

ME 230 Mechanical Processing of Materials

Course Instructor : Prof. Ramesh Singh
Office : Machine Tools Lab
Phone : rsingh@iitb.ac.in; 7507 (O) / 8507 (R)
Office Hours : Fridays 4:00 pm -5:00 pm
Website : <https://www.me.iitb.ac.in/~ramesh/courses/ME230/me230.html>

Teaching Assistant : Mr. Sutonu Oraon (lead TA)/ Mr. Suraj Kumar/Dr. Gururaja S.
Office : Machine Tools Lab
: 4518
: Thursdays 3:00 pm – 5:00 pm

Class Timing: Slot
1A: Monday: 08:30 AM - 09:25 AM
1B: Tuesday: 09:30 AM - 10:25 AM
1C: Thursday: 10:35 AM - 11:30 AM

Course Objectives:

- Learn the fundamentals of bulk and sheet metal deformation processes, machining, and non-conventional mechanical deformation processes
- Develop first order mathematical descriptions for selected processes
- Understand the advantages and limitations of various processes in terms of quality productivity
- Apply this knowledge to manufacturing process selection, design and part quality

Scheme of assessment

Class participation	10%
Assignments	10%
Quizzes	10%
Midterm	20%
Group project	20%
End semester examination	30%

Total	100 %

Please note:

1. Lecture notes and home works will be posted on the course website
2. Homework will be individual and due **on the day of submission. No late homework accepted.**
3. Any form of uncanny similarity or copying on the homework **will be severely penalized.**
4. Students could opt for an **analysis group project** either using Deform/commercial finite element code or analytical techniques. **Hands on group projects** which involves experimental analysis will also be considered.
5. In-class Mentimeter quizzes
6. **No cellphones on the desk except for Mentimeter quizzes. Phones to be off desk after the quiz**

Schedule of Lectures, Assignments and quizzes

Lecture No.	Date	Topics and Schedule	Lecture No.	Date	Schedule of Assignments & quizzes
1.	05.01.2026 Mon	Introduction to ME 206	21.	02.03.2026 6 Mon	Basics of Machining Processes
2.	06.01.2026 Tue	Mechanics Review I	23.	03.03.2026 Tue	Orthogonal Machining Oblique Machining
3.	08.01.2026 Thu	Mechanics Review II	24.	05.03.2026 Thu	Mechanics of Machining
4.	12.01.2026 Mon	Bulk Deformation Process	25.	09.03.2026 Mon	Merchant's Circle Diagram
5.	13.01.2026 Tue	Plane Strain Forging I	26.	10.03.2026 Tue	Cutting Force, Power and Energy
6.	15.01.2026 Thu	Plane Strain Forging II	27.	12.03.2026 Thu	Tool Temperature in Machining
7.	19.01.2026 Mon	Cylindrical/Die Forging (HW1)	28.	16.03.2026 Mon	Tool Wear Mechanisms and Tool Life
8.	20.01.2026 Tue	Rolling I	29.	17.03.2026 Tue	Machinability of Materials
9.	22.01.2026 Thu	Rolling II	30.	23.03.2026 Mon	Tools Materials and Geometry I
10.	27.01.2026 Tue	Wire Drawing I	31.	24.03.2026 Tue	Tools Materials and Geometry II
11.	29.01.2026 Thu	Wire Drawing II	32.	26.03.2026 Thu	Optimization in Machining
12.	2.02.2026 Mon	Quiz 1	33.	30.03.2026 Mon	Grinding I
13.	3.02.2026 Tue	Extrusion I	34.	02.04.2026 Thu	Grinding II
14.	5.02.2026 Thu	Extrusion II(HW2)	35.	06.04.2026 Mon	Introduction to Non-Conventional Machining
15.	9.02.2026 Mon	Introduction to Sheet Metal Forming	36.	07.04.2026 Tue	USM, AJM, WJM Processes
16.	10.02.2026 Tue	Sheet Metal Forming Process Analysis	37.	09.04.2026 Thu	Non-Conventional Machining
17.	12.02.2026 Thu	Deep Drawing Process	38.	13.04.2026 Mon	Advanced Topics I
18.	16.02.2026 Mon	Quiz 2	39.	14.04.2026 Tue	Advanced Topics II
19.	17.02.2026 Tue	Forming Limits and Defects (HW 3)	40.	17.04.2026 Thu	Recapitulation for Machining
20.	19.02.2026 Thu	Recapitulation of Deformation Processes			
		Mid-Sem Exam 21.02.2022 Sat - 28.02.2022 Sat			

Text Book:

- *Manufacturing Processes for Engineering Materials, S. Kalpakjian and S. R. Schmid, 4th edition; Prentice Hall, 2003*
- *Fundamentals of Machining and Machine Tools, G. Boothroyd and W.A. Knight. 2nd edition, Marcel Dekker, Inc., 1989.*
- *Manufacturing Science, A. Ghosh and A. Mallick, East West, 2010*
- *Mechanical Metallurgy, George E. Dieter, McGraw Hill Education; Third edition*
- *Lorraine F. Francis, Materials Processing, Academic Press, 2016*

References:

- *Introduction to Manufacturing Processes, J.A. Schey, 3rd edition. McGraw Hill Co., 2000.*