Maulana Abul Kalam Azad University of Technology, West Bengal

(Formerly West Bengal University of Technology)

SYLLABUS FOR BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

(Effective from academic session 2018-19)

Subject Code: I	**Category:** Professional Elective Courses
Subject Name: Material Handling	**Semester**: Sixth
L-T-P : **3-0-0**	**Credit: 3**
Pre-Requisites: Kinematics and Theory of Machines	

Course Objective:

1. To know about the material handling systems used in industry.
2. To learn about basic designing principles of some material handling systems.
3. To know about modern handling system using a robot.

Course Content:

Module No.	Description of Topic	Contact Hrs.
1	**Introduction:** Definition, importance and scope of material handling (MH); classification of materials; codification of bulk materials ; utility of following principles of MH– (i) materials flow, (ii) simplification, (iii) gravity, (iv) space utilization, (v) unit size, (vi) safety, (vii) standardization, (viii) dead-weight, (ix) idle time, (x) motion.	4
2	**Unit load**: Definition; advantages & disadvantages of unitization; unitization by use of platform, container, rack, sheet, bag and self contained unit load; descriptive specification and use of pallets, skids, containers, boxes, crates and cartons; shrink and stretch wrapping. **Classification of MH Equipment**: Types of equipment– (i) industrial trucks & vehicles, (ii) conveyors, (iii) hoisting equipment, (iv) robotic handling system and (v) auxiliary equipment; Independent equipment wise sub classification of each of above type of equipment.	6
3	**Industrial trucks & vehicles**: Constructional features and use of the following equipment – (i) wheeled hand truck, (ii) hand pallet truck, (iii) fork lift truck; Major specifications, capacity rating and attachments of fork lift truck.	5
4	**Conveyors:** Use and characteristics of belt conveyor, constructional features of flat and troughed belt conveyor; Use and constructional features of chain conveyors– (i) apron, car and trolley type; Construction of link-plate chains; Dynamic phenomena in chain drive; Use and constructional features of roller conveyors; Gravity and powered roller conveyor; Pneumatic conveyor-use and advantages; Positive, negative and combination system of pneumatic conveyors; constructional feature, application and conveying capacity of screw conveyor.	8

5	**Hoisting Equipment**: Advantage of using steel wire rope over chain; constructional features of wire ropes; Rope drum design; Pulley system-simple vs. multiple pulley; Load handling attachments : hooks, grabs, tongs, grab bucket; Arrangement of hook suspension with cross piece and pulleys (sheaves); Use and constructional features of (i) hand operated trolley hoist , (ii) winch; (iii) bucket elevator, (iv) Jib crane, (v) overhead traveling crane and (vi) wharf crane; Level luffing system of a wharf crane; Utility of truck mounted and crawler crane.	8
6	**Robotic handling**: Materials handling at workplace; Major components of a robot; Applications of robotic handling.	2
7	**Auxiliary Equipment:** Descriptive specification and use of (i) Slide and trough gates, (ii) belt, screw and vibratory feeders, (iii) Chutes, (iv) positioners like elevating platform, ramps, universal vice; (v) ball table.	3

Course Outcomes:

After completing this course, the students will

1. know about constructional features, working principle and specific applications of each of the material handling system.
2. learn about unit load calculation and selecting specification of some material handling system.

Learning Resources:

1. S. Ray, Introduction to Materials Handling, New Age International Pub., 2017.
2. T.K. Ray, Mechanical Handling of Materials, Asian Books Pvt. Ltd., 2005.
3. T.H. Allegri, Materials Handling: Principles and Practices, CBS Publishers and Distributors, 2018.
4. J.M. Apple, Material Handling System Design, John Wiley & Sons, 1972.