Mechanical Engineering Design 2

EML4501 Section 449F, Section 225B

Academic Term: Spring 2024

Class Periods and Location:

Section	Tuesday	Thursday
Section 449F	**Period 5 (11:45 AM – 12:35 PM)** (Asynchronous Online – Canvas)	**Period 5 – 6 (11:45 AM - 1:40 PM)** NSC 520 (Nuclear Sciences Building)
Section 225B	**Period 8 (3:00 PM - 3:50 PM)** (Asynchronous Online – Canvas)	**Period 8 – 9 (3:00 PM - 4:55 PM)** NSC 520 (Nuclear Sciences Building)

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: **Dr. Umesh Persad**
Email Address: **upersad@ufl.edu**
Office Address: MAE-C Room 102
Office Phone Number: 352-392-6743
Office Hours: Mondays 3pm-4pm, Wednesdays 3pm-4pm, or by appointment.

Learning Assistants:

Name	Role	Email
Joseph Hill	**Course Manager**	joseph.hill@ufl.edu
Haydn Rhodes	**Learning Assistant**	hrhodes@ufl.edu
Jake Rosken	**Learning Assistant**	jrosken@ufl.edu
Isabel Husted	**Learning Assistant**	ihusted@ufl.edu
Nathaniel Fuller	**Learning Assistant**	fuller.nathaniel@ufl.edu
Joseph Hill	**Learning Assistant**	joseph.hill@ufl.edu

Course Description
Integrated design and presentation of a mechanical system.
Credits: 3

Course Pre-Requisites / Co-Requisites
Prereq: EGN 3353C and EML 2322L and EML 3005 and (EGM 3401 with a minimum grade of C).

Course Objectives
1. Solve engineering problems by applying STEM principles.
2. Apply appropriate engineering design methods to produce creative solutions that meet specified needs.
3. Communicate effectively with a range of audiences.
4. Function effectively on a creative, collaborative, and inclusive team that establishes goals, plans tasks, and meets objectives.

Materials and Supply Fees
Course Fee: $50.00

Relation to Program Outcomes (ABET):
Students who successfully complete this course demonstrate the following outcomes in the context of mechanical engineering design theory and application:

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

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

Required Computer
Students must have their own computer whose specifications meet or exceed the capabilities required by:

1. The College
https://www.eng.ufl.edu/students/resources/computer-requirements/

2. The MAE Department
https://mae.ufl.edu/academics/prospective/undergraduate/computer-requirements/

Recommended Books

1. **Product Design and Development 7th Edition**
   K. Ulrich, S. Eppinger and M. C. Yang, McGraw Hill, 2019
   ISBN-10:1260043657, ISBN-13: 978-1260043655

2. **The Mechanical Design Process 6th edition**
   D. G. Ullman 2017
   ISBN-10: 0999357808, ISBN-13: 978-0999357804

3. **Shigley's Mechanical Engineering Design, 10th Ed.**
   R. G. Budynas and K. J. Nisbett, McGraw-Hill, 2015
   ISBN: 9780073398204

4. **Product Design: Techniques in Reverse Engineering and New Product Development**
   K. Otto and K. Wood, Pearson, 2000
   ISBN-10: 0130212717, ISBN-13: 978-0130212719

5. **Good to Great: Why Some Companies Make the Leap and Others Don't**
   J. Collins, Harper Business, 2001
   ISBN: 9780066620992

Course Schedule

Wk	**Tuesday (Single Period Session)** Asynchronous (Lectures, Quizzes, and Exercises)	**Thursday (Double Period Session)** Design Studio - Deliverables
1	Jan 9 **The Design Process (Models of Design)** **Design Process Management (Design Teams)**	Jan 11 **Team Formation, Team Lead Election, Team Naming** **Project Choice**
2	Jan 16 **Discover Phase:** **Methods for Understanding the Problem**	Jan 18 **Research Results** **Design Opportunity**
3	Jan 23 **Define Phase:** **Methods for Defining the Problem**	Jan 25 **Design Requirements** **Product Models**
4	Jan 30 **Develop Phase 1:** **Methods for Solving the Problem - Conceptual Design and Creativity**	Feb 1 **Alternative Concepts Set (Sketches)**
5	Feb 6 **Develop Phase 1:** **Methods for Solving the Problem - Concept Evaluation**	Feb 8 **Final Product Concept (Sketches, Mechanisms)**
6	Feb 13 *(prepare for Design Review 1 Presentations)*	Feb 15 **Design Review 1 Presentations:** **Product Concept Approval**
7	Feb 20 **Develop Phase 2:** **Design Analysis and Prototyping (Virtual and Physical)**	Feb 22 **Calculations, Virtual Models and Simulations**
8	Feb 27 **Develop Phase 2:** **Design for People and Safety**	Feb 29 **Task Analysis Models and Safety Analysis**
9	Mar 5 **Develop Phase 2:** **Design for Robustness and Reliability**	Mar 7 **Failure Modes and Effects Analysis**
10	Mar 12 *-- Spring Break*	Mar 14 *-- Spring Break*
11	Mar 19 **Deliver Phase:** **Design for Manufacturing and Assembly**	Mar 21 **Design Review 2 Presentations:** **Design Analysis**
12	Mar 26 **Deliver Phase:** **Product Development Economics (Costing)**	Mar 28 **Virtual and Physical Prototypes**
13	Apr 2 **Deliver Phase:** **Concept Pitches**	Apr 4 **Virtual and Physical Prototypes**
14	Apr 9 *(complete prototyping)*	Apr 11 **Presentation Preparation** **Team Performance Review**
15	Apr 16 *(prepare for Final Presentations)*	Apr 18 **Final Presentations**
16	Apr 23 **Final Reports Due** **Pitch Video Due** **Capstone Website Materials Due**	

Attendance Policy, Class Expectations, and Make-Up Policy

This course is centered around teamwork. Therefore, it is extremely important to attend all design studio sessions to contribute to your team. If you miss a session, you are responsible for contacting your team lead to find out about your allocated tasks.

All course materials are available through the Learning Management System. Students are held responsible for knowledge of all scheduling and policy announcements made in class. Excused absences must be consistent with university policies in the undergraduate catalog and require appropriate documentation and advance communication with the instructor:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

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/

Policies on Clear Communication, "Ghosting", Free Riding, Sources of Truth, & Assignment Grade Disputes

1. **Communication with the Teaching Team:**
   Once students are assigned into teams, all emails to the EML4501 Teaching Team related to team business must clearly identify the team's number and name. Communication can be via email or via Microsoft Teams (channels or chat).

2. **Ghosting and Free Riding:**
   Individuals who **fail to support their group or "ghost" the course**, as demonstrated by Team Lead reports, group feedback, and/or low participation in class and team meetings tracked in Canvas/Teams, will earn a failing grade in the course regardless of points accumulated in the class.

3. **Course Platforms and Sources of Truth:**
   Approved platforms for the course are Canvas and Microsoft Teams. Discussion platforms beyond these UF-sanctioned Learning Management Systems will not be monitored or curated by the instructor and learning assistants. Work or discussion evidence obtained from other external discussion platforms will not be considered as valid sources.

4. **Grade Disputes:**
   If an individual or group has as assignment grading dispute, the issue must first be addressed with the Teaching Team member who did the grading and the Course Manager. If individuals/groups can show where grading errors occurred, Teaching Team members will correct grades accordingly. Only after communication with a Teaching Team member and failure to resolve a grading dispute may the individual/group bring the dispute to the instructor.

Laboratory Safety

This course has laboratory sessions. To ensure safety of all participants, appropriate attire, personal protective equipment (PPE), and right conduct are always required in the lab. Failure to follow lab safety rules will result in students' immediate removal from the lab and forfeiture of course points at the instructor's discretion.

1. Lab Attire

- No open-toed shoes are permitted in the lab.
- No shorts are permitted in the lab.

2. PPE

- Sanitizing supplies are available in the lab to wipe down desks prior to sitting and at the end of class if needed.
- Eye protection is required in the laboratory for proximity to hands-on activities.

3. Behavior

- Disruptive or destructive behavior will not be tolerated.
- No food or drink is allowed in the machine shop, 3D print farm, or metrology areas of the lab.
- Food & drink are allowed at work desks, in conference rooms, at the coffee bar, and in the adjoining kitchen area

4. Emergencies

- Inform Teaching Team members immediately of injury or exposure.

Evaluation of Grades

Assignment	Type	Percentage of Final Grade
1. Quizzes and Exercises	Individual	30%
2. Team Member Performance Review	Individual	5%
3. Project Presentation	Group	10%
4. Project Report	Group	50%
5. Pitch Video	Group	5%
TOTAL		**100%**

This course is graded. Grades are earned based on individual and group deliverables. Further descriptions will be given when assignments and assessments are announced in class. Additional resources supporting these assignments will be posted on the course Learning Management System.

Grading Policy
The following is the course 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

More information on the UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

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.aa.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
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. 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
- 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

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

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**, 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 suppor*t*, 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/state-authorization-status/#student-complaint*.