

LESSON PLAN : a) Advanced Construction Technology (CEPE303 TH:4) FOR THE SESSION 2026-27(WINTER-2026) BATCH-2024-27, GOVT. POLYTECHNIC,KANDHMAL,PHULABANI

Discipline: civil engineering	Semester: 5TH	Name of the Teaching Faculty: GOURANG CHARAN PRADHAN, Sr Lecturer in Civil Engg.
Subject: a) Advanced Construction Technology (CEPE303 TH:4)	No. of days/ per week class allotted: 3	Semester From Date : 1/07/2026 to Date: 5/11/2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1ST	1	Introduction to Advanced Construction Materials• Need for advanced materials• Classification and applications• Advantages over conventional materials
	2	Fibres in Construction• Steel fibres• Polypropylene fibres• Carbon fibres• Glass fibres• Properties, advantages and applications
	3	Plastic Materials in Construction• PVC• RPVC (Rigid PVC)• HDPE• FRP• GRP• Properties and applications
2ND	1	Miscellaneous Construction Materials – Part I• Acoustic materials• Wall claddings• Plaster boards• Properties and applications
	2	Miscellaneous Construction Materials – Part II• Micro-silica• Waterproofing materials• Adhesives• Properties, advantages and applications
	3	Use of Waste Products and Industrial By-products• Waste materials in bricks• Blocks• Concrete• Mortar• Sustainability and environmental benefits
3RD	1	Revision and Evaluation• Comparative study of advanced construction materials• Sustainable construction practices• Doubt clarification• Unit test
	2	Introduction to Advanced Concreting Methods• Need for advanced concreting techniques• Modern construction trends• Limitations of conventional concreting
	3	Ready Mix Concrete (RMC) – Necessity and Use• Concept of RMC• Advantages and limitations• Applications in construction
4TH	1	RMC Plant and Equipment• Components of batching plant• Mixing and storage systems• Control systems
	2	Conveying of Ready Mix Concrete• Transit mixers• Pumps and pipelines• Handling and transportation precautions
	3	Concrete Vibrators – Internal and Needle Vibrators• Purpose of vibration• Internal (needle) vibrators• Operation and applications
5TH	1	Surface, Platform, and Form Vibrators• Types and working principles• Applications in different structures• Advantages and limitations
	2	Underwater Concreting – Overview• Challenges in underwater concreting• Required properties of concrete• Workability and water-cement ratio considerations
	3	Tremie Method of Underwater Concreting• Equipment and setup• Procedure• Advantages and limitations
6TH	1	Drop Bucket Method and Special Concretes• Drop bucket method• Introduction to special concretes• Roller Compacted Concrete (RCC)• Self-Compacting Concrete (SCC)
	2	Special Concretes & Revision• Steel fibre reinforced concrete• Foam concrete• Shotcreting• Applications of special concretes• Revision and evaluation
	3	Introduction to Advanced Construction Technology• Need for modern construction techniques• Scope in infrastructure development• Overview of advanced construction systems
7TH	1	Construction of Bridges and Flyovers – Overview• Types of bridges and flyovers• Construction sequence• Challenges in execution
	2	Equipment for Foundation Works in Bridges• Piling rigs• Drilling machines• Dewatering systems• Earthmoving equipment
	3	Equipment for Superstructure Construction of Bridges/Flyovers• Launching girders• Segmental construction equipment• Formwork systems
8TH	1	Construction of Multi-storeyed Buildings – Overview• Construction stages• Planning and logistics• Safety considerations
	2	Equipment for Vertical Transportation and Concrete Handling• Lifts and hoists• Belt conveyors• Concrete pumps• Tower cranes
	3	Prefabricated Construction – Introduction• Concept and advantages• Plant vs site prefabrication• Applications in modern construction
9TH	1	Prefabricated Building Elements• Wall panels• Slab panels• Beams and columns• Door and window frames
	2	Erection and Jointing of Prefabricated Elements• Lifting equipment• Positioning and alignment• Jointing techniques• Safety precautions
	3	Soil Reinforcement using Geo-synthetics & Revision• Types of geo-synthetics• Applications in embankments• Strengthening techniques• Revision of module
10TH	1	Introduction to Hoisting and Conveying Equipment• Need for material handling in construction• Classification of hoisting and conveying equipment• Selection criteria
	2	Basic Hoisting Equipment• Derrick Pole• Gin Pole• Lattice Girder• Working principles and applications
	3	Cranes – Part I• Hand-operated crane• Power-driven Scotch Derrick Crane• Locomotive crane• Working principles and uses
11TH	1	Cranes – Part II• Tower crane• Crawler crane• Truck-mounted crane• Gantry crane• Mast crane

	2	Winches, Elevators and Ladders• Types and working of winches• Construction elevators• Ladders used in construction• Safety precautions
	3	Conveying Equipment• Belt conveyors• Types of conveyor belts• Conveying mechanisms• Applications
12TH	1	Construction Transport Equipment• Dumpers• Tractors• Trucks• Capacity, selection, and applications
	2	Revision and Evaluation• Comparative study of hoisting and conveying equipment• Equipment selection for construction activities• Doubt clarification• Unit test
	3	Introduction to Construction Machinery• Importance of construction equipment• Classification of machinery• Equipment selection criteria
13TH	1	Excavation Equipment – Part I• Bulldozers• Scrapers• Graders• Uses, working principles, and output
	2	Excavation Equipment – Part II• Clamshell• Trenching equipment• Tunnel Boring Machine (TBM)• Wheel-mounted loaders
	3	Excavation Equipment – Part III• Power shovels• JCB (Backhoe Loader)• Draglines• Comparison and equipment selection
14TH	1	Compacting Equipment• Plain rollers• Sheep-foot rollers• Vibratory rollers• Pneumatic rollers• Rammers• Output and applications
	2	Pile Driving Equipment• Pile driving rigs• Pile hammers• Working principles• Selection of pile driving equipment
	3	Road Construction Equipment• Hot mix bitumen plant• Bitumen paver• Grouting equipment• Guniting equipment
15TH	1	Floor Finishing and Cutting Equipment• Floor polishing machine• Concrete cutting machine• Selection and applications
	2	Drilling and Blasting Equipment• Drilling patterns for blasting (overview)• Bentonite/Mud slurry in drilling• Types of explosives (e.g., dynamite)• Safe blasting process (conceptual overview)
	3	Revision and Evaluation• Comparative study of construction equipment• Equipment selection for different construction activities• Doubt clarification• Unit test

Dr. Selva

25/06/2026

sr. Lect. in
Civil Engg.

25/06/26
H.O.D.
Dept. of Civil Engg.
Govt. Polytechnic
Kandhamal