

Course Syllabus

Department: Science & Technology

Date: Spring 2014

I. Course Prefix and Number: TECH 232

Course Name: Automation Control I

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

Catalog Description including pre- and co-requisites:

Control tools and techniques used in automation are introduced using Microcontrollers, Programmable Logic Controllers, and Programmable Automation Controllers. Students will apply concepts and techniques learned to complete a team based case study project to solve problems encountered in high technology businesses. Prerequisites: ESC 174, MAT 152 or placement into Math Level 4, PHY 109 or TECH 122, TECH 123. Corequisite: TECH 231.

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

The proposed course relies on successful completion of prerequisites which are existing courses: TECH 123 Digital Electronics, ESC 174 Computing for Engineers, MAT 152 Pre-Calculus, PHY 109 Applied Physics II or TECH 122 Electronic Theory I. TECH 122 is required for AAS Mechanical Design and Drafting program. TECH 232 will be prerequisite for TECH 234 Automation Control II.

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 (Microcontroller, PLC, or PAC)
- * Setting up and testing of actuators and control hardware
- * Developing appropriate software solution for chosen 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: Microcontrollers, Programmable Logic Controllers, Programmable Automation Controllers, 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 will be used. Visits to industrial sites will help students learn from actual applications.

V. General Outline of Topics Covered:

Microcontroller

* Hardware and software

Programmable Logic Controller (PLC)

* Hardware and software

* Ladder Diagrams

Programmable Automation Controller (PAC)

* Hardware and software

Simulation of Control Hardware and Software
Communication between Microcontroller, PLC, PAC and Computer
Simulation of Control 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 (Microcontroller, PLC, or PAC)
- * Setting up and testing of actuators and control hardware
- * Developing appropriate software solution for chosen control hardware
- * Documenting and presenting an appropriate solution

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