

5.7.3 ADVANCED CONSTRUCTION TECHNOLOGY

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RATIONALE

This subject is an applied technology subject. In this subject, knowledge regarding advanced construction materials and methods, advanced concreting methods and equipment and miscellaneous hoisting and conveying equipment.

COURSE OUTCOMES

At the end of the open elective, the students will be able to:

- CO1: Use relevant materials in advanced construction of structures.
- CO2: Use relevant method of concreting and equipment according to type of construction.
- CO3: Apply advanced construction methods for given site condition.
- CO4: Select suitable hoisting and conveying equipment for a given situation.
- CO5: Identify advanced equipment required for a particular site condition

DETAILED CONTENTS

UNIT I

Advanced Construction Materials

- 1.1 Fibres: Use and properties of steel, polypropylene, carbon and glass fibres.
- 1.2 Plastics: Use and properties of PVC, RPVC, HDPE, FRP, GRP.
- 1.3 Miscellaneous Materials: Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, waterproofing materials, adhesives.
- 1.4 Use of waste products and industrial by-products in bricks, blocks, concrete and mortar.

UNIT– II

Advanced Concreting Methods and Equipments

- 2.1 Ready Mix Concrete: Necessity and use of ready mix concrete. Products and equipments for ready mix concrete plant. Conveying of ready mix concrete, transit mixers.
- 2.2 Vibrators for concrete consolidation: Internal, needle, surface, platform and form vibrators.

- 2.3 Underwater Concreting: Procedure and equipments required for Tremie method, Drop bucket method. Properties, workability and water cement ratio of the concrete.
- 2.4 Special concrete: procedure and uses of special concretes, Roller compacted concrete, Self-compacting concrete (SCC), Steel fibre reinforced concrete, Foam concrete, shotcreting.

UNIT III

Advanced Technology in Constructions

- 3.1 Construction of bridges and flyovers: Equipments and machineries required for foundation and super structure.
- 3.2 Construction of multi-storeyed Building: Equipments and machinery required for construction of multi-storeyed building such as use of lifts, belt conveyers, pumping of concrete.
- 3.3 Prefabricated construction: Methods of prefabrication, Plant fabrication and site fabrication, All prefabricated building elements such as wall panels, slab panels, beams, columns, door and window frames etc. Equipments and machineries used for placing and Jointing of prefabricated elements.
- 3.4 Strengthening of embankments by soil reinforcing techniques using geo-synthetics

UNIT IV

Hoisting and Conveying Equipments

- 4.1 Hoisting Equipments: Principles and working of Derrick-Pole, Gin Pole, Crane, Power driven scotch derrick crane, Hand operated crane, Locomotive crane, Tower crane, Lattice Girder, Winches, Elevators, ladders. Crawler cranes, Truck mounted cranes, Gantry cranes, Mast cranes.
- 4.2 Conveying Equipments: Working of belt conveyers, types of belts and conveying mechanism. Capacity and use of dumpers, tractors and trucks.

UNIT V

Miscellaneous Machineries and Equipments

- 5.1 Excavation Equipments: Use, working and output of following machinery – bull dozers, scrapers, graders, Clam Shell, trenching equipment, Tunnel boring machine, Wheel mounted belt loaders, power shovels, JCB, and drag lines.
- 5.2 Compacting Equipments: Output of different types of rollers such as plain rollers, ship footed rollers, vibratory, pneumatic rollers rammers.
- 5.3 Miscellaneous Equipments: Working and selection of equipments, Pile driving equipments, Pile hammers, Hot mix bitumen plant, bitumen paver, grouting equipment, guniting equipments,

floor polishing and cutting machine selection of drilling pattern for blasting, Bentonite / mud slurry in drilling, Explosives for blasting, Dynamite, process of using explosives.

RECOMMENDED BOOKS

1. Sharma S C and Deodhar S V, Construction Engineering and Management, Khanna Book Publishing, New Delhi
2. Chudly, R., Construction Technology Vol. I to II, ELBS-Longman Group.
3. Peurifoy, R. L., Construction Planning Equipment and Methods, McGraw Hill Co. Ltd. New York.
4. Seetharaman, S., Construction Engineering and Management, Umesh Publication, New Delhi.
5. Sengupta, B. and Guha., Construction Management and Planning, McGraw Hill Education, New Delhi.
6. Smith, R. C., Materials of Construction, McGraw Hill Co. Ltd.
7. Satyanarayana, R Saxena, S. C., Construction Planning and Equipment, Standard Publication, New Delhi.
8. Rangawala, S. C., Construction of Structures and Management of works, Charotar Publication, Anand.
9. Ghose, D. N., Materials of Construction, McGraw Hill Publishing Co, New Delhi.

RECOMMENDED WEBSITES

1. <https://swayam.gov.in/>
2. <https://www.udemy.com/>
3. <https://www.upgrad.com/>
4. <https://www.khanacademy.org/>

INSTRUCTIONAL STRATEGY

The teachers should use teaching aids for classroom teaching. Arrange industry visits to augment classroom teaching-learning process. Arrange expert lectures from the industry experts. This subject contains five units of equal weightage.