

ME 424: Design of Machine Elements
Fall or Spring Semester Elective

Type (check one): Required: _____ Elective: ✓

2005-2006 Catalog Data: An examination of the processes commonly used in the design of typical mechanical system components. Exploration of standardized design conventions, including design codes and handbooks, and the original design of non-standard components. Case studies and code histories are discussed. Subjects include: screw threads, mechanical connections, welding, bonded joints, springs, lubrication, bearings, gears, shafts, clutches and brakes, couplings, and mechanical drive systems. Two lectures and one discussion class each week. *One semester; three credit*

Prerequisites: ME 401, ME 420

Co-Requisites: None

Textbook: R.L. Norton, Machine Design, An Integrated Approach, 3rd Edition, Prentice-Hall, 2006.

Other Required Materials: None

Other References: None

Instructor: Dr. Yeu-Sheng Paul Shiue, Professor of Mechanical Engineering

Course Objectives:

1. Introduce machine component design techniques commonly used in engineering practice
2. Practice small scale machine design by producing and testing a prototype device designed to satisfy a specific need

Prerequisites by Topics:

1. Principles of statics: equilibrium of force systems, friction, centroids, moment of inertia
2. Basic kinematics and kinetics of rigid bodies and machine elements
3. Basic materials classification, behavior, and properties; stress, strain, and deflection analysis
4. Production processes for common engineering materials
5. Experimental methods for determining stress and strain

Topics:

1. Introduction - mechanical component design
2. Mechanical assembly techniques
3. Machine components
4. Bearings and lubrication theory
5. Creativity in design - development techniques
6. Design project

Class Schedule: Three 50-minute sessions per week

Prepared by: Dr. Yeu-Sheng Shiue

Date: 24-Oct-05

**Professional Component:
ME 424 – Design of Machine Elements**

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 type="checkbox"/> Sustainability <input checked="" type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input checked="" type="checkbox"/> Social <input 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