SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF MECHANICAL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
19ME5T02	MACHINE TOOLS	V	Mechanical Engineering	6	2021-22	04-10-2021

COURSE OUTCOMES

1	Describe the metal cutting theory and analyze importance of process parameters for machining. (K2)
2	Explain the working principles of different types of lathe and various operations performed.[K2]
3	Explain working principle of shaping, slotting, planning, drilling and boring machines and various operations performed.[K2]
4	Explain the working principle of milling, methods of indexing and accessories of milling machine. (K2)
5	Describe the different types of finishing process and describe the function of jigs and fixtures. (K2)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	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 its effects, chip breakers	T1, T2, R1	1	
		1.5	Chip formation and types of chips 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, coolants	T1, T2, R1	1	
		1.11	Tool materials	T1, T2, R1	1	
		1.12	Tool materials	T1, T2, R1	1	

Content beyond syllabus		1.13	Tool Dynamometers	T1, T2, R1	1	
				Total	13	
II	Explain the working principles of different types of lathe and various operations performed.[K2]	LATHE MACHINES				
		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	
		2.13	Estimating machining time, cutting tool materials	T1, T2, R2	1	
Content beyond syllabus				Total	13	
III	Explain working principle of shaping, slotting, planning, drilling and boring machines and various operations performed.[K2]	SHAPING, SLOTTING AND PLANNING MACHINES				
		3.1	Principles of working-Shaping	T1, T2, R1	1	Chalk & Talk, PPT, Web resources
		3.2	Principal parts, specification,	T1, T2, R1	1	
		3.3	Operations performed	T1, T2, R1	1	
		3.4	Whitworth quick return mechanism	T1, T2, R1	1	
		3.5	Crank and slotted link mechanism	T1, T2, R1	1	
		3.6	Machining time calculations	T1, T2, R1	1	
		DRILLING & BORING MACHINES				
		3.7	Principles of working, specifications, types	T1, T2, R1	1	Chalk & Talk, PPT
		3.8	Operations performed tool holding devices	T1, T2, R1	1	
		3.9	Nomenclature of twist drill	T1, T2, R1	1	
		3.10	Fine boring machines	T1, T2, R1	1	
		3.11	Jig boring machine	T1, T2, R1	1	
		3.12	Deep hole drilling Machine	T1, T2, R1	1	

Content beyond syllabus		3.13	Cutting force and torque	T1, T2, R1	1	
				Total	13	
IV	Explain the working principle of milling, methods of indexing and accessories of milling machine. (K2)	**MILLING MACHINES**				
		4.1	Principles of working, specifications milling machine	T1, T2, R1	1	Chalk & Talk, PPT, NPTEL video course
		4.2	Classification of milling machine	T1, T2, R1	1	
		4.3	Horizontal, milling machine	T1, T2, R1	1	
		4.4	Vertical milling machine	T1, T2, R1	1	
		4.5	Universal milling machine,	T1, T2, R1	1	
		4.6	Milling operations	T1, T2, R1	1	
		4.7	Milling operations	T1, T2, R1	1	
		4.8	Types of cutters	T1, T2, R1	1	
		4.9	Geometry of milling cutters	T1, T2, R1	1	
		4.10	Methods of indexing	T1, T2, R1	1	
		4.11	Methods of indexing	T1, T2, R1	1	
		4.12	Milling machines accessories	T1, T2, R1	1	
Content beyond syllabus		4.13	Production milling machines	T1, T2, R1	1	
				Total	13	
V	Describe the different types of finishing process and describe the function of jigs and fixtures. (K2)	**FINISHING PROCESSES**				
		5.1	Theory of grinding machines	T1, T2, R2	1	Chalk & Talk, PPT, Students Seminar
		5.2	classification of grinding machines	T1, T2, R2	1	
		5.3	cylindrical and surface grinding machines	T1, T2, R2	1	
		5.4	tool and cutter grinding machines	T1, T2, R2	1	
		5.5	Different types of abrasives bonds specification	T1, T2, R2	1	
		5.6	selection of a grinding wheel	T1, T2, R2	1	
		5.7	Lapping	T1, T2, R2	1	
		5.8	Honing	T1, T2, R2	1	
		5.9	Broaching operations	T1, T2, R2	1	
		JIGS & FIXTURES				
		5.10	Principles of jigs and	T1, T2, R2	1	PPT,

			fixtures and uses			Video
		5.11	Classification of jigs & fixtures	T1, T2, R2	1	
Content beyond syllabus		5.12	Classification of sawing machines	T1, T2, R2	1	
				Total	12	
				CUMULATIVE PROPOSED PERIODS	**Total**	**64**

Text Books:

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	Chital, A.K., and Jain, K.C., Text book of production Engineering, 2nd edition, PHI Learning India, 2014

Reference Books:

S.No.	
R1	Milton Clayton Shaw, Metal cutting principles, 2nd edition, Oxford University Press, 2005
R2	Winston A Knight, and Geoffrey Boothroyd, Fundamentals of machining and machine tools, 3rd edition, Taylor & Francis, 2006.

Web Details

1	https://nptel.ac.in/courses/112/105/112105306/

		Name	Signature with Date
i.	Faculty	CH.HARISH KUMAR	
ii.	Faculty II (for common Course)	M.SARAVANAN	4/1/22
iii.	Course Coordinator	CH.HARISH KUMAR	
iv.	Module Coordinator	Dr. R.SANJEEV KUMAR	
v.	Programme Coordinator	Dr. A. GOPI CHAND	

Principal