

# AUTOMATION PROGRAMMING CERTIFICATE

22 Semester Credit Hours; Curriculum: 0248

Intermediate level certificate prepares students for technical positions in modern automation and mechatronics fields. The main focus of the certificate is development of programming skills by students to run sophisticated automation systems managed by various controllers. Students will learn to design, program, monitor, and troubleshoot automation systems ranging from basic equipment to complex industrial systems.

Code	Title	Hours
<b>Courses for a Certificate</b>		
MFG 112	Introduction to Automation	3
MFG 135	Fluid Power and Controls	4
or MFG 210	Industrial Robotics and Automation	
MFG 220	Automation Vision Systems	3
or MFG 225	Motors and Controls	
MFG 240	Programmable Logic Controllers (PLC)	4
MFG 245	Programmable Automation Controllers (PAC)	4
MFG 250	Advanced Automation Controllers	4
<b>Total Hours</b>		<b>22</b>

## Automation Programming Certificate Pathway

The following Pathway is recommended for students pursuing the Automation Programming Certificate.

<b>First Year</b>		
<b>Fall Semester</b>		<b>Hours</b>
MFG 112	Introduction to Automation	3
MFG 240	Programmable Logic Controllers (PLC)	4
<b>Hours</b>		<b>7</b>
<b>Spring Semester</b>		
MFG 135	Fluid Power and Controls	3-4
or MFG 225	or Motors and Controls	
MFG 245	Programmable Automation Controllers (PAC)	4
<b>Hours</b>		<b>7</b>
<b>Second Year</b>		
<b>Fall Semester</b>		
MFG 210	Industrial Robotics and Automation	3-4
or MFG 220	or Automation Vision Systems	
MFG 250	Advanced Automation Controllers	4
<b>Hours</b>		<b>8</b>
<b>Total Hours</b>		<b>22</b>

**Note:** Pathway is a recommended sequence of courses. Students should contact the program coordinator with questions about course prerequisites and recommendations.

## Program Learning Outcomes

1. Compose state diagrams and flow charts based on machine functional sequence and operational requirements.
2. Define Programmable Logic/Automation Controllers (PLC/PAC) and their advantages over Relay Logic systems.

3. Create Ladder Diagram, Function Block Diagram, and Sequential Function Chart programs to control machine operation sequence.
4. Evaluate PLC/PAC programs to assure they meet OSHA operational safety requirements for automated equipment.
5. Design various screen layouts to control automated industrial equipment by Human Machine Interface (HMI) devices.