Syllabus: RBT 480: Advanced Robotics Capstone

Course Title: RBT 480: Advanced Robotics Capstone

Semester: Fall 2024

Instructor: Dr. Michael Johnson

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Office Hours: Wednesdays 2:00-4:30 PM OR by appointment

Class Time & Place: Tuesday or Thursday 3:00-4:15 PM in SANCA 265

Course Description:

This capstone course focuses on the development of advanced robotics systems, with an emphasis on automation and human-robot interaction. Students will design, build, and test a robotic system that addresses a specific challenge in the field. The course includes the development of a project proposal, system design, prototype development, and presentation of findings through a report and at the Innovation Showcase.

Course Objectives:

Design and implement an advanced robotics system that addresses a real-world challenge.

Conduct system simulations and prototype testing.

Evaluate the system's performance through user testing.

Effectively present the project at the Innovation Showcase.

Learning Outcomes:

Gain expertise in robotics system design and development.

Develop practical skills in mechanical, electrical, and software engineering.

Improve communication skills through written reports and presentations.

Enhance the ability to manage complex robotics projects from conception to completion.

Group Project and Required Subtasks:

The group project for this course will involve designing and implementing an advanced robotics system that addresses a specific challenge in automation or human-robot interaction. The project will be broken down into the following subtasks:

1. **Project Proposal (Week 3):**
   - Create a proposal detailing the project's objectives, the problem being addressed, and the anticipated impact. Include a timeline and assign roles to team members.

2. **System Design and Simulation (Weeks 4-6):**
   - Design the robotic system, including mechanical, electrical, and software components. Develop a simulation to test the system's functionality before physical implementation.

3. **Prototype Development (Weeks 7-10):**
   - Build and test a prototype of the robotic system. Refine the system based on test results and ensure it meets the project's objectives.

4. **User Testing and Feedback (Weeks 11-12):**
   - Conduct user testing to evaluate the system's performance and gather feedback. Use this feedback to make necessary adjustments.

5. **Final Report and Showcase Preparation (Weeks 13-15):**
   - Document the entire development process, including design decisions, challenges, and outcomes in a final report.
   - Prepare a presentation and poster for the Innovation Showcase that highlights the key aspects of the project.

Groups are expected to collaborate closely, meeting regularly to discuss progress and resolve any issues. Instructor check-ins will be scheduled to provide guidance and feedback.

Evaluation:

Class meetings (5): 20 points

Individual meetings (3): 12 points

Project Proposal: 10 points

System Design and Simulation: 15 points

Prototype Development: 18 points

User Testing and Feedback: 10 points

Final Report: 10 points

Presentation: 5 points

Poster: 10 points

Total: 100 points

Course Policies:

Attendance and Participation: Regular attendance and active participation are crucial for success in this course. Students are expected to attend all scheduled class meetings and individual sessions. If a student is unable to attend a class, they should inform the instructor in advance and arrange to complete any missed work.

Academic Integrity: All students must adhere to ASU's academic integrity policy. Any form of academic dishonesty, including plagiarism, will be reported and may result in severe penalties, including a failing grade for the course.

Accommodations: Students with disabilities or special needs should contact the ASU Disability Resource Center to arrange appropriate accommodations and notify the instructor as soon as possible.

Important Dates:

Class Week 1: Introductions & Project Brainstorming (Aug 26)

Individual Meeting #1: Discuss Ideas and Readings (Sep 4)

Class Week 2: Proposal Presentation & Group Feedback (Sep 18)

Individual Meeting #2: Proposal Feedback & Methods Discussion (Oct 2)

Class Week 3: Revised Proposal Presentation & CERTT Tour (Oct 23)

Individual Meeting #3: Data Analysis & Progress Review (Nov 13)

Class Week 4: Professional Development & Project Discussion (Nov 27)

Innovation Showcase: Final Presentations & Poster Display (Dec 6)