A.A.S. Industrial Controls

(1 Year)

Description:
Industrial Controls is offered as a second AAS degree following completion of an Electrical Journeyman AAS, or an Electrical Apprenticeship AAS program and completion of all General Education requirements. Students must have completed a minimum of three years of the Electrical Apprenticeship Program towards the first AAS degree before being able to apply for the Industrial Controls program. Students in this program can complete coursework focusing on either Instrumentation and Process Control or Motor Control and Protective Relaying.

Program Objectives:
1. Solve technical problems typical of those encountered in the energy systems instrumentation engineering technology discipline by using critical thinking skills, current technology, and principles of mathematics and applied science.
2. Work and communicate effectively in multidisciplinary teams in both industrial and academic settings.
3. Understand current professional issues and the need to pursue lifelong learning.

Student Outcomes:
1. Demonstrate safe work practices on industrial equipment.
2. Work and communicate effectively in a diverse team environment.
3. Utilize test equipment to troubleshoot and analyze electrical, electronic, and instrumentation related circuits.
4. Analyze alternating current (AC) and direct current (DC) electronic circuits and logic fundamentals.
5. Create schematics to document electrical, electronic, and process control systems.
6. Design and troubleshoot circuits for motor controls and associated devices.
7. Install, troubleshoot, and maintain electrical AC and DC motors, generators, and variable frequency drives.
8. Install, configure, calibrate, and troubleshoot pressure, temperature, level, flow, and analytical instrumentation.
9. Configure, troubleshoot, and optimize Proportional-integral-Derivative (PID) control loops.
10. Use the fundamentals of pump and valve operation to troubleshoot final element issues.
11. Utilize the fundamentals of fluid dynamics and thermodynamics to troubleshoot and maintain process control associated with industrial plants.
12. Design, implement, and troubleshoot Programmable Logic Controllers (PLC) programs and associated Human Machine Interface (HMI) applications for industrial processes.
13. Utilize the fundamentals of networks and digital communications to troubleshoot and maintain distributed plant automation and Supervisory Control and Data Acquisition (SCADA) systems.

General Education
The listing below includes program requirements that also fulfill General Education requirements.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Objective 1 -</td>
<td>ENGL 1101</td>
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</tr>
<tr>
<td>Objective 2 -</td>
<td>COMM 1101</td>
<td>3</td>
</tr>
<tr>
<td>Objective 3 -</td>
<td>MATH 1143</td>
<td>3</td>
</tr>
<tr>
<td>Objective 5 -</td>
<td>CHEM 1100 or PHYS 1101 and PHYS 1101L</td>
<td>4</td>
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<tr>
<td>Objective 6</td>
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<td>Total Credits</td>
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</table>

1  “P” courses are equivalent to the original course.

Prerequisite Courses
Students must complete nine (9) credits of the University’s General Education Objectives (see the General Education Requirements described in the Academic Information section of this catalog) and a minimum of five to six (5-6) credits of program-specific course work before entering this program. Listed below are the prerequisite requirements for the Associate of Applied Science: Industrial Controls. Students must meet with the program coordinator prior to beginning required course work.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>ESET 1110</td>
<td>Introduction to Process Control</td>
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<td>or ESET 1111</td>
<td>Laboratory</td>
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<tr>
<td>ESET 1112</td>
<td>Introduction to Digital Logic</td>
<td>2</td>
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<tr>
<td>ESET 1112L</td>
<td>Laboratory</td>
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<td>COMM 1101</td>
<td>Fundamentals of Oral Communication</td>
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<td>ENGL 1101</td>
<td>Writing and Rhetoric I</td>
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<td>MATH 1143</td>
<td>College Algebra</td>
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Required Courses (33-34 Credits)

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<th>Code</th>
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<tbody>
<tr>
<td>INST 2281</td>
<td>Electrical Automation Theory</td>
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<tr>
<td>&amp; INST 2282</td>
<td>Electrical Automation Laboratory</td>
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<tr>
<td>&amp; INST 2293</td>
<td>and Process Measurement and Control</td>
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<tr>
<td>&amp; INST 2295</td>
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<tr>
<td>&amp; INST 2296</td>
<td>and Process Measurement and Control</td>
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</tr>
<tr>
<td></td>
<td>Theory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Process Dynamics</td>
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OR
ESET 2222  Process Control Theory  26
& ESET 2226  and Process Control Devices
& ESET 2292  Laboratory
& ESET 2292L and Electrical Engineering Technology
& ESET 2293  I
& ESET 2293L  and Electrical Engineering Technology
   I Laboratory
   and Electrical Engineering Technology
   II
   and Electrical Engineering Technology
   II Laboratory
CHEM 1100  Concepts of Chemistry  4
or PHYS 1101/1101L  Elements of Physics
Objective 6: Social and Behavioral Ways of Knowing  3
Total Credits  47-49

### Degree Totals

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>Program Admission Requirements (Required General Education credits removed)</td>
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<td>General Education</td>
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<td>Major Requirements (Required General Education credits removed)</td>
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