

## **EML 3005 - Introduction to Mechanical Design – Spring 2024**

Engineering design is a process of devising a system, component, or process to meet desired needs and specifications within constraints. It is an iterative, creative, decision-making process in which the basic sciences, mathematics, and engineering sciences are applied to convert resources into solutions. Engineering design involves identifying opportunities, developing requirements, performing analysis and synthesis, generating multiple solutions, evaluating solutions against requirements, considering risks, and making trade-offs, for the purpose of obtaining a high-quality solution under the given circumstances.

Mechanical design is an essential part of mechanical engineering, focusing on the development and refinement of mechanical systems and components. In an introductory course, you will explore the fundamentals of designing various mechanisms, including gears, levers, and more complex components such as electric motors. The process integrates principles from mechanics and materials science with a focus on creativity and problem-solving. Key concepts include understanding the fatigue of materials and how this impacts the longevity and reliability of mechanical components. The primary goal in mechanical design is to create safe, efficient, and practical solutions, ensuring that the designs are technically sound and can be realistically manufactured.

### ***Class Periods:***

Section A: Period 4 (10:40 AM - 11:30 AM) - [WEIM1084](#)

Final Exam: 5/02/2024 @ 7:30 AM - 9:30 AM

Section B: Period 6 (12:50 PM - 1:40 PM) - [WEIM1094](#)

Final Exam: 4/30/2024 @ 3:00 PM - 5:00 PM

### ***Instructor:***

Dr. Dan Dickrell III

[Email: djd3@ufl.edu](mailto:djd3@ufl.edu)

[Links to an external site.](#)

Office Location: Building MAE-C, Room 130

Office Hours: TBA

*notes on communication:* Use official UF email, NOT CANVAS MAIL, for official course business if you want a timely response. UF email address: djd3@ufl.edu is checked regularly. The Canvas mail is not.

***Student Learning Assistants (SLAs):***

Please contact through the Canvas website

Marla Eismann	TBA
Riley Gilman	TBA
Dylan Errigo	TBA

***Course Description***

EML 3005 Mechanical Engineering Design (1) - 3 Credits

**Grading Scheme:** Letter Grade

Design process, kinematics, gear trains, and standard mechanical components.

**Prerequisites:** COP 2271 and EML 2322L and EGM 3520 with a minimum grade of C and EGM 3401 with a 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
- Have familiarity with the synthesis and analysis in mechanical design.

***Materials and Supply Fees***

n/a

***Relation to Program Outcomes (ABET)\*:***

This course prepares graduates to learn how to design a mechanical component to meet certain requirements.

- 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 (Low)
- 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 (Low)
- 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 (Medium)
- 6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (Medium)
- 7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies (Medium)

\*Coverage is given as high, medium, or low.

***Required Textbooks and Software***

Title: SHIGLEY'S MECHANICAL ENGINEERING DESIGN

ISBN: 9780073398204

Author: BUDYNAS

Edition: 10th (or new 2020 11th edition is good too)

Copyright: 2015

Publisher: MCGRAW-HILL

Note: Avoid "International Edition" which only has SI units

## ***Course Schedule***

Check the Canvas calendar for real-time updates

## ***Attendance Policy, Class Expectations, and Make-Up Policy***

Regular attendance is required.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/Links to an external site.>

Requests deviating from the above policies will not be granted unless verified by the Dean of Student's Office for validity and reason.

## ***Evaluation of Grades***

<b>Assignment</b>	<b>Percentage of Final Grade</b>
Non-Exam Assignments (Quizzes, HW, etc/)	20%
Individual Design Report	25%
Midterm Exam	25%
Group Design Project	30%

## ***Grading Policy***

The following is given as an example only.

<b>Percent</b>	<b>Grade</b>
90 - 100	A
87 - 89.9	B+
80 - 86.9	B
77 - 79.9	C+
70 - 76.9	C
67 - 69.9	D+

62 - 66.6     D  
0 - 59.9     E

READ AND UNDERSTAND:

**As the assignment deadlines will be clearly posted on the course websites, late submissions past the deadline will not be accepted.**

**There is no excuse for missed assignments, this is your responsibility to act like a professional student. Don't ask/beg for special treatment.**

### **GRADE DISPUTES:**

If a student feels that an exam or homework was graded unfairly, or if there is an error in the grading, it should be brought to the attention of the primary instructor within *two weeks* after the grades are posted for that assignment. Scores will not be reconsidered beyond the two week period.

TA's and graders don't have authority to change grades unilaterally, so please don't ask them.

More information on UF grading policy may be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> [Links to an external site.](#)

### ***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/> [Links to an external site.](#) 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/> [Links to an external site.](#) 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/Links to an external site.>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/Links to an external site.>.

## **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***

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/>)[Links to an external site.](#) 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. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

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 Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, [jpennacc@ufl.edu](mailto:jpennacc@ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. 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> [Links to an external site.](#)

### ***Campus Resources:***

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## 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](mailto: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>[Links to an external site.](#), 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](#)[Links to an external site.](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto: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>[Links to an external site.](#)

## 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>Links to an external site..

**Career Connections Center**, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>Links to an external site..

**Library Support**, <http://cms.uflib.ufl.edu/ask>Links to an external site.. 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/>Links to an external site..

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

**Student Complaints Campus**: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>Links to an external site.;<https://care.dso.ufl.edu>Links to an external site..

**On-Line Students Complaints**: <https://distance.ufl.edu/state-authorization-status/#student-complaint>Links to an external site..