

Course code	Course Name	L-T-P - Credits	Year of Introduction
ME331	MANUFACTURING TECHNOLOGY LABORATORY – I	0-0-3-1	2016

Prerequisite: ME220 Manufacturing Technology

Course Objectives:

1. To practice on machine tools and identify, manipulate and control various process parameters during machining processes in manufacturing industry.
2. To practice arc and gas welding technologies.
3. To gain knowledge on the structure, properties, treatment, testing and applications of Steel, Cast Iron and Brass.

List of Exercises/Experiments :

Centre Lathe

Study of lathe tools: - tool materials - selection of tool for different operations - tool nomenclature and attributes of each tool angles on cutting processes – effect of nose radius, side cutting edge angle, end cutting edge angle and feed on surface roughness obtainable – tool grinding.

- Study the different methods used to observe how the work-piece is precisely fixed on lathe.
- Study the **optimum aspect ratio** of work-piece to avoid vibration and wobbling during turning.
- Machine tool **alignment of test** on the lathe.
- **Re-sharpening** of turning tool to specific geometry

1. Exercises on centre lathe:- Facing, plain turning, step turning and parting – groove cutting, knurling and chamfering - form turning and taper turning – eccentric turning, multi-start thread, square thread and internal thread etc.

2. Exercises on lathe: - Measurement of cutting forces in turning process and correlation of the surface roughness obtainable by varying feed, speed and feed.

3. Measurement of **cutting temperature and tool life** in turning and machine tool **alignment test** on lathe machine.

4. Exercises on Drilling machine- drilling, boring, reaming, tapping and counter sinking etc.

5. Exercises on drilling machine: - Measurement of cutting forces in drilling process and correlate with varying input parameters.

6. Exercises on Shaping machine

Exercises on shaping machine: - flat surfaces, grooves and key ways.

7. Exercises on Slotting machine

Exercises on slotting machine: - flat surfaces, grooves and key ways.

Exercises on Milling machine

8. Exercises on milling machine: - face milling, end milling – spur and helical gear cutting – milling of keyways etc.

9. Exercises on milling machine: - Measurement of cutting forces in milling process and

<p>correlate the surface roughness obtainable by varying input parameters.</p> <p>10 Machine tool alignment test on milling machine</p>
<p>Planing and Broaching machine</p> <p>11. Study and demonstration of broaching machine.</p> <p>12. Exercises on planing machine</p>
<p>Exercises on Welding</p> <p>13. Exercises on arc and gas welding: - butt welding and lap welding of M.S. sheets.</p>
<p>Exercises on Grinding machine</p> <p>14. Exercise on surface grinding, cylindrical grinding and tool grinding etc.</p> <p>15. Measurement of cutting forces and roughness in grinding process and correlate with varying input parameters.</p>
<p>Metallurgy</p> <p>16. Specimen preparation, etching & microscopic study of Steel, Cast iron and Brass and Grain size measurement.</p>
<p>17. Heat treatment study:—Effect on mechanical properties and microstructure of Steel, Cast Iron and Brass.</p>
<p>18. Studies of various quenching mediums, Carryout heat treatments on steel based on ASM handbook vol.4 and observe the hardness obtained.</p>
<p>A minimum of 12 experiments are mandatory out of total 18 experiments but all the experiments mentioned in metallurgy are mandatory.</p> <p>Besides to the skill development in performing the work, oral examination should be conducted during end semester examination.</p> <p>The student's assessment, continuous evaluation, awarding of sessional marks, oral examination etc. should be carried out by the assistant professor or above.</p>
<p>Expected outcomes:</p> <p>The students will be able to</p> <ol style="list-style-type: none"> Identify various process parameters and their influence on surface properties of various metals. Recommend appropriate speed, feed and depth of cut for various processes on lathe machine. Position, hold and locate work material and cutting tools in various basic machine tools. Choose suitable welding process for different metals. Choose appropriate heat treatment process for different metals
<p>Text Books:</p> <ol style="list-style-type: none"> Acharkan. N., Machine Tool Design Vol. 1 to 4, MIR Publication, 2000. HMT, Production Technology, Tata McGraw Hill, 2001 W. A. J. Chapman, Workshop Technology Part I, ELBS & Edward Arnold Publishers, 1956