ADVANCED MECHATRONICS CERTIFICATE

40 Semester Credit Hours; Curriculum: 0254

Advanced certificate prepares students for exciting careers in systems integration. Mechatronics is a new field blending mechanical, electrical, and computer engineering to design, build, program, and operate smart industrial machines. Students will learn to operate, setup, program, and troubleshoot high-tech automation equipment by integrating electronics, mechanical systems, fluid power, industrial robotics, and programmable controllers.

Code	Title	Hours
Courses for a Certificate		
ELT 101	Introduction to Electronics	5
ELT 106	Semiconductor Theory	3
MFG 112	Introduction to Automation	3
MFG 135	Fluid Power and Controls	4
MFG 210	Industrial Robotics and Automation	4
MFG 220	Automation Vision Systems	3
MFG 240	Programmable Logic Controllers (PLC)	4
MFG 245	Programmable Automation Controllers (PAC)	4
MFG 250	Advanced Automation Controllers	4
Select two of the following:		6
ELT 110	Electronic Drafting Using CAD	
MFG 102	Industrial Drafting and Design	
MFG 170	Automation Equipment Maintenance	
MFG 225	Motors and Controls	
MFG 230	Automation Equipment Repair	
MFG 270	Automation Equipment Controls	
Total Hours		**40**

Advanced Mechatronics Certificate Pathway

The following Pathway is recommended for students pursuing the Advanced Mechatronics Certificate.

First Year		
Fall Semester		**Hours**
ELT 101	Introduction to Electronics	5
MFG 112	Introduction to Automation	3
MFG 240	Programmable Logic Controllers (PLC)	4
	Hours	**12**
Spring Semester		
ELT 106	Semiconductor Theory	3
MFG 135	Fluid Power and Controls	4
MFG 245	Programmable Automation Controllers (PAC)	4
Select one of the following:		3-4
ELT 110	Electronic Drafting Using CAD	
MFG 102	Industrial Drafting and Design	
MFG 170	Automation Equipment Maintenance	
MFG 225	Motors and Controls	
MFG 230	Automation Equipment Repair	
MFG 270	Automation Equipment Controls	
	Hours	**14-15**

Second Year		
Fall Semester		
MFG 210	Industrial Robotics and Automation	4
MFG 220	Automation Vision Systems	3
MFG 250	Advanced Automation Controllers	4
Select one of the following:		3-4
ELT 110	Electronic Drafting Using CAD	
MFG 102	Industrial Drafting and Design	
MFG 170	Automation Equipment Maintenance	
MFG 225	Motors and Controls	
MFG 230	Automation Equipment Repair	
MFG 270	Automation Equipment Controls	
	Hours	**14-15**
	Total Hours	**40-42**

Note: Pathway is a recommended sequence of courses. Part-time students should contact the program coordinator to discuss a part-time pathway as well as course prerequisites and recommendations.

Program Learning Outcomes

1. Recognize integrated system components and machine function by examining electrical wiring diagrams and symbols.
2. Design a control circuit to run number of valves and cylinders through a specified sequence of operations.
3. Explain the basic concepts of machine vision systems such as camera technology, pixel size, optics, and light sources.
4. Create, simulate, and troubleshoot programs for varied robot operations including safe industrial robot operation.
5. Create Ladder Diagram (LD), Function Block Diagram (FBD), and Sequential Function Chart (SFC) to control automated machines.
6. Design various screen layouts to control automated industrial equipment by Human Machine Interface (HMI) devices.