

Mechanical Design 3

EML 4502 Section 20368

Class Periods: W/F, periods 4-5, 10:40a to 12:35p

Location: MAEC-010

Academic Term: Spring 2026

Instructor:

Name: Mike Griffis

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Office Hours: Thu: 2 to 4p, in person or Zoom (other times on arrangement).

Zoom Link:

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

Course Description

Design and realization of a mechanical engineering system, component, or process subject to appropriate standards and constraints. Team project. (3 hrs)

Course Pre-Requisites / Co-Requisites

Prereq: EML 4501 or EAS 4700 or EAS 4710; Coreq: EML 4321.

Course Objectives

At the end of the course, the student will be able to

- begin with an existing design of an artifact¹ where the requirements have been established²,
- vet and validate the design by way of theory, simulation or experimentation under the supervision of instructor,
- realize (build, implement) the design under the supervision of instructor,
- test and evaluate the implementation³,
- function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet these objectives, and
- document the study and orally defend the effort.

¹Can be of a mechanical, aerospace, electronic, electrical, software, chemical, or other engineered full system, well-defined subsystem or substantial component of same. Students could also design (starting from “scratch”) or improve the design of the system, subsystem, or substantial component under supervision of instructor.

²Students could also establish the requirements with the customer under supervision of instructor.

³The evaluation is important and it should honestly describe how successful the projected design and current implementation is. The long-term goal (of success) is for the design to meet the requirements of the project. It is not necessary that the implementation be successful, as the evaluation might declare. Students should identify which requirements have been met and which have not been met and why.

Materials and Supply Fees

Course Material & Supply Fee: \$385.00

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 | High |

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| consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | |
| 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

None.

Recommended Materials

The materials used in previous courses.

Required Computer

HWCOE Computer Requirements:

<https://www.eng.ufl.edu/undergraduate/programs-and-partnerships/advising-center-for-student-excellence/newly-admitted-students/computer-requirements/>

Course Schedule

Week 1: Establish groups and individual roles, begin proposal
 Week 2: Continue proposal development, preliminary design, analysis
 Week 3: **Proposal due**
 Week 4: Detailed design, analysis
 Week 5: Simulation, finalize procurement
 Week 6: Manufacturing, control, assembly, testing, **Concept Report due**
 Week 7, 8: Manufacturing, control, assembly, testing
 Week 9: Manufacturing, control, assembly, testing, **Analysis/Simulation Report due**
 Week 10: Manufacturing, control, assembly, testing
 Week 11: Manufacturing, control, assembly, testing, **Realization/Evaluation Report due**
 Week 12, 13: Manufacturing, control, assembly, testing
 Week 14: Realization Presentation; **Final Report due**

Important Dates

Jan 28: Proposal Due
 Feb 18: Concept Report due
 Mar 11: Analysis/Simulation Report due
 Apr 1: Realization/Evaluation Report due
 Apr 22: Realization Presentation
 Apr 22: Final Report Due

Evaluation of Grades

| Assignment | Type | Percentage of Final Grade |
|-----------------------------|-------------|----------------------------------|
| Work Logs, Weekly Snapshots | Individual | 40 |
| Peer Evaluation Capture | Individual | 10 |
| Group Project | Group | 50 |
| | | 100% |

**Notes: Group Project is subject to (+/-) adjustments based on individual contributions (see below).
No Final Exam.**

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 |

Work Logs, Weekly Snapshots

To prepare for a professional career, it is important for each student to log individual effort and narrate activity: what was done, with who, and resulting status, concerns. Accordingly, each student should log each work session, whether it occurred during a regularly scheduled lab period or not. Work sessions must be recorded during the week they are performed. Snapshots are captured each week. Each week ends on Friday at 11:59p.

Group Project

The group project focuses on the design, analysis, simulation, realization, and evaluation of an electromechanical system that addresses a specific need while optimizing mobility under loaded conditions. The project aims to validate students' ability to contribute effectively within a diverse team, play a key role as a subject matter expert, understand and evaluate their teammates' work, and uphold high standards of creativity, technical rigor, and effort in producing a professional-quality project report and realization presentation.

Project Milestones and Group Grading:

The project is worth a total of 700 points, entered as group grades in Canvas, distributed among several milestones:

1. Proposal (100 points)
 - a. Need statement
 - b. Project Requirements
 - c. Development Plan (what to buy, when to do what, relevant codes & standards)
 - d. Roles Agreement (who does what)
2. Concept Report (100 points)
3. Analysis/Simulation Report (250 points)
4. Realization/Evaluation Report (150 points)
5. Final Report (600 points, sum of final values of the above milestones)
6. Realization Presentation (100 points, demonstration of the resulting artifact with evaluation takeaways)
7. Project completion (700 points, sum of 5 and 6 plus an Individual Grade Adjustment)

The Final Report is built progressively, incorporating new sections and revising previous ones with each milestone submission. The first four milestones contribute to the Final Report, while the Realization Presentation is graded independently. The project grading includes an individual grade adjustment described below.

Individual Roles and Work Logs:

As documented in the Proposal, each group member should have a clear and meaningful role aligned with their interests and skills, ensuring complementary roles that meet the project's needs. Throughout the project, it is essential for students to maintain their work logs documenting their day-to-day activities, including personal thoughts, concept sketches, detailed analyses, and references to relevant files generated individually. The work logs are captured in weekly snapshots (see above).

Individual Grade Adjustment:

Under the Group Project heading in Canvas, individual adjustments are recorded through the "Adjustment" assignment, entered as individual grades in Canvas. It is a 0-point assignment by default. The Adjustment Grade is used to recognize outstanding contributions or address underperforming behaviors of individual group members. Examples of adjustments are as follows:

- Nominal Teammate: 0 points (no effect on grade)
- Stellar Teammate: +50 points (potential to increase final grade by a full letter)
- Underperforming Teammate: -50 points (potential to decrease final grade by a full letter)
- Severely underperforming Teammate: as much as -700 points (potential for zero on project and failure of course).

Proposal description of roles, peer evaluations, weekly snapshots of work logs, and instructor observations are key elements utilized to periodically update the Adjustment Grade. In cases where a student fails to support their group or demonstrates "ghosting" behavior (as reflected in the key elements, e.g. peer evaluations two standard deviations below average), a severe deduction in the Adjustment Grade may be imposed. For instance, if a group earns 660 points but has a ghosted teammate, that student may receive a -660 point Adjustment, resulting in no credit for the Group Project. Since the Group Project constitutes 50% of the course grade, significant deductions in the Adjustment Grade can lead to course failure.

Students with questions regarding the Adjustment Grade are encouraged to contact the instructor for dedicated meetings while having their work logs handy.

Use of MAE facilities

Students must follow safety procedures established by instructor and use MAE facilities only as authorized by instructor. Infractions will be reported as Student Honor Code or Student Conduct Code violations.

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.

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