

SEMESTER S1

ENGINEERING WORKSHOP

Course Code	CMW107	CIE Marks	50
Teaching Hours/Week (L: T:P: R)	0-0-2-0	ESE Marks	50
Credits	1	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Lab

Course Objectives:

1. To enable the student to familiarize various tools, measuring devices, practices and different methods employed in the industry.
2. To enable the students to apply this experience while developing product/project for the benefit of society.

SYLLABUS

Module No.	Experiments (Minimum 12 experiments)
1	General: Introduction to workshop practice, Safety precautions, Shop floor ethics, and Basic First Aid knowledge. Study of mechanical and measurement tools, components and their applications: (a) Tools: screw drivers, spanners, Allen keys, cutting pliers etc. and accessories (b) bearings, seals, O-rings, circlips, keys etc. (c) Vernier Calipers, Height Gauge, Depth Gauge, Micrometers, Bevel Protractor etc.
2	Carpentry: Understanding carpentry tools and knowledge of at least one model 1. T-Lap joint 2. Cross lap joint 3. Dovetail joint 4. Mortise joints
3	Foundry: Understanding of foundry tools and knowledge of at least one model 1. Bench Moulding 2. Floor Moulding 3. Core making 4. Pattern making

4	<p>Sheet Metal: Understanding sheet metal working tools and knowledge of at least one model</p> <ol style="list-style-type: none"> 1. Cylindrical shape 2. Conical shape 3. Prismatic shaped job from sheet metal
5	<p>Fitting: Understanding the tools used for fitting and knowledge of at least one model</p> <ol style="list-style-type: none"> 1. Square Joint 2. V- Joint 3. Male and female fitting
6	<p>Plumbing: - Understanding plumbing tools and pipe joints, along with practicing one exercise on joining pipes using a minimum of three types of pipe joints</p>
7	<p>Smithy: - Understanding the tools used in smithy. Demonstrating the forge- ability of different materials (MS, Al, alloy steel and cast steels) in both cold and hot states. Observing the qualitative difference in the hardness of these materials. One exercise on smithy (Square prism).</p>
8	<p>Welding: Understanding welding equipment and practicing at least one welding technique, such as making joints using electric arc welding. Bead formation in horizontal, vertical and overhead positions</p>
9	<p>Rolling: - Objective of rolling, rolling process, practical on two high rolling mill.</p>
10	<p>Electroplating: - Electroplating a given job</p>
11	<p>Metrology: Common measuring instruments used in workshop, experiments to find the angle of a dovetail, angle of a taper and the radius of a circular surface. Introduction to instruments Vernier Bevel Protractor, Vernier Depth Gauge, Vernier Height Gauge.</p>
12	<p>Assembly: Demonstration only Disassembling and assembling of</p> <ol style="list-style-type: none"> 1. Cylinder and piston assembly 2. Tail stock assembly 3. Bicycle 4. Pump or any other machine
13	<p>Machines: Demonstration of the following machines: Shaping and slotting machine; Milling machine; Grinding Machine; Lathe; Drilling Machine.</p>
14	<p>Modern manufacturing methods (Fab lab/IDEA Lab - Demonstration only): Power tools, CNC machine tools, 3D printing, Soft Materials cutting using special machines</p>
15	<p>Use of proper Personal Protective Equipments. Measurements using Tape, Ruler, Vernier calipers, screw gauge</p>
16	<p>Measuring the area of a plot with an irregular boundary using a chain and cross staff.</p>

17	Measuring the area of a building using Distomat.
18	Finding the level difference between two points using dumpy level.
19	Onsite quality assessment of brick, and cement.
20	Construct a 1 and 1 ½ thick brick wall with a height of 50 cm and a minimum length of 60 cm using English bond. Check the verticality of the wall.
21	Construct a 1 and 1 ½ thick brick wall with a height of 50 cm and a minimum length of 60 cm using Flemish bond. Check the verticality of the wall
22	Estimate the number of different types of building blocks needed to construct the walls of a room measuring 2m x 3m, accounting for standard-sized doors and windows.
23	Setting out of a two roomed building using thread, tape and water tube levelling.
24	Conduct a market study to understand the types, prices, and general specifications of at least three materials available in the market (such as bricks, cement, aggregates, steel, plumbing items, fixtures, welding rods, fasteners etc.).
25	Studying the tools and testing instruments for electrical works. Wiring a light or a fan circuit using one way and two-way switch.
26	Familiarization/Application of testing instruments and commonly used tools in electronic works. [Multimeter, Soldering iron, De-soldering pump, Pliers, Cutters, Wire strippers, Screw drivers, Tweezers, Crimping tool, Hot air soldering and desoldering station etc.]
<i>Note: Minimum of 12 experiments from among the 26 experiments listed, is to be completed.</i>	

Course Assessment Method

(CIE: 50 marks, ESE: 50 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Preparation/Pre-Lab Work, experiments, Viva and Timely Completion of Lab Reports / Record (Continuous Assessment)	Total
5	45	50

End Semester Examination Marks (ESE) : (Internal Evaluation Only)

Procedure/ Preparatory work/Design/ Algorithm	Conduct of experiment/ Execution of work/ troubleshooting/ Programming	Result with valid inference/ Quality of Output	Viva voce	Record	Total
10	15	10	10	5	50

- *Submission of Record: Students shall be allowed for the end semester examination only upon submitting the duly certified record.*
- *Minimum Pass Mark: The requirement for passing the lab course included in the first-year curriculum is that the student must score a minimum of 50% overall, combining marks from both Continuous Internal Evaluation (CIE) and End Semester Examination (ESE). There is no separate minimum requirement for each component.*
- *There will not be any relaxation in the attendance requirement.*

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Identify workshop operations and instruments in accordance with the material and objects.	K3
CO2	Understand appropriate tools and instruments with respect to the workshop specializations.	K2
CO3	Apply various tools, measuring devices, practices and different methods employed in the industry.	K3
CO4	Examine the quality of common materials used in the industry.	K3
CO5	Conduct market study of various engineering materials and consumables available in the market.	K3

Note: K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

CO-PO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3								2		2
CO2	3								2		2
CO3	3				2				2		3
CO4	3								2		3
CO5	3							2	3		3

Note: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation

Text Books				
Sl No.	Title of the book	Name of the Author/s	Name of the Publisher	Edition and Year
1	Mechanical Workshop Practice	K C John	PHI Learning	Edition 2 2010
2	Engineering Materials	S C Rangwala	Charotar Publishing House Pvt Limited	Edition 43 2019
3	Building Materials	S K Duggal	New Age International	Edition 6 2025
4	Indian Practical Civil Engineering Handbook	Khanna P.N,	UBS Publishers Distributers (P) Ltd.	Year 2012
5	Building Construction	Arora S.P and Bindra S.P	Dhanpat Rai Publications	Edition 5 Year 2022

Reference Books				
Sl No.	Title of the book	Name of the Author/s	Name of the Publisher	Edition and Year
1	Elements of Workshop Technology Vol-1- Manufacturing Processes	S K Hajra Choudhury A K Hajra Choudhury Nirjhar Roy	MPP Media Promoters and Publishers	2008

Video Links (NPTEL, SWAYAM...)
Link ID
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