

Montgomery County Community College
 EGT 235
 Instrumentation and Controls
 4-3-3

COURSE DESCRIPTION:

This course provides the student the opportunity to investigate the selection and use of automated control devices and their associated input and output interfaces to measure operating characteristics in both electrical and mechanical systems. The student will work with programmable logic equipment as well as electromechanical devices and design actual processes that will then be monitored and feedback controlled. A design-of-experiments approach to learning is incorporated into the course. This course is subject to a course fee. Refer to <http://mc3.edu/adm-fin-aid/paying/tuition/course-fees> for current rates.

REQUISITE(S):*Previous Course Requirements*

- EGT 190 Principles of Critical Thinking in Technology
- EGR 111 Engineering Computations, or equivalent
- PHY 121 General Physics I
- PHY 122 General Physics II or equivalent
- MAT 162 Precalculus II

Concurrent Course Requirements

None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Explain the function of the devices and systems used in the monitoring and feedback control of industrial processes.	Lecture Case Studies Design of Experiments	Exams Design of Experiments Review
2. Apply the troubleshooting techniques necessary to maintain an industrial control process.	Lecture Case Studies Design of Experiments	Exams Design of Experiments Review
3. Operate robotic, AC/DC motor and PLC-based systems.	Lecture Case Studies Design of Experiments	Exams Design of Experiments Review

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
4. Design and fabricate a control system to control a process.	Lecture Design/Fabrication Project	Group Problem Solving Design/Fabrication Project/ Presentation Review

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS:

1. Overview of Industrial Automation
2. Safety
3. Overview of Programmable Logic Controllers
4. Fundamentals of Programming
5. Rockwell Automation Addressing and Instructions
6. Timers and Counters
7. Input/Output Modules and Wiring
8. Math and Advanced Instructions
9. Industrial Sensors
10. Introduction to Robotics
11. Introduction to Fluid Power Actuation
12. Fundamentals of Process Control
13. Process Control Systems
14. Overview of Plant Floor Communication
15. Computer Numerical Control (CNC) Machines
16. Installation, Maintenance, and Troubleshooting

LEARNING MATERIALS:

Textbook:

Stenerson. *Industrial Automation and Process Control*. (2003). Pearson.
ISBN: 9780130330307

Laboratory:

Allen Bradley 5000 PLC and Rockwell RSLogix Training Software
KUKA Agilus Robots and Control Software
Lab Volt Electro-Mechanical Trainer Systems

Other learning materials may be required and made available directly to the student and/or via the College's Blackboard course management system.

COURSE APPROVAL:

Prepared by: W. Brownlowe Date: 11/28/2004
Associate Professor of Engineering

Revised by: William H. Brownlowe Date: 9/26/2013
Associate Professor of Engineering

Revised by: William H. Brownlowe Date: 1/17/2014
VPAA/Provost or designee Compliance Verification:
Victoria L. Bastecki-Perez, Ed.D Date: 6/10/2014

Revised by: Debbie Dalrymple Date: 12/17/2017
VPAA/Provost or designee Compliance Verification: Date: 1/9/2018



This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.