



## Syllabus for ME120-01: Component Design

Spring 2017

Instructor: Michael Brokowski

### Designation:

### Catalog Description:

Design and analysis of machine element including fasteners, weld joints, coupling, belt and pulley, bearings, brakes, gears, springs. An integrated approach is employed where components' functionality and survivability at system level are part of the design scheme. Case studies are conducted to reinforce the concepts and practicality behind the design and analysis of components and their roles at assembly or system level. Engineering fundamentals such as materials engineering, solid mechanics, fracture mechanics, and dynamics, will be implemented in the design process.

### Text Books and Other Required Materials:

Shigley's Mechanical Engineering Design (McGraw-Hill).

### Course Objectives/ Student Learning Outcomes:

After successful completion of this class, students will be able to:

1. Develop technical solutions for mechanical components and assemblies that are capable of efficiently performing specific tasks.
2. Identify loadings of machine elements and perform stress analysis according to design criteria and specified safety factors.
3. Judiciously select appropriate materials for the designed machine component. These abilities will be demonstrated through course homework, quizzes and exams.

### Program Learning Outcomes:

### Prerequisites by Topic:

ENGR 151 - STRENGTH OF MATERIALS

### Course Policies:

1. All assignments must be submitted on the due date before the start of class.
2. No make-up exams or quizzes will be given. Exception will be made only in medical or family emergency circumstances (official documents may be required).
3. Students arriving late to a quiz or exam will not be allowed to take it.
4. University's policies concerning academic honesty will be strictly enforced.
5. All cell phones must be turned OFF prior to lecture time.
6. Distracting electronic devices are not permitted during lecture.

### Academic Dishonesty Statement:

- a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
- b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for

violation of this Policy can also be extended to include failure of the course and University disciplinary action.

c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

**Disability Statement:** Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

**Topics:**

- Static failure theories
- Fatigue failure theories
- Surface characterization and failure
- Shaft design
- Keys and couplings
- Bearings and lubrication
- Gears
- Springs
- Screws and fasteners

**Class/laboratory Schedule:** Monday and Wednesday: 9:00 AM - 10:20 AM

**Midterm/Final Exam Schedule:** Distributed separately

**Course Calendar:** Distributed separately

**Professional Component:** Engineering Science: 25%; Engineering Design: 75%

**Assessment/Grading Policy:** Distributed separately

**Coordinator:** Dr. Mike Brokowski

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**Office Hours:** Dr. Brokowski:  
Monday 12:30 PM to 2:30 pm, Wednesday 10:30 AM - 11: 30 AM, or by appointment