

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	MMC 208	DESIGN OF MINING EQUIPMENT AND COMPONENTS	3	0	0	09

Course Objective

The objective of the course is to present the design concepts of mining equipment.

Learning Outcomes

Upon successful completion of this course, students will:

- have a fundamental understanding of design of mining equipment.
- be able to analyze the basic design of gears, storage system, engine components and wire rope drive.
- be able to make design of Hoisting system and Excavator.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Machine design and design process, probabilistic approach to design.	3	Philosophy of probabilistic approach to design and understanding its application.
2	Design for strength and selection steps for Spur, Helical, Bevel and Worm gears: Geometric introduction and comparison, Force analysis, Beam Strength, Effective load and Wear Strength on Gear tooth, Selection of Material, Gear Lubrication.	6	Understanding and analyzing the gear and gear-box design and its applications.
3	Design of open and closed end Helical Spring, Spring Material, Series-parallel spring, Stress-deflection equation, Concentric spring, and Leaf spring.	4	Understanding and analyzing the design methods of different springs and its applications.
4	Design of thin and thick pressure vessels, Auto-frettage, Compound Vessel, Classification of Seals and gaskets, Oil and mechanical face seals.	4	Understanding and analyzing the design and selection of vessel storage system for different applications.
5	Design of I.C. Engine components: Design of piston, connecting rod, crank-shaft and flywheel.	5	Understanding and analyzing the design of engine components.
6	Design of wire ropes, sheaves and drum.	6	Understanding and analyzing the design parameters of wire rope drive.
7	Design of Hoists: Design of Drives for Hoists, Hoisting Gear, Brakes, Drums considering static and dynamic loadings.	7	Understanding and analyzing the design procedures for Hoisting system used for Underground mining.
8	Design of Excavator components: Booms, Buckets, Bucket Teeth and Crawlers.	7	Understanding and analyzing the design procedures of an excavator, an opencast mining equipment.

Text Books:

1. Mechanical Engineering Design, J. E. Shigley, Mischke & R. Charles, Mc Graw Hill, 9th Edition.
2. Design of Machine Elements, V. B. Bhandari, Mc Graw Hill Education, 4th Edition.

Reference Books:

1. Machine Design, O. P. Grover, CBS Publishers & Distributors, 6th Edition.
2. Design of Machinery - An introduction to the synthesis and analysis of mechanisms and machines, Robert L. Norton, Mc Graw Hill, 3rd Edition.
3. Design Data Hand Book, PSG College of Technology.
4. Relevant Indian Standards.