Undergraduate Realization Thesis

EML4914 Section 1234
Class Periods: Not regularly scheduled
Location: No classroom
Academic Term: Fall 2025
Credits: 3

Instructor:
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(352) 392-9473
Office Hours: M/W, 4 to 5p, NEB137

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website

Course Description
Individualized study that realizes a design under the supervision of a faculty mentor. Realization considers all steps in the design process with major focus on prototyping, testing, evaluation, and optimization. The student produces a written thesis that is defended orally.

Course Pre-Requisites
EML4501 or EAS4700 or EAS4710

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

- Demonstrate those design realization skills agreed to beforehand by the student and their faculty mentor.
- Document the attainment of those skills in both written and oral forms.

Materials and Supply Fees
None

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	Medium
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	Medium
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	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. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- Discussed between student and faculty mentor

Recommended Materials

- Discussed between student and faculty mentor

Required Computer

UF student computing requirement: *https://news.it.ufl.edu/education/student-computing-requirements-for-uf/*

Course Schedule

Week 1: Individual Realization Study (meet, finalize agreement of objectives and meeting specifics)
Week 2: Individual Realization Study (*Development Plan* established)
Week 3: Individual Realization Study
…
Week 13: Written Thesis to faculty mentor, followed by Oral Defense
Week 14: Signed oral defense form and final version of written thesis submitted to department

Attendance Policy, Class Expectations, and Make-Up Policy

There is no mandatory attendance based on a set schedule. The student is obligated to communicate with the faculty mentor at an agreed upon schedule. The method of communication should likewise be agreed to.

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/

Evaluation of Grades

Assignment	Percentage of Final Grade
Written Thesis	50%
Oral Defense	50%
Total	100%

**To earn credit, student must submit final version of written thesis and signed oral defense form to department.*

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

Guidelines for Students

I. The Undergraduate Realization Thesis course allows the student to explore a design realization topic of their choice. Ultimately, the student anticipates the existence of a design of some artifact that they believe can be realized. The student believes, "Hey, I think I can build this thing." In essence, this is the "thesis statement" of the self-directed study.

II. Under the guidance of the faculty mentor, the student performs their independent design realization study. It is the student's responsibility to find a mentor who agrees to provide this guidance. Once this agreement is made, the student notifies the undergraduate advising of the desire.

III. **Credit Allocation:** for a particular semester, the student will commit to 3 credit hours.

IV. The student and the faculty mentor agree beforehand on the scope of work and associated items identified in the ***Development Plan*** section. They effectively agree to define what a successful project will look like, consistent with ***Guidelines for Faculty*** IV. The purpose is to establish a rubric that can be used to grade the student's effort and design realization skill attainment.

V. **Communication:** It is the student's responsibility to maintain contact with the faculty mentor and apprise them of current status, difficulties or successes. A consistent meeting schedule should be agreed to early in the semester.

VI. The student who encounters difficulties with this arrangement should contact the undergraduate coordinator (information at top).

Guidelines for Faculty

I. The faculty mentor is obligated to provide guidance and give feedback to the student once they agree to serve in this role.

II. The faculty mentor should ensure appropriate, reasonable expectations for the work conducted by the student for the credit allocation.

III. **Communication:** The faculty mentor should be cognizant of a lack of communication from student and attempt to contact student if such happens.

IV. **Design Realization:** As a baseline, the following generally defines realization. It is the faculty mentor's responsibility to ensure that the student abides by the following:

- begin with an existing design of an artifact[1] where the requirements have been established[2],
- vet and validate the design by way of theory, simulation or experimentation under the supervision of faculty mentor,
- realize (build, implement) the design under the supervision of faculty mentor,
- test and evaluate the implementation[3],
- document the study (written thesis) and orally defend the effort.

This format gives structure to a relevant independent student effort. It realizes and documents a design that enables follow-on work to occur. The intent is that most of these activities occur in the term when credit is earned. Some discretion of the faculty mentor is acceptable with respect to nature of supervision and the scope of work and associated items identified in the ***Development Plan*** section.

Notes:

[1] Can be of a mechanical, aerospace, electronic, electrical, software, chemical, or other engineered full system, well-defined subsystem or substantial component of same. Student could also design (starting from "scratch") or improve the design of the system, subsystem, or substantial component under supervision of faculty mentor.

[2] Student could also establish the requirements with the customer under supervision of faculty mentor.

[3] The 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.

Development Plan
The student and faculty mentor together establish four key requirements that establish the *Development Plan*:

1. the scope of work (what is being realized, built? how?),
2. the schedule of work,
3. the written thesis (set expectations), and
4. the oral defense (set expectations).

(See Guidelines for Students IV and Guidelines for Faculty IV.) Accordingly, by Week 2, the *Development Plan* should be established defining the four key requirements. Both student and faculty mentor should agree to any subsequent changes afterwards. The purpose is to establish a rubric and aid the faculty mentor in their future assessment of student's ability to achieve the course objective. The MAE department provides a generic report template as a guide, but the student and faculty mentor can redefine according to the student's project.

Undergraduate Realization Thesis and Additional Requirements for Graduating with Honors
The final version of the written thesis document should be submitted to the MAE department. (Contact advising@mae.ufl.edu for more information.) During the final phase of the work, the student and their faculty mentor should arrange and agree on a time and place for the oral defense. Oral defense form must also be submitted.

The following describes additional elements that extend the realization thesis to an honors thesis. In the event that the student's upper division GPA is suitable for Latin honors, the student should discuss any additional goals with their faculty mentor, if appropriate, in order to submit the work as an Undergraduate Honors Thesis. Per HWCOE rules, the student should declare a committee early in the semester that they plan to defend their honors thesis. The HWCOE committee form must be submitted to MAE advising. The oral defense of the honors thesis must include one additional MAE faculty member and one external faculty member.

Submitting Deliverables to MAE Department
Students must submit the signed oral defense form and final version of written thesis to department, by way of MAE advising. A student who fails to submit these deliverables will receive a non-passing grade, e. g. an I* or N* grade, regardless of proposed grade provided by faculty mentor. In the case of an honors thesis, consistent with MAE policy, Latin honors will not be awarded in the event the documents are not provided.

UF Library's Undergraduate Works Collection
Each student can opt in to have their written thesis archived in UF library's *Undergraduate Works Collection* for public access. This is not required. If the student authorizes, MAE advising will submit all theses en masse to the library.

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
• 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