

Time/place: Section AL1: 10:00-11:50AM, Tuesday & Thursday, 4100 LuMEB
 Section AL2: 1:00-2:50PM, Tuesday & Thursday, 4100 LuMEB

Instructors: Brian Mercer, bmercer@illinois.edu (Section AL1)
 Kevin Wandke, wandke2@illinois.edu (Section AL2)

TAs: Kenta Hirashima, kentah2@illinois.edu
 Sean Taylor, seant2@illinois.edu
 Ruoyu Sun, ruoyus2@illinois.edu

Office Hours: See course website for the latest office hours schedule.

Textbook: Fundamentals of Machine Component Design, Sixth Edition
 By R. C. Juvinall and K. M. Marshek, Wiley, New York 2006

Websites: Illinois Canvas Login Page - <https://canvas.illinois.edu/>
 PrairieLearn for homework and quizzes - <https://www.prairielearn.org/>
 Campuswire online forum - <https://campuswire.com/>

Operation: Class sessions will be held in-person. Any changes to course operation will be communicated via announcements on the course website and/or in-person.

Description: Design and analysis of machinery for load-bearing and power transmission. Consideration of material failure modes, including yielding, fracture, and fatigue. Design and selection of machine elements: threaded fasteners, springs, bearings, gears, and friction drives.

Objective: Learn to design machine components that do not fail. The course has two components: 1) Study of failure modes, and 2) Design of various mechanical components, such as gears, threaded fasteners, and springs with optimum materials and geometry.

Final Grade Calculation:

10% - Participation: pre-lecture quizzes (2.5%) and in-class worksheets (7.5%)

10% - PrairieLearn Homework

10% - FEA Labs

30% - CBTF Quizzes

40% - Team Design Project (includes benchmarks and final deliverables)

The total score s corresponds to final grades as follows:

$97\% \leq s < 100\%$ A+	$93\% \leq s < 97\%$ A	$90\% \leq s < 93\%$ A-
$87\% \leq s < 90\%$ B+	$83\% \leq s < 87\%$ B	$80\% \leq s < 83\%$ B-
$77\% \leq s < 80\%$ C+	$73\% \leq s < 77\%$ C	$70\% \leq s < 73\%$ C-
$67\% \leq s < 70\%$ D+	$63\% \leq s < 67\%$ D	$60\% \leq s < 63\%$ D-

Prerequisites: Understanding of the materials covered in ME 330 (Materials and Processing) and ME 370 (Mechanical Design I) is expected to all students. Concepts in Statics (TAM 211), Dynamics (TAM 212) and Introduction to Solid Mechanics (TAM 251) are assumed to have been mastered by each student.

Teamwork:

- Teamwork is an integral part of the course, as both in-class activities and the Final Design Project are completed in teams.
- The final design project is a team-based project. Be a good teammate by being respectful and helpful, by showing up on time, by communicating needs and ideas clearly, by listening to and including others, by completing your tasks, and being proactive in contributing to the team goals. Make sure that your teammates are aware of your contributions! For team-related issues, please reach out to an instructor **early** so that timely guidance can be given. Instructors will solicit end-of-semester anonymous feedback from each team regarding performance and contributions of its individual members and reserve the right to modify an individual's project grade if there is evidence that they did not do their fair share of work on the project.

Class attendance and participation:

1. Before class, you must watch a pre-lecture video and complete an associated quiz which will prime you on the content that you will be engaging in during class time. The video and quiz are hosted on the Canvas course page. The quiz is graded based on performance.
2. During class, you will complete an active learning worksheet activity with your project group (or self-formed groups before project groups are assigned). A **scribe** from the group should be established for each class session, to prepare a neat version of the group's collective responses; this will be the only version collected for grading, and the rest of the students may keep their worksheets. The worksheet will be graded for completion and quality of submission, with all group members receiving the same grade. Each member must complete the role of scribe at least twice during the semester, else a 20% penalty to the final participation grade will be applied to the group.
3. You must be in attendance for the entire class period and be working and engaged with your groupmates to get full participation credit for in-class worksheets. If you miss class due to a reason that qualifies for formal excusal, you must fill out the Excused Absence Form on the course Canvas page and upload supporting documentation. The request for excusal should be filled out in advance when possible.
4. Endeavor to be on time for all class meetings. If you are more than 5 minutes late to the class meeting, you may lose participation credit for the day.

Quizzes:

1. This course uses the College of Engineering Computer-Based Testing Facility (CBTF) for its quizzes and exams: <https://cbtf.engr.illinois.edu>.
2. The policies of the CBTF are the policies of this course, and academic integrity infractions related to the CBTF are infractions in this course.

3. If you have accommodations identified by the Disability Resources and Educational Services (DRES) for exams, carefully go through and follow these instructions: <https://cbtf.illinois.edu/students/dres>. Please note the CBTF cannot add DRES accommodations at the time of an exam. They **MUST** be uploaded 5 business days beforehand.
4. Any problem with testing in the CBTF **must** be reported to CBTF staff at the time the problem occurs. If you do not inform a proctor of a problem during the test then you **forfeit** all rights to redress.
5. Review all instructions on the CBTF website before your first exam: <https://cbtf.illinois.edu/students>
6. **Retake quizzes:** Optional retake quizzes are available in the week following each first-chance quiz. If you choose to take the retake quiz, the quiz score will be computed as 90% of the higher score + 10% of the lower score. If you do not take the first-chance-quiz, then your score will be 90% of the retake score.

Homework:

1. PrairieLearn homework sets will be assigned roughly every 2 weeks. You may collaborate with other students to complete the homework sets if you wish. Homework problems are not penalized for incorrect submissions; you have an unlimited number of attempts to get the correct answer for each problem. Once the due date has passed, there is a 48-hour late period where you can earn up to 80% credit, beyond that you cannot earn further credit on the homework set.
2. You will need a copy of the textbook to be able access some figures, tables, and charts to complete some homework questions.

FEA Labs:

1. You will need an educational license for Autodesk Fusion 360 to complete these assignments. Follow instructions on the course Canvas page to download the software and obtain the license.
2. Late FEA lab submissions will be penalized 10% per day (24 hour period), up to 2 days past the initial due date. Any submissions beyond 48 hours past the deadline will receive a zero.

Group Project Deliverables: All group project deliverables (benchmarks, project evaluations, presentations, etc) must be turned in on the scheduled due dates. No late submissions will be considered for these deliverables.

Communication:

1. Use **Campuswire** to communicate with instructors and TAs about general conceptual questions, homework help, project help, and any other logistical issues related to the course..
2. Use the **Excused Absence Form** on the course site to request excusal from general class attendance and worksheets, request late submission of an assignment, or excusal or makeup

of a quiz at CBTF. You must provide documentation to verify the reason for your request. Excusals/makeups are only granted for emergency, illness (requires doctor's note with specific dates to be excused from class), or participation in official university activities.

Academic Integrity: Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the university's [Academic Integrity Policy](#). Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Community of Care: As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (217-333-0050 or <https://odos.illinois.edu/community-of-care/referral>). Based on your report, the staff in the Student Assistance Center reaches out to students to make sure they have the support they need to be healthy and safe. Further, we understand the impact that struggles with mental health can have on your experience at Illinois. Significant stress, strained relationships, anxiety, excessive worry, alcohol/drug problems, a loss of motivation, or problems with eating and/or sleeping can all interfere with optimal academic performance. We encourage all students to reach out to talk with someone, and we want to make sure you are aware that you can access mental health support at the Counseling Center (<https://counselingcenter.illinois.edu/>) or McKinley Health Center (<https://mckinley.illinois.edu/>). For mental health emergencies, you can call 911 or walk in to the Counseling Center, no appointment needed.

Students with Disabilities:

1. To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class should contact Disability Resources and Educational Services (DRES) and see the instructor as soon as possible. DRES provides students with academic accommodations, access, and support services. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail disability@illinois.edu. <http://www.disability.illinois.edu/>.
2. If you have accommodations identified by the Disability Resources and Educational Services (DRES) for exams, please submit your Letter of Accommodations (LOA) [here](#) before you make your first exam reservation. This must be done each semester you use the CBTF.

Disruptive Behavior: Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office for Student Conflict Resolution for disciplinary action.

Emergency Response Recommendations: Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency-preparedness/>. You are encouraged to review this website and the campus building floor plans website within the first 10 days of class. <http://police.illinois.edu/emergency-preparedness/building-emergency-action-plans/>.

Family Educational Rights and Privacy Act (FERPA): See <https://registrar.illinois.edu/ferpa> for more information on Family Educational Rights and Privacy Act (FERPA).

Religious Observances: It is the policy of the University of Illinois Urbana-Champaign to reasonably accommodate its students' religious beliefs, observances, and practices that conflict with a student's class attendance or participation in a scheduled examination or work requirement, consistent with state and federal law. Students must make requests for accommodation in advance of the conflict to allow time for both consideration of the request and alternate procedures to be prepared. Requests should be directed to the instructor. The Office of the Dean of Students provides an optional resource on its [website](#) to assist students in making such requests.

Sexual Misconduct Reporting Obligation: The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: wecare.illinois.edu/resources/students/#confidential. Other information about resources and reporting is available here: www.wecare.illinois.edu

Anti-racism and inclusivity statement: The Grainger College of Engineering is committed to the creation of an anti-racist, inclusive community that welcomes diversity along a number of dimensions, including, but not limited to, race, ethnicity and national origins, gender and gender identity, sexuality, disability status, class, age, or religious beliefs. The College recognizes that we are learning together in the midst of the Black Lives Matter movement, that Black, Hispanic, and Indigenous voices and contributions have largely either been excluded from, or not recognized in, science and engineering, and that both overt racism and micro-aggressions threaten the well-being of our students and our university community.

The effectiveness of this course is dependent upon each of us to create a safe and encouraging learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all of us. Everyone is expected to help establish and maintain an environment where students, staff, and faculty can contribute without fear of personal ridicule, or intolerant or offensive language. If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of the course director if you feel comfortable. You can also report these behaviors to the Bias Assessment and Response Team (BART) (<https://bart.illinois.edu/>). Based on your report, BART members will follow up and reach out to students to make sure they have the support they need to be healthy and safe. If the reported behavior also violates university policy, staff in the Office for Student Conflict Resolution may respond as well and will take appropriate action.

