

ME 420: Machine Design
Fall Semester Only

Type (check one):	Required: <input checked="" type="checkbox"/> _____ Elective: _____
2005-2006 Catalog Data:	An integrated treatment of the design of mechanical systems combining static and dynamic load analysis, stress analysis, material selection, and failure analysis. Includes many advanced topics in stress analysis. <i>One semester; three credits.</i>
Prerequisites:	ME 201, ME 318
Co-Requisites:	ME 401
Textbook:	R.L. Norton, <i>Machine Design, An Integrated Approach</i> , 3rd Edition, Prentice-Hall, 2006.
Other Required Materials:	None
Other References:	None
Instructor:	Dr. Yeu-Sheng Paul Shiue, Professor of Mechanical Engineering
Course Objectives:	<ol style="list-style-type: none">1. Integrate skills in mechanical design and analysis2. Develop ability to apply scientific and design principles to effect solutions to open-ended design problems3. Develop understanding of the role of codes, handbooks, and standards in the design process4. Expose students to case studies in engineering design
Prerequisites by Topics:	<ol style="list-style-type: none">1. Statics and dynamics of particles and rigid bodies2. Kinematics and dynamics of machine elements3. Material properties and behavior4. Manufacturing processes5. Stress and strain analysis
Topics:	<ol style="list-style-type: none">1. Overview of engineering design process; evolving nature of design process; economic / political / social etc. factors in design2. Review of stress analysis: stress components and transformations; axial loading, torsion, and bending; stress concentrations3. Deflection and stiffness as criteria in mechanical design4. Engineering materials5. Designing for static strength6. Designing for fatigue strength; vibrations; low- and high-cycle fatigue7. Design codes8. Design handbooks9. Professional design practice: case studies
Class Schedule:	Three 50-minute or two 1 hour and 15-minute sessions per week

Prepared by: _____ Dr. Yeu-Sheng Paul Shiue _____ **Date:** _____ 22-Aug-05 _____

**Professional Component:
ME 420 – Machine Design**

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Some <input type="checkbox"/> None
Realistic Constraints (check all that apply)	<input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Sustainability <input checked="" type="checkbox"/> Manufacturability <input checked="" type="checkbox"/> Ethical <input checked="" type="checkbox"/> Health & Safety <input checked="" type="checkbox"/> Social <input checked="" type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice