Industrial Automation, Controls, and Networking
10-631-2 Associate Degree

Program Overview
This program prepares the student to be employed at the technician level or higher on computers, industrial computer networks, programmable logic controllers (PLCs), and instruments. PLCs are often the heart of the control portion of the manufacturing process. The student will have both classroom and hands-on laboratory instruction with several systems to help students understand computer and PLC interfacing, control systems, network installation, and administration.

Special Feature
This program is unique in the state.

Career Pathway Options
A career pathway is a series of connected education and training strategies and support services that enable individuals to secure stackable industry relevant credentials and obtain employment within an occupational area and advance to higher levels of future education and employment in that area. The Industrial Automation, Controls, and Networking two-year associate degree includes an embedded technical diploma option as documented below:
• 30-150-4 IT Network Technician

Admission Requirements
Students in this program must:
• Complete application form and submit with fee (fee waiver may apply if previously submitted)
• Complete Accuplacer entrance assessment to determine placement (waiver may apply with acceptable alternative test scores and/or postsecondary degree completion)
• Complete Computer Literacy assessment
• Complete admissions interview with a WITC Counselor (above requirements should be completed prior to interview)

Program-Specific Requirement
Students in this program must:
• Complete the SmarterMeasure Learning Readiness Indicator assessment for online learning at: http://www.witc.edu/online/smartermeasure.htm.

Student Profile
Industrial Automation, Controls, and Networking students should be able to:
• Apply scientific principles and technical knowledge
• Perform mathematical computations accurately
• Evaluate data from tests and observations
• Work with precise standards
• Enjoy scientific and technical work
• Enjoy mechanical work requiring precision
• Work independently and with others
• Communicate clearly
• Be self-motivated

Preparation for Admission
Students should strive to reach a comfort level in the following courses or skills:
• Algebra/Geometry
• English/Speech/Creative Writing
• Economics/Business
• Basic computer skills

Program Outcomes
Employers will expect Industrial Automation, Controls, and Networking graduates to be able to:
• Identify controls systems and network requirements
• Make recommendations for hardware and software
• Perform installations and supportive functions for LAN/communication busses
• Perform installations and maintenance of controls hardware/software/cabling
• Develop system documentation
• Maintain system documentation
• Troubleshoot hardware/software of PLCs, instrumentation, and control systems
• Integrate controls systems
• Perform programming and configuration of distributed control systems

Collegewide outcomes and indicators will also be addressed to develop personal awareness, career effectiveness, and professionalism. See page 5 of the college catalog for a list of collegewide outcomes and indicators.

Career Outlook
The Industrial Automation, Controls, and Networking graduate will be ready to start a career as a(n):
• Computer Technician
• Network Technician
• Field Service Technician
• Control Systems Technician
• Instrument Technician
• Programmable Logic Controller (PLC) Technician
• Industrial Automation Technician

Curriculum
Number Course Title Credits
Technical Studies Courses
10150002015010111 Cisco CCNA 1 Introduction to Networks 3
101501113 Cisco CCNA 2 Routing and Switching Essentials 3
101501117 MS LAN Administration - Infrastructure 3
101501213 Hardware/Software Installation 2
101501393 IT Essentials 2
101541033 Linux Operating Systems 3
101541493 Windows Operating Systems 3
106051672 Electricity 1 2
106051682 Electricity 2 2
106311003 Introduction to Process Control 2
106311022 Industrial Power Electronics 2
106311032 Process Control and Instrumentation 2
106311042 Smart Instruments 2
10631105 Industrial Networks and Communication Buses 2
106311062 Supervisory and Distributed Control Systems 2
106311072 Industrial Automation Case Project 2
10631108 PLC Programming and Interfacing 3
10631109 Industrial AC, Motor Control, and Pilot Devices 3
10631110 Advanced PLC Programming and Interfacing 2 3

General Studies Courses
108001952 Written Communication 3
108001962 Oral/Interpersonal Communication or 3
108001982 Speech
108001972 Technical Reporting 3
108001113 College Technical Mathematics 1A 3
108001143 College Technical Mathematics 1B 2
108001662 Introduction to Ethics: Theory and Application or 3
108001722 Introduction to Diversity Studies 3
108001952 Economics 3
108001982 Introduction to Psychology 3

Program Requirements 70

Campus:
New Richmond
Programs and Course Descriptions
(See pages 41-43 for General Studies course descriptions)

10150111 Cisco CCNA 1 Introduction to Networks - Credits: 3
This course introduces the architecture, structure, function, components and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media and operations are introduced to provide a foundation for the curriculum. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

10150113 Cisco CCNA 2 Routing and Switching Essentials - Credits: 3
This course describes the architecture, components and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, static routes, broadcast domains, OSPF, BGP, VRRP, IGRP, GVRP, and multi-access VLANs. Additional topics will examine other operating systems like MAC OS, including an introduction to network configurations. Additional topics include BGP, OSPF, IS-IS, and VRRP. This course includes hands-on labs with various types of hardware and software on an IBM-compatible personal computer. The course includes laboratory activities with various types of hardware and software on a Linux-based lab system. The course includes laboratory activities with various types of hardware and software on a Linux-based lab system. The course includes laboratory activities with various types of hardware and software on an IBM-compatible personal computer. The course includes laboratory activities with various types of hardware and software on a Linux-based lab system. The course includes laboratory activities with various types of hardware and software on an IBM-compatible personal computer. The course includes laboratory activities with various types of hardware and software on a Linux-based lab system.

10605167 Electricity 1 - Credits: 2
Electricity 1 is a lecture/hands-on course designed to introduce students to basic electrical terminology, laws, concepts, instrumentation, and application. Hands-on activities will be used to reinforce electrical concepts related to practical applications dealing with computer networks. Theory topics covered will include electrical safety terminology and symbols, electrical laws, basic circuits, multimeter use, DC power supplies, and troubleshooting. Critical-thinking skills are emphasized to develop competencies in problem solving and troubleshooting.

10605168 Electricity 2 - Credits: 2
This course is designed to introduce students to the basic concepts of alternating current. Emphasis is placed on circuit analysis and the use of problem-solving skills necessary for the maintenance of modern industrial electric systems. PREREQUISITE: 10605167 Electricity 1.

10631100 Introduction to Process Control - Credits: 2
The Introduction to Process Control course explains the function of basic devices for measuring and controlling different kinds of variables in process control. It introduces closed-loop control, PID functions, analog input devices, and control system applications. It also covers instrumentation symbols and the interpretation and use of process diagrams. PREREQUISITE: 10605167 Electricity 1.

10631102 Industrial Power Electronics - Credits: 2
The Industrial Power Electronics course is a hands-on course dealing with the electronics that are used to control, power, and control machines and processes in the modern manufacturing plant. The course is divided into two sections: the study and use of the oscilloscope and digital multimeter; and the study of basic motors, AC/DC generators, and motors. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control.

10631103 Process Control and Instrumentation - Credits: 3
The Process Control and Instrumentation course offers hands-on skill exercises on controlling and manipulating temperature, pressure, flow, and level in the manufacturing process. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control.

10631104 Smart Instruments - Credits: 2
The Smart Instruments course introduces students to smart instruments including temperature devices, pressure devices, and smart control valves. Students will be able to calibrate, configure, and troubleshoot smart devices. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control. The course includes topics on AC/DC circuits and motor control.

10631105 Industrial Networks and Communication Busses - Credits: 2
This course introduces networks, communication busses, and protocols used in industrial applications. Students will be able to discuss strengths and weaknesses of each communications solution and pick the most appropriate for given applications.

10631106 Supervisory and Distributed Control Systems - Credits: 3
This course will provide an overview of distributed control systems and data acquisition systems. Included are PLCs, data acquisition systems, Simple Loop Controllers, Smart Devices, and Distributed Control Systems. Students will connect, configure, and operate a simulated process that includes the elements of distributed control and data acquisition systems. PREREQUISITES: 10631100 Introduction to Process Control and 10631108 PLC Programming and Interfacing or equivalent.

10631107 Industrial Automation Case Project - Credits: 1
The primary focus of this course is to have the students receive exposure to industrial automation, including an introduction to industrial process control and manufacturing automation systems. Students will complete a project or research dealing with an existing project in an area industry or complete an advanced project in the lab dealing with applications of industrial networks, sensors, control, and data acquisition. PREREQUISITES: 10631100 Introduction to Process Control; 10631102 Industrial Power Electronics; 10631103 Process Control and Instrumentation; 10631108 PLC Programming and Interfacing; and 10631109 Industrial AC, Motor Control, and Pilot Devices.

10631108 PLC Programming and Interfacing - Credits: 3
This course provides students with training in the configuration and use of programmable logic controllers and remote access servers. Microsoft file permissions will be examined and Active Directory will be introduced. Other topics include Windows Firewall, Network Access Protection, and IPv6. PREREQUISITE: 10515449 Windows Operating Systems.

10631110 Industrial AC, Motor Control, and Pilot Devices - Credits: 3
This course is designed to introduce students to the basic concepts of a computer, assemble a computer, install an operating system, and troubleshoot using system tools and diagnostic software.

Graduate Employment Information
(WITC Graduate Survey Responses 2012-2013; for most recent data, go to witc.edu)

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<tr>
<th>Number of graduates</th>
<th>Number employed</th>
<th>% employed in WITC district</th>
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<th>Number of responses</th>
<th>Percent employed</th>
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