

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Diploma Engineering			Branch		Civil Engineering		
Semester		V			Version		1.0.0.0		
Effective from Academic Year			2019-20		Effective for the batch Admitted in			July 2018	
Subject code		1CI 2505	Subject Name		ADVANCE CONSTRUCTION TECHNOLOGY				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Students have already learnt some basic concepts, principles and important aspects of building construction (1CI2305).

Course Learning Outcomes:

The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:

- CO1. Students will be able to describe, analyze, compare and evaluate the technology of high-rise Construction.
- CO2. Discuss purpose, types, materials, design issues, and erection of temporary structures for construction Activities.
- CO3. Propose and evaluate alternative construction systems and methods in response to given building performance requirements.
- CO4. Describe equipment and tackles used, problems encountered and their solutions in erection of steel Structures and compare alternative solutions in building construction technologies.

Course Content

Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hr
UNIT – 1 MODERN MATERIALS AND EQUIPMENTS USED IN SPECIAL CONSTRUCTIONS	1.1 Features and functions of the special types of civil engineering structures: Multi-storeyed building, Chimney, Elevated service reservoir Dams and retaining walls, Bridges and hydraulic structures, Industrial structures, Marine and offshore structures, Tall structures.	1a Describe the features of special types of civil engineering structures. 1b Discuss properties of advance materials and by products such as fly ash, red mud, furnace slag and their suitability to civil works.	05	02
	1.2 Use of Waste products and Industrial By products in bricks, blocks, concrete and mortar.			
	2.1 Excavations Machinery: Power Shovel, Drag line, Calm Shell, Scoop, Trenching equipment, Wheel mounted belt loaders. 2.2 Earth moving Vehicles: Tractors, Boulders, Graders, Scrapers, Rippers. 2.3 Earth moving machinery: Handling,	2a Discuss main features of excavation machinery and earth moving vehicles. 2b State the factors affecting the selection of excavation machinery and earth moving vehicles.		

<p style="text-align: center;">UNIT – 2 PLANTS AND EQUIPMENT USED IN CONSTRUCTIONS</p>	<p>Hoisting, Conveying, Pumping, and Compacting, Pile driving, Drilling equipment, Plants for Grouting, Guniting and Hot Mix Plant, Concrete Mix Plant, Ready Mix Plant.</p> <p>2.4 Hauling equipment: Trucks, Wagon, Dumpers, Scrapers and rippers. Hoisting equipment: Derrick-Pole, Gin Pole, Crane, Power driven scotch derrick crane, Hand operated crane, Locomotive crane, Gentry crane, Tower crane, Lattice Girder, Winches, Elevators, ladders.</p> <p>2.5 Conveying equipment: Belt conveyors, Buckets, Pumping equipment: Water pumps and concrete pumps.</p> <p>2.6 Compacting equipment: Rollers (earth compaction), Smooth surface roller, sheep foot roller, pneumatic rollers, tamping roller, vibrating roller and compactors.</p> <p>2.7 Vibrators: for concrete consolidation: Internal, Needle, Surface, Platform and form vibrators. Crushers and other Equipment: Production of aggregate Jaw crusher, Gyrotory crusher, Roll crusher, Cone crusher, rod and ball mill, screens, Log washer.</p> <p>2.8 Bituminous road construction Equipment for large concrete works & dredging equipment.</p>	<p>2c Discuss main features of earth moving machinery.</p> <p>2d State the factors affecting the selection of earth moving machinery.</p> <p>2e Discuss main features of hauling equipment and hoisting equipment.</p> <p>2f Discuss main features of compacting and pile driving equipment.</p> <p>2g State the factors affecting the selection of compacting and pile driving equipment.</p> <p>2h Discuss main features of vibrators and crushers.</p> <p>2i State the factors affecting the selection of vibrators and crushers.</p> <p>2j Discuss main features of bituminous road construction and dredging equipment.</p> <p>2k State the factors affecting the selection of bituminous road construction and dredging equipment.</p>	<p style="text-align: center;">15</p>	<p style="text-align: center;">13</p>
<p style="text-align: center;">UNIT – 3 PILE FOUNDATION</p>	<p>3.1 Pile foundations, Classification.</p> <p>3.2 Sheet piles based on materials.</p> <p>3.3 Classifications of piles based on materials like concrete, steel, timber, composite, sand, concrete (pre-cast, Cast –in –situ, Pre-stressed) including cased and uncased with advantages and disadvantages.</p> <p>3.4 Selection of type of piles.</p> <p>3.5 Pile accessories and tools and Pile driving methods.</p> <p>3.6 Settlement of piles and under reamed piles including method of it' construction.</p> <p>3.7 Group action of piles and its efficiency.</p>	<p>3a Classify pile foundations.</p> <p>3b Explain the factors affecting the selection of types of piles.</p> <p>3c Justify the use of pile foundation for a given situation.</p> <p>3d Describe the features of the equipment, tools and method of construction of under reamed piles.</p> <p>3e Describe pile driving method.</p> <p>3f Discuss efficiency of group of piles.</p>	<p style="text-align: center;">15</p>	<p style="text-align: center;">08</p>

<p style="text-align: center;">UNIT – 4 COFFER DAMS AND CAISSONS</p>	<p>Coffer dams: 4.1 Types of coffer dams. 4.2 Requirements of coffer dams. 4.3 Selection criteria for coffer dams. 4.4 Design features for coffer dams. 4.5 Leakage points and leakage prevention in coffer dams.</p> <p>Caissons: 4.6 Materials used for caissons. 4.7 Sinking loading of caissons. 4.8 Loads on caisson. 4.9 Design features of caissons. 4.10 Floating of caissons. 4.11 Sinking of caissons.</p>	<p>4a Explain purpose, use and principles of working of coffer dams. 4b Describe the major features of types of coffer dams with sketches. 4c State the selection criteria of types of coffer dams. 4d State the leakage points and suggest leakage prevention in coffer dams. 4e Differentiate between Coffe dams and caissons. 4f Describe the uses of caissons. 4g Classify the types of caisson. 4h Explain method of sinking of caissons. 4i State the problems and suggest suitable solutions in well sinking.</p>	10	08
<p style="text-align: center;">UNIT – 5 DRILLING AND BLASTING</p>	<p>Drilling: 5.1 Types of drilling & drilling requirements. 5.2 Selecting the drilling pattern for blasting. 5.3 Effect of air pressure on drilling operation. 5.4 Betonies/mud slurry in drilling. 5.5 Factors affecting the selection of drilling method and equipment.</p> <p>Blasting: 5.6 Explosives for blasting: Dynamite, Blasting caps Prime line, Safety fuse, Stemming, Blast hole, Prime detonators. 5.7 Process of using explosive. 5.8 Types of blasting & Precautions. 5.9 Storage of explosives & Features of magazine building.</p>	<p>5a Classify various types of Drilling and their suitability. 5b Describe drilling operations. 5c Justify with example the necessity of drilling at construction site. 5d Describe the step-by-step blasting process of using explosives with safety precautions. 5e Explain the precautions required in blasting and drilling operations, in storage and in handling of explosives.</p>	10	08
<p style="text-align: center;">UNIT – 6 ERECTION OF STEEL STRUCTURES</p>	<p>6.1 Roof truss: erection problems Building / Industrial component, Equipment and tackles used for erecting these. 6.2 Plate girder launching a portion of bridge Girder, Large span lattice girder. 6.3 Erection of chimney.</p>	<p>6a Describe problems faced and solutions adopted in erection of various types of steel structures such as roof truss, bridge girders. 6b Discuss various types of equipment and tackles used in erection of various types of steel structure.</p>	05	06
		Total	60	45

List of Practical		
No.		Name of Practical
1	Part-A	(Sketches With Nomenclature and Short Details-Study and Information Based in Sketch book) <ul style="list-style-type: none"> ➤ Earthmoving machineries ➤ Equipment for excavation ➤ Hauling equipment ➤ Hoisting equipment ➤ Conveying equipment ➤ Pumping equipment ➤ Compacting equipment ➤ Concrete vibrating equipment ➤ Pile driving equipment ➤ Plants for Grouting, Guniting. ➤ Drilling equipment ➤ Concrete and mixing plant ➤ Different types of pile foundations. ➤ Different types of coffer dams. ➤ Different types of caisson. ➤ Blast hole ➤ Crib and Trestle ➤ Erection of Steel roof truss ➤ Erection of Steel Bridge ➤ Erection of Plate girder
2	Part-B	Prepare a site visit report regarding your visit.
3	Part-C (Seminar Presentation)	Topic of Seminar shall be given to a group of students. The students are required to submit and present / defend the Seminar in presence of students and teachers and report including PowerPoint presentation to be attached with submission. Each individual student's contribution in group work need to be made explicit.

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Building construction	B.C. Punmia	Laxmi Publication, New Delhi.
2	Durable structure through planning for preventive measures	R.N. Raikar	Structural Designers and Consultants, New Delhi.

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Building construction	S.C. Rangwala	Charotar Publishing House Pvt. Ltd. Anand
2	Civil Engineering Construction	Antill and Ryan	Angus and Robertson

Link of Learning Web Resource	
1	www.sskphdmm.com
2	www.nptel.iitm.ac.in