

Mechanical Design 1
EML 3005 Class #12102
Class Periods: M,W,F, 2nd period, 8:30 to 9:20a
Location: PSY 0130
Academic Term: Fall 2025

Instructor:

Name: Mike Griffis

Email Address: mwg@ufl.edu

Office: NEB-137, 352-392-9473

Cell: 352-317-4045

Office Hours: M/W: 3 to 5p, in person or Zoom (other times on arrangement).

Zoom Link: <https://ufl.zoom.us/j/99948407020?pwd=ZPYEbPHleVfB5sOHwxrpLEx19Mc4av.1>

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

Course Description

Design process, kinematics, gear trains and standard mechanical components. (3 Credit Hours)

Course Pre-Requisites / Co-Requisites

Pre-Req: COP2271, EML2322L and EGM3520 with minimum grade of C.

Course Objectives

At the end of the course, the student should

- Understand how to design using the “design process”
- Be able to determine stresses in mechanical elements
- Be able to design elements to avoid failure from static and dynamic loading within some factor of safety
- Be able to design or select standard mechanical elements
- Be able to design a one-dimensional machine, consisting of simple machines, gearing, bearings, shafts
- Have familiarity with the synthesis and analysis in mechanical design.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	High
3. An ability to communicate effectively with a range of audiences	Medium
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives	

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

Title/Description: MH GO SHIGLEY'S MECHANICAL ENGINEERING DESIGN 2024 RELEASE
ISBN: 9781264627035
Author: BUDYNAS
Edition: 2024
Copyright: 2024
Publisher: MCGRAW HILL

Software:

Title: Solidworks (2025 – 2026)

Note: Student Access in this course is provided by department (instructions in Canvas)

Required Computer

Recommended Computer Specifications: <https://it.ufl.edu/get-help/student-computer-recommendations/>

HWCOE Computer Requirements:

<https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/>

Course Schedule

Week 1: Design Process, Static Failure Overview
Week 2: Design for Simple, Combined Loading, MSS, DE Theories
Week 3: Solidworks FEA use
Week 4: Fastening, Welding
Week 5: Introduction to Machines
Week 6: Gearing
Week 7: Solidworks Motion Study
Week 8: Bearings
Week 9: Design for Dynamic or Cyclic Loading, Fatigue
Week 10: Design for Fluctuating Loads, Modified Goodman
Week 11: Introduction to Shaft Design
Week 12: Design for 3D Fluctuating Loads, DE Goodman
Week 13: Project Concept Discussions
Week 14: Project Analysis Discussions
Week 15: Project Final Discussions

Important Dates

Sep 22: Exam 1 (in class)
Oct 27: Exam 2 (in class)
Dec 03: Project Due (last day of class)
Dec 11: Final Exam: (12/11/2025 @ 7:30 AM - 9:30 AM, in our classroom)

Evaluation of Grades

Assignment	Total Points
Homework	15%

Webgems/Canvas Quizzes/Participation (in-class activities or out-of-class supplemental)	20%
Exam 1, 2 (midterms 15% each)	30%
Final Exam	15%
Project*	20%
Total:	100%

Note: * Project Grade subject to adjustment (+/-) based on peer evaluations and instructor observations.

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

Homework

Homework should be taken seriously, and best effort should be applied. Be sure to read the technical writing tips on the course website. Be sure to read our comments on your homework, so that you get better. It is anticipated that there will be 7 homework assignments. Each takes time. If you wait until the last day, you will not be successful. The objective of the homeworks is to show you how to professionally present engineering analysis.

Project

The project is typically a genuine design project of some machine. You will be placed into groups of three or four. The objective is for you to design something, analyze it theoretically, and simulate to prove whether it will work. The end product will be a professional report that demonstrates what you abilities you have. Group participation is required for the project. Individual grades for project assignments are subject to change (+/-) based on peer evaluations and instructor observations.

Collaboration

A student who violates the honor code could receive an E for the course, even if it's the student's first honor code violation. Any collaboration on a quiz or an exam is a violation. Outside of exams, when working on an individual assignment, collaboration can be done **in general terms**, on a **conceptual basis**. What was your thought process? What steps did you take to do this problem? Details such as answers should not be shared. Do & understand your own work. Start, maintain, and finish your own computer file, softcopy, or handwritten hardcopy. Copying someone else's work and submitting it as your own work will be reported as an honor code violation. Helping someone do the same is also an honor code violation. Some homework assignments might be individualized on a student-by-student basis. If two students submit the same individualized homework, this will be reported as an honor code violation. Helping someone do the same is also an honor code violation. Note that Solid Works files will also be cross-referenced, so do not share Solid Works files. Collaboration between members of the same group is encouraged, so that everyone understands all aspects of the group's design. Collaboration between different groups should take the "conceptual basis in general terms" approach.

Use of AI in this Course

Artificial intelligence, large language models, like ChatGPT can be used as supplementary learning aids. Apply the previous “collaboration” paragraph to your dealings with ChatGPT. Use a “conceptual basis, in general terms” approach. Do and understand your own work. If you submit output directly from ChatGPT, then this is an honor code violation. Some things I see from ChatGPT are a little off and weird. Be very mindful that what you’re getting is wrong. If you submit something that you do not understand and cannot explain, then this is cheating yourself. Cultivate your own critical thinking abilities. Don’t rob yourself of the thrill of discovery. Earn your knowledge, so that you maintain it.

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: <https://go.ufl.edu/syllabuspolices>. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University’s core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWC OE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu