Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Design Engg.	Design of Material Handling Equipments	MED 515	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	3	3-0-0	3 Hours

Unit - I

Introduction: Importance of material handling; Principles of material handling system; Classification of material handling equipments; Interrelationships between material handling and plant layout; Factors affecting for selection; Material handling equation; Analysis procedures; Analytical techniques; Selection of suitable types of systems for applications; Activity cost data and economic analysis for design of components of material handling systems; Functions and parameters affecting service; Packing and storage of materials. **(06 Hours)**

Unit - II

Design of Hoists: Drives for hoisting; Components and hoisting mechanisms; Rail traveling components and mechanisms; Hoisting gear operation during transient motion; Selecting the motor rating and determining breaking torque for hoisting mechanisms. **(08 Hours)**

Unit - III

Design of Cranes: Hand-propelled and electrically driven E.O.T. overheat Traveling cranes; Traveling mechanisms of cantilever and monorail 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. **(08 Hours)**

Unit - IV

Design of load lifting attachments: Load chains and types of ropes used in Material Handling System; Forged; Standard and Ramshorn Hooks; Crane Grabs and Clamps; Grab Buckets; Electromagnet; Design consideration for conveyor belts; Application of attachments. **(08 Hours)**

Unit - V

Study of systems and Equipments used for Material Storage: Objectives of storage; Bulk material handling; Gravity flow of solids through slides and chutes; Storage in bins and hoppers; Belt conveyors; Bucket-elevators; Screw conveyors; Vibratory Conveyors; Cabin conveyors; Mobile racks etc.

(07 Hours)

Unit - VI

Material Handling / Warehouse Automation and Safety considerations: Storage and warehouse planning and design; Computerized warehouse planning; Need; Factors and Indicators for consideration in warehouse automation; Which function, when and how to automate; Levels and means of mechanizations; Safety and design; Safety regulations and discipline.

(08 Hours)

Recommended Books:

1. Material Handling Equipments; N. Rudenko; Peace Publishers; Moscow.
2. Material Handling System Design; James M. Apple; John-Willy and Sons Publication; New York.
3. Material Handling; John R. Immer; McGraw Hill Co. Ltd.; New York.
4. Material Handling in Machine Shops; Colin Hardi; Machinery Publication Co. Ltd.; London.
5. Bulk Solid Handling; C. R. Cock and J. Mason; Leonard Hill Publication Co. Ltd.; U.S.A.
6. Material Handling Hand Book; R. A. Kulwiac; 2nd edition; John-Willy Publication; New York.