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| | **SRI VIDYA COLLEGE OF**<br>**ENGINEERING & TECHNOLOGY**<br>**COURSE PLAN** | Doc.Ref:SV**CE**02<br>Revision: 01<br>Date: |

**DEPARTMENT OF CIVIL ENGINEERING**

ACADEMIC YEAR: 2018-19[Even]

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|---|---|---|---|---|---|---|
| Subject Code | **CE 8401** | | **L** | **P** | **T** | **C** |
| Subject Title | Construction Techniques, Equipment and Practice | | 3 | 0 | 0 | 3 |
| Year / Dept / Sem | II/CIVIL/IV | Regulation Year | 2017 | | | |
| Faculty Name / Desg / Dept | Ms.S.NAGAJOTHI, /AP/CIVIL | | | | | |
| Course Prerequisite | To make the student aware of the various constructions, techniques, practices and the equipment needed for different types of construction activities. | | | | | |

**CE8401 CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICE L T P C**
**3 0 0 3**

**OBJECTIVES:**

The main objective of this course is to make the student aware of the various construction techniques, practices and the equipment needed for different types of construction activities. At the end of this course the student shall have a reasonable knowledge about the various construction procedures for sub to super structure and also the equipment needed for construction of various types of structures from foundation to super structure.

**UNIT I CONSTRUCTION TECHNIQUES 9**

Structural systems - Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system - Development of construction techniques - High rise Building Technology - Seismic effect - Environmental impact of materials – responsible sourcing - Eco Building (Green Building) - Material used - Construction methods - Natural Buildings - Passive buildings - Intelligent(Smart) buildings - Meaning - Building automation - Energy efficient buildings for various zones-Case studies of residential, office buildings and other buildings in each zones.

**UNIT II CONSTRUCTION PRACTICES 9**

Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork - masonry – stone masonry – Bond in masonry - concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements – Building foundations – basements – temporary shed – centering and shuttering – slip forms – scaffoldings – de-shuttering forms – Fabrication and erection of steel trusses – frames – braced domes – laying brick –— weather and water proof – roof finishes – acoustic and fire protection.

**UNIT III SUB STRUCTURE CONSTRUCTION 9**

Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting-driving diaphragm walls, sheet piles - shoring for deep cutting - well points-Dewatering and stand by Plant equipment for underground open excavation.

**UNIT IV SUPER STRUCTURE CONSTRUCTION 9**

Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors -Erection of articulated structures, braced domes and space decks.

**UNIT V CONSTRUCTION EQUIPMENT** **9**

Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end waders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching and mixing and concreting - Equipment for material handling and erection of structures - Equipment for dredging, trenching, tunneling,

**TOTAL: 45 PERIODS**

**TEXTBOOKS :**


1. Arora S.P. and Bindra S.P., "Building Construction, Planning Techniques and Method of Construction", Dhanpat Rai and Sons, 1997.
2. Varghese, P.C. "Building construction", Prentice Hall of India Pvt. Ltd, New Delhi, 2007.
3. Shetty, M.S, "Concrete Technology, Theory and Practice", S. Chand and Company Ltd, New Delhi, 2008.


**REFERENCES:**


1. Jha J and Sinha S.K., "Construction and Foundation Engineering", Khanna Publishers, 1999.
2. Sharma S.C. “Construction Equipment and Management”, Khanna Publishers New Delhi, 2002.
3. Deodhar, S.V. “Construction Equipment and Job Planning”, Khanna Publishers, New Delhi, 2012.
4. Kannan.V, “construction techniques, equipment and practice”,sruthi publishers,Chennai,2016.
5. MAHALINGAM B, “construction techniques, equipment and practice”,ARS publications,Chennai,2016
6. Dr. Mahesh Varma, “Construction Equipment and its Planning and Application”, Metropolitan Book Company, New Delhi, 1983.


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| Course Objectives (CO) | • To make the students to gain the knowledge on concrete technology. This course imparts the student’s knowledge of various construction practices..<br>• To obtain the knowledge about various techniques of sub structure and super structure, various innovative techniques in construction of bridges and tall structures. |
| Expected Course Outcome (ECO) | On successful completion of this course, students will be able to:<br>• know the different construction techniques and structural systems<br>• Understand various techniques and practices on masonry construction, flooring, and roofing.<br>• Plan the requirements for substructure construction.<br>• Know the methods and techniques involved in the construction of various types of super structures<br>• Select, maintain and operate hand and power tools and equipment used in the building construction sites. |

**Mapping of CO & PO(Specify the PO’s) -** ***(Fill the col.s with the legend given below)***

**Programme Outcomes of Civil Engineering**

Graduates of Civil Engineering program will be able to apply the fundamental knowledge of mathematics, science and engineering to solve problems pertaining to Civil Engineering.

1. Graduates of Civil Engineering program will be able to identify, analyze, formulate, and solve civil Engineering problems in accordance with Indian Standard codes of practice.
2. Graduates of Civil Engineering program will be able to design a system component, or process to meet desired needs within realistic constraint such as economic, environmental, social, political, ethical, health safety, manufacturability, and sustainability.
3. Graduates of Civil Engineering program will able be to design and conduct experiments, as well as to analyze and interpret data.

4. Graduates of Civil Engineering will be able to use the techniques, skills, and modern civil engineering tools, necessary for engineering practice.
5. Graduates of Civil Engineering program will be able to incorporate specific contemporary issues into the identification, formulation, and solution of specific civil engineering problems.
6. Graduates of Civil Engineering program will be able to work on the basis of broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
7. Graduates of Civil Engineering program will be able to understand the role of Civil Engineers and ethical responsibility.
8. Graduates of Civil Engineering program will be able to function on multidisciplinary teams.
9. Graduates of Civil Engineering program will be able to deliver effective verbal, written, and graphical communications.
10. Graduates of Civil Engineering program will be able to recognize the need for, and an ability to engage in life-long learning
11. Graduates of Civil Engineering program will be able to perform economic analysis, quality checks, time/labour management and cost estimates related to design, construction, operations and maintenance of systems in the civil technical specialties.
12. Graduates of Civil Engineering program will be able to understand the role of Civil Engineers and ethical responsibility.

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | - | - | 2 | 3 | - | 1 | - | - | - | - | 1 |
| CO2 | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO3 | - | - | 3 | - | - | 3 | - | 2 | - | 1 | - | - |
| CO4 | - | - | - | - | - | - | - | - | 1 | - | 3 | 1 |
| CO5 | - | - | - | - | - | 1 | - | - | - | 1 | 3 | - |
| CO6 | - | - | - | - | - | - | - | 1 | - | - | 3 | - |

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| **Bridging the Curriculum Gap**<br><br>(Additional Topics beyond syllabus / Seminars / Assignments) | BCG1: MODERN CONSTRUCTION MATERIALS USED IN BUILDING CONSTRUCTION<br>BCG2: MODERN RAILWAY CONSTRUCTION TECHNIQUES AND MAINTENANCE<br>BCG3: ABOUT METRO,MONO AND UNDER GROUND RAIL CONSTRUCTION |
| Related Website URLs | www.slideshare.net/.../cv213-s5-transportation-**engineering**<br>www.universityquestions.in/.../ce2303-railways-airports-and-harbour<br>https://www.vidyarthiplus.com/vp/thread |
| Related Video Course Materials (min. 4 no.s) | http://freevideolectures.com/Course/2673/Transportation-Engineering-II<br>http://www.nptel.ac.in/courses/105107123/<br>https://www.youtube.com/watch?v=bvHAUpJbN0g– |

| S.No | Topic Name | Book | Page no | Mode of delivery | No of hrs | Cumulative hrs |
|---|---|---|---|---|---|---|

**UNIT I CONSTRUCTION TECHNIQUES** **9**

Structural systems - Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system - Development of construction techniques - High rise Building Technology - Seismic effect - Environmental impact of materials – responsible sourcing - Eco Building (Green Building) - Material used - Construction methods - Natural Buildings - Passive buildings - Intelligent(Smart) buildings - Meaning - Building automation - Energy efficient buildings for various zones-Case studies of residential, office buildings and other buildings in each zones.

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|---|---|---|---|---|---|---|
| **1** | Structural systems | R5 | 1.2 | Black board | 1 | 1 |
| **2** | Load Bearing Structure & Framed Structure | R5 | 1.3-1.4 | Black board | 1 | 2 |
| **3** | Load transfer mechanism – floor system | R5 | 1.6-1.13 | PPT | 1 | 3 |
| **4** | Development of construction techniques - High rise Building Technology | R5 | 1.15-1.26 | PPT | 1 | 4 |
| **6** | Seismic effect - Environmental impact of materials – responsible sourcing | R5 | 1.29-1.35 | PPT & Video presentation | 1 | 5 |
| **7** | Eco Building (Green Building) - Material used - Construction methods | R5 | 11.35-1.49 | Black board | 1 | 6 |
| **8** | Natural Buildings - Passive buildings - Intelligent(Smart) buildings | R5 | 1.53-1.61 | PPT | 1 | 7 |
| **9** | Building automation - Energy efficient buildings for various zones-Case studies of residential, office buildings and other buildings in each zones. | R5 | 1.62-1.75 | PPT | 1 | 8 |
| **UNIT II CONSTRUCTION PRACTICES 9**<br>Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork - masonry – stone masonry – Bond in masonry - concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements – Building foundations – basements – temporary shed – centering and shuttering – slip forms – scaffoldings – de-shuttering forms – Fabrication and erection of steel trusses – frames – braced domes – laying brick — weather and water proof – roof finishes – acoustic and fire protection. | | | | | | |
| 1 | Specifications, details and sequence of activities and construction co-ordination | R4 | 3.1 | Black board | 1 | 10 |
| **2** | Site Clearance – Marking – Earthwork | R4 | 3.2-3.8 | Black board | 1 | 11 |
| **3** | Masonry – stone masonry – Bond in | R4 | 3.11-3.25 | Black board | 1 | 12 |

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| | masonry - concrete hollow block masonry | | | | | |
| **4** | Flooring – damp proof courses | R4 | 3.27-3.32 | PPT | 1 | 13 |
| **5** | Construction joints – movement and expansion joints – pre cast pavements | R4 | 3.36-3.41 | PPT | 1 | 14 |
| **6** | Building foundations – basements – temporary shed | R4 | 3.41-3.57 | PPT & Video presentation | 1 | 15 |
| **7** | Centering and shuttering – slip forms – scaffoldings – de-shuttering forms | R4 | 3.59-3.68 | PPT | 1 | 16 |
| **8** | Fabrication and erection of steel trusses – frames – braced domes – laying brick | R4 | 3.69-3.72 | PPT | 1 | 17 |
| **9** | Weather and water proof – roof finishes | R4 | 3.73-3.77 | PPT | 0.5 | 17.5 |
| **10** | Acoustic and fire protection. | R4 | 3.77-3.84 | PPT | 0.5 | 18 |

**UNIT III SUB STRUCTURE CONSTRUCTION 9**

Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting-driving diaphragm walls, sheet piles - shoring for deep cutting - well points-Dewatering and stand by Plant equipment for underground open excavation.

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|---|---|---|---|---|---|---|
| **1** | Techniques of Box jacking | R4 | 4.1-4.7 | Black board | 1 | 19 |
| **2** | Under water construction of diaphragm walls and basement | R4 | 4.7-4.12 | PPT & Video presentation | 1 | 20 |
| **3** | Tunneling techniques-Piling techniques | R4 | 4.13-4.21 | PPT & video presentation | 1 | 21 |
| **4** | Well and caisson - sinking cofferdam | R4 | 4.24-4.34 | PPT | 1 | 22 |
| **5** | Cable anchoring and grouting | R4 | 4.36-4.37 | PPT | 1 | 23 |
| **6** | Driving diaphragm walls, sheet piles | R4 | 4.37-4.38 | PPT | 1 | 24 |
| **7** | Shoring for deep | R4 | 4.39-4.48 | PPT | 1 | 25 |

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| | cutting - well points | | | | | |
| **8** | Dewatering and stand by Plant equipment for underground open excavation | R4 | 4.48-4.54 | PPT | 2 | 27 |
| **UNIT IV SUPER STRUCTURE CONSTRUCTION 9**<br>Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors -Erection of articulated structures, braced domes and space decks. | | | | | | |
| 1 | Launching girders, bridge decks, off shore platforms | R4 | 5.1-5.11 | Black board | 1 | 28 |
| **2** | Special forms for shells - techniques for heavy decks | R4 | 5.14-5.20 | Black board | 2 | 30 |
| **3** | In-situ pre-stressing in high rise structures | R4 | 5.23-5.29 | Black board | 1 | 31 |
| **4** | Material handling - erecting light weight components on tall structures | R4 | 5.30-5.32 | PPT & Video presentation | 1 | 32 |
| **5** | Support structure for heavy Equipment and conveyors | R4 | 5.33-5.35 | PPT | 2 | 34 |
| **6** | Erection of articulated structures, braced domes and space decks | R4 | 5.38-5.41 | PPT | 2 | 36 |
| **UNIT V CONSTRUCTION EQUIPMENT 9**<br>Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end waders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching and mixing and concreting - Equipment for material handling and erection of structures - Equipment for dredging, trenching, tunneling, | | | | | | |
| **1** | Selection of equipment for earth work | R4 | 6.1-6.3 | Black board | 1 | 37 |
| **2** | Earth moving operations - types of earthwork equipment | R4 | 6.3-6.4 | PPT | 1 | 38 |
| **3** | Tractors, motor graders, scrapers, front end waders, earth movers | R4 | 6.4-6.14 | PPT | 2 | 40 |
| **4** | Equipment for foundation and pile driving | R4 | 6.15-6.17 | PPT | 1 | 41 |

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| **5** | Equipment for compaction, batching and mixing and concreting | R4 | 6.19-6.23 | Black board, | 2 | 43 |
| **6** | Equipment for material handling and erection of structures | R4 | 6.26-6.37 | PPT & Video presentation | 1 | 44 |
| **7** | Equipment for dredging, trenching, tunneling | R4 | 6.38-6.43 | PPT | 1 | 45 |

| | ***Prepared by*** | ***Approved by*** |
|---|---|---|
| Signature | | |
| Name | Ms.S.NAGAJOTHI | Dr.P.GANESAN |
| Designation | Assistant Professer<br>Civil Engineering | HOD/CIVIL |
| Signed date | | |

**LEGEND:**

**METHODOLOGY TO MAP OBJECTIVE WITH OUTCOME**

Course outcomes are achieved through

- **a.** Suitable Analogies.
- **b.** Class room teaching.
- **c.** Assignments.
- **d.** Tutorials
- **e.** Weekly, monthly and model exams.
- **f.** Brain storming.
- **g.** Group discussion and role play.
- **h.** Seminars

## SYLLABUS

## CE8401 CONSTRUCTION TECHNIQUES AND PRACTICES

**UNIT -I CONSTRUCTION TECHNIQUES 9**

Structural systems - Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system - Development of construction techniques - High rise Building Technology - Seismic effect - Environmental impact of materials – responsible sourcing - Eco Building (Green Building) - Material used - Construction methods - Natural Buildings - Passive buildings - Intelligent(Smart) buildings - Meaning - Building automation - Energy efficient buildings for various zones-Case studies of residential, office buildings and other buildings in each zones.

**UNIT-II CONSTRUCTION PRACTICES 9**

Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork - masonry – stone masonry – Bond in masonry - concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements – Building foundations – basements – temporary shed – centering and shuttering – slip forms – scaffoldings – de-shuttering forms – Fabrication and erection of steel trusses – frames – braced domes – laying brick — weather and water proof – roof finishes – acoustic and fire protection

**UNIT- III SUB STRUCTURE CONSTRUCTION 9**

Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting - driving diaphragm walls, sheet piles - shoring for deep cutting - well points -Dewatering and stand by Plant equipment for underground open excavation.

**UNIT -IV SUPER STRUCTURE CONSTRUCTION 9**

Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors - Erection of articulated structures, braced domes and space decks.

**UNIT -V CONSTRUCTION EQUIPMENT 9**

Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end waders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching, mixing and concreting - Equipment for material handling and erection of structures – types of cranes - Equipment for dredging, trenching, tunneling,

**TOTAL: 45 PERIODS**