

| Course code  | Course Name                             | L-T-P - Credits | Year of Introduction |
|--|---|-----------------|----------------------|
| ME331  | MANUFACTURING TECHNOLOGY LABORATORY – I | 0-0-3-1         | 2016                 |
| <b>Prerequisite: ME220 Manufacturing Technology</b>  |   |                 |                      |
| <b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. To practice on machine tools and identify, manipulate and control various process parameters during machining processes in manufacturing industry.</li> <li>2. To practice arc and gas welding technologies.</li> <li>3. To gain knowledge on the structure, properties, treatment, testing and applications of Steel, Cast Iron and Brass.</li> </ol>   |   |                 |                      |
| <b>List of Exercises/Experiments :</b>   |   |                 |                      |
| <b>Centre Lathe</b> <p>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.</p> <ul style="list-style-type: none"> <li>• Study the different methods used to observe how the work-piece is precisely fixed on lathe.</li> <li>• Study the <b>optimum aspect ratio</b> of work-piece to avoid vibration and wobbling during turning.</li> <li>• Machine tool <b>alignment of test</b> on the lathe.</li> <li>• <b>Re-sharpening</b> of turning tool to specific geometry</li> </ul> |   |                 |                      |
| <b>1. Exercises on centre lathe:-</b> 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.   |   |                 |                      |
| <b>2. Exercises on lathe:</b> - Measurement of cutting forces in turning process and correlation of the surface roughness obtainable by varying feed, speed and feed.  |   |                 |                      |
| <b>3. Measurement of cutting temperature and tool life</b> in turning and machine tool <b>alignment test</b> on lathe machine.   |   |                 |                      |
| <b>4. Exercises on Drilling machine-</b> drilling, boring, reaming, tapping and counter sinking etc.   |   |                 |                      |
| <b>5. Exercises on drilling machine:</b> - Measurement of cutting forces in drilling process and correlate with varying input parameters.  |   |                 |                      |
| <b>6. Exercises on Shaping machine</b> <p>Exercises on shaping machine: - flat surfaces, grooves and key ways.</p>   |   |                 |                      |
| <b>7. Exercises on Slotting machine</b> <p>Exercises on slotting machine: - flat surfaces, grooves and key ways.</p>   |   |                 |                      |
| <b>Exercises on Milling machine</b> <ol style="list-style-type: none"> <li>8. Exercises on milling machine: - face milling, end milling – spur and helical gear cutting – milling of keyways etc.</li> <li>9. Exercises on milling machine: - Measurement of cutting forces in milling process and</li> </ol>  |   |                 |                      |

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| <p>correlate the surface roughness obtainable by varying input parameters.</p> <p><b>10 Machine tool alignment test</b> on milling machine</p>   |
| <p><b>Planing and Broaching machine</b></p> <p><b>11.</b> Study and demonstration of broaching machine.</p> <p><b>12.</b> Exercises on planing machine</p>   |
| <p><b>Exercises on Welding</b></p> <p><b>13.</b> Exercises on arc and gas welding: - butt welding and lap welding of M.S. sheets.</p>  |
| <p><b>Exercises on Grinding machine</b></p> <p><b>14.</b> Exercise on surface grinding, cylindrical grinding and tool grinding etc.</p> <p><b>15.</b> Measurement of cutting forces and roughness in grinding process and correlate with varying input parameters.</p>   |
| <p><b>Metallurgy</b></p> <p><b>16. Specimen preparation,</b> etching &amp; microscopic study of Steel, Cast iron and Brass and Grain size measurement.</p>   |
| <p><b>17. Heat treatment study:</b>–Effect on mechanical properties and microstructure of Steel, Cast Iron and Brass.</p>  |
| <p><b>18.</b> Studies of various quenching mediums, <b>Carryout heat treatments on steel</b> based on ASM handbook vol.4 and observe the hardness obtained.</p>  |
| <p><b>A minimum of 12 experiments are mandatory out of total 18 experiments but all the experiments mentioned in metallurgy are mandatory.</b></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><b>Expected outcomes:</b></p> <p>The students will be able to</p> <ol style="list-style-type: none"> <li>1. Identify various process parameters and their influence on surface properties of various metals.</li> <li>2. Recommend appropriate speed, feed and depth of cut for various processes on lathe machine.</li> <li>3. Position, hold and locate work material and cutting tools in various basic machine tools.</li> <li>4. Choose suitable welding process for different metals.</li> <li>5. Choose appropriate heat treatment process for different metals</li> </ol> |
| <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Acharkan. N., Machine Tool Design Vol. 1 to 4, MIR Publication, 2000.</li> <li>2. HMT, Production Technology, Tata McGraw Hill, 2001</li> <li>3. W. A. J. Chapman, Workshop Technology Part I, ELBS &amp; Edward Arnold Publishers, 1956</li> </ol>  |