San José State University
Department of Mechanical Engineering
ME/ISE 110 Manufacturing Processes, Sections 02 & 03, Fall 2019

Course and Contact Information

Class Days/Time:	Section 02: Tuesdays and Thursdays 10:30 AM to 11:45 AM Section 03: Tuesdays and Thursdays 3:00 PM to 4:15 PM
Classroom:	Engineering 192
Registration Codes:	47607 for ME 110 Section 02, 49290 for ISE 110 Section 02 50672 for ME 110 Section 03, 50673 for ISE 110 Section 03
Prerequisites:	ME 020 with a grade of "C-" or better
Pre/corequisite:	MatE 25 (prior or concurrently)
Instructor:	Sang-Joon (John) Lee
Office Location:	Engineering 115A
Telephone:	408-924-7167
Email:	sang-joon.lee@sjsu.edu
Office Hours:	Mondays and Wednesdays 1:00 PM to 2:00 PM, and by appointment

Course Format

This class is run in mixed-mode, with in-person class meetings and online activities. Online components require use of the Canvas learning management system (LMS), 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/ecampus/. Important communications regarding this class may be sent via Canvas or to student email addresses listed in MySJSU, and thus each student is expected to maintain up-to-date contact information in both systems.

Course Description: http://info.sjsu.edu/web-dbgen/catalog/courses/ME110.html

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 dimensions and tolerancing.

Course 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. Apply geometric dimensioning & tolerancing (GD&T) concepts, rules, and nomenclature according to the ASME Y14.5 standard to encode and decode design intent in an engineering drawing.

5. Propose sensible strategies for fabricating new engineering components that have no pre-existing standard production method.

Required Textbooks

1. *Manufacturing Engineering and Technology*, 7th ed., by S. Kalpakjian & S. Schmid. Prentice Hall, 2010, ISBN 9780133128741. The 6th edition (ISBN 9780136081685) is also acceptable, but official references to chapter, section, and page numbers will be based on the 7th edition.
2. *Beginning GD&T for Design, Manufacturing and Inspection*, by Multi Metrics, Inc., 2013. Older versions of this book that are based on the 2009 version of the ASME Y14.5 standard are also acceptable.

Supplementary Textbook

Geometric Dimensioning and Tolerancing (per ASME Y14.5-2009), by J. D. Meadows, James D. Meadows & Associates, Inc., 2009, ISBN 9780791860915. Free online access is available via SJSU Library portal.

Library Resources

The liaison librarian as listed at http://library.sjsu.edu/staff-directory/sjsu-library-subject-liaisons can provide faculty and students with research instruction and resources, as needed, in person and online through the library website http://library.sjsu.edu/. Research guides http://libguides.sjsu.edu/ are accessible for departments and subject areas, including a guide specific to mechanical engineering at http://libguides.sjsu.edu/me.

Course Requirements and Assignments

According to the Office of Graduate and Undergraduate Programs http://www.sjsu.edu/gup/syllabusinfo/, "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 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

- Participation Tasks: Throughout the semester there will be several participation tasks to promote active engagement. Specific examples include assigned discussion posts, online quizzes or surveys, and peer review. These will be tallied for credit with strict deadlines and there are no make-up options.
- Product Case Study: This is a team-based mini-project that involves disassembling a multi-component commercial product, as an opportunity to demonstrate the breadth and depth of your manufacturing process knowledge. The primary deliverable is a pre-recorded and well-organized video presentation that presents evidence-based reasoning about the processes that were likely involved in manufacturing of the product..
- Tolerancing Scenario: This is team-based mini-project that involves identifying and tolerancing specific concerns between mating parts. An important objective is to have distinct and clear understanding among imperfections of size, form, orientation, and location. The primary deliverable is a pre-recorded and well-organized video presentation that presents specific concerns and how to apply the concepts and tools of geometric dimensioning and tolerancing (GD&T) in order to manage imperfection.
- Exams: There is one midterm exam and one final exam. All students are expected to complete exams in class as scheduled. Students may take exams only in their enrolled sections; the exams are not interchangeable between class sections. There are no make-up exams, but for truly unavoidable and extenuating circumstances a student may provide documentation and petition to have weight redistributed to the final exam. Disability accommodations must be coordinated through the Accessible Education Center http://www.sjsu.edu/aec/.

Grading Information

The course grade will be weighted as follows:
15% for Participation Tasks
15% for Product Case Study
20% for Midterm Exam
15% for Tolerancing Scenario
35% for Final Exam

The overall course grade is calculated from a weighted sum of all graded components. Graded percentage points correspond to letter grade as follows:
93.0-100 A | 90.0-92.9 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

Team Assignments and Peer Grading: Team assignments will be used for some portions of the course, and some assignments may involve peer grading. Alternative options will be considered for compelling reasons, but arrangements must be pre-approved in writing with ample time before corresponding deadlines (i.e., several days in advance).

Late Policy: Unless otherwise specified for a particular assignment, work that is submitted late will be accepted with reduced credit according to a depreciation rate of 1.5% for each late hour breached. Exams, however, are strictly limited to designated; late exams are not accepted.

Exceptions: Any grading appeals or petitions must be communicated promptly in writing (or email). Exceptions will normally be evaluated at the very end of the semester in context with an individual's overall semester track record and all other exceptions class-wide. Special consideration for truly unavoidable and extenuating circumstances will depend on timeliness and supporting documentation (e.g., doctor's note, police report).

University Policies

In accordance with University Policy S16-9 http://www.sjsu.edu/senate/docs/S16-9.pdf, the link below contains university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. http://www.sjsu.edu/gup/syllabusinfo/ .

Course Schedule

This schedule is subject to change with fair notice via announcement in class or notification via Canvas. Specific reading assignments and deadlines will be communicated in Canvas. Short routine assignments will be structured as online participation tasks and will typically have at least five days between the posting of an assignment and its deadline.

[8/22] Course introduction, material properties and behavior
[8/27] Deformation processes (e.g., forging, rolling, bending) [8/29] Deformation and shaping processes (e.g., extrusion)
[9/3] Cutting processes (e.g., shearing, drilling, turning) [9/5] Cutting processes (e.g., milling, broaching)
[9/10] Solidification processes: metal casting [9/12] Solidification processes: plastics molding
[9/17] Joining processes (fusion welding) [9/19] Joining processes (solid state, others)
[9/24] Non-mechanical machining [9/26] Surface finishing & treatments
[10/1] Powder net shaping [10/3] 3-D layered manufacturing
[10/8] **Product Case Study** presentations in class. Review discussion for Midterm Exam online. [10/10] **Product Case Study** presentations in class. Review discussion for Midterm Exam online.
[10/15] **Midterm Exam** [10/17] GD&T introductory concepts and geometric features
[10/22] GD&T tolerance zones [10/24] GD&T datums, and datum reference frames
[10/29] GD&T geometry control tools and feature control frames [10/31] GD&T “built-in” controls (e.g., "envelope rule")
[11/5] GD&T material condition [11/7] GD&T bonus tolerance
[11/12] Microfabrication processes (e.g., lithography, etching). Reinforcement of GD&T. [11/14] Microfabrication processes (e.g., vapor deposition). Reinforcement of GD&T.
[11/19] Statistical process control (variability, distributions) [11/21] Statistical process control (control charts)
[11/26] Automation and productivity [11/28] *Thanksgiving holiday (no class)*
[12/3] **Tolerancing Scenario** presentations in class. Review discussion for Final Exam online. [12/5] **Tolerancing Scenario** presentations in class. Review discussion for Final Exam online.

The **Final Exam** will be held in the regular classroom during the specific university-designated dates and times for each respective section, as posted at http://info.sjsu.edu/static/catalog/final-exam-schedule-fall.html