EML4501 Mechanical Engineering Design 2

Academic Term: Fall 2025

Class Periods and Location:

Section A	Monday	Tuesday (Double Period)
12138 Section 125C	**Period 5 (11:45 AM – 12:35 PM)** Location: Larson Hall 0330	**Period 5&6 (11:45 AM - 1:40 PM)** Location: Larson Hall 0330

Section B	Wednesday	Thursday (Double Period)
12139 Section 3324	**Period 9 (4:05 PM – 4:55 PM)** Location: FLG 0280	**Period 9&10 (4:05 PM - 6:00 PM)** Location: FLG 0245

Section C	Wednesday	Friday (Double Period)
27408 Section 3326	**Period 8 (3:00 PM - 3:50 PM)** Location: FLG 0270	**Period 8&9 (3:00 PM - 4:55 PM)** Location: FLG 0270

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 and Wednesdays 1-2pm in MAE-C Room 102 (other times by appointment).

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website.
The list of course learning assistants would be published on the Learning Management System.

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
$50

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 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	Low

*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

- Fusion 360 CAD (Educational Version)

Recommended Materials

- Title: **Product Design and Development**
  Author: K. Ulrich, S. Eppinger and M. C. Yang
  Publication date and edition: McGraw Hill, 2019, Latest Edition
  ISBN number: ISBN-10:1260043657, ISBN-13: 978-1260043655

- Title: **The Mechanical Design Process**
  Author: D. G. Ullman
  Publication date and edition: 2017, Latest Edition
  ISBN number: ISBN-10: 0999357808, ISBN-13: 978-0999357804

- Title: **Shigley's Mechanical Engineering Design**
  Author: R. G. Budynas and K. J. Nisbett,
  Publication date and edition: McGraw-Hill, 2015, Latest Edition
  ISBN number: ISBN10: 1265472696 | ISBN13: 9781265472696

- Title: **Roark's Formulas for Stress and Strain, 9th Edition**
  Author: Richard G. Budynas, Ali M. Sadegh
  Publication date and edition: 2020 McGraw-Hill Education
  ISBN number: 9781260453751

- Title: **Product Design: Techniques in Reverse Engineering and New Product Development**
  Author: K. Otto and K. Wood
  Publication date and edition: Pearson, 2000
  ISBN number: ISBN-10: 0130212717, ISBN-13: 978-0130212719

- Title: **Mechanical and Aerospace Design UF Library Collection (Courtesy MAE EAB)**
  Core books for design in mechanical and aerospace engineering
  https://ufl-flvc.primo.exlibrisgroup.com/discovery/collectionDiscovery?vid=01FALSC_UFL:UFL&collectionId=81764876490006597&lang=en

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/

MAE Computer Requirements:
https://mae.ufl.edu/students/undergraduate/computer-requirements/

Course Schedule

Wk	Date	Topic	Key Question	Project Deliverables
1	Aug 21st-22nd	**M1. The Engineering Design Process**	What is the design process and how is it managed?	
2	Aug 25th-29th	**M2. Discover Phase Methods**	How to understand user needs and benchmark existing technology?	**Project Planning, Discover Phase:** - Team Introductions - Team Structure and Roles - Work Breakdown Structure, GANTT Chart
3	Sept 1st – 5th	**M3. Define Phase Methods**	How to specify and abstractly model what the product must do?	**Discover Phase:** - Research Results
4	Sept 8th – 12th	**M4. Develop Phase Methods**	How to come up with novel design concepts and choose the best design concept from a range of concepts?	**Define Phase:** - Product Design Specification (PDS) - Use Model - Function Model
5	Sept 15th – 19th	**M5. Detail Phase Methods - Design Analysis**	How to analyze a design for its modes of failure and ensure its behavior satisfies requirements?	**Develop Phase:** - Combination Charts - Individual Design Concepts
6	Sept 22nd – 26th	**M6. Detail Phase Methods - Design for People**	How to design a product that is ergonomic and easy to use?	**Develop Phase:** - Final Design Concept - Systems Overview
7	Sept 29th – Oct 3rd	**M7. Detail Phase Methods - Design for Reliability and Safety**	How to design a product to be reliable and safe?	**Detail Phase:** - Preliminary CAD Model - Preliminary Design Analysis & Cost
8	Oct 6th – 10th	**M8. Detail Phase Methods – Material Selection and Sustainability**	How to select appropriate materials and manufacturing processes?	**Detail Phase:** - Preliminary CAD Model - Preliminary Design Analysis & Cost
9	Oct 13th – 17th	-	-	**Detail Phase:** **Design Review (Online)**
10	Oct 20th – 24th	**M9. Detail Phase Methods - Design for Manufacturing and Assembly**	How to design for ease of manufacturing and assembly?	**Detail Phase:** - Design for X – People, Reliability, Safety, Sustainability, Manufacturing, Assembly
11	Oct 27th 31st	**M10. Deliver Phase Methods**	How to effectively present project deliverables?	**Detail Phase:** - Design for X – People, Reliability, Safety, Sustainability, Manufacturing, Assembly
12	Nov 3rd - 7th	-	-	**Deliver Phase:** - Design for X – Manufacturing Plans and Cost
13	Nov 10th – 14th	-	-	**Deliver Phase:** - Prepare Project Presentation - Prepare Project Report
14	Nov 17th – 21st	-	-	**Deliver Phase:** **Project Presentations (Online)**
15	Nov 24th - 28th	*-- Thanksgiving Week --*		
16	Dec 1st – 3rd	-	-	**Deliver Phase:** ***Wednesday 3rd December 2025*** **Project Reports Due** **Peer Review Due**

Important Dates
Week 9: *Design Review (Online) during class time*
Week 14: *Final Presentations (Online) during class time*
Wednesday 3rd December 2025 (11:59pm): *Project Report and Peer Review Due*

Evaluation of Grades

Assignment	Type	Total Points	Percentage of Final Grade
1. Module Quizzes	Individual	variable	10%
2. Module Assignments	Individual	variable	30%
2. Team Member Peer Review	Individual	20	10%
3. Project Presentation	Group	20	10%
4. Project Report	Group	90	40%
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/UGRD/academic-regulations/grades-grading-policies/

Course Policies

1. Class Attendance and Team Meetings:

1.1. Students are required to attend all scheduled classes to work in assigned teams.
1.2. Students are required to walk with laptops to all classes to work on the design project.
1.3. The nature of the course requires teams to meet outside of scheduled class time to work on project deliverables. All students must attend these working meetings once scheduled by the team leader.

2. Communication with the Teaching Team:

2.1. Once students are assigned into teams, all emails to the teaching team related to team business must clearly identify the team's number and name.
2.2. Communication can be via email or via Microsoft Teams (channels or chat).
2.3. Emails and messages will be responded to within 24 hours during working hours/class days by the course instructor and teaching team. Please do not expect a response on weekends or holidays.

3. Ghosting and Free Riding:

3.1. Individuals who **fail to support their group or "ghost" the course**, as demonstrated by:
[1] Lack of attendance
[2] Team Lead Reports
[3] Group feedback
[4] Low/no participation in team meetings tracked by course TAs on Microsoft Teams
will earn a grade of **0 points/percent** in the:
- *Team Member Peer Review*
- *Project Presentation*
- *Project Report*

4. Course Platforms and Sources of Truth:

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

5. Grade Disputes:

5.1. 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. If individuals/teams can show where grading errors occurred, Teaching Team members will correct grades accordingly.
5.2. If the dispute is not resolved, the issue must then be directed to the Course Manager (Lead TA).
5.3. Only after communication with the Course Manager (Lead TA) and failure to resolve a grading dispute may the individual/team bring the grade dispute to the instructor.

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/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

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/

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
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu