

## MANUFACTURING TECHNOLOGY

<b>V Semester: ME</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AMEB16	Foundation	L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
<b>Contact Classes: 45</b>		<b>Tutorial Classes: 15</b>		<b>Practical Classes: Nil</b>		<b>Total Classes: 60</b>		
<p><b>COURSE OBJECTIVES:</b>  <b>The students will try to learn:</b></p> <ol style="list-style-type: none"> <li>The fundamental concepts of the metal cutting principles to study the behavior of various machining processes.</li> <li>The importance of tool materials, cutting parameters, cutting fluids and tool wear mechanisms for optimized machining.</li> <li>The principles of linear and angular measuring instruments for accurate measurement of a given component.</li> <li>The mechanics of machining process and optimization of various significant parameters in order to yield the optimum machining.</li> </ol> <p><b>COURSE OUTCOMES:</b></p> <p>CO 1    <b>Recognize</b> the importance of geometry of cutting tools, coolants and tool materials for the analysis of material behavior during manufacturing processes</p> <p>CO 2    <b>Illustrate</b> mechanism of orthogonal and oblique cutting along with developed cutting forces</p> <p>CO 3    <b>Explain</b> the chip formation mechanism by measuring the cutting forces during the chip formation process</p> <p>CO 4    <b>Explain</b> the operational principles of different lathe machines and various reciprocating machines for quality machining</p> <p>CO 5    <b>Select</b> a machining operation, corresponding machine tool for a specific application in real time</p> <p>CO 6    <b>Identify</b> most significant process parameters in machine tool for optimal machining</p> <p>CO 7    <b>Explain</b> the working principles of Milling, drilling and surface grinding machines for manufacturing the components of their requirement</p> <p>CO 8    <b>Estimate</b> machining times for machining operations at specified levels of cutting parameters of machine tools</p> <p>CO 9    <b>Apply</b> the principles of limits, fits and tolerance while designing and manufacturing the components of their requirement</p> <p>CO10    <b>Choose</b> an appropriate measuring instrument for accurate inspection of the dimensional and geometric features of a given component</p> <p>CO11    <b>Apply</b> various methods for the measurements of screw threads, surface roughness parameters and the working of optical measuring instruments</p> <p>CO12    <b>Analyze</b> the results of various measuring systems and instruments for motion and dimensional measurements</p>								
<b>MODULE -I</b>		<b>BASIC MECHANISM OF METAL CUTTING</b>					<b>Classes: 09</b>	
<p>Elementary treatment of metal cutting theory, element of cutting process, geometry of single point tool and angles chip formation and types of chips, built up edge and its effects, chip breakers: Mechanics of orthogonal cutting, Merchant's force diagram, cutting forces, cutting speeds, feed, depth of cut, tool life, coolants, machinability, tool materials.</p>								

<b>MODULE -II</b>	<b>MACHINE TOOL-I</b>	<b>Classes: 09</b>
Engine lathe, Principle, specification, types, work and tool holding devices, Automatic lathes, classification: Single spindle and multi-spindle automatic lathes and its tool layouts; Shaping, slotting and planning machines, Principles of working, specification, operations performed, Kinematic scheme.		
<b>MODULE -III</b>	<b>MACHINE TOOL-II</b>	<b>Classes: 09</b>
Milling machine, classifications, specifications, working principles of milling machines; Geometry of milling cutters, methods of indexing, kinematic scheme of milling machines. Drilling and boring machines, principles of working, specifications, types, operations performed, twist drill; Kinematics scheme of the drilling and boring machines.		
<b>MODULE -IV</b>	<b>GEOMETRICAL DIMENSIONING AND TOLERANCES</b>	<b>Classes: 09</b>
Systems of Limits and Fits: Introduction, normal size, tolerance limits, deviations, allowance, fits and their types, unilateral and bilateral tolerance system, hole and shaft basis systems, Interchangeability and selective assembly; Linear Measurement: Slip gauges, dial indicator, micrometers; Measurement of angles and tapers: Bevel protractor, angle slip gauges, spirit levels, sine bar.		
<b>MODULE-V</b>	<b>MEASURING INSTRUMENTS</b>	<b>Classes: 09</b>
Optical measuring instruments: Tool maker's microscope and its uses, collimators, optical projector, interferometer; Screw thread measurement: Element of measurement, errors in screw threads, measurement of effective diameter, angle of thread and thread pitch, profile thread gauges; Surface roughness measurement: Numerical assessment of surface finish: CLA, R.M.S Values, Rz values, methods of measurement of surface finish: profilograph, talysurf - ISI symbol for indication of surface finish.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. Dr. R. Kesavan, Dr. R. Kesavan, "Machine Tools" Laxmi publications, 2<sup>nd</sup> Edition, 2016.</li> <li>2. N. K Mehta, "Metal Cutting and Design of Cutting Tools, Jigs &amp; Fixtures", McGraw-Hill Education, 1<sup>st</sup> Edition, 2014.</li> <li>3. T. L. Chaudhary, "Metal Cutting and Mechanical Tool Engineering", Khanna Publishers, 5<sup>th</sup> Edition, 2013.</li> <li>4. R. K. Jain, Engineering Metrology, Khanna Publishers, 1<sup>st</sup> Edition, 2013.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. B.L. Juneja, G.S. Sekhon, Nitin Seth "Fundamentals of Metal Cutting and Machine Tools ", New Age Publishers, 2<sup>nd</sup> Edition, 2014.</li> <li>2. Geoffrey, "Fundamentals of metal machining and machine tools", Tata McGraw Hill Education, 1<sup>st</sup> Edition, 2013.</li> <li>3. R. S. Sirohi, H. C. Radha Krishna, "Mechanical Measurements", New Age Publishers, 3<sup>rd</sup> Edition, 2011.</li> <li>4. M Mahajan "A Textbook of Metrology ", Dhanpatrai and Co, 2<sup>nd</sup> Edition, 2013.</li> </ol>		
<b>Web References:</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.ocw.mit.edu/courses/mechanical-engineering/">https://www.ocw.mit.edu/courses/mechanical-engineering/</a></li> <li>2. <a href="http://www.nptel.ac.in/courses/112106138">http://www.nptel.ac.in/courses/112106138</a>.</li> </ol>		

**E-Text Books:**

1. [https://books.google.co.in/books/about/Manufacturing\\_Technology\\_II.html?id=1qAzQwAACAAJ&redir\\_esc=y](https://books.google.co.in/books/about/Manufacturing_Technology_II.html?id=1qAzQwAACAAJ&redir_esc=y)
2. [https://books.google.co.in/books?id=9rNldaV3FwcC&source=gbs\\_similarbooks](https://books.google.co.in/books?id=9rNldaV3FwcC&source=gbs_similarbooks)