

Techno India NJR Institute of Technology



Course File

Construction Technology and Equipment

(5CE3-01)

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Department of CE

For Techno India NJR Institute of Technology
पंकज पोरवाल
Dr. Pankaj Kumar Porwal
(Principal)



RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Syllabus

3rd Year - V Semester: B.Tech. (Civil Engineering)

5CE3-01: CONSTRUCTION TECHNOLOGY AND EQUIPMENT

Credit: 2

Max. Marks: 100(IA:20, ETE:80)

2L+0T+0P

End Term Exam: 2 Hours

| SN | Contents | Hours |
|----|---|-----------|
| 1 | Introduction: Objective, scope and outcome of the course. | 1 |
| 2 | Engineering Economy Principle of Engineering Economy, Minimum cost point analysis, Breakeven point analysis, Depreciation and depletion | 6 |
| 3 | Safety in construction Causes, classification, cost and measurement of an accident, safety programme for construction, protective equipment, accident report, safety measure: (a) For storage and handling of building materials. (b) Construction of elements of a building (c) In demolition of buildings; Safety lacuna in Indian scenario. Fire safety provisions as per NBC. | 8 |
| 4 | Construction Planning Need of construction planning, Constructional Resources, construction team, stages in construction, preparation of construction schedule, Job layout, inspection and quality control; Materials Management: Objective and functions of material management | 7 |
| 5 | Construction Equipment and Management Earth Moving Equipment-Bull dozers tractor pulled scrapers Power shovels Draglines clamshells; cranes; Hoes, Trenching machine types Hauling Equipment; Drilling, Blasting and Tunnelling Equipment; Pile Driving Equipment | 6 |
| | TOTAL | 28 |

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Course Overview:

Student will learn basics of CTE from this 28-hour course. This course will introduce and train students in the basic skills necessary to pursue a career in construction. This course covers foundations, flooring, framing, plumbing, electrical, sheet rock, windows, doors, cabinetry, blueprint reading, use of hand tools, construction math and Proper use of appropriate equipment contributes to Economy, Quality, Safety, Speed and Timely completion of the Project. Upon completion of this course, students will have the opportunity to apply for summer work with several industry partners.

CTE is the basic requirement for the job role as Civil Site Engineer in the companies like L&T, NCC Ltd. etc. Most of the questions asked during the placement drive for the Construction Company are created from this subject. Student should learn and develop problem solving abilities.

Course Outcomes:

| CO.NO. | Cognitive Level | Course Outcome |
|--------|-----------------|--|
| 1 | Understand | Understand the construction practices and techniques. |
| 2 | Apply | Learner executes the rules used in using construction equipment and it's Management. |
| 3 | Analyze | Test the factors to be considered in planning and construction of buildings. |
| 4 | Understand | Learn objectives and functions of material management. |
| 5 | Remember | Understand about construction equipment and their management. |

Prerequisites:

- 1) Apply the construction practices and techniques.
- 2) Practice about the Construction Equipment and Management.
- 3) Examine the factors to be considered in planning and construction of buildings.
- 4) Demonstrate safety measures involved in construction work
- 5) Choose the appropriate machinery for various construction works

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Course Outcome Mapping with Program Outcome:

| V SEM | | | | | | | | | | | | | | | |
|---------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CONSTRUCTION TECHNOLOGY AND EQUIPMENT | | | | | | | | | | | | | | | |
| Course Outcome | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO351.1 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 1 | 1 | 3 | 1 |
| CO351.2 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 1 | 1 | 3 | 1 |
| CO351.3 | 2 | 3 | 3 | 3 | 1 | 2 | 1 | 2 | 3 | 3 | 3 | 1 | 1 | 3 | 1 |
| CO351.4 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 1 |
| CO351.5 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 1 |
| CO351 (AVG) | 2.4 | 1.8 | 1.8 | 2 | 2 | 2 | 1.4 | 1.6 | 2.6 | 2.2 | 2.6 | 1.4 | 1.8 | 2.6 | 1 |

Course Coverage Module Wise:

| Lecture No. | Unit | Topic |
|-------------|------|---|
| 1 | 1 | INTRODUCTION: Objective, scope and outcome of the course |
| 2 | 2 | INTRODUCTION ON ENGINEERING ECONOMY |
| 3 | 2 | Student Should be able to write about Principle of Engineering Economy |
| 4 | 2 | Student Should be able to write about Minimum cost point analysis |
| 5 | 2 | Student Should be able to write about Breakeven point analysis |
| 6 | 2 | Student Should be able to write about Depreciation |
| 7 | 2 | Student Should be able to write about Depletion./Depreciation & Depletion |
| 8 | 3 | SAFETY IN CONSTRUCTION: Causes, classification |
| 9 | 3 | Student Should be able to write about Cost and measurement of an accident ,safety programmed for construction |
| 10 | 3 | Student Should be able to write about Safety in construction: Protective equipment, accident report, |
| 11 | 3 | Student Should be able to write about Safety measure:(a) For storage and handling of building materials |

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| | | |
|----|----------|---|
| 12 | 3 | Student Should be able to write about Safety measure:(b)Construction of elements of a building |
| 13 | 3 | Student Should be able to write about Safety measure: (c) In demolition of buildings |
| 14 | 3 | Student Should be able to write about Safety lacunain Indian scenario |
| 15 | 3 | Fire safety provisions as per NBC |
| 16 | 4 | CONSTRUCTION PLANNING : Need of construction planning |
| 17 | 4 | Student Should be able to write about Constructional Resources, Construction team |
| 18 | 4 | Student Should be able to write about Stages in construction |
| 19 | 4 | Student Should be able to write about Preparation of construction schedule |
| 20 | 4 | Student Should be able to write about Job layout, inspection and quality control |
| 21 | 4 | Student Should be able to write about Materials Management :Objective of Material Management |
| 22 | 4 | Student Should be able to write about Materials Management: Functions of Material Management |
| 23 | 5 | Student Should be able to write about Introduction on Construction Equipment and Management |
| 24 | 5 | Earthmoving Equipment-Bulldozers |
| 25 | 5 | Student Should be able to write about TractorpulledscrapersPowershovelsDragline'sclamshells;cranes;Hoes |
| 26 | 5 | TRENCHING MACHINE TYPES HAULING EQUIPMENT; Drilling |
| 27 | 5 | Student Should be able to write about Blasting and Tunneling Equipment |
| 28 | 5 | Student Should be able to write about Pile Driving Equipment |

TEXT/REFERENCE BOOKS

1. Construction Planning, Equipment and Methods by Robert Peurifoy and Clifford J Schexnayder.
2. Construction Technology and Management by Gaurav K Sagar & Arvind K Sagar.
3. Modern Construction Equipment and Methods by Frank Harris.

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Course Level Problems (Test Items):

| CO.NO. | Problem description |
|---------|--|
| CO351.1 | Write a note on Principal of Engineering Economy Write a note on Minimum Cost Point analysis Write a short note Breakeven Point analysis Write a note on Depreciation and Depletion |
| CO351.2 | Write a note on Accident Write a note on causes of accident Explain in detail about Protective equipment Explain in detail the Demolition Process of Building Write a note on Safety Masseur at site |
| CO351.3 | Explain detail about Job layout Write a note on Construction planning in detail Explain in detail Quality Control at site Explain in detail construction schedule Write about Material Management |
| CO351.4 | Write about a note on Earth Moving Equipment. Explain in detail Function of Scrapers. |
| CO351.5 | Write a note on Hauling Equipment Explain in detail the Function of Cranes Write a note on Tunnelling Equipment |

Assessment Methodology:

1. Assignments one from each unit.
2. Midterm subjective paper where they have to write About Construction Technology and Equipment. (Twice during the semester)
3. Final paper at the end of the semester subjective.

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Teaching and Learning resources unit-wise:

Unit-1

Engineering Economy

Principal Engineering Economy

Video Tutorials: <https://www.youtube.com/watch?v=yMlryT9LL8w>

Break even analysis

Video Tutorials https://www.youtube.com/watch?v=wOEkc3O_Q_Y

Depreciation and depletion

Video Tutorials <https://www.youtube.com/watch?v=SjLzJ1WkOE0>

Theory concepts: <https://www.investopedia.com/terms/d/depreciation-depletion-and-amortization.asp>

<https://cleartax.in/s/break-even-analysis>

<https://www.hzu.edu.in/engineering/engineering%20economy.pdf>

Sample Quiz: <https://engineeringinterviewquestions.com/engineering-economics-multiple-choice-questions-answers/>

Unit-2

Safety in Construction

Video Tutorials: https://www.youtube.com/watch?v=GuqMJy_e3U4

<https://www.youtube.com/watch?v=ZdeetmkhpKs>

Theory concepts: <https://www.labour.gov.hk/eng/public/os/D/ConstructionSite.pdf>

<https://core.ac.uk/download/pdf/287324325.pdf>

Sample Quiz: <https://play.howstuffworks.com/quiz/the-construction-safety-quiz>

Unit-3

Construction planning

Video Tutorials: <https://www.youtube.com/watch?v=Jgg03Pplheo>

Construction stage

https://www.youtube.com/watch?v=pvJpXvjw_v8

Construction schedule

<https://www.youtube.com/watch?v=Nto1VbJSQWs>

Construction Quality Control

<https://www.youtube.com/watch?v=ypTiYyh7YT0>

Theory concepts: <http://raymushomes.com/DOWNLOADS/stages-of-construction.pdf>

https://www.state.nj.us/transportation/eng/documents/scheduling/pdf/Scheduling_Manual_02-15-2002.pdf

<http://www.cdb.gov.bt/uploads/downloads/1.%20Quality%20Assurance%20and%20Quality%20Control.pdf>

Sample Quiz:

<https://www.objectivebooks.com/2016/04/construction-planning-and-management.html>

<https://www.civildairy.in/2020/06/interview-based-40-questions-and.html>

Unit 4

Construction Equipment and Management

Video Tutorials: <https://www.youtube.com/watch?v=-cuCUP-Fz38>

<https://www.youtube.com/watch?v=cwNq3PI5kWI>

Theory concepts: https://www.lkdfacility.org/wp-content/uploads/2016-06-30-BASIC-MECHANICS6_EM-Equipments-FINAL-WEB.pdf

Sample Quiz: <https://engineeringinterviewquestions.com/construction-equipment-interview-questions-answers/>

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Previous Year Question Papers:

Total No of Pages: **2**

5E1341
B. Tech. V - Sem. (Main / Back) Exam., Feb.-March - 2021
ESC Civil Engineering
5CE3 - 01 Construction Technology & Equipment's

5E1341

Time: 2 Hours

[To be converted as per scheme]
Max. Marks: 65
Min. Marks: 23

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and one questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART - A

(Answer should be given up to 25 words only)

[5×2=10]

All questions are compulsory

- Q.1 Write the scope of construction technology. [2]
- Q.2 Explain the breakeven point analysis. [2]
- Q.3 Write the safety measures in demolition of buildings. [2]
- Q.4 What are the objectives of material management? [2]
- Q.5 How can scrapers help in increasing speed of construction? [2]

[5E1341]

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PART - B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Explain the minimum cost point analysis. [10]
- Q.2 Describe the depreciation and depletion. ✓ [10]
- Q.3 What are the causes of an accident? How the accidents can be classified? ✓ [10]
- Q.4 How the construction schedule is prepared? [10]
- Q.5 Describe the quality control measures in construction. [10]
- Q.6 What are the various forms of earth movers? What are the major earth moving operations? [10]

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

[1×15=15]

Attempt any one questions

- Q.1 (a) What are the safety measures for storage and handling of building materials? [8]
(b) Describe the various stages in construction. [7]
- Q.2 (a) Describe the principles of engineering economy. [7]
(b) What are the basic functions of material management? [8]
- Q.3 (a) What is pile driving? Explain the various equipments for pile driving. [8]
(b) Describe the different equipments used for tunneling. [7]

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