

Mechanical Design 1

EML3005 Sections 12808, 12809

Class Periods: 12808 is MWF, 3rd period, 9:35-10:25a

Class Periods: 12809 is MWF, 7th period, 1:55-2:45p

Locations: WEIL 234(3rd), WM 100(7th)

Academic Term: Fall-2023

It may become necessary to modify this syllabus during the semester.

In this event, students will be notified and the revised syllabus will be posted on the course web site.

Instructor:

Name: Mike Griffis

Email Address: mwg@ufl.edu

Office: MAEA-212, 352-392-9473

Cell: 352-317-4045

Zoom Office Hours: M/W: 4 to 6p (other times on arrangement).

<https://ufl.zoom.us/j/98251133080?pwd=RnZ6RGVUeHdOVXpPY245QVNtaEtMZz09>

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 and inclusive 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

Book:

Title: SHIGLEY'S MECHANICAL ENGINEERING DESIGN
ISBN: 9780073398211
Author: BUDYNAS
Edition: 11th
Copyright: 2019
Publisher: MCGRAW-HILL
Note: Avoid "International Edition" which only has SI units.

Software:

Title: Solidworks (2023 – 2024)
Note: Student Access in this course is provided by department (instructions in Canvas)

Required Computer:

This is discussed on both the department and college websites:

- <https://www.eng.ufl.edu/students/resources/computer-requirements/>
- <https://mae.ufl.edu/academics/prospective/undergraduate/computer-requirements/>

Bottomline: if you don't have a laptop, you need one. If you have one that works, feel free to discuss with the instructor whether it will suffice.

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 (8:20 pm - 10:10 pm, location TBD)
Oct 27: Exam 2 (8:20 pm - 10:10 pm, location TBD)
Dec 06: Project Due (last day of class)
Dec 13: 3rd Period Final Exam: (12/13/2023 @ 10:00 AM - 12:00 PM)
Dec 14: 7th Period Final Exam: (12/14/2023 @ 10:00 AM - 12:00 PM)

Attendance Policy, Class Expectations, and Make-Up Policy

You are responsible for participating, staying up-to-date on all announcements, in-class lectures, posted video lectures, reading assignments, homework, and webgems. Course notes will not always be supplied on the Canvas webpage. Late homework is not generally accepted. Late webgems will not generally be accepted. Late project submission is not generally accepted. Makeups and makeup exams are only allowed for students with extreme, documented circumstances. Students must contact the instructor as soon as possible to provide documentation

and request a make-up exam. Final exam is required and there is no make-up final. Note: club sport activities are not excused absences, personal vacations are not excused absences, job interviews are not excused absences.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies in the undergraduate catalog. Excused absences require appropriate documentation. See <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Group participation is required for the project. Individual grades for project assignments are subject to change (+/-) based on peer evaluations.

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.

Evaluation of Grades

Assignment	Total Points
Homework	15%
Webgems/Canvas Quizzes (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.

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

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their

Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

In this class, use of unauthorized aid, copying of homework, sharing of files (Solidworks or reports), dishonest attendance logging (in-class Quizzes, Webgems) are considered honor code violations. (If you are leaving class early or leaving our Zoom meeting, fine. Do not log attendance. Logging and leaving is an honor code violation.)

Honor code violation can result in “E” for the course, even if it’s your first offense. UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel (e.g. the instructor). A violation of the honor code will result in academic sanctions (typically a failing grade “E” assigned for the course) and further disciplinary action. If you have any questions or concerns, please consult with the instructor in this class.

Commitment to a Safe and Inclusive 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, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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

- Your academic advisor or Undergraduate Program Coordinator: advising@mae.ufl.edu
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu

- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use and Copyrighted Material

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use and the use of copyrighted material. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](https://title-ix.ufl.edu), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>;<https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/getting-help/>; <https://distance.ufl.edu/state-authorization-status/#student-complaint>