



**Subject :** Construction Practices and Equipment - METCP11502

**Type of course:** Major(Core)

**Prerequisite:** NIL

**Rationale:** Construction practices and equipment are meticulously chosen for efficiency, safety, and quality. Proven methods ensure structures meet blueprints and regulations. Equipment selection hinges on the task at hand. Cranes lift heavy materials, while bulldozers prepare foundations. This synergy minimizes labor costs and project timelines. Advanced techniques like prefabrication allow for quicker assembly on-site. Safety protocols are paramount, with equipment designed to minimize risk and practices emphasizing worker protection. Ultimately, the goal is to construct safe, high-quality structures efficiently, making the right tools and methods crucial.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			ESE		MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

**Continuous Assessment:**

Sr. No	Active Learning Activities	Marks
1	<b>Case Study</b> Prepare the detail report on the Highway Construction and upload on GMIU Web Portal.	10
2	<b>Equipment Management</b> Prepare the various equipment used in construction work and make the cost control of it and upload on GMIU Web Portal.	10
3	<b>Structure Construction</b> Develop a CPM chart for a 5 span bridge on an open foundations.	10



	Develop a comparative table for a 10- storied building constructed by at least three different methods, listing their pros and cons and upload on GMIU Web Portal.	
<b>Total</b>		<b>30</b>

**Course Content:**

Sr. No	Course content	Hrs	% Weightage
1	<p><b>Sub Structure Construction</b> Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques -Dewatering and stand by Plant equipment for underground open excavation.</p> <p><b>Superstructure Construction</b> Launching girders, bridge decks, offshore platforms – Material handling - erecting lightweight components on tall structures - Erection of articulated structures - Fabrication and erection of steel trusses and frames.</p>	18	30%
2	<p><b>Highway Construction Practice</b> Embankment Construction - Ground improvement techniques, Retaining and Breast walls on hill road. Bituminous Constructions-Concrete Road construction: Test - Construction equipments -Method of construction of joints in concrete pavements - IRC specifications.</p> <p><b>Dams and Harbour Construction Practice</b> Construction Methods and Equipment for Dams, Harbours, River works and Pipelines.</p>	16	27%
3	<p><b>Earthwork Equipment</b> Fundamentals of Earthwork Operations - Earth Moving operations-Types of Earthwork Equipment - Tractors, Motor Graders, Scrapers, Front end Loaders, Earth Movers – capacity calculations.</p> <p><b>Forklifts and Screening Equipment</b> Forklifts and related equipment - Portable Material Bins - Conveyors - equipment used in demolition – Chain Pulley Blocks. Crushers – Feeders - Screening Equipment - Batching and Mixing Equipment – Hauling equipment - Pouring and Pumping Equipment – Ready mixed concrete carriers</p>	18	30%
4	<p><b>Equipment Management</b> Factors affecting selection of equipment and methods –Planning - Equipment Management in Projects - Maintenance Management – Replacement - Cost Control of Equipment – Depreciation Analysis, Methods of calculation of depreciation-Safety Management.</p>	8	13%



	<b>Total</b>	<b>60</b>	<b>100</b>
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**Suggested Specification table with Marks (Theory):60**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	NA	NA	NA	NA	NA	NA

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Course Outcome:**

After learning the course, the students should be able to: _____	
CO1	Identify the suitable techniques to construct the structure based on site condition, implement in construction of Embankment, Retaining wall, breast wall in hill road.
CO2	Prepare the work schedule for any type of super structure construction.
CO3	Identify the suitable method and equipment to construct a Road, Dams, Harbour, River work and pipelines.
CO4	Prepare a suitable plan for erection of new plants like Batching and mixing plant, Ready mix concrete plant at site.
CO5	Manage and maintain the equipment and its cost control.

**List of Assignment**

Sr. No	Descriptions
1	Give the assignment of Sub-structure construction
2	Give the assignment of superstructure construction
3	Give the assignment of Highway construction and IS specification of various joint
4	Give the assignment on Dam & Harbour construction
5	Give the assignment of Earthwork, Forklift and screening equipment
6	Give the assignment on Equipment Management



**Instructional Method:**

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

**Text Books:**

1. Punmia B. C., Ashok Kumar Jain, Arun Kumar Jain, (2017), Building Construction, 11th Edition, Lakshmi Publications, New Delhi.
2. Robert L. Peurifoy, Clifford J. Schexnayder, Aviad Shapira (2010), Construction Planning, Equipment and Methods, Indian Edition, Mc-Graw Hill-Education, New Delhi.

**Reference Books:**

1. Kumar Neeraj Jha, (2015), Construction Project Management, 2nd Edition, Pearson, New Delhi.
2. Varghese P.C., (2012), Foundation Engineering, PHI Learning Private Limited, New Delhi.

