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CIVIL ENGINEERING WORKSHOP **Course Code : 311010**

Programme Name/s	**: Agricultural Engineering/ Civil Engineering/ Civil & Rural Engineering/ Construction Technology/ Civil & Environmental Engineering**
Programme Code	**: AL/ CE/ CR/ CS/ LE**
Semester	**: First**
Course Title	**: CIVIL ENGINEERING WORKSHOP**
Course Code	**: 311010**

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, concerting, 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			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
311010	CIVIL ENGINEERING WORKSHOP	CEW	SEC	-	-	4	-	4	2	-	-	-	-	-	50	20	50@	20	-	-	100

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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	TLO 1.1 Explain the safety practices & precautions while operating firefighting equipment. TLO 1.2 Explain the procedure for using the given type of fire extinguisher. TLO 1.3 Justify the given type of firefighting equipment for the given situation. TLO 1.4 Prepare a list of equipment used for safety in workshop operations. TLO 1.5 Maintain the good housekeeping in the working area TLO 1.6 Prepare a layout of workshop	**Unit - I Safety Practices & Precautions** 1.1 1.1 Safety Practices, Causes of accidents, General safety rules, Safety signs and symbols, Safety Precaution. 1.2 1.2 First Aid box and its constituent materials. 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). 1.4 1.4 Workshop Layout: Issue and return system of tools, equipment and consumables.	Demonstrate Show first aid box Hands on practice Video Demonstrations
2	TLO 2.1 Explain the basic activities to be undertaken for the construction of the given component of civil structure. TLO 2.2 Lay the foundation layout on site using relevant techniques. TLO 2.3 Explain the safety precautions to be undertaken at the given construction site.	**Unit - II Construction Activities** 2.1 Construction activities such as layout, excavation, brick masonry, concreting, plumbing, electrification, Interdependency of various activities. 2.2 Causes of accidents, Safety Practices and Precaution.	Demonstrate the various construction activity. Hands-on practice Field Visit Videos

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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.
3	TLO 3.1 Carry out the given type of masonry work using relevant tools. TLO 3.2 Explain the relevant method for doing plaster of required thickness. TLO 3.3 Explain the relevant method of doing pointing work for rubble masonary TLO 3.4 Explain the need of the formwork in construction. TLO 3.5 Construct the false ceiling using relevant tools in the given situation. TLO 3.6 Fix the aluminum partition using the relevant specified material. TLO 3.7 Justify the need of plastering in construction. TLO 3.8 Undertake the flooring operation using the given type of flooring material. TLO 3.9 Explain the procedure for Painting a level surface of the given wall. TLO 3.10 Explain the relevant steps involved in Painting of steel frames/wooden structure using given type of paint.	**Unit - III Masonary & Finishing works** 3.1 Brick and stone Masonry work, Types of bonds and joints (vertical and horizontal) 3.2 String (Line dori), plumb bob, right angle and water level tube. 3.3 Plastering (Internal & External) work. 3.4 Pointing work 3.5 Types of Formwork with safety measures. 3.6 False ceiling, Plaster of Paris (POP) work. 3.7 Aluminum glass works, cladding. 3.8 Different types of flooring and its application 3.9 Dado with its importance 3.10 Whitewash and painting: -Tools required, brush, roller and spray-painting preparation of surface for timber and steel members for painting.	Demonstrate Hands on practice Tool handling. Simulation Videos. Field visit
4	TLO 4.1 Undertake the plumbing operation for the given situation. TLO 4.2 Select the relevant tools to perform the given plumbing work. TLO 4.3 Use the concerned tools to lay the pipe line of required specification using relevant fittings TLO 4.4 Draw the flow chart describing the laying operations of water supply pipe line from overhead tank to the given flat/house.	**Unit - IV Plumbing Fixtures** 4.1 Different types of pipes, Joints, Taps. Fixtures and accessories used in plumbing. 4.2 Components (pipes, valves bends.) used in water supply/sanitary/ sewerage lines. 4.3 Pipe fittings- bends, elbows, tees, cross, coupler, socket, reducer, cap, plug, nipple and their Specifications 4.4 Various Operation in plumbing shops- pipe bending machine their specifications and maintenance. Basic process cutting, threading etc.	Demonstrate Hands on practice. Simulation Videos. Field visit.
5	TLO 5.1 Identify the tools used in sheet metal work, available in the workshop. TLO 5.2 Perform the required operation on sheet metal using relevant tools in given situation. TLO 5.3 Perform bending operations on the given piece of sheet metal TLO 5.4 Maintain the equipment and machineries used in sheet metal works.	**Unit - V Sheet Metal** 5.1 Sheet metal hand tools snip, shears sheet gauge, straight edge, L square, scriber, divider, trammel, punches, pliers, stakes, groovers, limit set and their Specifications 5.2 Operation of machineries in sheet metal shops- sheet cutting and bending machine their specifications and maintenance. 5.3 Basic process- marking, bending, folding, edging, seaming, staking, riveting.	Demonstrate Hands on practice. Simulation Videos.

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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.
6	TLO 6.1 Select the relevant type of wood in the given situation TLO 6.2 Carry out the relevant operations on the given piece of wood using the carpentry tools. TLO 6.3 Maintain carpentry tools in good condition. TLO 6.4 Use the relevant type of material for preparing the furniture of given specification.	**Unit - VI Carpentry Work** 6.1 Types of engineered woods such as plywood, block board, hardboard, laminated boards, Veneer, fiber Boards and their applications. 6.2 Wood working hand tools carpentry vice, marking and measuring tools, saws, claw hammer, mallet, chisels, plans, squares, and their specifications 6.3 Operation of wood working machineries - Wood turning lathe, circular saw, their specifications and maintenance. 6.4 Basic process- marking, sawing, planning, chiseling, turning, grooving, boring. 6.5 Components of wood work- different types of Hinges, tower bolts, brackets etc.	Demonstrate Hands on practice. Simulation Videos.

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

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Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
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. Lancing 5. Welding 6. Riveting	4	CO5
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

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Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

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.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

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	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
3	Levels and mason's line, brushes	11
4	Portable Hammer, Spade, Pans (ghamela), Thread, lime	11,14
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
7	String Level/Water tube, Plumb bob. Right Angle	12
8	The mason's level to establish "plumb" and "level" lines.	12
9	Ordinary Portland Cement (43,53 grade)	13
10	Plumbing materials such as pipes and accessories for different sizes and materials. pipe wrench	15,16,17
11	Sheet metal hand tools- snip, shears sheet gauge, straight edge, L square, scriber, divider, trammel, punches, pliers, stakes, groovers, limit set	17
12	Components of wood work- different types of Hinges, tower bolts, brackets etc.	19,20
13	Fire extinguisher (Type A,B,C and ABC)	2

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Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
14	Measuring Tape (15meter ,30meter)	8

IX. SUGGESTED 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 : NOT APPLICABLE

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
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.
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-masonr y-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

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students