COURSE CODE	COURSE NAME	L	T	P	CREDIT	YEAR OF INTRODUCTION
101908/CO922T	CIVIL AND MECHANICAL WORKSHOP	0	0	2	1	2021

1. Preamble

The course is designed to train the students to identify and manage the tools, materials and methods required to execute an engineering project. Students will be introduced to a team working environment where they develop the necessary skills for planning, preparing and executing an engineering project. To enable the student to familiarize various tools, measuring devices, practices and different methods of manufacturing processes employed in industry for fabricating components.

2. Prerequisite: Nil

3. Syllabus

Section 1 - Civil Workshop

Exercise 1. Calculate the area of a built-up space and a small parcel of land- Use standard measuring tape and digital distance measuring devices

Exercise 2. (a) Use screw gauge and Vernier caliper to measure the diameter of a steel rod and thickness of a flat bar

(b) Transfer the level from one point to another using a water level

(c) Set out a one room building with a given plan and measuring tape

Exercise 3. Find the level difference between any two points using dumpy level

Exercise 4. (a) Construct a 1 brick thick wall of 50 cm height and 60 cm length using English bond. Use spirit level to assess the tilt of walls.

(b) Estimate the number of different types of building blocks to construct this wall.

Exercise 5. (a) Introduce the students to plumbing tools, different types of pipes, type of connections, traps, valves, fixtures and sanitary fittings.

(b) Install a small rainwater harvesting installation in the campus

Section 2 - Mechanical Workshop

List of Exercises

(Minimum EIGHT units mandatory and FIVE models from Units 2 to 8 mandatory)

UNIT 1

General: Introduction to workshop practice, Safety precautions, Shop floor ethics and Basic First Aid knowledge.

Study of mechanical 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.

UNIT 2

Carpentry: Understanding of carpentry tools

Minimum any one model

1. T –Lap joint 2. Cross lap joint 3. Dovetail joint 4. Mortise joints

UNIT 3:

Foundry: Understanding of foundry tools

Minimum any one model

1. Bench Molding 2. Floor Molding 3. Core making 4. Pattern making

UNIT 4

Sheet Metal: Understanding of sheet metal working tools

Minimum any one model

1. Cylindrical shape, 2. Conical shape, 3. Prismatic shaped job from sheet metal

UNIT 5

Fitting: Understanding of tools used for fitting

Minimum any one model 1. Square Joint, 2. V- Joint, 3.Male and female fitting

UNIT 6

Plumbing: Understanding of plumbing tools, pipe joints

Any one exercise on joining of pipes making use of minimum three types of pipe joints

UNIT 7

Smithy: Understanding of tools used for smithy.

Demonstrating the forge-ability of different materials (MS, Al, alloy steel and cast steels) in cold and hot states. Observing the qualitative difference in the hardness of these materials Minimum any one exercise on smithy 1. Square prism, 2. Hexagonal headed bolt, 3. Hexagonal prism, 4. Octagonal prism

UNIT 8

Welding: Understanding of welding equipment

Minimum any one welding practice Making Joints using electric arc welding. Bead formation in horizontal, vertical and overhead positions.

UNIT 9

Assembly: Demonstration only

Dissembling and assembling of 1. Cylinder and piston assembly, 2. Tail stock assembly, 3. Bicycle, 4. Pump or any other machine.

UNIT 10

Machines: Demonstration and applications of the following machines

Shaping and slotting machine; Milling machine; Grinding Machine; Lathe; Drilling Machine.

UNIT 11

Modern manufacturing methods: Power tools, CNC machine tools, 3D printing, Glass cutting.

4. Text Books

1. Rangwala, S. C., *Essentials of Civil Engineering*, Charotar Publishing House
2. Chen W.F and Liew J Y R (Eds), *The Civil Engineering Handbook*. II Edition CRC Press (Taylor and Francis)
3. Kandya A A, *Elements of Civil Engineering*, Charotar Publishing house

5. Reference Books

1. Khanna P.N, "*Indian Practical Civil Engineering Handbook*", Engineers Publishers.
2. Bhavikatti. S, "*Surveying and Levelling (Volume 1)*", I.K. International Publishing House.
3. Arora S.P and Bindra S.P, " *Building Construction*", Dhanpat Rai Publications.
4. S. C. Rangwala, "*Engineering Materials*," Charotar Publishing House.
5. Bawa H S, "*Workshop Technology*", 2nd edition, 2017.
6. Chapman W A J, "*Workshop Technology*", 5th edition, 2001.
7. John K C, "*Mechanical Workshop and Laboratory Manual*", 2nd edition, 2010.

6. Course Outcomes

After the completion of the course the student will be able to

CO1: Use the different instruments in civil engineering measurements
CO2: Demonstrate the steps involved in basic civil engineering activities like setting out operation, plot measurement, transferring of level and levelling work
CO3: Study the construction of simple masonry work like English bond
CO4: Understand the use of different plumbing connections and fittings
CO5: Students will be able to understand the various manufacturing processes in the basic mechanical engineering workshop trades
CO6: Students will be able to use various tools used in the basic mechanical engineering workshop trades.
CO7: Students will be able to select appropriate measuring instruments according to the work.
CO8: Students will be able to understand the operations of various machine tools and advanced manufacturing techniques.
CO9: Students will be able to identify the different components of mechanical devices by assembling & disassembling models.
CO10: Construct models by using various basic mechanical workshop operations
CO11: Apply appropriate safety measures with respect to the mechanical workshop trades.

7. Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1				1	1			2	1		1
CO2	1				1	1			2	1		1

CO3	1					1			2	1		1
CO4	1					1			2	1		1
CO5	2		1									
CO5	1	1	1									
CO7	1	1										
CO8	1											
CO9	1								2			
CO10	1	1	1					1	1			
CO11	2					2						

8. Assessment Pattern

Total marks allotted for the course is 100 marks. CIE shall be conducted for 100 marks. CIE should be done for the work done by the student and also viva voice based on the work done on each practical session.

9. Mark Distribution

Total	**CIE**		
100	Attendance	Classwork/ Assessment/Viva Voce	Final Examination
	20	50	30

10. End Semester Examination Pattern

There is no End Semester Examination.

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