

**School of Engineering and Computer Science**  
**Mech 314: Design Process**

<b>Catalog Data:</b>	<b>Mech 314 Design Process;</b> 3 credits [M] Design process, design projects, engineering economics, and ergonomics. The course makes extensive use of CAD. This is a writing-in-the-major course.
<b>Class Schedule:</b>	Three 50-minute lecture sessions per week, for one semester.
<b>Laboratory Schedule:</b>	None
<b>Prerequisites by Course:</b>	Mech 215
<b>Prerequisites by Topic:</b>	Certified major in engineering, CE 215, completed writing portfolio or c//.
<b>Required Texts:</b>	Eggert, Rudolph, J., <i>Engineering Design</i> , 2005, Prentice-Hall Publishing Company.  Shigley, Joseph, E., Mischeke, Charles, R., and Budynas, Richard, <i>Mechanical Engineering Design</i> , 7 <sup>th</sup> Edition, 2004, McGraw-Hill Publishing Company.
<b>Reference (s)</b>	Hyman, Barry, <i>Fundamentals of Engineering Design</i> , Third Edition, 2003, Prentice-Hall Publishing Company.  Dieter, George, <i>Engineering Design: A materials and Processing Approach</i> , Third Edition, 2000, McGraw-Hill Publishing Company.
<b>Course Coordinator:</b>	Dr. Hamid Rad
<b>Course Objectives:</b>	<ol style="list-style-type: none"> <li>1. Introduce engineering design process.</li> <li>2. Develop skills in application of engineering principles to open-ended projects.</li> <li>3. Learn to effectively communicate engineering designs, both verbally and in writing.</li> <li>4. Learn fundamentals of engineering economics.</li> <li>5. Use energy method to analyze two- and three-dimensional components under combined loadings.</li> <li>6. Introduce failure theories for mechanical design.</li> </ol>
<b>Topics Covered:</b>	<ol style="list-style-type: none"> <li>1. Design Process.</li> <li>2. Reverse Engineering.</li> <li>3. Project Management.</li> <li>4. Design of Experiments.</li> <li>5. DFM/Ergonomics, Teamwork-Ethics.</li> <li>6. Engineering economics.</li> <li>7. Oral and Written Project Reports.</li> <li>8. Concepts of stress-strain and deflection due to axial, torsional, bending, and combined loading conditions.</li> <li>9. Introduce strain energy method.</li> <li>10. Design of curved beams.</li> <li>11. Failure Theories for static and dynamic loadings.</li> </ol>
<b>Lab Experiments and Activities:</b>	None

<b>Course Outcomes:</b>	<p>Students will be able to:</p> <p>A-3. Make decisions based on design of mechanical systems using engineering fundamentals they learn in this course.</p> <p>A-4. Apply engineering principles in analysis and design of mechanical components/systems to meet desired needs.</p> <p>B-1. Identify models for experiment.</p> <p>C-1. Analyze needs to produce problem definition for mechanical systems.</p> <p>C-2. Carry out design process (such as concept generation , modeling, evaluation, iteration) to satisfy project requirements.</p> <p>C-3. Work within realistic constraints, (such as economical, environmental, social, political, manufacturability, safety, ethical) in realizing systems.</p> <p>C-4. Build prototype that meet design specifications.</p> <p>D-1. Share responsibilities and information on schedule with others on the team.</p> <p>D-2. Participate in the development and selection of ideas.</p> <p>D-3. Know how a team can use the engineering design process to carryout a project.</p> <p>F-1. Evaluate ethical issues that may occur in professional practice using professional codes of ethics.</p> <p>G-1. Produce progress reports, memos, project reports both formal and informal, recording and maintaining an engineering journal.</p> <p>G-2. Deliver well-organized, logical oral presentations, including good explanations when questioned.</p> <p>H-2. Explain how engineering solutions impact society.</p> <p>H-3. Evaluate the impact of engineering systems on the environment.</p> <p>H-4. Explain the impact of engineering solutions in an economic context.</p>		
<b>Required or Elective Course:</b>	Required		
<b>Contribution to Professional Component:</b>	Engineering Topics		
<b>Relationship of Course to Program:</b>	Meets: Educational Objectives <u>1, 2, 3, 4</u> Program Outcomes <u>A, B, C, D, F, G, H</u>		
<b>Prepared by:</b>	Dr. Hamid Rad	Date:	November 1, 2006
<b>Approved by CAC:</b>			