

CIVIL ENGINEERING WORKSHOP LAB

Course Title:	Civil Engineering Workshop Lab	Course Code :	CE-110
Semester:	I Year	Course Group :	Practical
Teaching Scheme in Periods(L:T:P):	30:0:60	Credits :	2
Methodology :	Lecture+ Practical	Total Contact Periods :	90
CIE :	60 Marks	SEE :	40 Marks

Pre-requisites

- No pre requisite required

Course outcomes

After completion of the course, the student shall be able to

CO1	Identify different tools used in construction field and work shop and their uses. Apply safety rules, Use the relevant type of firefighting equipment in the given situation.
CO2	Use the relevant tools for the specified carpentry work and sheet metal
CO3	Prepare and assemble reinforcement bars by interpreting simple bar bending schedules and performing cutting, bending, and tying operations.
CO4	Carry out basic masonry and finishing works such as brick bonding, plastering, putty finishes and tile fixing using appropriate materials, tools, and techniques.
CO5	Execute basic plumbing operations including identification of pipes and fittings, pipe jointing, laying of pipelines, and fixing of sanitary fixtures for building services.
CO6	Perform basic electrical wiring exercises such as lamp, switch, socket, fan, and staircase wiring while following safety practices and welding

Course Content and Blue Print of Marks for SEE

Unit no	Unit name	hours/periods
1	Safety and Work shop practice (Earth work, carpentry, sheet metal)	30
2	Masonry, Plumbing and finishing works	30
3	Electrical services, welding and integrated practical	30
total		90

Course Contents

I: SAFETY AND WORK SHOP PRACTICES:

a) SAFTY:

Duration:30 Periods(L10-P:20)

- Safety signs rules and regulations
- Personal Protective Equipment (PPE)
- Fire safety and first aid
- Operate the fire extinguisher available in laboratory (Any two types)
- Perform mock drill for extinguishing fire. (Group of 10 students preferably)
- Do earth work in field like excavation , gardening etc.,

b) CARPENTRY:

- 1) Identify the tools required for carpentry and uses- Wood working hand tools carpentry vice, marking and measuring tools, saws, claw hammer, mallet, chisels, plans, squares, and their specifications -. Basic process- marking, sawing, planning, chiseling, turning, grooving, boring- Make simple jobs.
- 2) Identification of timber and wood products- Types of engineered woods such as plywood, block board, hardboard, laminated boards, Veneer, fiber Boards and their applications.
- 3) Understand the elements of carpentry in connection with the erection of scaffolding and form work with a particular reference to use of braces
- 4) Scaffolding and Formwork Erection of Scaffolding Material - Position of Shuttering - Fixing of form work.

c) SHEET METAL:

- 1) Sheet metal hand tools snip, shears sheet gauge, straight edge, L square, scriber, divider, trammel, punches, pliers, stakes, groovers, limit set and their Specifications
- 2) Operation of machineries in sheet metal shops- sheet cutting and bending machine their specifications and maintenance Basic process- marking, bending, folding, edging, seaming, staking, riveting

d) REINFORCEMENT AND BAR BENDING PRACTICE

- Identification of reinforcement bars and tools
- Read the data required from bar bending schedule for bending of bars. Bar bending schedule (simple).
- Bend the bars using the specified tools to the exact shape as per bar bending schedule as specified in IS-2502(Code of practice for bending and fixing of bars for concrete reinforcement) Cutting, bending, and tying of reinforcement
- Prepare the grills as per the drawings of the structural elements using binders, stirrups, links etc. Preparation of small reinforcement cage model

UNIT 2: MASONARY AND FINISHING WORKS

Duration:30 Periods(L10-P:20)

a) Bricks:

- Identification of bricks, blocks, and tools
- Practice of brick bonds: English bond-Flemish bond

b) Plumbing exercises

- Identification of Plumbing tools and Masonry tools- Identification of pipes and fittings (PVC, GI)-Pipe cutting, threading and bending-Practice of PVC and GI pipe joints-Preparation of simple plumbing layout
- Assembling of pipe lines for toilet with two taps, shower and wash basin - Fixing of floor traps, gully traps, water closet, drain pipes - Laying stoneware/PVC pipes and construction of inspection chambers

c) Demonstration of Modern Construction Tools

- Concrete vibrator
- Power drill
- Tile cutter
- Bar cutting and bending machine

UNIT 3: ELECTRICAL SERVICES AND INTEGRATED PRACTICAL

Duration:30 Periods(L10-P:20)

a) Electrical Exercises

Identify various electrical accessories - Identify line, neutral and earth terminals in power sockets and power plugs - Measure the AC voltage between line and neutral using DMM - Study of earthing and earth pit - Connecting a fuse in the main circuit - Controlling the lamp using a switch - Controlling the fan with a switch and regulator - Connect a i) 2-pin socket ii) 2-pin socket with switch control - Control one lamp with 2 switches (Staircase wiring).

b) Integrated practical exercise

- Preparation of a small civil engineering model combining:
 - Formwork
 - Reinforcement
 - Concrete/masonry

KEY Competencies to be achieved by the student

S. No	Title	Key Competency
1	Safety and Professional Practice Competency	• Adherence to workshop and construction site safety rules • Proper use of Personal Protective Equipment (PPE) • Ability to respond to fire safety and first-aid situations • Maintenance of a safe and disciplined work environment • Maintain premises clean and do some earth work.
2	Basic work shop practice, carpentry, and sheet metal	• Identification and selection of timber, wood products, bricks, blocks, tiles, pipes, and reinforcement bars. • Recognition of construction tools and equipment used in various building activities. carry out small jobs in carpentry and sheet metal and do earth work or gardening.
3	Scaffolding and Formwork Competency	• Erection of basic scaffolding systems • Positioning and fixing of shuttering and formwork for simple structural elements • Understanding stability, alignment, and safety aspects of temporary structures

4	Reinforcement and RCC Practice Competency	• Interpretation of simple bar bending schedules • Cutting, bending, and tying of reinforcement bars • Preparation of reinforcement cage models for RCC elements
5	Masonry and Finishing Works Competency	• Execution of brick masonry using standard bonds • Preparation and application of plastering mixes • Fixing of tiles with proper alignment, level, and finish • Carrying out pointing and finishing techniques
6	Plumbing and Sanitary Services Competency	• Identification of plumbing tools, pipes, and fittings • Assembly of water supply and sanitary pipelines • Fixing of sanitary fixtures, traps, and drainage pipes • Construction of inspection chambers
7	Electrical Services Competency	• Identification of electrical accessories and terminals • Measurement of AC voltage using DMM • Execution of basic electrical wiring circuits safely • Understanding of earthing and protection systems
8	Modern Construction Tools Handling Competency	• Awareness and demonstration of modern construction equipment • Safe operation and basic functional understanding of power tools • Appreciation of productivity and quality improvement using modern tools
9	Integrated Construction Practice Competency	• Integration of formwork, reinforcement, and concrete/masonry • Planning and execution of small construction models • Application of multiple construction skills in a coordinated manner

10	Documentation and Teamwork Competency	• Preparation of practical records and sketches • Effective communication and teamwork during lab activities • Demonstration of responsibility, discipline, and work ethics • Maintain premises clean and green.
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Reference Books

1. Electrical estimation and costing
2. Basic Plumbing with illustrations by Howard C Massey Craftsman Book Co
3. Workshop Technology by B.S.Raghuwansh, Dhanpat Rai and sons, New Delhi

Suggested E- Learnings

- <http://nptel.ac.in>

Suggested Learning Outcomes

UNIT-I: SAFETY AND CONSTRUCTION PRACTICES

1. Follow workshop and site safety rules, use appropriate PPE, and respond to fire and first-aid situations.
2. Identify tools for carpentry and prepare small jobs like planning, T-Joint and Lap joint
3. Identify tools for Sheet metal and carryout jobs like Formation of joints like grooved joints, locked groove joint, rectangular open type tray, Preparation of hollow cylinder, Preparation of funnel
4. Identify different types of timber and wood products used in construction works.
5. Erect basic scaffolding systems and position shuttering/formwork for simple structural elements.
6. Identify reinforcement bars and bar bending tools used in RCC works.
7. Prepare a simple bar bending schedule and perform cutting, bending, and tying of reinforcement bars.
8. Fabricate a small reinforcement cage model as per given dimensions and drawings.
9. Perform activities like keeping premises clean and carry out earth work.

UNIT-II: MASONARY AND FINISHING

1. Identify bricks, blocks, masonry tools, and demonstrate English and Flemish brick bonds.
2. Prepare plastering mixes of required proportions and apply plaster to wall surfaces.
3. Identify plumbing and masonry tools, pipes, and fittings used in building services.
4. Perform pipe cutting, threading, bending, and make PVC and GI pipe joints.
5. Assemble plumbing layouts for toilets including taps, shower, wash basin, traps, water closet, and drainage pipelines.
6. Lay stoneware/PVC pipes and construct inspection chambers for drainage systems.
7. Cut and fix tiles using cement mortar or adhesive and carry out pointing and finishing works.
8. Observe and explain the working of modern construction tools such as concrete vibrator, power drill, tile cutter, and bar cutting/bending machine.
9. Perform activities like keeping premises clean and carry out earth work.

UNIT-III: ELECTRICAL SERVICES AND INTEGRATED PRACTICAL

1. Identify electrical accessories, wiring tools, and terminals in sockets and plugs.
2. Measure AC voltage using a Digital Multimeter (DMM) and understand earthing systems and earth pits.
3. Perform basic electrical wiring circuits including lamp control, fan with regulator, socket wiring, and staircase wiring by following safety norms.
4. Integrate formwork, reinforcement, and concrete/masonry to prepare a small civil engineering model.
5. Document the materials, tools, procedure, and observations of the integrated practical work.
6. Perform activities like keeping premises clean and carry out earth work

Suggested Student Activities

1. Prepare a report on tools required, process of plastering and mortar mix preparation for Plastering.
2. Make a presentation on tool required and function of each tool in bar bending process.
3. Visit local construction site and prepare a report on types and process of scaffolding used.

4. Prepare a report on plumbing tools and their functions in plumbing process
5. Prepare a report on fixing of floor trap, gully trap and water closet of a house at nearby construction site.
6. Prepare a report on electrical accessories, Wires and cables.
7. Prepare a report on how the lights are controlled in nearby godown
8. Prepare a report on house wiring of your house.

CO-PO Mapping Matrix

	Basic and Discipline Specific Knowledge	Problem Analysis	Design/Development of Solutions	Engineering Tools, Experimentation and Testing	Engineering Practices for Society, Sustainability and Environment	Project Management	Lifelong Learning	Linked PO
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	
CO1	2	–	2	3	–	1	1	1,3,4,6,7
CO2	2	2	3	2	–	1	–	1,2,3,4,6
CO3	3	2	3	2	1	1	–	1,2,3,4,5,6
CO4	3	2	3	2	1	1	–	1,2,3,4,5,6
CO5	2	2	3	2	1	1	–	1,2,3,4,5,6
CO6	2	2	3	3	1	1	–	1,2,3,4,5,6

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MID I Examination

Model Question Paper

DCE I Year

Course Code: CE-110

Duration:1 hour

Course Name:Civil Engineering Workshop Lab

Max.Marks:20 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given lot.

Each question carries 20 Marks

1. a) List the safety rules to be followed in a construction site.
b) Identify at least six Personal Protective Equipment (PPE) used in construction works and state their purpose. Identify the various tools used for bending of reinforcing bars.
2. a) Identify the tools required for carpentry and plumbing and for earthwork.
b) Make a lap joint between two wooden pieces
c) Make a job using given sheet metal (Funnel or jar) etc.,
3. a) Identify the materials used for scaffolding in building construction.
b) Explain the procedure for erection of scaffolding and positioning of shuttering for a simple structural element.
4. Identify reinforcement bars and bar bending tools used in RCC works.
b) Prepare a simple bar bending schedule and explain the steps involved in cutting, bending, and tying of reinforcement bars.

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MID II Examination

Model Question paper

DCE I Year

Course Code:CE-110

Duration:1 hour

Course Name: Civil Engineering Workshop Lab

Max.Marks:20 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given lot Each question carries 20 Marks

1. a) Identify the tools used for brick masonry.
b) Draw and explain English bond and Flemish bond with neat sketches.
c) State the applications of each bond. Explain the preparation of plastering mix proportions.
 2. a) Identify plumbing tools, pipes, and fittings used in building construction.
b) Explain the procedure for cutting, threading, and joining PVC and GI pipes.
c) Draw a simple plumbing layout for a toilet showing taps, wash basin, water closet, and traps.
 3. a) Explain the steps involved in tile cutting and fixing using cement mortar or adhesive.
b) List the precautions to be taken during tile fixing and finishing works.
c) Write the uses of any two modern construction tools (concrete vibrator, power drill, tile cutter, bar bending machine).
6. Explain different types of distempers and their application

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Year End Examination Model Question paper

DCE I Year End Examination

Course Code:CE-110

Duration:2 hours

Course Name: Civil Engineering Workshop Lab

Max.Marks:40 Marks

Instructions to the Candidate:

Pick and Answer any One of the following Questions from given lot.

Each question carries 40 Marks

- Q1. a) Explain common causes of accidents in construction workshops.
b) Describe the role of safety signs, barricading, and housekeeping in preventing accidents.
- Q2. a) Classify wood products used in construction and state their uses.
b) Explain the requirements of good formwork and methods of fixing and removal of shuttering.
- Q3. a) Explain types of scaffolding used in building construction with sketches.
b) State the precautions to be followed during bar bending and tying operations.
- Q4. a) Explain defects in plastering and their causes.
b) Describe surface preparation before plastering and tile fixing.
- Q5. a) Explain the functions of floor traps, gully traps, and inspection chambers.
b) Describe the procedure for laying stoneware/PVC drainage pipes.
- Q6. a) Explain the importance of earthing and methods of earthing used in buildings.
b) Describe the planning and execution of an integrated construction exercise involving formwork, reinforcement, and concrete/masonry.