

## COURSE OUTLINE

Course Prefix and Number	SYEN 3379
Course Title	Elements of Mechanical Design
Credit	3 Hours
Semester and Year	Fall 2013
Instructor	Dr. Andrew Wright
Class Time	MW 10-10:50 (lecture), TBA (lab)
Class Location	EIT 322 (lecture), ETAS 003 (lab)
Office Location	EIT 522
Office Hours	TBA
Telephone	569-8071
Email	<a href="mailto:abwright@ualr.edu">abwright@ualr.edu</a>
Class Notes Site:	<a href="http://calliope.ualr.edu">http://calliope.ualr.edu</a> -> Courses -> Elements of Mechanical Design

Prerequisite: SYEN 2233 or equivalent, and CNEG 3376 or equivalent.

### Course Description:

Prerequisites: Introduction to the design, integration and best practices for using mechanical elements such as springs, gears, cams and mechanisms, clutches and brakes, and bearings. Methods of joining, such as fasteners, welds, press and shrink fits, and shaft coupling will be covered. Performance and failure analysis for components and machines will be covered. Solid modeling of machine assemblies for documentation and basic analysis will be emphasized. A semester long design project in which a mechanical system is designed, fabricated and characterized will serve as the practical application of these concepts. 2 hours lecture, 4 hours laboratory, 3 credit hours

### Learning Objectives:

1. An inventory of the basic mechanical elements used in machines
2. Using solid modeling techniques to facilitate the mechanical design process
3. Learning the connections between design, modeling, and fabrication; how to restrict the design space to available fabrication techniques
4. Have a controlled, first experience in creating a realized design; testing for failure and performance.

### Texts, Readings, and Instructional Resources

Required Text: Budynas, R. G., Nisbett, J. K., Shigley's Mechanical Engineering Design, Ninth ed., McGraw-Hill, 2008.

Version 1.1, Issued: 8/19/13

Assignments, Evaluation Procedures, and Grading Policy

Prerequisite Exam

An in-class written exam based on stress material that was covered in Mechanics of Materials will be offered. This exam will be graded pass/fail. Students who fail the exam will be given a list of problems to complete. Failure to complete the problems satisfactorily will result in a 5% deduction from the final grade.

The course requirements consist of:

1. **Homework:** Homework assignments will be given periodically to supplement the reading material and lectures. Homework will be graded pass/fail.
2. **Written Exams (2):** in-class written exams will be given at roughly the 1/3 and 2/3 points in the semester.
3. **Final Project:** Individual reports based on the design stages of the project undertaken in the class. Credit will be given based on both the reports and the quality of the parts constructed during the semester.
4. **Scrub School:** The lab experience will be spent refreshing shop skills by building parts to a drawing and comparing the finished parts against the specification for compliance.

Bonus Points

At the instructor's discretion, bonus points may be granted for meritorious service that contributes to the overall learning experience for the class in some positive way.

## XVI. Grading

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|----------------------|----------------|
| 1. Homework          | 10 points      |
| 2. Written exams (2) | 25 points each |
| 3. Final Project     | 30 points      |
| 4. Scrub School      | 10 points      |

## XVII. Grades (points gained/100 points)

**A = 90%**

**B = 80%**

**C = 70%**

**D = 60%**

**F = below 60%**

**Attendance** will be taken periodically. If a student misses 15% of classes his/her final grade will be reduced by one letter grade (i.e., from A to B or B to C). Students who do not attend during the first eleven days of class may be administratively dropped from the course.

A student who misses more than 25% of classes will receive a final course grade of an F and may be administratively withdrawn at the discretion of the instructor.

**Tardiness** is disruptive, so please be respectful of your peers and instructor and get to class on time. If you are tardy, please come into the room quietly and sit in the nearest available seat to the door.

**Cell phones** can be disruptive. Please turn off your cell phone (i.e. airplane mode) before class. If you forget and receive a call in class, please immediately disable your ringer/buzzer and terminate the call. Do NOT answer the call and have a conversation as this may be classified as disruptive behaviour.

**Disruptive Behaviour** may result in your being administratively dropped from the class, especially if it is persistent. Persistent disruptive behaviour will also be penalized through the Class Participation grade.

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**Sickness or Emergency** is a legitimate excuse to make up a graded assignment (attendance or exam). However, to guarantee that no late penalties are applied, the student should notify the instructor in advance or provide an independent written excuse (e.g., a doctor's note) after the fact.

**Make up policy:** Exams may be made up on the date of the final exam provided that the student notifies the instructor in writing at least two weeks prior to the date of the final exam. There will be an 80% maximum for any exam for which a legitimate excuse was not provided for the absence.

**Mid-Term Grades** are not required by this course. They may be issued based on student's progress in the course at the mid-point, if it appears that such grades would be useful in assisting in an intervention to improve the student's chance of success in the course.

**Late assignments** are any homework or lab assignment that is turned in after the official due date. The assignment will receive a 20% deduction unless excused for some sickness/emergency.

**Electronic delivery of assignments** will NOT be accepted in lieu of a hard-copy of the assignment. However, in extreme circumstances, the student may delivery his/her assignment electronically by the due date to avoid the late penalty. A hard copy must follow up in a reasonable time (for instance, the time it might take the post office to deliver a hard copy) and the hard copy must be identical in content to the electronic copy. The instructor will dispose of the electronic copy once the hard copy has been accepted.

**Modifications to Syllabus** may be made to improve delivery of the course content. The instructor will provide an updated syllabus at least one week prior to any changes taking effect and no modifications will be done within two weeks of the final exam.

#### **Students with Disabilities:**

Per academic policy 501.2, the following statement must be included in all syllabi (see <http://ualr.edu/policy/index.php/5012/>)

"Students with Disabilities: Your success in this class is important to me, and it is the policy and practice of the University of Arkansas at Little Rock to create inclusive learning environments consistent with federal and state law. If you have a documented disability (or need to have a disability documented), and need an accommodation, please contact me privately as soon as possible, so that we can discuss with the Disability Resource Center (DRC) how to meet your specific needs and the requirements of the course. The DRC offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process among you, your instructor(s) and the DRC. Thus, if you have a disability, please contact me and/or the DRC, at 501-569-3143 (V/TTY) or 501-683-7629 (VP). For more information, please visit the DRC website."

This statement has not been prepared by the instructor of this course, but is an academic policy, so please excuse the colloquial wording (use of first and second person).

The UALR Student Handbook is available at <http://ualr.edu/deanofstudents/assets/archive/HANDBOOK.pdf>.