

Mechanical Engineering Department

ME 465 Mechatronics

Course Syllabus

Electromechanical system modeling, control and applications. Design of electronic interfaces and controllers for mechanical devices. Sensor technology, signal acquisition, and conditioning. Microcontroller-based closed-loop control and device communications. Sensor and actuator selection, installation, and application strategies, PLC programming.

Textbook(s)/ Required Material

Bolton, William. Mechatronics: electronic control systems in mechanical and electrical engineering. Pearson Education, 7th edition, 2018.

Prerequisites by Course

DYNAMICS GE 202

Course Objectives

1. Expose students to several basic mechatronics concepts and techniques.
2. Learn and have hands-on experience of mechatronics components and control.
3. Be able to use commercial software tools for modeling and simulation of mechatronic systems
4. Be able to design a system, component, or process to meet desired needs within realistic constraints.
5. Understand the concept of PLC system and its ladder programming, and significance of PLC systems in industrial application
6. Demonstrate team work with work division, team meetings and communications among team members.

Topics Covered

Week	Description
1	Introduction and Basic Concepts of Mechatronics
2	Electromechanical system modeling
3, 4, 5 & 6	Measurements (sensors and transducers)
7, 8 & 9	Actuators selection (mechanical, pneumatic, hydraulic)
10	digital logic
11 & 12	High-level programming tools
13 & 14	classic control and PLC

Assessment Tools

Two mid-term exams: 30%

Homework and quizzes: 10%

Term project: 10%

Presentation: 10%

Final exam: 40%