ME469: DESIGN OF MATERIAL HANDLING EQUIPMENT
CREDITS = 5 (L=3, T=2, P=0)

Course Objective:

To design various bulk and discrete material handling systems

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Assessment Scheme				
L	T	P	C	Theory		Practical		Total Marks
				ESE	CE	ESE	CE	
3	2	0	5	70	30	30	20	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Introduction:** Objectives of material handling system, Principal groups of materials handling equipment and classification, Scope of Material Handling, Criteria for selection of Material Handling Equipment's, Basic kind of material handling problems, Various methods to analyze material Handling problems.	06
2	**Conveyor Design:** Introduction to Apron conveyors , Pneumatic conveyors, Belt Conveyors, Chain conveyors, Screw conveyors and vibratory conveyors and their applications, Design of Belt conveyor- Belt selection procedure and calculation of drop energy, Idler design.	10
3	**Design of bucket and Cage Elevator:** Introduction, Types of Bucket Elevator, Design of Bucket Elevator- loading and bucket arrangements, Cage elevators, shaft way, guides, counter weights.	04
4	**Design of Hoists:** Design of hoisting elements: Welded and roller chains – Hemp and wire ropes - Design of ropes, pulleys, pulley systems, sprockets and drums, Load handling attachments. Design of forged hooks and eye hooks – crane grabs - lifting magnets - Grabbing attachments - Design of arresting gear -Brakes: shoe, band and cone types.	09

Unit No.	Topics	Teaching Hours
5	**Design of Cranes:** Hand-propelled and electrically driven overhead traveling cranes; Traveling mechanisms of cantilever and monorail cranes , goliath cranes; design considerations for structures of rotary cranes with fixed radius ; fixed post and overhead traveling cranes; Stability of stationary rotary and traveling rotary cranes.	09
6	**Packaging and storage of bulk materials:** Steps for design of packages, protective packaging, testing the physical characteristics of packaging, container testing, types of storage and industrial containers ,Automatic guided vehicles, Automatic storage and retrieval system.	04
	TOTAL	**42**

List of References:

1. Conveyor Equipment Manufacturer's Association, "*Belt conveyors for bulk materials*" 6th edition, The New CEMA Book.
2. Rudenko N., "*Materials handling equipment*", Elnvee Publishers, 1970.
3. Ishwar G Mulani and Mrs. Madhu I Mulani, "*Engineering Science and application design for belt conveyor*", Madhu I. Mulani, 2002.
4. Spivakovsy A.O. and Dyachkov V.K., "*Conveying Machines, Volumes I and II*", MIR Publishers, 1985.
5. Alexandrov, M., "*Materials Handling Equipments*", MIR Publishers, 1981.
6. Boltzharol, A.,"*Materials Handling Handbook*", The Ronald press company 1958.

Course Outcomes (COs):

At the end of this course students will be able to …

1. Illustrate various material handling systems
2. Design belt conveyor systems.
3. Design bucket elevator
4. Design hoist systems.
5. Design various cranes
6. Illustrate packaging and storage of bulk materials