

Branch Name:	Mechanical Engineering
Semester/Year:	Semester VI / Third Year
Subject Title:	Production Technology
Subject Code:	1ET1010605
Pre-requisite:	Manufacturing Processes I and II

Course Objectives:

This course will help student to

1. Apply basics of metal machining processes.
2. Interpret and utilize the economics of machining.
3. Understand the usefulness of Jig & Fixtures, Presses & Press work.
4. Understand non conventional machining processes.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	-	02	04	70	30	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weightage (%)	
01	Metal Cutting: Principles of metal cutting, classification of Metal cutting/machining processes: Orthogonal and oblique cutting, Effect of tool geometry and other cutting parameters, Mechanisms of formation of chips, types of chips formed, The forces acting on the cutting tool and their measurement, Merchant's circle diagram, force dynamometer, force and velocity relationship, Tool wear, Factors causing wear, Tool life, variables affecting tool life, economical cutting speed, machinability of metals.	10	25	
02	Thermal Aspects in Machining: Sources of heat generation in machining and its effects, Temperature Measurement techniques in machining, Cutting fluids, Functions of cutting fluid, Characteristics of cutting fluid, Application of cutting fluids, Economics of Metal Cutting Operations.	06	15	
03	Gear and Thread Manufacturing: Different types of threads manufacturing methods, tools involved, Different gear forming and generating methods with their special features, Gears finishing processes.	06	15	
04	Jigs and Fixtures:	06	15	

	Definition, Differences between Jigs and Fixtures, design principles, 3-2-1 location principle, types of locators, concept of work piece control, Geometric control, Dimensional control and Mechanical control, Clamps, Jig bushes, Jigs and fixtures for various machining operations.		
05	Press Tool: Classification of presses and dies, Cutting actions in dies, clearance, cutting forces, Methods of reducing cutting forces, Minimum Diameter of Piercing center of pressure, Blanking, Piercing, Drawing, Bending and Progressive Die design, scrap reduction, strip layout.	06	15
06	Non-conventional Machining: Introduction, Need of non conventional machining, Basic process principle, parameters, capabilities and applications of EDM, Wire cut EDM, IBM, ECM, ECG, AJM, AWJM, USM, LBM and EBM.	06	15

Course Outcomes:

The student will be able to

1. Understand types of tools, their geometries and cutting fluids used for various machining processes.
2. Select and justify machining parameters for practical applications.
3. Design Jig and Fixture for various application
4. Perform on automatic and unconventional machines

List of Reference Books:

1. Sharma, P. C. "Production Technology (Manufacturing Processes): Manufacturing Processes". S. Chand Publishing, 2007.
2. Jain, R. K. "Production Technology [Manufacturing processes, Technology and Automation]." Khanna Publication, (2011).
3. Bhattacharyya, A. "Metal Cutting: Theory and Practice (1984)." Jamini Kanta Sen of Central Book Publishers.
4. Knight, Winston A., and Geoffrey Boothroyd. "Fundamentals of metal machining and machine tools". Vol. 198. CRC Press, 2005.
5. Hmt, H. M. T. "Production technology". Tata McGraw-Hill Education, 2001.

List of Practical:

1. To measure different tool angles and study of various cutting tools geometry.
2. To understand the effect of chosen parameters on the type of chip produced on lathe machine.
3. To determine chip-thickness ratio and shear plane angle during machining.
4. To Measure cutting forces in turning using Lathe Tool Dynamometer under various cutting conditions.
5. To study the Temperature Measurement on chip tool interface.
6. To study and understand the effect of a suitable cutting lubricant.
7. To design a Jig and Fixture for given component.
8. To study different press and design of punch and die.
9. To study various gear manufacturing and finishing processes.
10. Demonstration of non conventional machining process.

E-Resources:

1. <http://nptel.ac.in/courses/112104204>
2. <http://nptel.ac.in/courses/112104195>
3. <http://nptel.ac.in/courses/112104028>