

## Advanced Construction Technologies

### 01CP0102 (PCC)

#### Objective of the Course:

- To introduce various advanced construction techniques currently used in the industry
- To make students aware of state-of-the-art construction practices with the help of case studies

#### Credit Earned: 3

#### Students learning outcomes:

After successful completion of the course, it is expected that student will be able to,

1. Select and apply suitable advanced construction techniques for a given project
2. To learn about emerging trends such as sustainable construction
3. Aware of current problems and innovative solutions offered by the industry through case studies.
4. To learn about the procedure of the advanced construction methods for heavy structures

#### Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
03	00	00	03	50	30	20	25	25	150

#### Detailed Syllabus

Sr No.	Title of the unit	Number of hours
<b>1</b>	<b>Excavation and Tunneling</b>	<b>10</b>
	trenching machines, blasting method, dewatering methods, Tunnel ventilation, lighting and drainage, cut and cover, rock tunneling, shield tunneling in free air, compressed air tunneling, linings, machine tunneling, Construction methods for drilled shafts, caissons, cofferdams, Shores, needles, grillages	
<b>2</b>	<b>Advance Concrete Construction</b>	<b>10</b>
	Formwork: types, design criteria, patented systems. Fabrication of precast and pre-stressed components Pre-stressing: Plants, Equipment for Pre-stressed Construction, Different types of Pre-stressing. Pumped and sprayed concrete, roller compacted, self-compacted, fiber compacted concrete	

<b>3</b>	<b>Sustainable Construction</b>	<b>8</b>
	Building materials from Agricultural & Industrial wastes. Recycled concrete and aggregates Pre-engineered Buildings: need, type, advantages and disadvantages	
<b>4</b>	<b>Case Studies</b>	<b>8</b>
	Case study of heavy structures/construction projects like thermal/hydro/nuclear power plants/refineries, etc	
<b>5</b>	<b>Recent trends in Construction techniques</b>	<b>6</b>
	3D Volumetric Construction, Precast Flat Panel Modules, Tunnel Formwork System, Flat Slab Technology, Pre-cast Foundation Technique, Hybrid Concrete Building Technique, Thin Joint Masonry Technique, Insulating Concrete Formwork (ICF) Technique	
		<b>42</b>

### **Suggested Theory Distribution**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	25%	25%	20%

### **Instructional Method and Pedagogy:**

1. Use of Learning Management system like canvas
2. Demonstration through presentations on power point and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

### **Recommended Study Material:**

#### **Reference Book:**

1. Jonathan Ricketts, M. Loftin, Frederick Merritt (2004); "Standard Handbook for Civil Engineers", Mcgraw Hill. ISBN-13: 978-0071433372. 1600p.
2. Waddell (1974); "Concrete Construction Handbook", Mcgraw Hill
3. J.R. Illingworth (2002); "Construction Methods and Planning" CRC Press. ISBN 13: 9780203478578. 440p
4. Varma Mahesh (1975); "Construction Equipment, Its Planning & Application" Metropolitan. 539p