

CIVIL ENGINEERING WORKSHOP**Course Code : 311010**

Programme Name/s : Architecture Assistantship/ Agricultural Engineering/ Architecture/ Civil Engineering/
Programme Name/s : Civil & Rural Engineering/ Construction Technology/ Interior Design & Decoration/ Interior Design/
Programme Name/s : Civil & Environmental Engineering

Programme Code : AA/AL/AT/CE/CR/CS/IX/IZ/LE

Semester : First

Course Title : CIVIL ENGINEERING WORKSHOP

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I. RATIONALE

General Civil Engineering Practices is a basic engineering course. The course of Civil Engineering Workshop practices would facilitate the opportunity to appreciate the basic construction activities that a Diploma holder is expected to perform. Supervision of construction activities like brick masonry, woodwork, concreting, welding etc. and quality control and maintenances of safety to self, coworkers and the constructed components of the building. The knowledge of basics of civil Engineering operations like Line out, Excavation, masonry, mixing, concreting, plumbing and finishing works is essential for technician to perform his/her duties in industries. Therefore, an opportunity is created through this course to develop basic skills with the safety aspects required for the same. Students should be able to supervise construction activities and use quality control techniques and maintain tools and equipment's with safety to self, co-workers and the constructed components of the building Working in field develops the attitude of team working and safety awareness, this course provides the unique experience of field work.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified outcomes through various teaching learning experiences: Perform the basic civil engineering operations using relevant tools and identifying appropriate materials, tools and equipment required for each construction activity. The course will develop awareness, knowledge & skills of various Civil Engineering practice with safety precautions and quality control at the construction site.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Use the relevant type of firefighting equipment in the given situation.
- CO2 - Undertake the various construction activities at site.
- CO3 - Perform the masonry work for the given situation.
- CO4 - Carry out the specified Plumbing work in the given situation
- CO5 - Prepare the simple job using relevant sheet metal tools.
- CO6 - Use the relevant tools for the specified carpentry work.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

| Course Code | Course Title | Abbr | Course Category/s | Learning Scheme | | | Credits | Assessment Scheme | | | | | | | |
|-------------|--------------|------|-------------------|--------------------------|----|---|---------|-------------------|--------|-------|-------|-------------------|----|-------------|-------------|
| | | | | Actual Contact Hrs./Week | | | | Paper Duration | Theory | | | Based on LL & TSL | | Based on SL | Total Marks |
| | | | | SL | NL | H | | | FA-TH | SA-TH | Total | Practical | | | |
| | | | | | | | | | | | | CL | TL | | |
| | | | | | | | | | | | | | | | |

| | | | | | | | | | | | Max | Max | Max | Min | Max | Min | Max | Min | Max | Min | |
|--------|----------------------------|-----|-----|---|---|---|---|---|---|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 311010 | CIVIL ENGINEERING WORKSHOP | CEW | SEC | - | - | 4 | - | 4 | 2 | | - | - | - | - | 50 | 20 | 50@ | 20 | - | - | 100 |

Total IKS Hrs for Sem. : 6 Hrs
 Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment
 Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination
 Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

| Sr.No | Theory Learning Outcomes (TLO's) aligned to CO's. | Learning content mapped with Theory Learning Outcomes (TLO's) and CO's. | Suggested Learning Pedagogies. |
|-------|---|---|---|
| 1 | <p>TLO 1.1 Explain the safety practices & precautions while operating firefighting equipment.</p> <p>TLO 1.2 Explain the procedure for using the given type of fire extinguisher.</p> <p>TLO 1.3 Justify the given type of firefighting equipment for the given situation.</p> <p>TLO 1.4 Prepare a list of equipment used for safety in workshop operations.</p> <p>TLO 1.5 Maintain the good housekeeping in the working area</p> <p>TLO 1.6 Prepare a layout of workshop</p> | <p>Unit - I Safety Practices & Precautions</p> <p>1.1 1.1 Safety Practices, Causes of accidents, General safety rules, Safety signs and symbols, Safety Precaution.</p> <p>1.2 1.2 First Aid box and its constituent materials.</p> <p>1.3 1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire Classification of fire, Firefighting equipment, fire extinguishers (Class A, B, C, D).(As per NBC 2016).</p> <p>1.4 1.4 Workshop Layout: Issue and return system of tools, equipment and consumables.</p> | <p>Demonstrate</p> <p>Show first aid box</p> <p>Hands on practice</p> <p>Video</p> <p>Demonstrations</p> |
| 2 | <p>TLO 2.1 Explain the basic activities to be undertaken for the construction of the given component of civil structure.</p> <p>TLO 2.2 Lay the foundation layout on site using relevant techniques.</p> <p>TLO 2.3 Explain the safety precautions to be undertaken at the given construction site.</p> | <p>Unit - II Construction Activities</p> <p>2.1 Construction activities such as layout, excavation, brick masonry, concreting, plumbing, electrification, Interdependency of various activities.</p> <p>2.2 Causes of accidents, Safety Practices and Precaution.</p> | <p>Demonstrate the various construction activity.</p> <p>Hands-on practice</p> <p>Field Visit</p> <p>Videos</p> |
| 3 | <p>TLO 3.1 Carry out the given type of masonry work using relevant tools.</p> <p>TLO 3.2 Explain the relevant method for doing plaster of required thickness.</p> <p>TLO 3.3 Explain the relevant method</p> | <p>Unit - III Masonry & Finishing works</p> <p>3.1 Brick and stone Masonry work, Types of bonds and joints (vertical and horizontal)</p> <p>3.2 String (Line dori), plumb bob, right angle and water level tube.</p> <p>3.3 Plastering (Internal & External) work.</p> | <p>Demonstrate</p> <p>Hands on practice</p> <p>Tool handling.</p> <p>Simulation Videos.</p> <p>Field visit</p> |

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|-------|---|---|--|
| | <p>of doing pointing work for rubble masonry</p> <p>TLO 3.4 Explain the need of the formwork in construction.</p> <p>TLO 3.5 Construct the false ceiling using relevant tools in the given situation.</p> <p>TLO 3.6 Fix the aluminum partition using the relevant specified material.</p> <p>TLO 3.7 Justify the need of plastering in construction.</p> <p>TLO 3.8 Undertake the flooring operation using the given type of flooring material.</p> <p>TLO 3.9 Explain the procedure for Painting a level surface of the given wall.</p> <p>TLO 3.10 Explain the relevant steps involved in Painting of steel frames/wooden structure using given type of paint.</p> | <p>3.4 Pointing work</p> <p>3.5 Types of Formwork with safety measures.</p> <p>3.6 False ceiling, Plaster of Paris (POP) work.</p> <p>3.7 Aluminum glass works, cladding.</p> <p>3.8 Different types of flooring and its application</p> <p>3.9 Dado with its importance</p> <p>3.10 Whitewash and painting: -Tools required, brush, roller and spray-painting preparation of surface for timber and steel members for painting.</p> | |
| 4 | <p>TLO 4.1 Undertake the plumbing operation for the given situation.</p> <p>TLO 4.2 Select the relevant tools to perform the given plumbing work.</p> <p>TLO 4.3 Use the concerned tools to lay the pipe line of required specification using relevant fittings</p> <p>TLO 4.4 Draw the flow chart describing the laying operations of water supply pipe line from overhead tank to the given flat/house.</p> | <p>Unit - IV Plumbing Fixtures</p> <p>4.1 Different types of pipes, Joints, Taps. Fixtures and accessories used in plumbing.</p> <p>4.2 Components (pipes, valves bends.) used in water supply/sanitary/ sewerage lines.</p> <p>4.3 Pipe fittings- bends, elbows, tees, cross, coupler, socket, reducer, cap, plug, nipple and their Specifications</p> <p>4.4 Various Operation in plumbing shops- pipe bending machine their specifications and maintenance. Basic process cutting, threading etc.</p> | <p>Demonstrate</p> <p>Hands on practice.</p> <p>Simulation Videos.</p> <p>Field visit.</p> |
| 5 | <p>TLO 5.1 Identify the tools used in sheet metal work, available in the workshop.</p> <p>TLO 5.2 Perform the required operation on sheet metal using relevant tools in given situation.</p> <p>TLO 5.3 Perform bending operations on the given piece of sheet metal</p> <p>TLO 5.4 Maintain the equipment and machineries used in sheet metal works.</p> | <p>Unit - V Sheet Metal</p> <p>5.1 Sheet metal hand tools snip, shears sheet gauge, straight edge, L square, scribe, divider, trammel, punches, pliers, stakes, groovers, limit set and their Specifications</p> <p>5.2 Operation of machineries in sheet metal shops- sheet cutting and bending machine their specifications and maintenance.</p> <p>5.3 Basic process- marking, bending, folding, edging, seaming, staking, riveting.</p> | <p>Demonstrate</p> <p>Hands on practice.</p> <p>Simulation Videos.</p> |
| 6 | <p>TLO 6.1 Select the relevant type of wood in the given situation</p> <p>TLO 6.2 Carry out the relevant operations on the given piece of wood using the carpentry tools.</p> <p>TLO 6.3 Maintain carpentry tools in good condition.</p> <p>TLO 6.4 Use the relevant type of material for preparing the furniture of given specification.</p> | <p>Unit - VI Carpentry Work</p> <p>6.1 Types of engineered woods such as plywood, block board, hardboard, laminated boards, Veneer, fiber Boards and their applications.</p> <p>6.2 Wood working hand tools carpentry vice, marking and measuring tools, saws, claw hammer, mallet, chisels, planes, squares, and their specifications</p> <p>6.3 Operation of wood working machineries - Wood turning lathe, circular saw, their specifications and maintenance.</p> <p>6.4 Basic process- marking, sawing, planning, chiseling, turning, grooving, boring.</p> | <p>Demonstrate</p> <p>Hands on practice.</p> <p>Simulation Videos.</p> |

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|-------|---|--|--------------------------------|
| | | 6.5 Components of wood work- different types of Hinges, tower bolts, brackets etc. | |

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

| Practical / Tutorial / Laboratory Learning Outcome (LLO) | Sr No | Laboratory Experiment / Practical Titles / Tutorial Titles | Number of hrs. | Relevant COs |
|--|-------|--|----------------|--------------|
| LLO 1.1 Safety Practices & Precautions | 1 | * Operate the fire extinguisher available in laboratory (Any two types) | 2 | CO1 |
| LLO 2.1 Safety Practices & Precautions | 2 | Perform mock drill for extinguishing fire. (Group of 10 students preferably) | 4 | CO1 |
| LLO 3.1 Construction activities | 3 | * Prepare the report of site visit of a construction project with reference to substructure construction activities along with the equipment used. | 4 | CO2 |
| LLO 4.1 Construction activities | 4 | * Perform the lineout activity on the site for the given type of foundation work. | 4 | CO2 |
| LLO 5.1 Construction activities | 5 | * Prepare a report on the observation carried on the site regarding the safety precautions followed during construction activities. | 4 | CO2 |
| LLO 6.1 Study the different Agricultural Equipment's and their applications. | 6 | Prepare a report on different equipment involved in agricultural activities | 2 | CO6 |
| LLO 7.1 Construction activities | 7 | Prepare a report on vernacular construction techniques used in old constructions. | 2 | CO2 |
| LLO 8.1 Construction activities | 8 | * Prepare the schematic diagram of the given structure by measuring its dimensions using measuring tape | 2 | CO2 |
| LLO 9.1 Construction activities | 9 | Conduct the survey of the construction material through internet with reference to their properties, cost and utilities. | 2 | CO2 |
| LLO 10.1 Masonary & Finishing works | 10 | * Prepare the report of site visit of a construction project with reference to superstructure construction activities along with the equipment used. | 6 | CO3 |
| LLO 11.1 Masonary & Finishing works | 11 | * Construct a corner brick wall using the relevant type of bond by ensuring wall is in straight line, plumb and at right angle. (Group of 10 students). | 6 | CO3 |
| LLO 12.1 Masonary & Finishing works | 12 | * Transfer the marked level at the required location by using water tube level for a given construction activity. | 4 | CO3 |
| LLO 13.1 Masonary & Finishing works | 13 | * Conduct the various field test on the given sample of cement to check its quality. | 4 | CO3 |
| LLO 14.1 Masonary & Finishing works | 14 | * Conduct the various field test on the given sample of brick to check its quality. | 2 | CO3 |
| LLO 15.1 Plumbing Fixtures | 15 | * Prepare the pipe line of required length using the given type of fittings. | 2 | CO4 |
| LLO 16.1 Plumbing Fixtures | 16 | * Connect the two pipes of given diameters in the form of T- joint by using relevant pipe fitting. | 4 | CO4 |
| LLO 17.1 Sheet Metal | 17 | * Prepare the given shape of sheet metal utility job (tray, dustbin, letter box, fire bucket etc.) using following operations 1. Cutting And Bending 2. Edging 3. End Curling | 4 | CO5 |

| Practical / Tutorial / Laboratory Learning Outcome (LLO) | Sr No | Laboratory Experiment / Practical Titles / Tutorial Titles | Number of hrs. | Relevant COs |
|--|-------|--|----------------|---------------------------------|
| | | 4. Lancing 5. Welding 6. Riveting | | |
| LLO 18.1 Carpentry Work | 18 | Perform the sawing operation on the given sample of wood to convert rough surface to smooth and levelled surface. | 4 | CO6 |
| LLO 19.1 Carpentry Work | 19 | Draw the labelled diagram of truss reflecting the tongue and groove joints with brief note on it. | 2 | CO6 |
| LLO 20.1 Carpentry Work | 20 | * Compile the information in a report format, regarding latest construction equipment used in a construction project through internet surfing. | 2 | CO6 |
| LLO 21.1 Carpentry Work | 21 | Prepare the architectural model of the given structure using relevant types of materials. | 4 | CO6 |
| LLO 22.1 Carpentry Work | 22 | Prepare the model of farm pond of the given capacity by using relevant materials. | 4 | CO6 |
| LLO 23.1 Carpentry Work | 23 | Prepare a report on various ancient tools/modern tools.(Any Five each) | 2 | CO2 CO3 CO4 CO5 CO6 |
| LLO 24.1 Study and collect the information about various heritage structures | 24 | * Prepare a report on the site visit of a Heritage structures/ Ancient structure available in the immediate vicinity (Any Two) | 4 | CO2 CO3 CO4 CO5 CO6 |

Note :

A suggestive list of LLOs is given in the above table. A judicious mix of minimum 20 LLOs needs to be performed out of 24. The LLOs which are marked as '*' at the start of practicals are compulsory, so that the student reaches the 'Precision Level' of Dave's 'Psychomotor Domain Taxonomy' as generally required by the industry.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Assignment

- a. Undertake a market survey of local dealers for procurement of civil engineering materials, plumbing materials and finishing items.
- b. Organize a visit to Construction sites of different types such as simple residential buildings, malls, multistoried buildings. Observe the course/topic based practices on the field.
- c. Course library internet based mini-projects.
- d. Develop Power point presentation or animation for activities seen during field visit..
- e. Concerned faculty member may add the assignments.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

| Sr.No | Equipment Name with Broad Specifications | Relevant LLO Number |
|-------|--|---------------------|
| 1 | Fire buckets of standard size. | 1 |
| 2 | Fire extinguisher (Type A,B,C and ABC) | 2 |
| 3 | Measuring Tape (15meter ,30meter) | 8 |
| 4 | Ordinary Portland Cement (43,53 grade) | 13 |
| 5 | Raw material such as bricks of standard size 230 mm x 115 mm x 75 mm, | 11,14 |
| 6 | Trowels (Brick, Buttering, Pointing), triangular, ranging in size up to about 11 inches (279.40 mm) long and from 101.6 mm to 203.2 mm wide i.e. (4 to 8 inches wide). | 11,14 |

| Sr.No | Equipment Name with Broad Specifications | Relevant LLO Number |
|-------|---|---------------------|
| 7 | Portable Hammer, Spade, Pans (ghamela), Thread, lime | 11,14 |
| 8 | Square, mason's level, and straightedge 28.57 mm to 38. 10 mm and the middle 4 portion of the top edge from 152.40 mm to 254 mm wide | 11 |
| 9 | Levels and mason's line, brushes | 11 |
| 10 | String Level/Water tube, Plumb bob. Right Angle | 12 |
| 11 | The mason's level to establish "plumb" and "level" lines. | 12 |
| 12 | Plumbing materials such as pipes and accessories for different sizes and materials. pipe wrench | 15,16,17 |
| 13 | Components of wood work- different types of Hinges, tower bolts, brackets etc. | 19,20 |
| 14 | Sheet metal hand tools- snip, shears sheet gauge, straight edge, L square, scribe, divider, trammel, punches, pliers, stakes, groovers, limit set | 17 |

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table) : NOT APPLICABLE

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Termwork

Summative Assessment (Assessment of Learning)

- Practical

XI. SUGGESTED COS - POS MATRIX FORM

| Course Outcomes (COs) | Programme Outcomes (POs) | | | | | | | Programme Specific Outcomes* (PSOs) | | |
|-----------------------|--|-----------------------|---------------------------------------|------------------------|--|-------------------------|-------------------------|-------------------------------------|-------|-------|
| | PO-1 Basic and Discipline Specific Knowledge | PO-2 Problem Analysis | PO-3 Design/ Development of Solutions | PO-4 Engineering Tools | PO-5 Engineering Practices for Society, Sustainability and Environment | PO-6 Project Management | PO-7 Life Long Learning | PSO-1 | PSO-2 | PSO-3 |
| CO1 | 1 | 1 | 0 | 2 | 2 | 0 | 3 | | | |
| CO2 | 2 | 2 | 1 | 3 | 2 | 3 | 3 | | | |
| CO3 | 2 | 3 | 1 | 3 | 1 | 2 | 2 | | | |
| CO4 | 2 | 3 | 1 | 3 | 1 | 2 | 2 | | | |
| CO5 | 0 | 2 | 0 | 3 | 0 | 0 | 2 | | | |
| CO6 | 2 | 2 | 2 | 3 | 1 | 1 | 2 | | | |

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

| Sr.No | Author | Title | Publisher |
|-------|--------|---|---|
| 1 | PWD | PWD- Standard Data Book for Building Work | PWD, Government of Maharashtra. Mumbai. |
| 2 | CPWD | CPWD Specifications (Vol.-1 and IT) | CPWD, Govt. of India, New Delhi. |

| Sr.No | Author | Title | Publisher |
|--------------|----------------|--|--|
| 3 | PWD | District Schedule of rates, (DSR) | PWD, Government of Maharashtra, Mumbai. |
| 4 | Mantri Sandeep | A To Z Of Practical Building Construction & its Management | Satya Prakashan, New Delhi: 2015; ISBN 9788176842051 |

XIII . LEARNING WEBSITES & PORTALS

| Sr.No | Link / Portal | Description |
|--------------|---|---|
| 1 | http://www.asnu.com.au | Experts in residential house painting, carpentry repairs and renovations. |
| 2 | www.mahapwd.com/ | Official Portal for Public works Department for Maharashtra State |
| 3 | cpwd.gov.in/ | Official Portal for Public works Department for Government of India |
| 4 | https://wrd.maharashtra.gov.in/ | Official Portal for Water Resource Department for Government of Maharashtra |
| 5 | https://theconstructor.org/building/types-bonds-brick-masonry-flemish-english-wall/11616/ | Different types of brick bonds |
| 6 | https://dailycivil.com/types-of-joints-in-plumbing/ | Different types of plumbing materials and joints |