MIDDLESEX
COUNTY COLLEGE

COURSE SYLLABUS

Department: Engineering Technologies

Programs: Electrical Engineering Technology
Mechanical Engineering Technology

Course Number: MCT 220

Title of Course: Introduction to Robotics and Control Systems

Curriculum Coordinator: Rick Schieni

Designation: Required Course

Course Description:
A study of the pneumatics, electrical, and mechanical components and drives utilized in robotics and control systems. Topics include kinematics of robotics, analog and digital controllers, operations, and applications. Students are required to complete projects that include reports and oral presentations.

Prerequisites:
MEC 123 Technical Graphics/CAD I
MAT 129 PreCalculus
ELT 105 Foundations of Electrical and Electronics Technology

Co-requisite:
None

Textbooks and /or other required material:
Electrical Control For Machines by Lobsiger, Giuliani and Rexford, Cengage, 7th Ed

Course Learning Outcomes and their relationships to Student Outcomes:
1. Determine the displacement of robot linkages using direct kinematics and AutoCAD.
2. Determine gear ratios. **(SO b)**
3. Design and build pneumatic circuits utilizing valves, flow controls, linear actuators, and air motors.
4. Specify AC and DC motors based on application.
5. Specify on/off or proportional control depending on the design application.
6. Specify temperature, pressure, flow, and proximity sensors to control a process.
7. Interface sensors and actuators and write ladder logic programs to control a process**. (SO e)**
8. Recognize the need for and an ability to engage in lifelong learning.

Lecture Topics Covered:

- Introduction to Robotics and Industrial Automations
- Kinematics of Robotics arms, manipulators, linkages and gears
- Program Logic Controllers and Microprocessor Controllers
- Pneumatics Systems, Motor and Actuators
- Electric Motors and Actuators
- Feedback Control Systems, and Proportional, Integral and Derivative(PID) Control
- Sensors (temperature, force, motion, flow, proximity)
- Interfacing Sensors and Actuators

Laboratory Topics Covered:

- Design a three link robot using kinematics equations
- Design and assemble pneumatic control circuits
- Design and assemble relay control circuits
- Program PLC
- Program a Robot to perform a specific task

Class/Laboratory schedule. Number of sessions each week and duration of each session:
1 lecture hour per week for 14 weeks
4 laboratory hours per week for 14 weeks

Criterion 5 Contribtion:
Technical Content

Prepared By:	Joseph Misuraca	**Date:**	3-19-2008
Updated By:	Joseph Misuraca	**Date:**	1-13-2009
Rev 2:	T. Sabol	**Date:**	4/4/14
Rev 3:	J. Misuraca Remap course outcome to new ABET Student Outcomes. Update course learning outcomes.	**Date:**	9/29/14
Rev 4:	General Update	**Date:**	3/15/21