Instructor: Dr. Cyders, 261 Stocker, cyderst@ohio.edu

Prerequisites: ET 2220

Meetings: T Th, 9:00 PM – 10:20 AM, ARC 314

Office Hours: Arranged


Course Content: Review of Concepts from Strengths of Materials
- Static/Dynamic Failure
- Stress Intensity Factors
- High-Cycle Fatigue Analysis
- Bolts and Fasteners
- Bearing Selection and Shaft Design
- Gears
- Machine Design Process

Grading:
- Homework: 20%
- Quizzes/Exams: 40%
- Final Project: 40%

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<th>Grade</th>
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<td>93.3-100</td>
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Policies:

**Attendance:** Attendance is compulsory. This class involves a lot of in-class individual and team work. I do not take attendance in class. I do, however, expect professional behavior out of all students. If a student is late for class or misses a class unexcused, it is their responsibility to gather material missed from their colleagues. Exams may only be made up if an absence is excused beforehand in writing. Acceptable reasons for missing an exam are outlined in the student handbook.

**Assignments:** All assignments must be turned in at the beginning of the class in hard copy, unless specified otherwise. Late assignments will not be accepted.

**Academic Honesty:** Academic misconduct and related sanctions are defined in the Ohio University Code of Conduct. In particular, the first incidence of cheating on an individual homework or plagiarism in a writing assignment will result in a zero for said assignment. Infractions may also be referred to the Director of University Judiciaries and the Office of Community Standards and Student Responsibility. Repeated instances will
result in failure of the course as a whole, and definite referral to the aforementioned parties. The Office of Community Standards and Student Responsibility may also impose additional sanctions. **Copying individual work will not be tolerated.** Please be particularly conservative about avoiding plagiarism and copying others' work. Cite references and sources in all reports and projects. Sanctions may be appealed through the grade appeal process outlined in the Ohio University Student Handbook.

**Cell Phones:** Please turn cell phones off while in class. Students are reminded that they are expected to behave as professionals in class.

**Disabilities:** Any student who suspects s/he may need an accommodation based on the impact of a disability should contact the class instructor privately to discuss the student’s specific needs and provide written documentation from the Office of Student Accessibility Services. If the student is not yet registered as a student with a disability, s/he should contact the Office of Student Accessibility Services.

**Homework:** Part of the grade on every assignment is the professionalism exhibited in your presentation of results. I may go so far as to reject work that is difficult to decipher for grading. It is often useful to make a separate copy of your assignment after working through it to clearly organize your results. You should be able to hand this to any competent design engineer, and they should be able to **quickly** determine on their own what the problem was, what assumptions you made, what models you applied, what equations you used, and what your results and recommendations were. An example of an acceptable assignment can be found on the ME 3700 website. **It is HIGHLY recommended that you photocopy your homework before turning it in, and keep one copy in your notes for the class, so you can review your performance as we review problems in-class.**

**Teamwork:** Engineers, especially designers, pretty much never work alone. As a result, this course makes extensive use of teamwork. We use an external system (CATME) to form teams and conduct peer reviews. You are expected to contribute to your team and work on it at least as hard as you would for individual work. Your team performance and subsequent peer reviews have significant impact on your **individual** grade in the course. It is highly recommended that you do your best to be a good teammate who contributes to the various pieces of work your team will complete.

**Course Outcomes**

At the end of this course, ME 3700 students will be able to:

(1) Design machine components and assemblies including the use of common elements such as fasteners, bearings, keys, shafts and gears

(2) Analyze designs for failure under static and dynamic loads using textbook methods, as well as finite element methods for model validation, including the effects of geometric stress concentrations

(3) Select materials based on basic constraints and criteria for use in mechanical part design, and discuss tradeoffs in decision making in this regard
(4) Design parts based on various considerations relating to overall factor of safety, and discuss the reasoning for said factors

(5) Discuss and implement an understanding of the stochastic nature of design

(6) Design mechanical parts using methods of fatigue analysis to project part life and strength based on loading scenarios

(7) Analyze machines for location of critical loads and stresses, and propose design changes to mitigate risk of failure

(8) Estimate static and dynamic loads on parts in real-world scenarios to develop design specifications

(9) Approximate complicated scenarios with simple models, discerning the applicability and accuracy of the model.