Course code	Course Name	L-T-P-Credits	Year of Introduction
ME337	MACHINE TOOLS LAB	0-0-3-1	2016

Course Objectives:

- To introduce various machining process & provide practical experience.
- To familiarise the fundamentals of CNC machine.
- To introduce the student to CNC, EDM operations.

List of Exercises/ Experiments (Minimum 12 are mandatory)

1. Study of Lathes.
   Equipment: Centre lathe (Accessories & Attachments)
2. Plane and step turning on Lathe.
   Equipment: Cutting saw, Centre lathe, HSS tools, Tool holder, Center drill, Live center, Spanners, Vernier Caliper, Steel rule, Work piece.
3. Ball & curve , and Taper turning on lathe.
   Equipment: Cutting saw, Centre lathe, HSS tools, Form tools, Tool holder, Center drill, Live center, Spanners, Vernier Caliper, Steel rule, Work piece.
4. Thread Forming on Lathe.
   Equipment: Cutting saw, Centre lathe, HSS tools, Form tools, Tool holder, Center drill, Live center, Spanners, Thread pitch gauge ,Center gauge, Vernier Caliper, Steel rule, Work piece.
5. Study of Shaping Machine.
   Equipment: Shaping Machine
6. To perform V-Block on the given work piece
   Equipment: Shaping Machine, Cutting Tools, Try square, Parallel Block, Spanners, Marking and Measuring tools.
7. Study of Slotting Machine
   Equipment: Slotter
8. To perform a Slot on the given work piece
   Equipment: Slotting Machine, Steel rule, hammer, slotting tool, Try square.
9. To Perform Keyway using Slotter
   Equipment: Slotting Machine, Steel rule, hammer, slotting tool, Try square.
10. Study of Milling Machine(Horizontal & Vertical)
    Equipment: Horizontal Milling Machine & Vertical Milling Machine.
11. To Perform a Spur Gear on given work piece.
    Equipment: Horizontal Milling Machine Indexing Head Vernier caliper, Milling Cutter, Spanners, Mandrel , Try Square, Allen keys
12. To Perform a Bevel Gear on given work piece.
    Equipment: Horizontal Milling machine Universal Indexing Head Vernier caliper, Milling cutter, Spanners, Mandrel, Try Square, Allen keys.
13. To Perform Plane Milling Operation in given specimen.
    Equipment: Horizontal Milling Machine, Vernier caliper, Plane Milling Cutter, Spanners, Try Square, Parallel blocks, Marking Tools
14. To Perform Step Milling Operation in given specimens.
    Equipment: Vertical Milling Machine, Vernier caliper, End Milling Cutter, Spanners, Try Square, Parallel Blocks, Marking Tools
15. Study of Drilling Machine & Nomenclature of drill Bits

	Equipment; Radial Drilling Machine, Drill bits
16	To perform drilling operation on given specimen in specified coordinate points. Equipment; Radial Drilling Machine, Drill bits, Punch , Hammer, Marking & Measuring Tools.
17	Study of Surface Grinding Machine. Equipment : Surface Grinding machine
18	To Perform Grinding operation (Mirror finish) on the given specimen. Equipment: Surface Grinding machine ,Magnetic chuck, cutting fluids, file.
19	Study of Cylindrical Grinding Machine. Equipment : Cylindrical Grinding Machine.
20	Study and Demonstration of CNC Machine. Equipment: CNC Machine.
21	To Program and run Milling operation using CNC machine. Equipment: CNC machine ,Computer, Vernier caliper
22	To program and execute turning operation using CNC Lathe. Equipment: CNC lathe , Computer, Vernier Caliper
24	Study and Demonstration of EDM Equipment: EDM
23	To program and execute wire cutting operation using EDM. Equipment: EDM, Copper wire, Cutting fluids, and computer.
24	Study of Cutting Process Equipment: Variety of cutting Equipments
25	Study of CNC Plasma arc Cutting (working Principle and Procedure only)

Course Outcome:

The students will be able to

i. Machine the given work piece to specified dimension.
ii. Understand the fundamentals of CNC machines.

Text Books:

1. Acharkan. N: Machine tool Design Vol. I to IV MIR Publication.
2. Chapman: Workshop Technology, Vol II: EL.BS
3. HMT: Production Technolgy: Tata McGraw Hill
4. Yoran Koren: Numerical control of Machine Tools.,Mc Graw Hill