifugal pump, working principle of reciprocating pump. Uses of pumps in mining industry.**		
6.	**WIRE ROPES** **6.1. Classification of different types of wire ropes, Stranded rope, Non stranded rope, Different types of stranded rope, Different types of Non stranded rope, Lays of rope, Different definition like Space factor, static load, dynamic load, factor of safety.** **6.2. Selection of wire rope, Care and maintenance in ropes, Types of deterioration in the ropes** **6.3. Testing of wire ropes.** **6.4. Types of Rope capping, White metal capping (cone socket type capel), Wedge type capping (Reliance rope capel), Capping with split capel and rivets (Split capel), Recapping, Rope splicing procedure**		

STRATEGY OF IMPLEMENTATION:

Conducting theory classes, practical, Industrial visits, seminars, group discussion, and assignment on different topics shall complete the curriculum for the subject.

REFERENCE BOOKS:

Author	Title	Publisher
Edward Huges	**Electrical Technology**	
H. Cotton	**Electrical Technology**	**C.B.S. Publisher**
B.L. Theraja	**Electrical Technology**	**S.Chand**
Malvino	**Electronic Principles**	
P.L.Ballaney	**Thermal Engineering**	
Avner	**Engineering Metallurgy**	**Mcgraw Hill**

D.J. DESHMUKH	**Vol- III**	**Central techno publication, Nagpur.**
S. GHATAK	**Mine pump, haulage, winding.**	**Coal Field Publisher Asansol.**