

Design and Manufacturing I
ME58120320 – Summer 2024

Instructor	Lei Chen (陈雷), University of Massachusetts Lowell, Lei_Chen@uml.edu
Lectures	July 1 st – July 10 th , 8:00 AM -11:35 AM
Textbook	Steven Liang and Albert Shih, <i>Analysis of Machining and Machine Tools</i> , Springer, 2016. ISBN 978-1-4899-7645-1
Goals	<p>The goals of this course are to provide the knowledge of:</p> <ul style="list-style-type: none">• traditional and non-traditional machining processes and machine tools.• modeling and analysis methods of machining processes• advanced machining technology
Content	<p>Traditional machining processes</p> <ul style="list-style-type: none">• Single point, multiple point and abrasive machining processes and surface generation• Machine tools – components, accuracy and metrology• Cutting mechanics – chip formation, forces, and energy• Cutting temperatures – thermal modeling and measurements• Cutting tools – materials, coatings, and tool geometry, tool wear and tool life• Machining dynamics <p>Non-traditional machining processes</p> <ul style="list-style-type: none">• Electrical discharge machining• Chemical-based machining• Energy-based machining• Biomedical machining <p>Machining systems</p> <ul style="list-style-type: none">• Systems configurations• Data for design, fabrication and inspection
Exams	A 2-hour final exam on July 11 th . Closed book. An A4 size hand-written cheat sheet (both sides) and a calculator are allowed.
Homework	<p>Three homework will be assigned on July 1st, 4th, and 8th. Homework due at the start of the lecture on July 4th, 8th, and 10th). Please submit your solution and bring a photocopy to class as the instructor will go through homework problem solutions during lecture.</p>
Quiz	To make the class interactive and to take attendance, we will conduct quizzes during lecture.
Honor Code	Homework assignments must be completed on your own. You must independently formulate your solution, though discussing the subject matter with your classmates is encouraged. You may not compare your solution with your classmates. You must submit the solution individually.

In-class quiz should be taken by yourself. No one may answer the quiz question for you by using your name. Discussion about quiz questions is not allowed.

Grading

Grade will be based on final exam, homework, quiz, and participation. The grading scheme is as follows

Final Exam	60%
Homework	30%
Quiz and Participation	10%

Tentative Course Schedule

Date	Lectures and events	Homework
July 1 (Mon)	Chapter 1 Introduction Chapter 2 Single Point Cutting	HW1 on Chapters 1-3 assigned
July 2 (Tue)	Chapter 3 Multiple Point Cutting	
July 3 (Wed)	Chapter 4 Grinding Chapter 5 Machines	
July 4 (Thu)	Chapter 6 Machine Tool Metrology Chapter 7 Mechanics of Machining HW1 Solutions	HW1 Due before lecture HW2 on Chapters 4-7 assigned
July 5 (Fri)	Chapter 9 Temperature Chapter 10 Dynamics Chapter 11 EDM	
July 8 (Mon)	Chapter 11 EDM Chapter 12 ECM HW2 Solutions	HW2 Due before lecture HW3 on Chapters 9-13 assigned
July 9 (Tue)	Chapter 13 Laser and E-beam Machining Chapter 14 Biomedical Machining	
July 10 (Wed)	HW3 Solutions Practice Problem Session Exam Review and Q&A	HW3 Due before lecture
July 11 (Thu)	Final Exam	