

**ELECTROMECHANICAL TECHNOLOGY**

Associates of Applied Science

## About the Electromechanical Technology Program

Develop a wide variety of technical skills in electronics, fluid power, mechanical systems, computers and computer-controlled machines. Programmable logic controllers, robotics, motors and drives, servo hydraulic systems and closed loop positioning will be studied. A comprehensive understanding of how these technical skill areas are linked together to create automated systems is developed through a hands-on project course that allows the student to put together the various technologies in an integrated manufacturing system.

### PROGRAM OUTLINE

SEMESTER: 1		
Course #	Course Title	Credits
1010311500	MS Word Beginning Provides practice in using basic word processing functions and features of MS Word.	1.00
1010312600	MS Excel Beginning Develops skills in using basic spreadsheet functions of MS Excel for business users.	1.00
1044910000	Industrial Safety Fundamentals Introduces general safety for a manufacturing environment while raising the awareness of the worker to the hazards around them, and how to best protect themselves while working safely. Students will earn an OSHA 30 card and confined space certificate upon completion.	2.00
1046212600	Industrial Electronic Concepts Introduces the student to basics of electricity needs by the industrial mechanic. Included are basic electrical theory, operation and use of the Volt-Ohm meter, AC and DC electric motors, motor controls and wiring, and applications as needed to install, operate, and control industrial machines.	3.00
1062010500	Hydraulics and Pneumatics for Electromech Overview of basic components, applications, and circuitry involved in hydraulics and pneumatics systems. Lecture and lab experiences involving pumps, valves, cylinders, fluids, and conditioners; basic theory and circuitry.	2.00
1062011500	PLC Systems I Principles of programmable logic controllers (PLCs) including programming the PLCs, creating basic ladder logic circuits containing basic logic functions, timers, counters, and sequencers. Emphasis is on basic PLC functions to assist one in servicing and troubleshooting PLC controlled equipment.	3.00
1080119500	Written Communication Develops writing skills which include prewriting, drafting, revising, and editing. A variety of writing assignments is designed to help the learner analyze audience and purpose, research and organize ideas, and format and design documents based on subject matter and content. Also develops critical reading and thinking skills through the analysis of a variety of written documents.	3.00
1080916600	Intro to Ethics Theory and Application Provides a basic understanding of the theoretical foundations of ethical thought. Diverse ethical perspectives will be used to analyze and compare relevant issues. Students will critically evaluate individual, social and/or professional standards of behavior, and apply a systematic decision-making process to these situations.	3.00

**SEMESTER: 2**

Course #	Course Title	Credits
1046211000	<b>Mechanical Concepts 1</b> This course is designed to give the student a basic understanding of the mechanical concepts that are found on industrial equipment. Since all industrial machinery is equipped with some type of mechanical drive, a firm understanding of these drives is necessary for both the industrial mechanical technician and the electro-mechanical technician.	2.00
1062010700	<b>Electronic Devices and Digital Concepts</b> Electronic circuits and digital electronics from an electromechanical perspective. Topics covered include electronic switching devices, operational amplifiers, D-A and A-D conversions and basic digital circuits and systems. Emphasis will be placed on installation considerations, compatibility with other devices and troubleshooting. Prerequisite(s): 1046212600 Industrial Electronic Concepts (C or better).	3.00
1062012200	<b>Industrial Motor Control</b> This course will lead you through the fundamentals of electric motor control and power circuits. You will learn to recognize and draw the basic symbols, the language of motor control, and how to apply these symbols, into current industrial format. Forward and reversing motor starters, contractors and frequency drives. 3-phase AC motors, single-phase, split-phase AC motors, and DC motors, motor starters and motor controls. Mounting and wiring of control systems for easy maintenance. You will also learn to draw and read ladder and wiring diagrams. You will be introduced to the logic used in motor control and be required to apply this logic in order to correctly interpret, design, and wire control circuits. Prerequisite(s): 1046212600 Industrial Electronic Concepts (C or better).	3.00
1062013000	<b>PLC Systems II</b> Design and add documentation to ladder logic programs to solve application problems. PLC applications examples as used in industry will be programmed on real industry equipment utilizing a wide variety of various sensors, photoelectric, proximity, motor drives, and control devices creating working automated systems. Prerequisite(s): 1062011500 PLC Systems I (C or better).	2.00
1080413400	<b>Mathematical Reasoning</b> An activity based approach is used to explore numerical relationships, graphs, proportional relationships, algebraic reasoning, and problem solving using linear, exponential and other mathematical models. Students will develop conceptual and procedural tools that support the use of key mathematical concepts in a variety of contexts. This course is not designed for Science, Technology, Engineering, or Math (STEM) students and/or others who require calculus. Prerequisite(s): 7785478000 Principles of College Math (C or better) or Accuplacer Algebra score $\geq 35$ or UW Math Placement Basic Math score $\geq 250$ or ACT Math score $\geq 18$ or Tailwind Math CMath Fund score $\geq 16$ .	3.00
1080919900	<b>Psychology of Human Relations</b> Focuses on improving personal and job-related relationships through understanding and applying sound psychological principles. Topics include self-concept, motivation, emotions, stress management, conflict resolution, and human relation processes.	3.00

**SEMESTER: 3**

Course #	Course Title	Credits
1015011000	<b>Networking Fundamentals</b> Gives the student a basic understanding of a network. The student will gain an understanding of basic networking terminology, and OSI model, network cabling practices, TCP/IP addressing, and subnet masking. The student will investigate communication on a LAN environment.	3.00

Course #	Course Title	Credits
1044216600	Fund of Welding Machine Tool Operations Introduces students to basic shielded metal arc welding, oxy-fuel arc cutting, and pipe welding operations. The students will also work with basic machine tools used in manufacturing and maintenance to develop skills using the lathe, drill press, band saw, and grinders.	2.00
1062013500	Industrial Robotics Systems Terminology, concepts, and components of robots, robot-type machines, and automation. Emphasis will be on interfacing automated machinery.	3.00
1062014100	PLC Systems III Determine the operation of PLC circuits using ladder diagrams, wiring diagrams, input/output schematics, and data sheets then develop a variety of specific techniques for diagnosing malfunctions in circuits containing PLC's. Prerequisite(s): 1062013000 PLC Systems II (C or better).	3.00
1062014500	Motion Control Applications This course explains the fundamentals of stepper motors including; testing, operation, drivers, indexers, and computer control of motion for use in applications to control X Y motion such as lathes, and X Y Z motion such as control of milling machines. This course will also cover fundamentals of servo control including; testing motors, optical encoders, servo drivers, and computer control of motion for use in applications to control X Y motion such as lathes, and X Y Z motion such as control milling machines.	3.00
1080613900	Survey of Physics Emphasizes understanding basic physics concepts through laboratory investigation and applications. Topics include kinematics, dynamics, work, energy, power, temperature, heat, waves, electricity, magnetism, electromagnetic waves, optics, and atomic and nuclear physics.	3.00

#### SEMESTER: 4

Course #	Course Title	Credits
1046216000	Industrial Fluid Process Control Systems Provides a hands-on approach to the study of fluid handling systems in industry. A wide variety of system components, including pumps, piping, flow control devices, flow measuring devices, level control, and related industrial instrumentation will be studied. Prerequisite(s): 1062012200 Industrial Motor Control (C or better).	3.00
1062015000	SCADA Concepts SCADA stands for Supervisory Control And Data Acquisition. This course will focus on industrial applications of acquiring data from PLC based equipment using industrial and ethernet networks. Display of data will use industrial display terminals such as the Allen-Bradley Panel View and Microsoft Excel spreadsheet using DDE technology. Additional applications utilizing ASCII text strings and HyperTerminal will be investigated.	2.00
1062015500	Automated Processes This course is designed to give the student understanding and experience with various types of automated equipment, including proper lock-out, tag-out, and troubleshooting motors and motor drives. Learning activities include occupational or project experience demonstrating functionality, troubleshooting, and repair. Prerequisite(s): 1062013500 Industrial Robotics Systems (C or better).	2.00
1062016500	EM System Interfacing Hands-on interfacing of PLC's, operator interfaces, sensors, and various automated equipment to create a work cell level of automation. Students gain experience in programming, wiring, and configuration. Learn the troubleshooting and programming of a more complex process. Prerequisite(s): 1062013000 PLC Systems II (C or better) and 1062013500 Industrial Robotics Systems (C or better).	2.00

Course #	Course Title	Credits
1062017500	<b>Electromechanical Capstone</b> Offers electromechanical technology students the opportunity to incorporate content from the first three semesters while focusing on personal interests within the field of electromechanics. Students will begin projects as preliminary proposals, further refine them through the design phase, and then develop them into a final project. This course culminates assessment of program outcomes for the Electromechanical Technology program.	2.00
1080119600	<b>Oral Interpersonal Communication</b> Focuses upon developing speaking, verbal and nonverbal communications, and listening skills through individual presentations, groups activities, and other projects.	3.00

**Total Credits: 65.00**

Talk with an Academic Advisor about the program outline. Together, you will determine if credits you've already earned satisfy any requirements, discuss possible alternative courses, and choose the best classes if you're thinking of transferring.

## AT A GLANCE

### Flexible Options



**ON CAMPUS**

### Term Start Dates

**Fall 2019:** September 4

**Spring 2020:** January 8

**Summer 2020:** May 8

### Approximate Cost

**\$8,723\***

Financial Aid Eligible

\*Based on 10-level courses - materials, books, and fees may be additional

### What You'll Learn

- Practice industry recognized safety practices and guidelines, including the use of personal protective equipment in an industrial operating environment.
- Work as part of a maintenance team to assemble/disassemble, troubleshoot, diagnose and repair industrial equipment and systems using appropriate tools, materials, and methods
- Interpret drawings, schematics, and specifications for industrial equipment.
- Document technical information through descriptive writing, sketches/diagrams, mathematical expression, computation, and graphs.
- Use precision measuring equipment.
- Apply knowledge of electricity, electronics, hydraulics, and electric motors and mechanics.
- Perform electrical, mechanical, and fluid measurements by properly selecting tools and test equipment.
- Operate and control robotic machines, motors and other industrial equipment components.
- Apply electrical skills to troubleshoot control and operator panels.
- Apply programming languages to the control of single programmable controllers and industrial networks.

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## Your Potential Careers

- Electromechanical Technician
- Industrial Automation Technician
- Research and Development Technician
- Robotics Technician
- Industrial Maintenance Technician
- Field Service Technician

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## Median Annual Salary

\$43,347	\$47,632	\$51,085
Local	State	National

EMSI 2018.3

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## Get Started

Your application can be submitted online, it takes just a few minutes to complete.

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