San José State University
Department of Mechanical Engineering
ME/ISE 110, Manufacturing Processes, Section 1, Fall 2019

Course and Contact Information

Instructor:	Edward Cydzik
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Office Hours:	MW 18:30-19:15 (6:30 PM- 7:15 PM)
Class Days/Time:	MW 19:30-20:45
Classroom:	DMH 227
Prerequisites:	ME 20 with a grade of "C" or better, and MatE 25 (co-requisite)

Course Format

This is a mixed-mode class, with both in-person and online components. Online components require use of the Canvas learning management system, accessed via https://sjsu.instructure.com/. Successful completion of course requirements necessitates accessing the course website frequently, typically at least twice a week on a regular basis. Technical support for Canvas is available at http://www.sjsu.edu/at/ec/canvas/. Important communications regarding this class may be sent via Canvas or to email addresses listed in MySJSU, and thus each student is expected to maintain up-to-date contact information in both systems.

Course Description

Fundamentals of manufacturing processes such as machining, forming, casting, molding and welding.
Surface treatments, powder-based processes, and microfabrication methods.
Materials behavior and selection for manufacturing.
Geometric dimensioning and tolerancing.
May require access to SolidWorks™ for some activities and homework.

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Identify candidate materials and processes appropriate for given design requirements.
2. Make relative comparisons among a wide variety of engineering materials in terms of mechanical properties and workability.
3. Describe capabilities and limits for several manufacturing processes in terms of size, resolution, precision, surface quality, rate, and cost.
4. Communicate effectively across design, manufacturing, and inspection perspectives, specifically using geometric dimensioning & tolerancing (GD&T).
5. Propose sensible strategies for fabricating new engineering components that have no pre-existing standard production method.

Required Texts/Readings (Required)

Textbook

1) Manufacturing Engineering and Technology, 7th edition, by Serope Kalpakjian and Steven R. Schmid, Prentice Hall, 2010, ISBN 9780133128741. The immediate previous edition (6th edition) is also acceptable.
2) Geometric Dimensioning and Tolerancing,© 2009, James D. Meadows, available from the MLK Library for download. https://sjsu-primo.hosted.exlibrisgroup.com/primo-explore/fulldisplay?docid=01CALS_ALMA71456175050002901&context=L&vid=01CALS_SJO&search_scope=EVERYTHING&tab=everything&lang=en_US
3) Recommended reference: Materials Selection in Mechanical Design, Fifth Edition, Michael F. Ashby, Butterworth-Heinemann, 2017, ISBN 9780081005996.

Course Requirements and Assignments (Required)

The course will require active participation in class by students including frequent oral presentations by individuals and/or teams. In addition, homework will be assigned.

There will be three mid-term examinations based on a) traditional manufacturing methods, b) rapid prototyping and manufacturing methods, and c) SPC and Geometric Dimensioning and Tolerancing. These may be adjusted some during the course of the semester.

Short quizzes will also be held at the beginning of lectures so students can demonstrate comprehension of the reading material.

“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.”

Final Examination or Evaluation

In addition to three mid-term exams, we may have a Final Evaluation presentation by each student team covering a product (previously discussed and agreed to with the professor) describing the major components of the product and how these were manufactured based on visual inspection.

Grading Information (Required)

30 % for each Mid Term (3)
10 % for Homework, Quizzes, Team Presentations

The overall grade shall be calculated from a weighted sum of all graded components.

Grades and percentages are as follows:

92.0% -	100%	A
90.0% -	91.9%	A-
87.0% -	89.9 %	B+
83.0% -	86.9 %	B
80.0% -	82.9%	B-
77.0% -	79.9%	C+
73.0% -	76.9%	C
70.0 % -	72.9%	C-
67.0% -	69.9%	D+
63.0 % -	66.9%	D
60.0 % -	62.9 %	D-
0%	59.9%	F

Classroom Protocol

Lectures will start on time and end on time. If you are not able to attend, please send me an email.

Attendance is strongly advised .

Students are expected to participate, ask questions, and add to the discussion based on their work experience.

No cell phone use during lecture. If you have to take a call, excuse yourself and step out of the lecture room.

Closed Laptops/ Tablets during lecture unless you are taking electronic notes.

Midterm exams will be open book, open note. Laptops will be allowed during midterm exams only in airplane mode (print your notes and bring them to the Midterms).

University Policies (Required)

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

Course Number / Title, Semester, Course Schedule

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Wed 8/21/19	Introduction – Green Sheet review – Read Introduction and Chapter 1
2	Mon 8/26/19	Material properties and behavior – Read Chapter 2
2	Wed 8/28/19	Material properties and behavior – Read Chapter 3
3	Wed 9/4/19	Deformation and shaping processes – Read Chapters 13 and 14
4	Mon 9/9/19	Deformation and shaping processes – Read Chapters 15 and 16
4	Wed 9/11/19	Cutting processes – Turning and Hole Making – Read Chapter 23
5	Mon 9/16/19	Cutting processes – Milling, Broaching, Sawing, Filing, and Gear Manufacturing – Read Chapter 24
5	Wed 9/18/19	Solidification processes – metal casting – Read Chapters 10, 11, and 12
6	Mon 9/23/19	Solidificatioin processes - polymer structures - Read Chapter 7
6	Wed 9/25/19	Deformation processes – forming and shaping plastics and composite materials – Read Chapter 19
7	Mon 9/30/19	Joining processes – Fusion Welding – Read Chapters 30, 31, and 32
7	Wed 10/2/19	Joining processes – Solid-State Welding, Brazing, Soldering, Adhesive Bonding and Mechanical Fastening Processes
8	Mon 10/7/19	Midterm #1
8	Wed 10/9/19	Surface Finishing and Treatments, Coatings and Cleaning – Read Chapter 34
9	Mon 10/14/19	Powder Metal Processes – Read Chapter 17
9	Wed 10/16/19	Rapid Prototyping Processes and Operations - Read Chapter 20
10	Mon 10/21/19	Fabrication of Microelectronic Devices – Read Chapter 28
10	Wed 10/23/19	Fabrication of Microelectromechanical Devices – Read Chapter 29
11	Mon 10/28/19	Midterm #2
11	Wed 10/30/19	Statistical Process Control – Read Chapter 36
12	Mon 11/4/19	Statistical Process Control
12	Wed 11/6/19	GD&T – Introduction – Read Chapter 5 in the Meadows Text
13	Wed 11/13/19	GD&T – Why use GD&T – Read Chapter 20 in the Meadows Text and Chapter 35
14	Wed 11/18/19	GD&T – Tolerance Stack-Up Analysis – Read Chapter 23 in the Meadows Text

Week	Date	Topics, Readings, Assignments, Deadlines
14	Mon 11/20/19	GD&T – Tolerance Stack-Up Analysis
15	Wed 11/25/19	GD&T – Tolerance Stack-Up Analysis
16	Mon 12/2/19	Midterm#3
16	Wed 12/4/19	Presentations
17	Mon 12/9/19	Presentations
Final Exam		Presentations