

Th 3. ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

Current age construction industry is adopting state of art materials and technologies to improve aesthetics, strength, earthquake resistance, services relating to civil construction. The course will help the student to develop a general awareness on these advancements.

B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Select proper material during construction in domain of advanced materials including fibers, artificial timbers etc.
2. Select appropriate prefabrications in pursuance of standard codes
3. Adopt structural requirements and possible retrofits to improve earthquake resistance
4. Comprehend requirement of various services need to be operational
5. Understand the role of different construction earth moving equipments and select during planning
6. Comprehend necessity of soil reinforcing and prescribe appropriate strategy

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Advanced construction materials	10
2	Prefabrication	08
3	Earthquake Resistant Construction	08
4	Retrofitting of Structures	08
5	Building Services	08
6	Construction and earth moving equipments	10
7	Soil reinforcing techniques	08

D. COURSE CONTENT

1 Advanced construction materials

1.1 Fibers and Plastics-

Types of fibers- Steel, Carbon, glass fibers, Use of fibers as construction material, properties of Fibers.

Types of plastics- PVC, RPVC, HDPE, FRP, GRP etc. Colored plastic sheets.

Use of plastic as construction material.

- 1.2 Artificial Timbers – Properties and uses of artificial timber. Types of artificial timber available in market, strength of artificial timber.
- 1.3 Miscellaneous materials – Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, artificial sand, bonding agents, adhesives etc.

2 Prefabrication

- 2.1 Introduction, necessity and scope of prefabrication of buildings, history of prefabrication, current uses of prefabrication , types of prefabricated systems, classification of prefabrication, advantages and disadvantages of prefabrication,
- 2.2 The theory and process of prefabrication, design principle of prefabricated systems, types of prefabricated elements, modular coordination
- 2.3 Indian standard recommendation for modular planning.

3 Earthquake Resistant Construction

- 3.1 Building Configuration
- 3.2 Lateral Load resisting structures
- 3.3 Building characteristics
- 3.4 Effect of structural irregularities-vertical irregularities, plan configuration problems.
- 3.5 Safety consideration during additional construction and alteration of existing Buildings.
- 3.6 Additional strengthening measures in masonry building-corner reinforcement, lintel band, sill band, plinth band, roof band, gable band etc.

4 Retrofitting of Structures

- 4.1 Seismic retrofitting of reinforced concrete buildings :
- 4.2 -Sources of weakness in RC frame building
- 4.3 -Classification of retrofitting techniques and their uses

5 Building Services

- 5.1 Cold Water Distribution in high rise building, lay out of installation
- 5.2 Hot water supply – General principles for central plants-layout

- 5.3 Sanitation –soil and waste water installation in high rise buildings
- 5.4 Electrical services – i) requirements in high rise buildings ii) Layout of wiring - types of wiring iii) Fuses and their types iv)Earthing and their uses
- 5.5 Lighting – Requirement of lighting, Measurement of light intensity
- 5.6 Ventilation - Methods of ventilation (Natural and artificial Systems of ventilation) problems on ventilation
- 5.7 Mechanical Services- Lifts, Escalator, Elevators – types and uses.

6 Construction and earth moving equipments –

- 6.1 Planning and selection of construction equipments
- 6.2 Study on earth moving equipments like drag line, tractor, bulldozer, Power shovel
- 6.3 Study and uses of compacting equipments like tamping rollers, Smooth wheel rollers, Pneumatic tired rollers and vibrating compactors
- 6.4 Owning and operating cost – problems

7 Soil reinforcing techniques

- 7.1 Necessity of soil reinforcing.
- 7.2 Use wire mesh and geo-synthetics.
- 7.3 Strengthening of embankments, Slope stabilization in cutting and embankments by soil reinforcing techniques.

E. Syllabus Coverage up to Internal Assessment: Chapters 1, 2, 3, 4

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	Agrawal & Shrikhande	Earthquake Resistant Design of Structures	Prentice-Hall of India Pvt. Ltd.
2	Swami Saran	Reinforced Soil and its Engineering applications	I.K.International Pvt. Ltd.
3	National building code of India_ BIS		
4	Fred & Greeno	Building Services Hand book	Routledge Publisher
5	B.L. Gupta & Amit Gupta	Construction Management & Machinery Limit	Standard Publishers
6	S.K. Duggal,	Earthquake resistant design of structures	Oxford
7	M.R. Samal	Advance Construction and Equipment	Platinum Publisher,Kolkata
8	Hand book on repair & rehabilitation of RCC buildings- CPWD		