

# INTEGRATED SYSTEMS ENGINEERING TECHNOLOGY, ASSOCIATE OF APPLIED SCIENCE



The Integrated Systems Engineering Technology program prepares students to diagnose and resolve industrial equipment problems using good technical assessment skills and core electrical skills. The program also provides students with a base knowledge in advanced skills such as Programmable Logic Controllers (PLCs) electronics and digital applications, robotics, and process controls. Students completing the Integrated Systems Engineering Technology program will find jobs as instrument control technicians, maintenance repair technicians, electrical maintenance technicians, power plant control room operators, or integrated systems technicians.

**Program contact:** Learn more (<http://www.tri-c.edu/programs/engineering-technology/integrated-systems-engineering-technology>)

**This degree program contains one or more embedded certificates which will be automatically awarded when the certificate requirements are completed. If you do not want to receive the embedded certificate(s), please notify the Office of the Registrar at [RegistrarOffice@tri-c.edu](mailto:RegistrarOffice@tri-c.edu).**

Learn more here (<http://catalog.tri-c.edu/pathways/industrial-manufacturing-construction/integrated-systems-engineering-technology>) and here (<http://catalog.tri-c.edu/pathways/science-technology-engineering-mathematics/integrated-systems-engineering-technology>) about how certificate credits apply to the related degree.

## Related Degrees and Certificates

- Automation Maintenance Technician, Certificate of Proficiency (<http://catalog.tri-c.edu/programs/automation-maintenance-technician-certificate-proficiency>)
- Building Maintenance Technician, Certificate of Proficiency (<http://catalog.tri-c.edu/programs/building-maintenance-certificate-proficiency>)
- Mechatronics, Certificate of Proficiency (<http://catalog.tri-c.edu/programs/mechatronics-certificate-proficiency>)
- Industrial Welding, Certificate of Proficiency (<http://catalog.tri-c.edu/programs/industrial-welding-certificate-proficiency>)
- Introductory Welding, Short-Term Certificate (<http://catalog.tri-c.edu/programs/introductory-welding-short-term-certificate>)
- Welding Technology, Short-Term Certificate (<http://catalog.tri-c.edu/programs/welding-technology-short-term-certificate>)

## Related Training and Credentials

- Fast-Track Welding Certificate Program (<http://catalog.tri-c.edu/programs/fast-track-welding-certificate>)
- Electrical Technician Certificate of Completion (<http://catalog.tri-c.edu/programs/electrical-technician-certificate>)
- Facility Technician (<http://catalog.tri-c.edu/programs/facility-technician>)
- FirstEnergy Power Systems Institute PSI, Associate of Technical Study (<http://catalog.tri-c.edu/programs/firstenergy-power-systems-institute-psi-ats>)
- Steelworkers for the Future (<http://catalog.tri-c.edu/programs/steelworkers-future>)
- Industrial Automation Certificate of Completion (<http://catalog.tri-c.edu/programs/industrial-automation-certificate>)
- Nondestructive Testing (NDT) and Quality Assurance (QA) (<http://catalog.tri-c.edu/programs/nondestructive-testing-ndt-quality-assurance-qa>)

## Program Admission Requirements

- High School Diploma/GED
- ENG-0990 Language Fundamentals II or appropriate score on English Placement Test.
- MATH-0910 Basic Arithmetic and Pre-Algebra or appropriate score on Math Placement Test.

## Other Information

- Options available in Integrated Systems Maintenance - Fluid Power and Programmable Logic Controllers, Environmental Systems Maintenance - Boiler, HVAC, and Welding.

## Program Learning Outcomes

This program is designed to prepare students to demonstrate the following learning outcomes:

- Identify, select, and operate appropriate test equipment and tools, and interpret test results to solve problems in a controlled environment.
- Use team skills to collaborate and perform in a professional and workman like fashion in a diverse workforce and a dynamic environment to meet organizational goals and objectives.
- Apply appropriate Math, Science, and computer skills to support installation, troubleshooting, and maintenance of electrical equipment and systems.
- Demonstrate effective comprehension and communication skills through listening, writing and speaking about problems, processes, and procedures to supervisors, team members, and management.
- Diagnose and resolve equipment problems by utilizing good technical assessment skills that include planning, reliability, logical thinking, ability to use drawings, schematics and documentation, and a solid understanding of electrical maintenance theory and principles.
- Work with a safety-focuses mindset and follow industry safety standards, local regulations, and company policies and procedures.
- Apply the fundamentals of electrical/electronic skills including wiring methods, motor controls, National Electric Code, troubleshooting and print reading and exhibit base knowledge in advanced skills such as PLC's, electronics and digital applications, robotics, and process controls.

8. Employ cross-functional skills to differentiate between thermal, mechanical, fluid and electrical power systems, and isolate and resolve breakdown(s).

Letters in parenthesis relate to Options (a) Integrated Systems Maintenance and (b) Environmental Systems Maintenance and (c) Welding

## Suggested Semester Sequence

| Course                                  | Title  | Credit Hours |
|---|--|--------------|
| <b>First Semester</b>                   |  |              |
| ISET-1300                               | Mechanical/Electrical Print Reading                              | 2            |
| ISET-1310                               | Mechanical Power Transmission                                    | 2            |
| ISET-1410                               | Applied Electricity I  | 3            |
| MATH-1240                               | Contemporary Mathematics   | 3            |
| Option B:                               |  |              |
| ISET-1450                               | Heating Ventilation Air Conditioning/ Refrigeration I (Option B) |              |
| Option C:                               |  |              |
| ISET-1101                               | Welding Blue Print Reading (Option C)                            |              |
| Select one of the following: 3          |  |              |
| ENG-1010                                | College Composition I  |              |
| ENG-101H                                | Honors College Composition I                                     |              |
| Credit Hours                            |  | 13           |
| <b>Second Semester</b>                  |  |              |
| ISET-1340                               | Industrial Piping and Tubing                                     | 2            |
| ISET-1420                               | Applied Electricity II   | 3            |
| Option A:                               |  |              |
| ISET-1320                               | Fundamentals of Fluid Power (Option A)                           |              |
| Option B:                               |  |              |
| ISET-1460                               | Fundamental Boiler Technology (Option B)                         |              |
| Option C - Select one of the following: |  |              |
| ISET-2100                               | Gas Metal Arc Welding (MIG) (Option C)                           |              |
| ISET-2120                               | Shielded Metal Arc Welding (STICK) (Option C)                    |              |
| Select one of the following: 3          |  |              |
| IT-1090                                 | Computer Applications  |              |
| IT-109H                                 | Honors Computer Applications                                     |              |
| Credit Hours                            |  | 8            |
| <b>Summer Session</b>                   |  |              |
| ISET-2200                               | Industrial Motor Controls  | 3            |
| COMM-1000                               | Fundamentals of Interpersonal Communication                      | 3            |
| Credit Hours                            |  | 6            |
| <b>Third Semester</b>                   |  |              |
| ENG-2151                                | Technical Writing  | 3            |
| ISET-2240                               | Applied National Electric Code                                   | 3            |
| ISET-2500                               | Programmable Logic Controllers Maintenance I                     | 3            |
| PSY-1050                                | Introduction to Industrial/Organizational Psychology             | 3            |
| Option A:                               |  |              |
| MET-2300                                | Fluid Power (Option A)   |              |

Option B:

|   |   |    |
|---|---|----|
| ISET-2450                               | Heating Ventilation Air Conditioning/ Refrigeration II (Option B) |    |
| Option C - Select one of the following: |   |    |
| ISET-2110                               | Gas Tungsten Arc Welding (TIG) (Option C)                         |    |
| ISET-2131                               | Oxyfuel Processes/Plasma Processes (Option C)                     |    |
| Credit Hours                            |   | 12 |

**Fourth Semester**

|   |  |    |
|---|--|----|
| BADM-1050                               | Professional Success Strategy  | 3  |
| ISET-2210                               | Commercial Wiring  | 3  |
| ISET-2220                               | Fundamentals of Electronics and Instrumentation                        | 3  |
| ISET-2990                               | Reliability Centered Maintenance                                       | 3  |
| Option A - Select one of the following: |  |    |
| ISET-2510                               | Programmable Logic Controllers Maintenance II (Option A) <sup>1</sup>  |    |
| ISET-2520                               | Programmable Logic Controllers Maintenance III (Option A) <sup>1</sup> |    |
| Option B:                               |  |    |
| ISET-2460                               | Applied Boiler Technology (Option B)                                   |    |
| Credit Hours                            |  | 12 |
| Total Credit Hours                      |  | 51 |

<sup>1</sup> Consecutive eight week course.

## Options

### (A) Integrated Systems 8

#### Fluid Power and Programmable Logic Controllers Option (A)

| Code                       | Title  | Credit Hours |
|----------------------------|--|--------------|
| ISET-1320                  | Fundamentals of Fluid Power                    | 2            |
| MET-2300                   | Fluid Power                                    | 3            |
| ISET-2510                  | Programmable Logic Controllers Maintenance II  | 2            |
| ISET-2520                  | Programmable Logic Controllers Maintenance III | 2            |
| Additional program courses |  | 51           |
| Total Credit Hours         |  | 60           |

### (B) Environmental Systems

#### Boiler Technology, HVAC, Option (B)

| Code                       | Title  | Credit Hours |
|----------------------------|--|--------------|
| ISET-1450                  | Heating Ventilation Air Conditioning/ Refrigeration I  | 2            |
| ISET-1460                  | Fundamental Boiler Technology                          | 3            |
| ISET-2450                  | Heating Ventilation Air Conditioning/ Refrigeration II | 2            |
| ISET-2460                  | Applied Boiler Technology                              | 2            |
| Additional program courses |  | 51           |
| Total Credit Hours         |  | 60           |

**(C) Integrated Systems**

**Welding, Option (C)**

To complete this option, students must complete ISET-1101 Welding Blue Print Reading and two of the four welding courses listed below.

| <b>Code</b>                  | <b>Title</b>                       | <b>Credit Hours</b> |
|------------------------------|------------------------------------|---------------------|
| ISET-1101                    | Welding Blue Print Reading         | 3                   |
| Select two of the following: |                                    | 8                   |
| ISET-2100                    | Gas Metal Arc Welding (MIG)        |                     |
| ISET-2120                    | Shielded Metal Arc Welding (STICK) |                     |
| ISET-2110                    | Gas Tungsten Arc Welding (TIG)     |                     |
| ISET-2131                    | Oxyfuel Processes/Plasma Processes |                     |
| Additional program courses   |                                    | 51                  |
| Total Credit Hours           |                                    | 62                  |