

Course-Plan

ME216	Manufacturing Technology II	L-T-P-Cr-CH:3-0-0-3-3	Core/ME Prerequisite: Nil
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School: Engineering

Department: Mechanical Engineering

Course Code: ME 102

Course Name: Engineering Mechanics

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Abstract: This is an important course in mechanical engineering. In this course different aspects of manufacturing processes in real life industries will be discussed. Mechanism for different manufacturing system, mathematical model and analysis for different process has been also included. This course also includes the recent advanced in manufacturing and different advances processes in detail.

Course Objectives: The main objective of this course is

- Applying the knowledge of metal cutting and machining in solving practical machining problems dealing with variety of tool materials and machining operations.
- Introduce the basic principles that govern the principles of metal cutting and machining.
- Establish the underlying principles related to Non conventional machining processes

Prerequisites of the course: ME208 – Manufacturing Technology I.

Expected Course Outcomes (COs): Upon the completion of the course, the students will be able to:

CO1: Identify the different aspects of machining science and machine tools.

CO2: Explain the increased need of advanced, automated and non-conventional machining processes.

CO3: Analyze the cutting tool geometry and design a single point cutting tool for shaping operation.

CO4: Demonstrate a practical understanding of machining operations and fabrication techniques, and to be able to make realistic suggestions for the evaluation of metal cutting behaviour.

CO5: Evaluate the basic mechanical behaviour of composite materials and make sound prediction on the metal cutting behaviour of new materials.

Course outline:

Unit I

Machine Tool: Tool geometry, Tool materials and properties, Tool wear and tool life (5Lectures)

Unit II

Metal Cutting: Introductory concept, orthogonal and oblique cutting, single point cutting tool nomenclature, chip formation and types, chip thickness ratio, velocity relationships, cutting forces – Merchant’s circle, cutting tool materials, Surface finish and Machinability, Heat generation and cutting temperature, Cutting fluids (10 Lectures)

Unit III

Machining Processes (conventional): Lathe, Milling, Shaping, Slotting, Planning, Drilling, Boring, Broaching, Reaming, Grinding, Thread rolling and Gear cutting machines, Gear hobbing, Super finishing processes. (12 Lectures)

Unit IV

Tooling: Jigs and fixtures: principles of work holding, principles of design of jigs and fixtures (3 Lectures)

Unit V

Batch Production: Capstan and Turret lathe, NC, CNC, DNC and FMS, Rapid prototyping and rapid tooling (8 Lectures)

Unit VI

Non-conventional Machining Processes: Electro-chemical, Electro-Discharge, Ultrasonic, LASER, Electron Beam, Water Jet, Abrasive Jet (4 Lectures)

Lesson Plan

Topic	No. of classes	Topic	No. of classes
Machine Tool	5	Jigs and Fixtures	3
Metal Cutting	10	Batch Production	8
Machining Processes	12	Unconventional Machining	4
Total = 42 Classes			

Evaluation plan: Evaluation would be based upon the following:

Component	Marks	Time
Test I	25	45 min
Major I	40	1 hr 15 min
Test III	25	Assignment type
Major II	60	2 hrs
Total	150	

Pedagogy: Theory classes will help students in understanding the concepts and origin of all rigid body mechanics related theorems and corollaries while tutorial classes would discuss how these concepts are used in the solution of practical and field related problems. Assignments and exams will be formulated to test the fundamental concepts and ability to solve problems in mechanics.

Text books:

- S. Kalpakijan and S.R. Schmid, Manufacturing Engineering and Technology, Pearson Education, 2006.

Reference books:

- Ghosh and A. K. Mallik, Manufacturing Science, Wiley Eastern, 1986
- P.N. Rao, Manufacturing Technology: Metal Cutting and Machine Tools, McGraw Hill, 2013
- O.P. Khanna. Production Technology: Manufacturing Processes, Volume II, Dhanpat Rai Publications, 2013.