ADVANCED MECHATRONICS A.A.S.

61 Semester Credit Hours; Curriculum: 0253

Advanced Mechatronics degree is designed to prepare students for exciting careers in systems integration. Mechatronics is an emerging field that blends 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.

***Note**: Refer to* IAI General Education Courses *page for guidelines on General Education course selection.*

Code	Title	Hours
General Education Requirements		
Area A — Communications		
EGL 101	Composition I	3
Select one of the following:		3
EGL 102	Composition II	
EGL 111	Introduction to Business and Technical Writing (recommended)	
EGL 212	Technical Writing Applications (recommended)	
SPE 103	Effective Speech	
Area B — Mathematics		
Select one course from Area B		3-4
MAT 114	Applied Mathematics I (recommended)	
Area C — Science		
No course required		0-3
PHY 101	Applied Physics (recommended)	
Area D — Social and Behavioral Sciences		
Select one course from a social or behavioral science discipline		3
Area E — Humanities/Fine Arts		
Select one course from a humanities or fine arts discipline		3
Area F — Global Studies [1]		
Select one course that satisfies Global Studies requirement		0-3
Area G — U.S. Diversity Studies [2]		
Select one course that satisfies U.S. Diversity Studies requirement		0-3
Total Hours		**15**

1 *Students may take a Global Studies course that satisfies both Area F and another Area requirement.*

2 *Students may take a U.S. Diversity Studies course that satisfies both Area G and another Area requirement.*

Code	Title	Hours
Major Requirements		
ELT 101	Introduction to Electronics	5
ELT 106	Semiconductor Theory	3
ELT 224	Industrial Circuit Applications	3
or MFG 225	Motors and Controls	
MFG 102	Industrial Drafting and Design	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	
ELT 221	Digital Circuit Fundamentals	
ELT 223	Integrated Circuits	
MFG 170	Automation Equipment Maintenance	
MFG 230	Automation Equipment Repair	
MFG 270	Automation Equipment Controls	
Total Hours		**46**

Advanced Mechatronics A.A.S. Pathway

The following Pathway is recommended for students pursuing an Associate in Applied Science degree in Advanced Mechatronics. For more information or program specific advising contact the Department Chair or Program Coordinator. **General Education courses should be selected from the list of IAI General Education Courses.**

First Year		
Fall Semester		**Hours**
EGL 101	Composition I	3
MAT 114	Applied Mathematics I	4
MFG 102	Industrial Drafting and Design	3
MFG 112	Introduction to Automation	3
MFG 240	Programmable Logic Controllers (PLC)	4
	Hours	**17**
Spring Semester		
Select one of the following:		3
EGL 102	Composition II	
EGL 111	Introduction to Business and Technical Writing (recommended)	
EGL 212	Technical Writing Applications (recommended)	
SPE 103	Effective Speech	
ELT 101	Introduction to Electronics	5
MFG 135	Fluid Power and Controls	4
MFG 245	Programmable Automation Controllers (PAC)	4
	Hours	**16**
Second Year		
Fall Semester		
ELT 106	Semiconductor Theory	3
MFG 210	Industrial Robotics and Automation	4
MFG 220	Automation Vision Systems	3
MFG 250	Advanced Automation Controllers	4
	Hours	**14**
Spring Semester		
ELT 224	Industrial Circuit Applications	3
or MFG 225	or Motors and Controls	
Select two of the following:		6-8
ELT 110	Electronic Drafting Using CAD	
ELT 221	Digital Circuit Fundamentals	
ELT 223	Integrated Circuits	
MFG 170	Automation Equipment Maintenance	
MFG 230	Automation Equipment Repair	
MFG 270	Automation Equipment Controls	
Select one Social and Behavioral Sciences course that also satisfies Global Studies [1] or U.S. Diversity Studies [2] requirement		3

Select one Humanities/Fine Arts course that also satisfies Global Studies [1] or U.S. Diversity Studies [2] requirement	3
Hours	**15-17**
Total Hours	**62-64**

1 *At least one Global Studies course is required for degree completion.*

2 *At least one U.S. Diversity Studies course is required for degree completion.*

Note: Pathway is a recommended sequence of courses. Part-time students should contact the department chair or 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.
7. Propose best solution for systems integration projects using critical thinking and communication skills.