

Manufacturing Technologies- II



ME312: Manufacturing Technologies - II
Instructor: R K Mittal



Outline

- Contact details
- Course objectives
- Introductory remarks
- Grading policy
- Introduction to manufacturing processes



Sections / Instructors

- Section I
 - Students with roll number:
200103002 – 200103071
and 190103021
 - Instructor: Prof. R K Mittal
 - Classroom: 5003
 - Teaching Assistants (TAs):
Abhishek Punia
Kailas Dumane
- Section II
 - Students with roll number:
200103073 – 200103136
and 180103041
 - Instructor: Prof. Biranchi Panda
 - Classroom: 5004
 - Teaching Assistants (TAs):
Vishwajeet Jaiswal
Devalla Tharun Kumar



Contact Details

Prof. R K Mittal

Room: FR21 (ME-Extension Building)

E-mail: rkmittal@iitg.ac.in

Tel: 3576

Office Hrs.: Monday 4-5 PM. (also by appointment)

Course Website: www.iitg.ac.in/rkmittal/me321



Contact Details

- Teaching Assistants :

- Abhishek Punia (a.punia@iitg.ac.in)
- Kailas Dumane (kailas.dumane@iitg.ac.in)

Class Timings: Tuesdays 3:00 PM – 3:55 PM
 Wednesdays 3:00 PM – 3:55 PM
 Thursdays 3:00 PM – 3:55 PM

Classroom: 5003 (Core 5 – Ground Floor)



Objective of Course

- Learn the principles of material removal mechanisms of conventional or non-conventional machining
- 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



Objective of Course

- Emphasis on understanding **the physical principles** underlying these processes
- **Encourage teamwork and group activity via group assignments and Project.**



Grading Policy

Group Assignments	10%
Quizzes	10%
Project	15%
Midterm Exam	25%
End Semester Examination	40 %
Total	100 %

Attendance is not optional. FA grade will be awarded for attendance less than 75%



Important Instructions

- Lecture notes and homeworks will be posted on **the course website or through shared folder**
- Home assignments will be submitted **in a self-selected group of three** and are due in class on **the submission date. No late submission will be accepted.**
- Any form of uncanny similarity or copying on the homework **will be severely penalized.**
- **Hands on projects** which involves experimental analysis will be considered.



Important Instructions

- Students could opt for an **analysis project** either using Deform/commercial finite element code or analytical techniques.
- **Surprise quizzes** may be there in classes.
- **No cellphones on the desk. Cell phones should be either in your bag or pocket.**
- It would be good if we all learn together – the more two-way interactions, the better for all of us. I will make mistakes, which you will be expected to correct, and vice versa!



Course Outline

- **Metal cutting:** mechanics, tools (geometry: single and multi-point, nomenclature and tool signature, material, temperature, wear, and life considerations), chip formation; cutting fluids and surface finish; economics of machining
- **Machine tool:** Generation and machining principles
- **Basic machining operations:** lathe, milling, shaping, drilling, boring, grinding, thread cutting, gear cutting
- **Unconventional methods:** electro-chemical, electro-discharge, ultrasonic, LASER, electron beam, water jet machining etc.
- **Tooling:** Jigs and fixtures, principles of location and clamping;
- Rapid manufacturing and rapid tooling
- Basic concepts of CAD/CAM and CAPP



Textbooks

- S. Kalpakjian and S. R. Schmid, Manufacturing Processes for Engineering Materials, 5th edition; Prentice Hall, 2003.
- A. Ghosh and A. K. Mallik, Manufacturing Science, East West Press, Second Edition, 2010.
- G. K. Lal, Introduction to Machining Science, New Age International Pvt Ltd., 2007.
- W. A. Knight and G. Boothroyd, Fundamentals of Metal Machining and Machine Tools, CRC Press, 2006.
- A. B. Chattopadhyay, Machining and Machine Tools, 2nd Edition, Wiley India, 2017



Reference Books

- J.A. Schey, Introduction to Manufacturing Processes, 3rd edition. McGraw Hill Co., 2000.
- A.Y.C. Nee, K. Whybrew, and N. Senthil Kumar, Advanced Fixture Design for FMS, Springer Verlag
- J. F. W.Galyer, and C. R. Shotbolt, Metrology for Engineers, ELBS
- Production Technology HMT, Tata McGraw Hill, 2001.
- M. C. Shaw, Metal Cutting Principles, Second Edition, Oxford University Press, 2005.
- P. K. Mishra, Nonconventional Machining, Narosa Publishing House, 2007.
- C. Donaldson, G. H. LeCain, V C Goold and J Ghose, Tool Design 4e (SIE), 4th Edition, TMH, 2012.
- M. P. Groover, Fundamentals of Modern Manufacturing, Materials, Processes and Systems, Second Edition, Wiley India, Reprint 2007.