

SE 410 Syllabus – Fall 2022

Course Name: SE 410 – Component Design

Lecture: 1:00 pm to 1:50 pm on Monday, Wednesday and Friday

Location: 112 Transportation Building

Instructor Information:

Dr. Yumeng Li (yumengl@illinois.edu)

Office: 212 Transportation Building

Office hours: 1:00 pm to 3:00 pm on Tu./Th.

Teach Assistant: Ruolei Wang ruoleiw2@illinois.edu

Catalog Description:

Design of basic engineering components: structural members, machine parts, and connections. Principles applied include: material failure (yield, fracture, fatigue); buckling and other instabilities; design reliability; analytical simulation.

Prerequisites:

SE 311 and SE 320. It is expected that students in SE 410 have basic programming skills.

Required Text:

- Shigley's Mechanical Engineering Design (Ninth or Tenth Edition, Budynas and Nisbett)
- Structural Steel Design (Fifth Edition, McCormac and Csernak)

Recommended Reading Material:

- Machinery's Handbook (Oberg, Jones, Ryffel, McCauley, and Heald)

Course Website:

Canvas will be used to post important announcements, documents, and homework assignments. It can be accessed at <https://canvas.illinois.edu> using your NetID and password. Grades will also be posted on Canvas. Please check it regularly. Class sessions include a mix of lecture and discussion.

Homework:

Homework will be assigned throughout the semester in weekly fashion. Sometimes we review homework solutions in class, so late submissions will not be accepted under any circumstances. Study group for homework is encouraged, but homework is required to be submitted individually. Electronic submission is required for homework. You can scan and upload handwritten notes, or submit typed documents.

Exam:

There will be three in-class exams. Exams are closed book, open paper notes. Notes must be either handwritten or typed by you. No page limits. No photocopies of the textbook or other materials prepared by others are allowed. Calculators are allowed during the exams. No electronic devices other than calculators are permitted during exams.

Class participation:

Class participation will be assessed by the completion of in-class activities, and instructor evaluation. A few class activities are announced ahead of time, and count toward your grade.

Most in-class activities, however, will not be announced. These are in-class quizzes and usually completed working together with other students in class. Unannounced class activities take 10% of your class participation grade. There is no make up permitted for unannounced activities.

Term Project:

There will be no final exam. The semester project serves as the cumulative integrative assessment for the course. The course project is to be completed by project groups of 3 students. There will be 1 or 2 groups of 4 students if the number of students is not evenly divisible by 3. Students can self-select to team up before the submission of PD1. Please aim to form groups where students have complementary skills and interests (e.g. at least one person who is good at programming, at least one person with experience in mechanical or structural systems). For students who are not part of a group, you will be assigned to a group soon after the PD1 deadline.

Several project deliverables are required throughout the semester. These deliverables are spread out to help you stay on track with the project. Please plan ahead for these deliverables with your group as most of them cannot be completed in a single afternoon or evening of work. Please work together as groups on each project deliverable, and make a single submission as a group for each group deliverable. Deliverables will be graded as a group. Each group submission requires a short summary of how each group member contributed.

Each student will submit confidential peer reviews of their fellow group members and the end of the semester. If at the end of the semester a group member has contributed significantly less than the rest of the group, his/her project grade will be adjusted appropriately.

Grading: The overall grade of the course will be assembled based on

- 30%: Homework
- 30%: Exams
- 30%: Course Project
- 10%: Class Participation

A+: 97 – 100%	A: 93 – 96%	A-: 90 – 92%
B+: 87 – 89%	B: 83 – 86%	B-: 80 – 82%
C+: 77 – 79%	C: 73 – 76%	C-: 70 – 72%
D+: 67 – 69%	D: 63 – 66%	D-: 60 – 62%

Academic Integrity:

We will follow university regulations for academic integrity: (<http://admin.illinois.edu/policy/code/>). Students who violate academic integrity will receive a “0” on that exam or assignment and may receive an “F” grade in the course. Discussing a homework assignment in a group is encouraged as long as each student writes the answer in his/her own words. Plagiarism is considered a serious violation of academic integrity and will be dealt with utmost severity.

Re-grade Policy:

If you believe a mistake has been made in the grading of a homework or exam, please prepare a written description of this mistake along with the assignment or exam and submit either to the instructor or to TA within one week of receiving your grade. The instructor reserves the right to re-grade the entire assignment or exam when submitted for consideration of a re-grade.

Schedule Overview:

Week	Date	Topics
1	8/22	Introduction to design, failure theories, bulking
2	8/29	Bulking, fatigue
3	9/5	Fatigue, shaft design
4	9/12	Shaft design
5	9/19	Shaft design, power screws, kinematics
6	9/26	Exam 1, bolted joints
7	10/3	Bolted joints, spring design
8	10/10	Spring design, gear design
9	10/17	Gear design
10	10/24	Gear design, bearings
11	10/31	tension members
12	11/7	Exam 2, tension members
13	11/14	Beams
14	11/21	Thanksgiving break
15	12/28	Beams
16	12/5	Project work day, Exam 3

Resources for Students with Disabilities:

To obtain disability related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 3334603, email disability@illinois.edu (<mailto:disability@uiuc.edu>) or go to the [DRES website \(http://disability.illinois.edu/\)](http://disability.illinois.edu/). If you are concerned, you have a disability related condition that is impacting your academic progress, there are academic screening appointments available on campus that can help diagnosis a previously undiagnosed disability by visiting the DRES website and selecting "Sign Up for an Academic Screening" at the bottom of the page.