EE Design 1

EEL 3923C Section 11228
Class Periods: N/A, asynchronous class
Location: Design I Lab: NEB 246
Academic Term: Spring 2025

Instructors:

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

- Will Diaz, williamdiaz@ufl.edu, office hours: see Canvas, NEB 246
- Mario Tumasionis, mtumasionis@ufl.edu, office hours: see Canvas, NEB 246
- Elizavetta Stetsenko, e.stetsenko@ufl.edu, office hours: see Canvas, NEB 246

Course Description
Students design, produce, and report on a hardware prototypes, meeting defined specifications and using a structured design methodology. Includes project management, hardware prototyping, and project reporting. Laboratory. Credits 3.

Course Pre-Requisites / Co-Requisites
EEE 3308C and EEL 3112 and EEL 3701C (with minimum grades of C) and 2 courses from breadth elective list.

Course Objectives
Students will reinforce basic circuit and digital systems analysis and techniques to implement electrical engineering projects. PCB design software will also be taught such that small PCBs can be populated and tested in the lab. At the end of the semester, a design project is assigned that uses the modules taught earlier in the semester.

Materials and Supply Fees
Lab fees (includes all components for lab modules and final project): including in tuition
Printed Circuit Board (for final project): ~$30
x
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 consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	

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	
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	High
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*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

- Thonny (microPython IDE) Available for free at: https://thonny.org/
- LTSPICE IV: Available for free at http://www.linear.com/designtools/software/
- Altium (available with a license through UF)

Recommended Materials

- N/A

Course Schedule

The class consists of 8 modules plus a final project listed below. Each module will have a demo and lab report associated with it. The demos will occur in the Design 1 lab with the TA or the instructor during their office hours. The report will always be due two weekdays after your assigned module demo due date. You may demo any module or the Final Project before the final due date. The report due date will still be two days after your assigned demo due date. The Design 1 Lab (NEB 246) is open 24/7 to any registered student in this course via UFid entry.

1. Test and Measurement – learn how to use lab equipment (power supply, oscilloscope, multimeter, DAD network analyzer)
2. PCB Design – use Altium (an industry-standard software) to design and layout a printed circuit board
3. Power Supply Design – build DC-DC converters and learn about voltage regulation schemes (linear vs. switched regulators)
4. Microcontroller Basics – review/learn general purpose digital input/output on a microcontroller (Pi Pico)
5. Microcontroller A/D with LCD – use the internal analog to digital converter on the microcontroller and learn how to interface with an LCD screen using parallel communication
6. Microcontroller SPI to DAC – use serial communication peripheral hardware on microcontroller (SPI) to communicate to a digital-to-analog converter IC (DAC).
7. Amplifier Design – review op-amp configurations for amplification purposes and learn about IC-specific specifications for use in real-world electronic circuit applications
8. Analog/Digital Filter Design – learn three common active filter types and topologies and the issues with component tolerances when building them; also learn to implement a digital filter using a microprocessor (optional – digital part)
9. Final Project - implement a system on a PCB using analog and digital inputs and outputs (microcontroller, LCD, DAC, amplification, power regulation)

Calendar

We will have 2 lecture-based classes during the semester to introduce the course and the final project, respectively. The class will meet at 5pm in lecture hall NEB 202 on Jan. 13th and March 24th. The class will be broadcast via Zoom and a recording will be made available after the class. Attendance is not mandatory. All other lectures are available on Canvas. The demo due dates are shown in the graphic below.

Lecture (NEB 202)	Demo Due Date

Week	M	T	W	R	F
13-Jan	Lecture 1				
20-Jan	Holiday			Group 1/ Test & Meas., PCB Demo	
27-Jan					
3-Feb				Group 1/ Power Supply Demo	
10-Feb				Group 1/ Microcontroller Basics Demo	
17-Feb				Group 1/ Microcontroller ADC-LCD Demo	
24-Feb					
3-Mar				Group 1/ Microcontroller DAC-SPI Demo	
10-Mar				Group 1/ Amplifer Demo	
17-Mar	Spring Break				
24-Mar	Final Project Lecture			Group 1/ Filter Demo	
31-Mar	Final Project Proposal Due				order PCB
7-Apr					
14-Apr					
21-Apr			Final Project Demo Due		
28-Apr	Final Project Report Due				

Attendance Policy, Class Expectations, and Make-Up Policy

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/

Format: The course is comprised of 8 modules and a final project. All module demos are due on an assigned day. Module lab reports are due at 11:59 PM two weekdays after the deadline for that module. If the demo was done after the due date (considered tardy), then the on-time report due date is moved to two days after the actual demo date. The assignments and supporting material will be available on canvas. A lecture introducing the module/final project will be held live and through Zoom on dates defined in the course schedule. The lecture recording will be posted on canvas.

Students must submit individual work on each module/final project. **You are encouraged to work together and share ideas on assignments. However, you are not allowed to copy or duplicate anything from anyone.** This work will be considered cheating and will be dealt with in a severe manner. See Section 19 on Honesty Policy. Any reference source you find to help with the design must be cited in your report (including those from generative AI sources).

Class and Laboratory etiquettes: It is understood that attendees at lectures and labs will be focused on the particular lecture or lab and will take every possible measure to minimize distractions for everyone.
It is the student's responsibility to return all equipment and clean her/his work area before leaving the Lab unless the equipment is specifically checked out. In the latter case the equipment must be checked in before the end of the semester.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Module Demos (8)	Pass/Fail	late or incomplete demos decrease grade
Module Reports (7)	Pass/Fail	late or incomplete reports decrease grade
Final Project	100	100%

The overall grade for the course will be based on 8 Modules and a Final Project.

Module Demos:
The module demos are pass/fail. If you demo after your assigned due date, then you will accrue tardy points: One point for a demo less than or equal to one week after due date, 2 tardy points for demos later than 1 week.

1. Each student will be allowed to have two tardy points without grade penalty.
    1. A tardy point extends the due date for that module by one week.
    2. After two tardy points for one module (> one week late), that module can be demoed up until the last day of class for credit
2. Each excess tardy will result in a reduction in the final grade for the course to the next lower grade. i.e. two excess tardies would reduce an 'A' first to an 'A-' and then to a 'B+'.
3. Students are encouraged to NOT GET TARDIES IN THE BEGINNING OF THE COURSE so that they will be available if they need them later.
4. There will be a full letter grade deduction from the final grade for each module that was not fully completed. Full completion requires a pass on the demonstration AND a pass on the associated report.

Module Reports:
A report on every module (except the Test and Measurement Module) is required. The report format and required figures, etc. are given on Canvas. The report must cite (using in-text citations) any resources used for the module build (e.g., data sheets, reference books, websites, generative AI resources).
Reports will be given a score of 1-5 based on technical mastery of the material and presentation. A score of 2 or more is considered passing. Any report given a score of 1 will have to be rewritten and resubmitted for a pass of the module. Reports are due two weekdays after a module is demoed. Reports not turned in on the assigned due date will accrue tardy points, unless the demo was late, then a new report due date is updated to be two days after the actual demo date.

Final Project:
The final project will be graded on a 100 point scale based on completion of required elements. To pass the course, the final project must be implemented on a PCB designed by each student, AND, the PCB must have been designed, and intended, to fully implement the entire functionality of the system. A final project that works properly, but meets only the minimum requirements, will receive a score no higher than 90. The final project report will be given a 1-5 score like other modules and will be judged based on presentation and level of understanding of the technical components of the design. Only scores of 4-5 will not take points away from the demo score. A score of 3 will

reduce the demo score by 10 points. A score of 2 will reduce it by 20 points. A score of 1 is considered failing. Feedback will be given on the report grades before the end of the course and resubmissions are accepted.

The final grade for the course will be determined by reducing the final project grade by any letter grade reductions due to failing to fully complete any of the modules and/or for excess tardies and/or for final report grade deductions.

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

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*.