Advanced Robotic Systems Design
ABE 4932 Section 28287
Class Periods: Tuesdays, Periods 7-8, 1:55pm - 3:50pm
Location: Frazier Rogers Hall 106
Academic Term: Spring 2026

Instructor:
Henry Medeiros
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352-294-6706
Office Hours: Mondays, 3:00pm – 4:00pm (or by appointment), Frazier Rogers Hall 275

Teaching Assistant/Peer Mentor/Supervised Teaching Student: N/A

Course Description
This course provides students foundational skills for the design, implementation, and performance assessment of agricultural robotic systems. Students will learn how to design and implement modules for robotic navigation, perception, and manipulation using the Robot Operating System. They will also be introduced to best design practices and project management techniques for integrated hardware/software development teams. Students who successfully complete this course will be encouraged to participate in the Robotics Competition held at the Annual International Meeting of the American Society of Agricultural and Biological Engineering (2 credits).

Course Pre-Requisites / Co-Requisites
ABE 4171C or equivalent for undergraduate students or ABE 6005 or equivalent for graduate students. Both pre-requisite courses can be taken concurrently with this course.

Course Objectives
Students should leave the course with knowledge of how to conceive and manage an integrated hardware/software development project, as well as hands-on experience on the design, implementation, and evaluation of the main components of a fully functional specialized robotic system.

Materials and Supply Fees
N/A

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 environment, establish goals, plan	High

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	Medium

Required Textbooks and Software

- Readings assigned on Canvas.

Recommended Materials

- N/A
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Course Schedule

Weeks 1-2: Robot Operating System (ROS) Architecture
Weeks 3-4: ROS Robot Specification
Weeks 5-6: Navigation, Perception, and Manipulation Nodes
Weeks 7-8: Project Specification, Scheduling, and Management
Week 9:Project Documentation and Versioning
Weeks 10-11: Module Design
Week 12: Module Design Presentations
Week 13: Software Testing and Assessment
Week 14: Hardware Testing and Assessment
Week 15: Prototype Proof of Concept Implementation and Performance Evaluation Presentation

Evaluation of Grades

Assignment	**Percentage of Final Grade**
Attendance and Participation	15%
Mini-projects and homework	20%
Module Design Presentation	20%
Prototype Proof of Concept Presentation	20%
Prototype Testing and Performance Assessment Presentation	25%
	100%

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 academic policies may be found at: https://go.ufl.edu/syllabuspolicies

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