California State University, Chico
Department of Mechanical, Mechatronic Engineering and Sustainable Manufacturing
MECH 340 Mechanical Engineering Design
Instructor: Dr. Ramesh Varahamurti

Course Description:
Design and performance of machine components and systems subjected to both steady and variable loading conditions are studied. Failure theories, reliability, use of codes and standards, and standard design practices are introduced.


Office: OCNL 418, 898-6353. Please consult my door card for office hours. (RVarahamurti@csuchico.edu)

Class: Lecture: Section 1 PLMS 106 MWF 11:00-11:50 a.m.
Lecture: Section 2 PLMS 106 MWF 12:00-12:50 p.m.

Prerequisites: CIVL 311 with a grade of C- or better, MECH 210; MECH 100, MECH 100L.

Note: All students MUST show proof that they have passed CIVL 311 with a grade of C- or better before the end of the second week. A student will be disenrolled if the student has not passed CIVL 311 with a grade of C- or higher.

Course Objectives:

1. To understand and apply the design process.
2. To understand, and apply the failure theories to designing components.
3. To design a semester-long mini application, while being mindful of the constraints imposed by material and economic limitations, manufacturing, standard practices, codes and standards, and impact to environment and society.
4. To be introduced to the concepts of uncertainty and reliability in design, as they pertain to material properties, manufacturing processes, and applied loads.

Coverage includes the following topics:

1. Introduction to Design
2. Materials and Processes
3. Loading
4. Stress, Strain, and Deflection
5. Failure Theories (Static, Fatigue, and Surface)
6. Component Design (Load Analysis, Beams, Keys, Shafts, Couplings, Fasteners, Impact, Clutch & Brakes, Gears, Springs)

Grading Policy
5% of Homework
35% of Design Project
60% of Exams
Note: Late work will not be accepted.

Homework: Homework is due at the beginning of class.

Exams:
There will be in-class exams. Each successive exam may include prior course material. Exam dates will be announced in class along with your responsibility. Examinations are used to assess basic competency in a certain area of the course. All competency assessments in the course are summarized later in the syllabus.

Design Project:
One has the opportunity to integrate course material to potentially design an actual product. The design project must be completed to be graded. More complex the design project, higher will be its value. An appropriate grading rubric will be provided when needed. Late projects will receive a lower grade. The design project is used to assess basic competency in certain areas of the course. All competency assessments in the course are summarized later in the syllabus.

Plagiarism:
Copying is plagiarism and will not be tolerated. Such incidences are referred to the student judicial affairs and may result in expulsion from the University. Refer to Students Rights and Responsibilities section of the University Catalog, or ask the student judicial affairs about a specific situation.

Reference:
Mechanical Engineering Design

Fundamentals of Machine Elements

Many useful URLs are available at the end of most chapters. For example:

1. http://www.machinedesign.com
**Americans with Disabilities Act:** If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations. **Accessibility Resource Center** 530-898-5959 located in Student Services Center 170, arcdept@csuchico.edu.

**Mechanical Engineering Design MECH 340 Competencies Assessment Summary:**

The design competencies of all the Mechanical and Mechatronic Engineering Program will be assessed in a set of program learning outcomes.

This course assesses four basic competencies in the following program outcomes **a, c1, g2, and g3.** These outcomes are stated below along with how they are assessed to demonstrate basic competency.

**a** “An ability to apply knowledge of mathematics, science, and engineering”

This competency is demonstrated by receiving a C, based on the possible maximum exam total.

The **design project** is used to assess basic competency in the following program outcomes

**c1** “An ability to design a mechanical system, component, or process to meet desired needs”

**g2** “An ability to communicate technical matters effectively in written form”

**g3** “An ability to communicate technical matters effectively in graphical form”

To demonstrate basic competency in the **design project** one must receive:

1. a grade of C (i.e. of the **Technical Aspects** of the design project)
2. a grade of C (i.e. of the **Written Summary Report** of the design project)
3. a grade of C (i.e. of the **Graphical Presentation** of selected parts of the design project. Must conform to departmental standards at [http://www.csuchico.edu/mmem/drawing_standards.shtml](http://www.csuchico.edu/mmem/drawing_standards.shtml)