Marwadi University
Marwadi Chandarana Group

Syllabus for Bachelor of Technology
Department of Mechanical Engineering

Subject Code: 01ME1606
Subject Name: Design of Material Handling Equipment
B. Tech. Year-III (Semester 6)

Type of course: Under Graduate
Prerequisite: Mechanics of Solid, MDID, Machine Design - I, Machine Design - II

Rationale: The course aims to provide fundamental knowledge of Material Handling Equipment. Design and analysis of Hoisting Equipment's Like, Rope, Drum, Hook, Chain, Pulley and Girder etc. and design of arresting gear, Conveyors and Elevators.

Course Outcome:

After completion of this course, student will be able to

1. Understand the basic Fundamentals of Material Handling Equipment.
2. Design various hoisting elements like, chains, Hemp and wire ropes, Pulley systems, Sprockets & drums, forged hooks and eye hooks and Girders.
3. Design of Conveyors and Selection based on the Application.
4. Types, Applications and design of elevators

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks			Practical Marks		
L	T	P	C	ESE(E)	IA	CSE	Viva (V)	Term Work (TW)	
3	0	2	4	50	30	20	25	25	150

Content:

Sr. No.	Content	Total Hrs.
1	**Materials Handling Equipment:** Introduction to material handling Equipment, Detail classification of MHE, Application and their selection, Types of material, unit load, Objectives, Principles, selection parameters of MHE,	05
2	**Design of Hoists:** Design of hoisting Equipment likes: Wire and Hemp Rope,	18

	Welded and roller chains. Design of ropes, pulleys, Pulley Systems, Sprockets and drums, Load handling attachments. Design of Hooks: forged hooks and eye hooks, Crane grabs, Grabbing attachments, hoisting components and their types	
3	**Conveyors:** Classification of Conveyors, Layout of flat belt conveyor, Methods of feeding and discharge, types of conveyor belt, types of Pulleys, idlers, take up device, Belt sag, Frictional resistance and belt tension at various point along conveyor path	**15**
4	**Elevators:** Types of Elevators, Traction Drum elevator, Hydraulic elevator, Bucket elevator and its types	**04**

Distribution of Theory Marks

R Level	**U** Level	**A** Level	**N** Level	**E`** Level	**C** Level
10	**20**	**25**	**25**	**10**	**10**

Legends: R: Remember**; U:** Understand**; A:** Apply**; N:** Analyze**; E:** Evaluate**; C**: Create

Reference Books:

1. Material Handling Equipments by Rudenko, MIR Publishers
2. Alexandrov M., "Materials Handling Equipments", MIR Publishers, 1981.
3. Spivakovskii, "Conveyors and related equipments". MIR publishers.
4. ASME, "Materials Handling Handbook", Wiley-Interscience, 1985
5. Spivakovsy A.O. and Dyachkov V K, "Conveying Machines", Volume I and II, MIR Publishers,1985
6. Tech P S G, "Design Data Book", Kalaikathir Achchagam, Coimbatore, 2003

Practical: Design based Problems (DP)/ Open Ended Problem:

1. Introduction to Material Handling system.
2. Design the wire rope for hoisting application.
3. Design the chain drive for hoisting application.
4. Design the belt conveyor for conveying bulk material.

5. 3D modelling of Crane hook using CAD software.
6. Prototype making of MHE system.
7. Study of hoisting equipment.
8. Study of hoisting wire rope.
9. Study of Crane and its components.
10. Study of different types of elevator.
11. Case study of Elevator
12. Discuss the Classification of Crane as per CMAA.