

**DEPARTMENT OF MECHANICAL ENGINEERING  
AUBURN UNIVERSITY**

**MECH 5970/6970 INTERMEDIATE SPECIAL TOPICS IN MECHANICAL ENGINEERING: APPLIED MECHATRONICS**

**Final Project Instructions**

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**Assignment 1 – Submit Initial Proposals: Due 1/28 before class**

- Propose *two* separate ideas
- The main requirement of the project is to *prototype* a combination of *sensor(s)*, *actuator(s)*, and *control(s)* to do something. There can be a balance of these four goals – e.g., a project that has simpler control should have more complex prototyping/sensing/actuation.
- Document (one per group!) should be a single .pdf with illustration/drawing/figures as needed. <1 page!
- Document should include title, names, 5970/6970 enrollment, and descriptions of:
  - Actuation Strategy: Type, number
  - Sensing strategy: type, number
  - Prototyping/construction: how/where will this be put together?
  - Control: algorithm or strategy
  - Implementation strategy: microcontroller/processor, motor drivers, power supply, etc.
  - Cost estimates (big ticket items)
  - Novelty: What will this project add to the course?
  - Motivation: Why are you doing this project?

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**Assignment 2 - Project Proposal: Due 2/25 before class**

- Select one of your two ideas
- Your project proposal should be approximately 3-5 pages (single-spaced, 11-12 pt font) and consist of the following sections:
  1. Title, team name, team members
  2. Overview description and figure describing basic operation (max 1 page)
  3. Project details (combined, or in sub-sections). Your project must contain ALL FIVE:
    - a. Sensing
    - b. Actuation
    - c. Control (logic, computation)
    - d. Prototyping of mechanical design (COTS vs Custom)
    - e. Cost sharing proposal
  4. Schedule (weekly deadlines) and breakdown of work.

Details:

Your project should operate in the space of a cube 3' on a side. There should be no rapid combustion or dangerous projectiles. IF YOU HAVE ANY COMBUSTION, YOU MUST BRING SAFETY EQUIPMENT. Your proposal will be graded on the following criteria:

- Is the project ambitious, requiring outside learning and extending beyond what we'll cover in class and labs?
- Is the project feasible within ~6 weeks? Be reasonable! Your grade will depend in part on how well you meet your specified goals. I am looking for innovative uses of inexpensive actuators and sensors, not ground-breaking experimental mechatronics research! However, you do have ~6 weeks, and the level of effort and time should be reflected in your final product.
- Is the project carefully thought out? What level of details is given in the proposal? Are figures, diagrams, and visual information appropriately leveraged to clearly convey the idea? You don't need every detail addressed, but you should convey that you have carefully considered your project.
- How creative is the project? Is it useful, aesthetically pleasing, interesting, fun?
- Is your project robust? (Will it work more than one time?)
- The project must not be submitted for credit in any other course. See me if you have questions.

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**Assignment 3 - Project Execution/Presentation: Due 4/27**

Demonstrate to the class your working project. Explain its function and how you included the four components (sensing, actuation, computation, and mechanical design). You will be graded by your peers on the demonstration (see rubric below). You may

Submit electronically a final report with emphasis on pictures, schematics, and videos. Include the following:

1. Title, team name, team members
2. Team picture (with names labeled)
3. Photo of your project
4. Links (Youtube is preferred) to video of project in operation and/or stages of construction.
5. Summary of its function, and how you incorporated the four course components (sensing, actuation, computation, and mechanical design)
6. Particularly useful schematics, drawings, files (e.g., datasheets, tutorials, etc). If a group in the future wanted to improve on your design, what would they need to know? Links are acceptable.

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**Project Grades:**

Initial Proposal	5
Full Proposal	15
Execution	60 (20 - functionality/aesthetics; 15 - reliability; 15 - reaching goals; 10 - peer evaluation)
Report	20
<b>Total:</b>	<b>100</b>

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