



**SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY**  
(Autonomous)  
Narsapur, West Godavari District, A.P. 534280  
**DEPARTMENT OF MECHANICAL ENGINEERING**

**TEACHING PLAN**

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
20ME5T02	MACHINE TOOLS AND METROLOGY	V	Mechanical Engineering	6	2024-25	05-06-2024
<b>COURSE OUTCOMES</b>						
1	Describe the metal cutting theory and analyze importance of process parameters for machining.[K2]					
2	Illustrate the working principles of different types of lathe and various operations performed.[K2]					
3	Summarize working principle of shaping, slotting, planning, grinding machines and various operations performed.[K2]					
4	Show the basic concepts of metrology and measurements. [K3]					
5	Generalize the principles of linear and angular measurement various methods. [K2]					
UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
<b>I</b>	Describe the metal cutting theory and analyze importance of process parameters for machining. (K2)	1.1	Elementary treatment of metal cutting theory	T1, T2, R1	1	Chalk & Talk, PPT, NPTEL video
		1.2	Element of cutting process	T1, T2, R1	1	
		1.3	Geometry of single point cutting tool	T1, T2, R1	1	
		1.4	Chip formation and types of chips and	T1, T2, R1	1	
		1.5	Built up edge and its effects, chip breakers	T1, T2, R1	1	
		1.6	Mechanics of orthogonal cutting	T1, T2, R1	1	
		1.7	Merchant's force diagram, cutting forces	T1, T2, R1	1	
		1.8	Merchant's force diagram, cutting forces	T1, T2, R1	1	
		1.9	Cutting speeds, feed, depth of cut	T1, T2, R1	1	
		1.10	Tool life, Taylor's tool life equation,	T1, T2, R1	1	
		1.11	Coolants, Tool materials	T1, T2, R1	1	
		1.12	Tool materials	T1, T2, R1	1	
<b>Total</b>					<b>13</b>	



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		<b>LATHE MACHINES</b>						
<b>II</b>	Explain the working principles of different types of lathe and various operations performed.[K2]	2.1	Engine lathe - principle of working, lathe components	T1, T2, R2	1	Chalk & Talk, PPT, Working animation video		
		2.2	lathe operations, specification of lathe	T1, T2, R2	1			
		2.3	lathe operations, specification of lathe	T1, T2, R2	1			
		2.4	Types of lathe	T1, T2, R2	1			
		2.5	Types of lathe	T1, T2, R2	1			
		2.6	Work holding devices	T1, T2, R2	1			
		2.7	Work holding devices	T1, T2, R2	1			
		2.8	Tool holding devices	T1, T2, R2	1			
		2.9	Turret and capstan lathes	T1, T2, R2	1			
		2.10	Turret and capstan lathes	T1, T2, R2	1			
		2.11	Principal features of automatic lathes	T1, T2, R2	1			
		2.12	Single spindle and multi-spindle automatic lathes	T1, T2, R2	1			
				<b>Total</b>	<b>13</b>			
		<b>SHAPING, SLOTTING AND PLANNING MACHINES</b>						
<b>III</b>	Explain working principle of shaping, slotting, planning, grinding machines and various operations performed.[K2]	3.1	Principles of working-Shaping	T1, T2, R1	1	Chalk & Talk, PPT, Web resources		
		3.2	Principles of working-Slotting	T1, T2, R1	1			
		3.3	Principles of working-Planning	T1, T2, R1	1			
		3.4	Principal parts, specification,	T1, T2, R1	1			
		3.5	Operations performed	T1, T2, R1	1			
		3.6	Whitworth quick return mechanism	T1, T2, R1	1			
		3.7	Crank and slotted link mechanism	T1, T2, R1	1			
		3.8	Machining time calculations	T1, T2, R1	1			
				<b>GRINDING MACHINES</b>				
				3.9	Classification of grinding machines	T1, T2, R1	1	Chalk & Talk, PPT
				3.10	Cylindrical grinding machines	T1, T2, R1	1	
				3.11	Surface grinding machines	T1, T2, R1	1	
		3.12	Tool and cutter grinding machines	T1, T2, R1	1			
				<b>Total</b>	<b>13</b>			



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		BASICS OF METROLOGY AND MEASUREMENT				
IV	Explain the basic concepts of metrology and measurements. [K3]	4.1	Need, process, role in quality control	T1, T2, R1	1	Chalk & Talk, PPT, NPTEL video course
		4.2	Factors affecting measurement	T1, T2, R1	1	
		4.3	Measurement uncertainty	T1, T2, R1	1	
		4.4	Statistical analysis of measurement	T1, T2, R1	1	
		4.5	Measurement system analysis	T1, T2, R1	1	
		4.6	Calibration of measuring instruments	T1, T2, R1	1	
		4.7	ISO standards	T1, T2, R1	1	
		4.8	Introduction to Systems of limits and fits nominal size	T1, T2, R1	1	
		4.9	Tolerance, types	T1, T2, R1	1	
		4.10	Limits, deviations, allowance	T1, T2, R1	1	
		4.11	Fits and their types	T1, T2, R1	1	
		4.12	Problems – limits, fits	T1, T2, R1	1	
<b>Total</b>					<b>13</b>	
		LINEAR AND ANGULAR MEASUREMENTS				
V	Explain the principles of linear and angular measurement various methods. [K2]	5.1	Vernier caliper	T1, T2, R2	1	Chalk & Talk, PPT, Students Seminar
		5.2	Micrometer	T1, T2, R2	1	
		5.3	Telescopic gauge	T1, T2, R2	1	
		5.4	Height gauge, Depth gauge	T1, T2, R2	1	
		5.5	Gauge blocks use and precautions	T1, T2, R2	1	
		5.6	Bevel protractor	T1, T2, R2	1	
		5.7	Clinometer, angle gauges	T1, T2, R2	1	
		5.8	Angle dekkor	T1, T2, R2	1	
		5.9	Sine bar	T1, T2, R2	1	
		5.10	Angle alignment telescope	T1, T2, R2	1	PPT, Video
		5.11	Autocollimator	T1, T2, R2	1	
		5.12	Autocollimator	T1, T2, R2	1	
Content beyond syllabus			Tool Dynamometers	T1, T2, R1	1	Chalk & Talk, PPT, Students Seminar
			Estimating machining time, cutting tool materials	T1, T2, R2	1	
			Cutting force and torque	T1, T2, R1	1	
			Errors in measurement	T1, T2, R1	1	
			Comparators - Mechanical	T1, T2, R2	1	
<b>Total</b>					<b>13</b>	
<b>CUMULATIVE PROPOSED PERIODS</b>					<b>Total</b>	<b>65</b>
<b>Text Books:</b>						

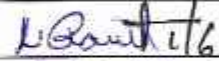
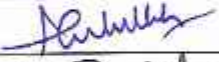
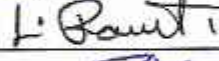

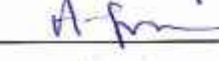


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S.No.	
T1	R.K. Jain, Production Technology, 1st edition, Khanna Publishers, 2012.
T2	P.N.Rao, Manufacturing Technology: Metal Cutting and Machine Tools, 4th edition, McGraw-Hill Education, 2018.
T3	R.K. Jain, Engineering Metrology, 21st edition, Khanna Publishers, 2018.
<b>Reference Books:</b>	
S.No.	
R1	Bhattacharya A and Sen, Principles of Machine Tools, 1 <sup>st</sup> Edition, New Central Book Agency, 2009
R2	Beckwith G and Thomas G, Mechanical Measurements, 6 <sup>th</sup> Edition, Pearson Education, 2013
<b>Web Details</b>	
1	<a href="https://nptel.ac.in/courses/112105233">https://nptel.ac.in/courses/112105233</a>
2	<a href="https://nptel.ac.in/courses/112106179">https://nptel.ac.in/courses/112106179</a>

	Name	Signature with Date
i. Faculty	L.RAVI KISHORE	
ii. Faculty II (for common Course)	ADBUL. AZEZ	
iii. Course Coordinator	L.RAVI KISHORE	
iv. Module Coordinator	Dr.R.SANJEEV KUMAR	
v. Programme Coordinator	Dr. A. GOPI CHAND	

  
Principal