

GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL AND INFRASTRUCTURE ENGINEERING MACHINERIES AND EQUIPMENT

SUBJECT CODE: 2134001

B.E. 3rd SEMESTER

Type of Course: Core subject of Civil & Infrastructure Engineering

Prerequisite: No Prerequisite

OBJECTIVES: To impart students on the need, use, application various construction equipment, earth movers concepts, power plant equipment and machines used, different material handling techniques & equipment, concepts of machine maintenance and safety equipment.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)		PA (M)		ESE (V)		PA (I)	
			PA	ALA	ESE	OEP				
3	0	0	3	70	20	10	0	0	0	100

Contents:

Sr.	Content	Hours	% Weightage
1	Introduction: Identification, Planning of equipment, Selection of equipment.	2	5
2	Construction: Different crushers, feeders, batching and mixing equipment, pumping equipment, ready mix concrete equipment, Concrete pouring equipment, Asphalt Plant, Asphalt Pavers, Asphalt compacting equipment.	8	15
3	Earth Movers: Fundamentals of Earth work operations, Earth Moving operations, Types of Earth work equipment - tractors, Motor Graders, Scrapers, Front end Waders - Dozer, Excavators, Rippers, Loaders, trucks and hauling equipment, Equipment for foundation and pile driving. Equipment for dredging, trenching, tunneling.	7	15
4	Power Plant: Blowers, Fan, Cooling tower, Pulverizing Mill, compressor – Types, uses, advantages and limitations	6	15
5	Material Handling: Principal groups of material handling equipment, Crane with rotary pillar, cranes with fixed post, jib cranes with trolley, cranes luffing boom cantilever cranes, Hoisting elements, types of ropes, type of pulleys, loading handling attachments, standard forged hook, hook weights, hook bearings, cross piece and casing of hook. Bucket elevators, loading and bucket arrangements. Types – description of conveyor like belt conveyors, apron conveyors, escalators pneumatic conveyor, screw conveyors and vibratory conveyors. Fork lift types and its uses. Introduction to AGV as new material handling device.	9	25

6	Maintenance: Maintenance, Importance, Factors involved, Types of maintenance with advantages and limitations, Breakdown maintenance, Preventive maintenance, Predictive maintenance, VAIN analysis, Total productive maintenance conceptualization	6	15
7	Safety: Background of industrial safety, Accident causation, Industrial hazards, Accident investigation, prevention, Major Safety equipment and its uses.	4	10

OUTCOME: The course would familiarize the student on the technique to select suitable construction equipment, power plant equipment, earthmover & material handling equipment and also maintain them based on the need.

TEXT BOOK:

1. Material handling equipment - N. Rudenko, Envee publishers, New Delhi.
2. Material handling equipment - M. P. Alexandrov, MIR publications, Maskow
3. Maintenance engineering and management – R. C. Mishra & K. Pathak, PHI publication
4. Maintenance of industrial equipments – Gellery & pakelts, MIR publications
5. Construction Planning, Equipment and Methods - Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., 5th Edition, McGraw Hill
6. Building Construction, Planning Techniques and Method of Construction - Arora S.P. and Bindra S.P., Dhanpat Rai
7. Power Plant Engineering - Domkundwar, Dhanpat Rai
8. Construction Equipment and Management – Sharma S. C., Khanna Publishers
9. Heavy Construction – Planning, equipment and methods – J. Singh, CRC press
10. Construction equipment management for engineers, estimator and owners – D. G. Gransberg, C. M. Popescu & R. C. Ryan, Taylor & Francis.

Design based Problems (DP)/Open Ended Problems:

Below mentioned problems are for reference only. Similar problems may be developed by individual teachers.

1. Understand the technique to select suitable construction equipment
2. Understand the technique to select power plant equipment
3. Understand the technique to select earthmover & material handling equipment and maintain them.

List of Open Source Software/learning website:

1. nptel.ac.in

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.