

Course Syllabus

Department: Science & Technology

Date: Spring 2013

I. Course Prefix and Number: TECH 234

Course Name: Automation Control II

Credit Hours and Contact Hours: 4 Credit Hours - 5 Contact Hours

Catalog Description including pre- and co-requisites: *supporting data required for grade prerequisite of 'C' or higher.*

Control tools and techniques used in automation are developed using Mechatronics (automated motion control) and Industrial Machine Vision (acquisition, processing and use of images in automation control). Students will apply concepts and techniques learned to complete a team based case study project to solve problems encountered in high technology businesses. Prerequisites: TECH 231 and TECH 232

Relationship to Academic Programs and Curriculum including SUNY Gen Ed designation if applicable:

The proposed course relies on successful completion of prerequisites: TECH 231 Automation of Data Acquisition and TECH 232 Automation I

II. Course Student Learning Outcomes: *State the student learning outcome(s) for the course (e.g. Student will be able to identify...)*

The culminating synthesis of student learning in the course will be a team based case study project in which they will define and develop an innovative automation control solution using appropriate hardware and software tools. The student will demonstrate specific learning outcomes:

- * Identifying and defining the automation control requirements, and specifying tasks to be performed
- * Selecting appropriate actuators and control hardware (Mechatronics & Machine Vision)
- * Setting up and testing of actuators and control hardware (Mechatronics & Machine Vision)
- * Developing appropriate software solution for chosen Mechatronics & Machine Vision control Hardware
- * Documenting and presenting an appropriate solution

College Learning Outcomes Addressed by the Course: (check each College Learning Outcome addressed by the Student Learning Outcomes)

- | | |
|---|---|
| <input type="checkbox"/> writing | <input checked="" type="checkbox"/> computer literacy |
| <input type="checkbox"/> oral communications | <input type="checkbox"/> ethics/values |
| <input type="checkbox"/> reading | <input type="checkbox"/> citizenship |
| <input checked="" type="checkbox"/> mathematics | <input type="checkbox"/> global concerns |
| <input checked="" type="checkbox"/> critical thinking | <input type="checkbox"/> information resources |

III. Assessment Measures (Summarize how the college and student learning outcomes will be assessed): For each identified outcome checked, please provide the specific assessment measure.

List identified College Learning Outcomes(s)	Specific assessment measure(s)
<i>eg: writing</i>	<i>eg: student will complete a research paper</i>
Mathematics	Student will complete quantitative assignment using mathematical methods to model and analyze automation control system.
Critical Thinking	Student will complete complex problem solving assignment using all available resources.
Computer Literacy	Students will complete project work and assignment using control software.

IV. Instructional Materials and Methods

Types of Course Materials: Hardware & Software: Mechatronics and Machine Vision. LabVIEW and other software appropriate to specific hardware components.

Methods of Instruction (e.g. Lecture, Lab, Seminar ...): Mini-lectures, active learning, hands-on activities, team based case study project.

V. General Outline of Topics Covered:

- Principles and Practice of Motion Control
 - * Selecting and Sizing Servo and Stepper Motors
 - * Using Feedback in Motion Control
 - * Control of Trajectory using Motion Control Software Mechatronics
 - * Hardware and software
- Principles and Practice of Industrial Machine Vision
 - * Choice of Lighting, Optics, Camera, and Image Acquisition Devices
 - * Acquiring and Displaying Images
 - * Techniques and Algorithms of Image Processing

- * Calibrating Images
- * Industrial Machine Vision Applications: Metrology, Automated Inspection, Robotics Simulation of Motion Control and Machine Vision Hardware and Software

The students will complete a team-based case study project in which they will define and develop an innovative automation control solution using appropriate hardware and software tools.

Specific outcomes include:

- * Identifying and defining the automation control requirements, and specifying tasks to be performed
- * Selecting appropriate actuators and control hardware (Mechatronics & Machine Vision)
- * Setting up and testing of actuators and control hardware (Mechatronics & Machine Vision)
- * Developing appropriate software solution for chosen Mechatronics & Machine Vision control Hardware
- * Documenting and presenting an appropriate solution

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