GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering
Subject Code: 3152201
MINE MACHINERY-II
B.E. 5thSEMESTER

Type of course: Undergraduate

Prerequisite: Zeal to learn the subject

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 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.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	1	0	4	70	30	0	0	100

Content:

Sr. No.	Topics	Teaching Hrs.	% Weightage
1	**Mine Pumps:** Types of pumps. Working head and Efficiencies for centrifugal pumps. Multistage pumps. Performance characteristics. Reciprocating pumps. Construction details.	**06**	**10**
2	**Mine Winders:** Koepe and Drum winders and their applications, head gear, head gear pulley, various shaft fittings such as Keps, rope guides, platforms, Cage and suspension gear, Detaching hooks. Different types of winding drums, Safety devices in winders, Methods of counter balancing rope. Duty cycle. Mechanical and electrical braking. Ward Leonard control. Torque time diagram. Ground and tower mounted friction winders, Winding from different horizons, Multi rope winding. Design calculation for different types of winding system.	**14**	**22**
3	**Pit Top And Pit Bottom:** Layouts of pit-top and pit-bottom; Run round arrangement, back shunt circuit, Lofco system, traverser circuit, turn table, Creepers, tipplers. Tub couplings. Mine Regulations on winding. pit top arrangement for a skip, Mineral handling and screening equipment's, Layouts of railways siding of mines	**10**	**17**
4	**Coal Face Machinery:** Coal drill- construction, operation and maintenance. Shearers: Different types, single and double drums; Coal Ploughs and continuous miners; Principles of operation, construction features, their suitability, their choice, operation and maintenance. Road header and dint header, Face Loaders for Coal Mines, Selection and application of machinery.	**10**	**17**
5	**Face Machinery in Metal Mines:** Types of drill machines and their application. Simba and Jumbo drills. Mechanical Loaders: Classifications, scope of use of each in different conditions, construction and operations of scraper loader, pneumatics loaders, gathering arm loader, load-haul-dumper, low profile dump trucks, side discharge loader.	**10**	**17**
6	**Conveyors:** Construction and operation of different types of belt conveyors, chain conveyors, armoured flexible conveyors, stage loaders; main and extensible belt conveyors, Idlers and the supporting structure, Capacity &	**10**	**17**

	power calculation and selection of conveyors		

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	**15**	**15**	**09**	**11**	**08**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's 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.

Reference Books:

1. Elements of Mining Technology (Vol- II, III), D.J.Deshmukh.
2. S. Ghatak; Mine Pumps Haulage and Winding; Lovely Prakashan Publ.
3. Advance coal mining Tech., Samir Kumar Das.
4. R. D. Singh; Principles and Practices of Modern Coal Mining; New Age International.
5. Amitosh Dey; Heavy Earth Moving Machinery; Lovely Prakashan Publ.

Course Outcome:

The student after undergoing this course will be able to:

1. Select the suitable mine winders and pumps for a mine.
2. Design pit top and pit bottom layouts.
3. Select suitable machinery for better exacavation and transportion for improve mine output.
4. Supervise appropriate and safe installation, use and maintaince of different mining machinery.

List of Experiments:

Following experiments are suggested for Laboratory work

1. Study of characteristic curves of centrifugal pumps.
2. Draw and explain Winding Drum.
3. Draw and explain Winding Engine Brakes.
4. Draw and explain Safety Detaching Hooks.
5. Draw and explain different types of Pit Top & Bottom Circuits for Cage windings.
6. Draw and explain constructional features of Coal Plough and Continuous Miner.
7. Study and design of belt conveyors for material transportation in mines.
8. Study of various face machinery used in metal mines.

Important Note:

80 % From above suggested laboratory work should be covered and remaining 20 % is as per facility available at Department

GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering
Subject Code: 3152201

Design based Problems (DP)/Open Ended Problem:

Visit to a mines and study the operation and maintenance of mining machineries.

Major Equipment:

1. Models of various machines.
2. Centrifugal pump
3. Working models of all safety devices

List of Open Source Software/learning website:

1. http://www.joy.com/
2. http://en.wikipedia.org/wiki/Underground_mining_(hard_rock)
3. http://www.mtu-online.com/mtu/applications/mining/underground-mining-machines/
4. http://www.greatmining.com/Underground-Mining.html
5. Undergroundcoal.com