INTEGRATED SYSTEMS ENGINEERING TECHNOLOGY (ISET)

ISET-1101 Welding Blue Print Reading
3 Credits

Explore the techniques of reading blueprint and welding symbols relating to the welding field, including the proper way to read and apply measurements and dimensioning pertaining to industrial blueprints and metal specifications. Includes how to understand and interpret views and translate measurements and dimensions.
Lecture: 3 hours
Prerequisite(s): None.

ISET-1300 Mechanical/Electrical Print Reading
2 Credits

Introduction to fundamental theory and application of blueprint reading skills. Included material will cover electrical, mechanical, structural drawings with symbols and wiring diagrams, Safety Codes, basic troubleshooting techniques. Extensive guided instruction and practice provided.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): None.

ISET-1310 Mechanical Power Transmission
2 Credits

Introduction to basic concepts of industrial maintenance and installation of mechanical drive systems including bearing, shafts, gears, and couplings. With an emphasis on OSHA safety standards, installation, maintenance, troubleshooting, and lubrication of mechanical components.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): None.

ISET-1320 Fundamentals of Fluid Power
2 Credits

Principles of power transmission are presented and contrasted with other means of transmission. Includes laws and principles of fluid power transmission, units of pressure and flow, plumbing materials and sizing, pressure losses through piping, and the uses of vacuum and vacuum applications. Extensive guided instruction and practice provided.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): ISET-1300 Mechanical/Electrical Print Reading.

ISET-1340 Industrial Piping and Tubing
2 Credits

Concepts and principles specific to piping, pipefitting, and tubing techniques, materials, routing and layout including types of material, cutting, threading, measurements, fittings, bending, and offsets. Extensive guided instruction and practice provided.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): ISET-1300 Mechanical/Electrical Print Reading

ISET-1410 Applied Electricity I
3 Credits

Fundamentals of electricity with emphasis on resistance, direct current voltage and current, electrical quantities and units of measurements. Ohm's Law, Kirchoff's voltage and current laws will also be covered.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): MATH-0910 Basic Arithmetic and Pre-Algebra, or appropriate Math placement score.

ISET-1420 Applied Electricity II
3 Credits

Principles and applications of electricity with emphasis on alternating current, inductors, capacitors, and phase relationships. Electrical quantities and units of measurements, Ohm's Law, Kirchoff's voltage and current laws, single and three phase transformers will also be included. Extensive guided instruction and practice provided.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): ISET-1410 Applied Electricity I, or departmental approval.

ISET-1450 Heating Ventilation Air Conditioning/Refrigeration I
2 Credits

Learn the basics of refrigeration, heat transfer, and thermodynamics HVAC/R applications. This course covers modern HVAC/R systems including their major components, controls, different duct work designs, combustion, HVAC/R blueprint reading, refrigerants, working fluids, and energy management systems.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): None.

ISET-1460 Fundamental Boiler Technology
3 Credits

Concepts and fundamental skills associated with the operation and maintenance of steam boilers. Topics include an overview of steam boilers and boiler operation, basic boiler processes, boiler construction and material properties, boiler operating and maintenance procedures, combustion theory and fuels, efficiency, and codes and standards. Safety codes and procedures, preventive maintenance and basic troubleshooting techniques will also be covered. Extensive guided instruction and practice provided.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): None.

ISET-2100 Gas Metal Arc Welding (MIG)
4 Credits

Develop skills in Gas Metal Arc Welding (MIG). Extensive guided instruction provided. Prepares students for the MIG certification test.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-1101 Welding Blue Print Reading or departmental approval.

ISET-2110 Gas Tungsten Arc Welding (TIG)
4 Credits

Develop skills in Gas Tungsten Arc Welding (GTAW-TIG). Extensive guided instruction provided and prepares a student for the TIG certification test.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-1101 Welding Blue Print Reading or departmental approval.

ISET-2120 Shielded Metal Arc Welding (STICK)
4 Credits

Develop skills in Shielded Metal Arc Welding (STICK). Extensive guided instruction provided and prepares a student for the SMAW (STICK) certification test.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-1101 Welding Blue Print Reading or departmental approval.

ISET-2131 Oxyfuel Processes/Plasma Processes
4 Credits

Develop skills in OxyFuel processes, cutting, brazing, and plasma processes. Extensive guided instruction provided.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-1101 Welding Blue Print Reading; or departmental approval.

ISET-2140 Non-Destructive Testing
3 Credits

An introduction to terms, definitions, methods, and applications of the non-destructive testing profession and an in-depth exploration of two methods of non-destructive testing: visual inspection and liquid penetrant examination. The tools, proper processing techniques, different testing methods, and interpretation involved with visual inspection and liquid penetrant testing will be discussed and practiced.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): None.

ISET-2151 Robotic Welding
4 Credits

Concepts and fundamental skills associated with the operation and programming of robotic welding machines. Topics include safe operation of robotic welding machines; building and editing programs to complete simple and complex welds; welding variables and options; and machine maintenance and setup.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-2100 Gas Metal Arc Welding (MIG).

ISET-2160 Structural Fabrication
4 Credits

Complete a fabrication project, beginning by interpreting a set of prints, developing a plan, and working to cut, prepare, fit and weld raw materials together. The fabrication project will resemble a real world scenario related to the shipbuilding, construction, aeronautical, or related industries on a smaller scale.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-1101 Welding Blue Print Reading, and ISET-2100 Gas Metal Arc Welding (MIG).

ISET-2170 Flux-Cored Arc Welding (FCAW)
4 Credits

Presents both a practical and theoretical understanding of Flux-Cored Arc Welding (FCAW) processes through extensive hands-on instruction. Provides solid background for field-competitive FCAW certification.
Lecture: 2 hours. Laboratory: 4 hours
Prerequisite(s): ISET-1101 Welding Blue Print Reading; or departmental approval.

ISET-2200 Industrial Motor Controls
3 Credits

Instruction in theory, application, and use of industrial type motors focusing on topics of safety, direct current (DC) motors, alternating current (AC) motors, single-phase motors, three-phase motors, motor troubleshooting methods, and motor starting. Extensive guided instruction and practice provided.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): ISET-1420 Applied Electricity II, or EET-1210 AC Electric Circuits, or EET-1220 Circuits and Electronics for Automation, or departmental approval.

ISET-2210 Commercial Wiring
3 Credits

Principles of commercial electrical installations to prepare for work in the electrical field in a commercial, environmental setting. Based on the National Electric Code, study includes job specifications, sizing and selection of materials, and installation techniques. Extensive guided instruction and practice provided.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): ISET-2240 Applied National Electric Code or concurrent enrollment; or departmental approval.

ISET-2220 Fundamentals of Electronics and Instrumentation
3 Credits

Concepts of electronics circuitry and instruments including purpose, function, and operation of diodes, transistors, Silicon Controlled Rectifiers (SCRs), DIACs, TRIACs, Field Effect Transmitters FETs), and other solid state devices used in live dynamic electronic circuits. Extensive guided instruction and practice provided.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): ISET-1420 Applied Electricity II, ISET-2200 Industrial Motor Controls; and departmental approval.

ISET-2240 Applied National Electric Code
3 Credits

Introduction to the National Electric Code including industry safety hazards, standards, and precautions. Extensive guided instruction and practice provided.
Lecture: 3 hours
Prerequisite(s): ISET-1420 Applied Electricity II.

ISET-2450 Heating Ventilation Air Conditioning/Refrigeration II
2 Credits

This is a continuation in the study of the basics of refrigeration, heat transfer and thermodynamics in HVAC/R applications. Emphasis is placed on the calculation and determination of space heating and cooling loads, experimental work, and hands-on training and preparation to pass the EPA Proper Refrigerant Practices certification exam. Important topics include: HVAC/R thermodynamics and heat transfer, air conditioning processes, comfort and IAQ, space heating loads, space cooling load, volumetric flow rates, advanced blueprint readings and systems designs, energy consumption, specifications, and components selections.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): ISET-1450 Heating Ventilation Air Conditioning/Refrigeration I, or departmental approval.

ISET-2460 Applied Boiler Technology
2 Credits

The focus of this course will be the applications of steam and hot water boilers, water chillers, steam and hydronic heating and cooling systems. This course is the prerequisite for the State of Ohio approved Low Pressure Operators Exam Preparatory class. Extensive guided instruction and practice provided.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): ISET-1460 Fundamental Boiler Technology, or departmental approval.

ISET-2500 Programmable Logic Controllers Maintenance I
3 Credits

Fundamental concepts of Programmable Logic Controllers (PLCs) Maintenance including applications of industrial type PLCs requiring motion control, automated manufacturing and the functions PLCs serve in that environment. Extensive guided instruction and practice provided.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): ISET-2200 Industrial Motor Controls, and departmental approval.

ISET-2510 Programmable Logic Controllers Maintenance II
2 Credits

Programming and application of Programmable Logic Controllers (PLCs) including timers, counters, program control, data manipulation, and math instructions. Extensive guided instruction and practice provided.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): ISET-2500 Programmable Logic Controllers Maintenance I, or departmental approval.

ISET-2520 Programmable Logic Controllers Maintenance III
2 Credits

Programming and application of programmable logic controllers (PLCs) including sequencers, shift registers, PLC installation, editing, troubleshooting, process control, date acquisition, and computer-controlled machines and processes. Extensive guided instruction and practice.
Lecture: 1 hour. Laboratory: 2 hours
Prerequisite(s): ISET-2510 Programmable Logic Controllers Maintenance II or concurrent enrollment; or departmental approval.

ISET-2990 Reliability Centered Maintenance
3 Credits

Advanced concepts and principles of troubleshooting, preventative and predictive maintenance. Reliability centered maintenance, elements of root cause and failure analysis for hydraulic systems.
Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): ISET-1450 Heating Ventilation Air Conditioning/Refrigeration I, and ISET-2500 Programmable Logic Controllers Maintenance I, and ISET-2210 Commercial Wiring, or departmental approval.