

Course code	Course Name:	L-T-P-Credits	Year of Introduction
ME237	WELDING AND MACHINE TOOLS LAB	0-0-3-1	2016

Prerequisite: Nil

Course Objectives:

- Provide practical experience on various machining operations using Lathe.
- Familiarization with basics of welding.
- Provide practical experience in carrying out welding.

List of Exercises/ Experiments (Minimum 10 are mandatory)

(a). Machine Tools:

1. Study of Precision Tools and Measuring Instruments.

Equipment: Vernier Calliper, Micrometer, Surface Plate, Surface Gauge, Slip Gauge, Screw Pitch Gauge, Feeler Gauge, Dial Gauge, Sine Gauge, Plug Gauge, Straight edge Gauge.

2. Study of Nomenclature of Single Point Cutting Tool.

Equipment: HSS Single point cutting tool.

3. Study of Centre Lathe.

Equipment: Centre Lathe.

To perform following lathe operations on a work piece for given dimensions :

4. Plane Turning.

Equipment: HSS Single point cutting tool (V-tool), Tool holder, Surface gauge, steel rule, outside calliper, Jenny calliper, and Vernier calliper.

5. Step Turning.

Equipment: HSS Single point cutting tool (V-tool), Parting tool, Tool holder, Surface gauge, steel rule, outside calliper, Jenny calliper, and Vernier calliper.

6. Grooving.

Equipment: HSS Single point cutting tool (V-tool), Parting tool, Tool holder, Surface gauge, steel rule, outside calliper, Jenny calliper, and Vernier calliper.

7. Taper Turning.

Equipment: HSS Single point cutting tool (V-tool), Tool holder, Surface gauge, steel rule, outside calliper, Jenny calliper, Vernier calliper and double end spanner.

8. Thread Cutting.

Equipment: HSS Single point cutting tool (V-tool), Tool holder, Surface gauge, steel rule, outside calliper, Jenny calliper, Vernier calliper Centre gauge and thread pitch gauge.

(b) Welding:

9. Study of Welding Equipment and Procedures.

Equipment: MMAW, MIG, TIG, SAW.

10. To study various types of welding joints and practice edge preparation.

Equipment: Butt joint, Lap joint, T-Joint, Corner joint, Workpiece, File/Grinder, Wirebrush.

11. To Prepare a Single V-Butt Joint using Arc Welding Process.

Equipment: Arc welding machine, Mild steel work pieces, Mild steel Electrodes, Electrode holder, Ground clamp, Flat nose tong, Face shield, Apron, Hand gloves, work table, Bench vice, Rough flat file, steel rule, wire brush, Try square, Bell peen hammer, chipping hammer, chisel, grinding machine.

12. To Prepare a Lap Joint using Arc Welding Process.

Equipment: Arc Welding Machine, Mild Steel Work Pieces, Mild Steel Electrodes, Electrode Holder, Ground Clamp, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Bell Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

13. To Prepare a T Joint using Arc Welding Process

Equipment: Arc Welding Machine, Mild Steel Work Pieces, Mild Steel Electrodes, Electrode Holder, Ground Clamp, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Bell Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

14. To prepare a Butt Joint Using TIG Welding Process.

Equipment: TIG Welding Machine, Welding Cable With Earth Clamps, Gas Cooled TIG Welding Torch, Inert Argon Gas Hose Pipe, Tungsten Rod, Flow Meter, Mild Steel Work Pieces, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Ball Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

15. To prepare a Lap Joint Using TIG Welding Process.

Equipment: TIG Welding Machine, Welding Cable With Earth Clamps, Gas Cooled TIG Welding Torch, Inert Argon Gas Hose Pipe, Tungsten Rod, Flow Meter, Mild Steel Work Pieces, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Bell Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

16. To Prepare a Butt Joint using MIG Welding Process.

Equipment: MIG Welding Machine, Welding Cable With Earth Clamps, MIG Welding Torch, CO₂ Gas Flow Meter with Preheater, Contact Tips, Input Gas Hose Pipes, Mild Steel Work Pieces, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Bell Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

17. To Prepare a Lap Joint using MIG Welding Process.

Equipment: MIG Welding Machine, Welding Cable With Earth Clamps, MIG Welding Torch,

CO₂ Gas Flow Meter With Preheater, Contact Tips, Input Gas Hose Pipes, Mild Steel Work Pieces, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Bell Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

18. To Prepare a T Joint using MIG Welding Process.

Equipment: MIG Welding Machine, Welding Cable With Earth Clamps, MIG Welding Torch, CO₂ Gas Flow Meter With Preheater, Contact Tips, Input Gas Hose Pipes, Mild Steel Work Pieces, Face Shield, Apron, Hand Gloves, Work Table, Bench Vice, Rough Flat File, Try Square, Bell Peen Hammer, Chipping Hammer, Chisel, Grinding Machine.

19. Demonstration of Submerged Arc Welding Process.

Equipment: Power Source, Welding Head Trolley, Welding Clamp With Earth Clamp, Welding Cable With Earth Lug, Control Cable, Track, Contact Tip, Contact Pole, Flux Hose, Flux Hopper .

Expected Outcome:

After successful completion of the course, the student will be able to:

- i. Machine the given specimen to required dimension using Lathe.
- ii. Demonstrate the principle of operation of MMAW, TIG, MIG & SAW.
- iii. Prepare specified type of joint using various welding processes.

Text Book(s):

1. O.P Khanna; Welding Technology; Dhanpat Rai Publications.
2. Acharkan. N.; Machine Tool Design Vol. 1 to 4, MIR Publication.
3. Chapman; Workshop Technology, Vol II, ELBS.

Estd.



2014