AUTOMATION TECHNOLOGY

Stacey McCollough,
Electronics Bldg.
(479) 508-3328
smccollough2@atu.edu

Automation Technology provides for a study of components, circuits, instruments and control techniques used with industrial automated systems. Students will develop skill sets which enable the integration of: electronics, mechanics, pneumatics, hydraulics and computer controls.

The focus of study is on two main areas, one is control techniques for industrial components, such as electric motors, variable-speed drives, programmable logic controllers, servomechanisms and sensors. The computer system area of concentration will allow the student to have an understanding of how to repair, upgrade, or network a complete computer system, both hardware and software.

The intent of this program is to prepare the student to deal with a broad concept of automation technology. The diverse educational training provides for a host of integrated skills that can be applied in a variety of job contexts to include: green energy technology, electronics, robotics, manufacturing, and production.

The Technical Certificate in Industrial Electronic Technology is designed to enhance the technical skills and job-related knowledge of individuals who are currently employed in the industrial field as well as other persons seeking careers in Industrial Systems. The majority of the technical courses are offered on a flexible schedule on campus, at off-site industrial locations, and on the web. Courses taken for the certificate may be applied to the Associate of Applied Science degree in Industrial Systems.

The Certificate of Proficiency in Industrial Controls is a course of study that prepares students for entry-level employment in an industrial maintenance, computer networking, or engineering related field. This certificate of proficiency may be applied to the Technical Certificate and the Associate of Applied Science degree in Industrial Control Systems.

The Certificate of Proficiency in Machinist Operations program prepares students for entry into the manufacturing of mechanical parts. In the production of precision metal parts students will use lathes, milling machines, welders, and grinders. Machinist operators work in machine shops, manufacturing, and tool rooms. Employment projects are based on replacing an aging workforce and potential manufacturing growth in the region.

This certificate of proficiency may be applied to the Technical Certificate in Industrial Electronic Technology and the Associate of Applied Science degree in Industrial Control Systems.

High school students may begin the Automation Technology program by taking classes concurrently with their regular studies and earn credit toward a certificate of proficiency which will apply to the technical certificate and associate of applied science degree.

Programs

- Automation Technology, Associate of Applied Science (https://catalog.atu.edu/ozark/programs/automation-technology/automation-technology-aas/)
- Industrial Control Systems, Certificate of Proficiency (https://catalog.atu.edu/ozark/programs/automation-technology/industrial-control-systems-cp/)
- Industrial Control Systems, Technical Certificate (https://catalog.atu.edu/ozark/programs/automation-technology/industrial-control-systems-tc/)
- Industrial Electronic Technology, Technical Certificate (https://catalog.atu.edu/ozark/programs/automation-technology/industrial-electronic-technology-tc/)
- Machining Concepts and Operations, Certificate of Proficiency (https://catalog.atu.edu/ozark/programs/automation-technology/machining-concepts-operations-cp/)
- Machining Operations Milling and Turning, Certificate of Proficiency (https://catalog.atu.edu/ozark/programs/automation-technology/machining-operations-milling-turning-cp/)

Courses

AT 1103 PROGRAMMING I
Cross-listed with CIS 1103. This course is designed to give the student an understanding of established and new methodologies using Microsoft Visual Basic programming. Emphasis is placed on developing logical thinking skills. Ozark CTE General Technology

AT 1113 INDUSTRIAL NETWORKING
This course introduces students to the network devices, standards, protocols, and security requirements used to connect industrial and other types of equipment. Lecture 3 hours, Ozark CTE General Technology

AT 1123 SEMICONDUCTORS I
This course introduces semiconductors or solid-state components. Topics covered include the diode and applications, transistors, and amplifiers. Prerequisites AT 1163 Fundamentals of Electricity I and AT 1173 Fundamentals of Electricity II. Ozark CTE General Technology

AT 1133 INTRODUCTION TO MANUFACTURING COMPONENTS
This course provides a strong foundation in four major areas of industrial equipment, including general, mechanical, electrical, and preventive maintenance, to help students understand, diagnose, and troubleshoot a wide variety of equipment. Lecture 3 hours, Ozark CTE General Technology

AT 1143 INTRODUCTION TO DIGITAL LOGIC
An introductory course in the study of digital logic systems. Basic digital logic gates, truth tables, numbering systems, and different types of TTL integrated circuits are studied. Ozark CTE General Technology

AT 1163 FUND ELECTRICITY I (DC CRCTS)
This course is an overall study of the fundamental principles of D.C. circuits. A basic study of Ohm's Law, series, parallel and series parallel resistor circuits. The fundamental concepts form the basis for the study of advanced applications of electronic systems. It is necessary for the electronic technician to be able to understand the basic concepts to function as an Electronic Technician. Ozark Campus CTE fee: $51.

AT 1173 FUND ELECTRICITY II (AC CRCTS)
This course is an overall study of the fundamental principles of A.C. circuits. A basic study of Ohm's Law, series, parallel and series parallel resistor circuits. The fundamental concepts form the basis for the study of advanced applications of electronic systems. It is necessary for the electronic technician to be able to understand the basic concepts to function as an Electronic Technician. Ozark CTE General Technology

AT 2013 INTRO TO INDUSTRIAL ROBOTICS
Introduction to Industrial Robotics studies the basic operation of a Robot. Skills covered include safety, power up, shutdown, manual operation, homing, and end effector operation. Skills taught also include basic robot programming including movement and effector commands, interfacing and material handling, application development, flexible manufacturing cells, quality control, production control, and work cell development. Ozark CTE General Technology

AT 2033 INDUSTRIAL ROBOTICS PROGRAM
Prerequisite: ICS 2013.
This course is intended for an operator, technician, engineer, or programmer who must setup and record programs on robot or virtually. The course covers the Robot Operations outline intermixed with the tasks required to setup the specific application, test, run and refine the program and production setup. Students will learn Fanuc or ABB robot programming in this course. Ozark General CTE

AT 2043 ROBOTICS AND MOTION CONTROL
Prerequisite: ICS 1163 and ICS 1173.
This course teaches the skills required to understand and maintain the sophisticated applications so commonly found in modern industry. The motion control action may be as simple as opening and closing a valve or as complex as controlling multiple axes on a CNC machine. The motion control learning system is self-contained and teaches students to control one axis. It allows students to learn industry-relevant skills including how to create, navigate, configure, operate, maintain, and apply motion control systems. This course covers the basic tasks and procedures required for an operator, technician, engineer, or programmer to setup, teach, test, and modify iRVision applications or ABB integrated Vision applications. Ozark General CTE

AT 2123 INDUSTRIAL FLUID POWER
This course is designed to provide the basic knowledge and application of physical principles involving pumps, cylinders, valves, motors, design, assembly, graphic symbols, and the operation of hydraulic and pneumatic control circuits based on logic principles. Lecture: 4 hours, laboratory: 1 hour. Ozark CTE General Technology

AT 2133 INTRO TO PROGRAMMABLE CONTROLS
Co-requisite: ICS 2123, 2143, 2153, and 2163.
Prerequisite: ICS 1123, 1163, 1173, and 2123.
NOTE: ICS 2123 may be taken before or concurrently with ICS 2133.
An introduction to programmable controllers (PCs). The PC is a microprocessor-based programmable device used in controlling mechanical machinery, energy management systems, computer integrated manufacturing, and other applications. Lecture: 3 hours, laboratory: 6 hours. This course is designated as "Green". Ozark CTE General Technology

AT 2143 PROGRAMMABLE CONTROLLERS
Co-requisite: ICS 2123, 2133, 2153, and 2163.
Prerequisite: ICS 1123, 1163, 1173, 2123 and 2133.
NOTE: ICS 2123 and 2133 may be taken before or concurrently with ICS 2143. A continuation of ICS 2133. The PC is a microprocessor-based programmable device used in controlling mechanical machinery, energy management systems, computer integrated manufacturing, and other applications. Lecture: 1 hours, laboratory: 4 hours. This course is designated as "Green". Ozark CTE General Technology

AT 2153 INTRO TO INDUSTRIAL AUTOMATION
Co-requisite: ICS 2123, 2133, 2143, and 2163.
Prerequisite: ICS 1123, 1163, 1173, and 2123.
NOTE: ICS 2123 may be taken before or concurrently with ICS 2153.
An introduction to circuit configurations used in industry. Topics to be covered are: solid-state systems used to control D.C. motors, electro-mechanical devices, three-phase power, open and closed loop motor control, robotic input and output transducers, various instrumentation and process control classes. Lecture: 4 hours, laboratory: 3 hours. This course is designated as "Green". Ozark CTE General Technology

AT 2163 INDUSTRIAL AUTOMATION
Co-requisite: ICS 2123, 2133, 2143, and 2153.
Prerequisite: ICS 1123, 1163, 1173, 2123, and 2153.
NOTE: ICS 2123 and 2153 may be taken before or concurrently with ICS 2163. A continuation of ICS 2153. Topics to be covered are: solid-state systems used to control A.C. motors, electro-mechanical devices, three-phase power, open and closed loop motor control, robotic input and output transducers, various instrumentation and process control classes. Lecture: 4 hours, laboratory: 3 hours. This course is designated as "Green". Ozark CTE General Technology

AT 2203 COMPUTER SYSTEM COMPONENTS
A study of the internal structure of the microprocessor. The full computer system is analyzed from both aspects of hardware and software. Many of the principles studied apply to computer troubleshooting and computer interfacing. Many of the computer support circuits are studied. Many of the skills learned from Programming I, Operating Systems, and Digital Logic are brought together and enhanced. This course is designated as "Green". Ozark CTE General Technology

AT 2213 SEMICONDUCTORS II
Prerequisite: ICS 1123.
A continuation of ICS 1123, this course is a study of field effect transistors, thristors, and linear integrated circuits. Ozark CTE General Tech

AT 2223 INTRODUCTION TO PROCESS TECHNOLOGY
This course is a technician-level approach to instrumentation and control techniques used in advanced manufacturing. It is organized in a logical sequence beginning with an introduction to the field of instrumentation and continuing through all the elements of a control system. Lecture 3 hours, Ozark CTE General Technology

AT 2513 BLUEPRINTS/MEASUREMENTS/SAFETY
This course introduces how to interpret and accurately work with technical drawings, the care and use of precision measuring instruments, and machine safety. Ozark CF Machining

AT 2514 CNC MILLING
Prerequisite: ICS 2513 and ICS 2523.
Manufacturing today utilizes innovative technologies, including Computer Numerical Control (CNC), Computer Aided Manufacturing (CAM) software, and specialty materials to develop and build the products of tomorrow. Students will be walked through all aspects of CNC machining: how to upload and download programs to the machine and how to apply machining techniques to machine a part. At the end of the course, students will spend time on the milling machine learning how to machine a part in a CNC Milling machining center. This last step is critical to putting pieces of the puzzle together so that one can understand the whole process. Students will be applying machining techniques in the virtual world and then applying and seeing how a virtual object becomes reality on a CNC machine. Ozark Machining

AT 2523 MACHINING TECHNOLOGY
This course introduces machining operations as they relate to the metalworking industry. Topics include machine shop safety, measuring tools, lathes, drill machines, saws, milling machines, and layout instruments. Ozark Machining

AT 2524 CNC TURNING
Prerequisite: ICS 2513 and ICS 2523.
Manufacturing today utilizes innovative technologies, including Computer Numerical Control (CNC), Computer Aided Manufacturing (CAM) software, and specialty industry materials to develop and build the products of tomorrow. Students will be walked through all aspects of CNC machining: how to upload and download programs to the machine and how to apply machining techniques to machine a part. At the end of the course, students will spend time on the turning machine learning how to machine a part in a CNC Turning Machining Center. This last step is critical to putting the pieces of the puzzle together so that one can understand the whole process. Students will be applying machining techniques in the virtual world and then applying and seeing how a virtual object becomes reality on a CNC machine. Ozark Machining

Faculty

Instructor

Cody Harkness