

ME303 Manufacturing Technology II										
L	T	P	Credit	Area		CWS	PRS	MTE	ETE	PRE
3	0	2	4	DCC		15	25	20	40	-

Objective: To familiarize students with cutting tool materials, chip formation, force analysis, machine tool drive metrology, Gigs and fixtures. To impart in-depth knowledge of non-conventional machining processes.

Syllabus		Contact Hours
Unit-1	Theory of Metal Cutting: Mechanics of metal cutting- Orthogonal and oblique cutting, Chip formation, Types of chips, Chip control, Merchant's theory of cutting forces at tool point, Limitations and modifications of Merchant's theory, Plowing forces and the 'Size effect', Heat generation in metal cutting, Cutting fluids and their physical action, Tool wear, Tool life and Machinability, Nomenclature of cutting tools and Cutting tool materials, Economics of machining, Analysis of milling and grinding processes.	8
Unit-2	Design Features of Machine Tools: Design requirements of machine tools, Kinematic drives of machine tools, Types of machine tool drives	6
Unit-3	Design of machine tool spindle: Functions of spindle unit and requirements, materials of spindles, effect of machine tool compliance on machining accuracy, design calculations of spindles, bearing and its types .	6
Unit-4	Non-conventional machining: Studies on basic principle, working and effects of process parameters of the following processes: Ultrasonic machining (USM), Abrasive jet machining (AJM), Electro-discharge machining (EDM), Electro-chemical machining (ECM), Electron beam machining (EBM), Plasma arc machining (PAM) and Laser beam machining (LBM).	8
Unit-5	Metrology: Introduction to Metrology and its relevance, Limits, fits, and tolerances, Linear and angular measurements.	8
Unit-6	Jigs & Fixtures: Important considerations in jigs and fixture design. Main principles of designing of jigs and fixtures. Different devices and methods of locations. Different types of clamps used in jigs & fixtures.	6
	Total	42

Reference Book:	
1	Fundamentals of Machining & Machine Tools by Geoffrey Boothroyd & Winston A. Knight, Marcel & Dekker Publications.
2	Fundamentals of Metal Cutting & Machine Tools by B.L. Juneja, G.S. Sekhon & Nitin Seth, New Age International Publications
3	Manufacturing Technology by P.N.Rao, Tata McGraw Hill Publications
4	Production Engineering Sciences by P.C. Pandey & C.K. Singh, Standard Publications.
5	Engineering Metrology by R.K. Jain, Khanna Publications
6	Engineering Metrology by I.C.Gupta

Course Outcomes

CO1	To understand cutting tool materials, chip formation, cutting fluids.
CO2	To understand machine tool drives, jigs and fixtures design principles
CO3	To discuss limits, fits, tolerances and measurements.
CO4	To describe working principles of non-conventional machining processes.
CO5	To explain design features of different types of machines tools.
CO6	To apply fundamentals of conventional and non-conventional machining processes for verity of practical problems.

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2