

ME 310: Manufacturing Processes

<i>Course description:</i>	Manufacturing processes, material fabrication, and nontraditional processing.
<i>Number of credits:</i>	2
<i>Course Coordinator:</i>	A. Gozen
<i>Prerequisites by course:</i>	MSE 201; certified major in Mechanical Engineering
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. Equilibrium phase diagrams.2. Time-temperature transformation characteristics of plain carbon steels.3. Engineering stress, engineering strain, Hooke's law.4. Structure and properties of polymeric materials.
<i>Postrequisites:</i>	ME 474, ME 475
<i>Textbooks/other required materials:</i>	<ol style="list-style-type: none">1. S. Kalpakjian and S. Schmid. <i>Manufacturing Engineering & Technology</i>. Pearson, 6/e.
<i>Course objectives:</i>	<p>To identify, discuss, and analyze the following manufacturing processes for engineering materials and the associated equipment:</p> <ol style="list-style-type: none">1. Casting.2. Bulk deformation.3. Sheet metal forming.4. Traditional and Nontraditional material removal.5. Joining and fastening.6. Manufacturing of polymers, metal-powders, composites, and ceramics.
<i>Topics covered:</i>	<ol style="list-style-type: none">1. Casting of metals and alloys.2. Rolling, forging, extrusion, and drawing.3. Cutting, bending, and drawing of sheet metal.4. Traditional, shear process machining.5. Nontraditional machining.6. Manufacturing of polymers and reinforced plastics.7. Processing of metal-powders and ceramics.8. Contemporary topics such as rapid manufacturing; nano-manufacturing, automation, computer-integrated manufacturing systems, sustainable manufacturing, manufacturing costs.
<i>Expected student outcomes:</i>	<p>Upon successful completion of the course, the students will be able to:</p> <ol style="list-style-type: none">1. Examine the design drawing of a component and describe a feasible sequence of manufacturing processes for production of the component.2. Distinguish between different types of casting and differentiate between their output product characteristics.3. Describe, in engineering sketch form, the bulk deformation processes of forging, rolling, extrusion, and drawing.4. Characterize the major machining operations of turning, milling, and drilling via description of cutting tools used and basic components of the machine tools.5. Relate the common mechanisms of cutting tool wear to desirable cutting tool material properties.6. State the advantages and physical description of the nontraditional material removal processes of waterjet machining, electric discharge machining, and chemical machining.7. Identify specific polymer processing methods based on material and component

geometric properties.

Class schedule: Two 50 minute lectures per week, for one semester.

Laboratory schedule: None

Contribution to meeting the professional component: Engineering Topics

Relationship of course to program objectives: Meets:
1. School of MME ME educational objectives: 1, 2
2. School of MME ME program outcomes: 1
3. ABET EC2019, Criterion 3 program outcomes: 1

Prepared by: Andrea Butcherite and A. Gozen

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POLICIES

A. Reasonable Accommodation (the nature of the particular course determines which one applies):

- **Pullman Campus.** Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.
- **WSU Online Course.** Reasonable accommodations are available in online classes for students with a documented disability. All accommodations must be approved through your WSU Disability Services office. If you have a disability and need accommodations, we recommend you begin the process as soon as possible. For more information contact a Disability Specialist on your home campus: Pullman or WSU Online (<http://accesscenter.wsu.edu>), Spokane (<http://spokane.wsu.edu/students/current/studentaffairs/disability/>), Tri-Cities (<http://www.tricity.wsu.edu/disability>), Vancouver (<http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services>).

B. Academic Integrity

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The Standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

C. WSU Safety

WSU is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information provided.