

## Program Review

This program prepares you 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. You will have both classroom and hands-on laboratory instruction with several systems to help you understand computer and PLC interfacing, control systems, network installation, and administration.

Offered at:

**New Richmond**



## Special Feature

This program is unique in the state. The first year of the Industrial Automation, Controls, and Networking program and the Information Technology - Network Specialist program at New Richmond are the same. Second-year students have the option to continue with the Industrial Automation, Controls, and Networking program or pursue the Information Technology - Network Specialist program. (See page 102 for more information on the IT - Network Specialist program.)

## Student Profile

As an Industrial Automation, Controls, and Networking student, you 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

The following experiences will help you prepare for this program:

- Algebra/Geometry
- English/Speech/Creative Writing
- Economics/Business
- Basic Computer Skills

## Program Outcomes

Employers will expect you, as an Industrial Automation, Controls, and Networking graduate, to be able to:

- Identify system and network requirements.
- Evaluate and recommend hardware/software.
- Install and support LAN/communication busses.
- Install and maintain hardware/software/cabling.
- Develop and maintain system documentation.
- Troubleshoot the hardware and software involved with PLCs, instruments, and control systems.
- Utilize effective communication skills.

## Career Outlook

After graduating from the Industrial Automation, Controls, and Networking program, you will be ready to start your 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
<b>Technical Studies Courses</b>		
10150110	Computer and Internet Concepts	3
10150111	Cisco 1	3
10150112	Cisco 2 ▲	3
10150117	Microsoft LAN Administration ▲	3
10150121	Hardware/Software Installation ▲	2
10154102	Microcomputer Operating Systems 1	2
10154103	Microcomputer Operating Systems 2 ▲	3
10605167	Electricity 1 ▲	2
10605168	Electricity 2 ▲	2
10631100	Introduction to Process Control	2
10631102	Industrial Power Electronics ▲	2
10631103	Process Control and Instrumentation ▲	3
10631104	Smart Instruments ▲	2
10631105	Industrial Networks and Communication Buses	2
10631106	Supervisory and Distributed Control Systems ▲	3
10631107	Industrial Automation Case Project ▲	1
10631108	PLC Programming and Interfacing ▲	3
10631109	Industrial AC, Motor Control, and Pilot Devices ▲	3
10631110	Advanced PLC Programming and Interfacing ▲	<u>3</u>
		47
<b>General Studies Courses</b>		
10801195	Written Communication ♦	3
10801196	Oral/Interpersonal Communication	3
10801197	Technical Reporting ▲	3
10804113	College Technical Mathematics 1A	3
10804114	College Technical Mathematics 1B ▲	2
10809144	Macroeconomics	3
10809166	Introduction to Ethics: Theory and Application	3
10809198	Introduction to Psychology	<u>3</u>
		23
	<b>PROGRAM REQUIREMENTS</b>	<b>70</b>

▲ This course requires a prerequisite and/or corequisite, and must be completed with a grade of "C-" or better.

♦ Appropriate placement score or Introduction to College Writing course required.

# Course Descriptions

## 10150110

### Computer and Internet Concepts - Credits: 3

An introduction to the study of computers and computer systems used in today's business world. The focus is on basic computer terminology and concepts. Students will also learn basic logic gates, numbering systems, and Internet concepts. The student will create a simple Web page using standard Hypertext Markup Language (HTML) tags.

## 10150111

### Cisco 1 - Credits: 3

Cisco 1 provides an introduction to the networking field. Topics covered include network terminology and protocols, local-area networks (LANs), wide-area networks (WANs), Open Systems Interconnection (OSI) models, cabling, cabling tools, routers, router programming, Ethernet, Internet Protocol (IP) addressing, and network standards.

## 10150112

### Cisco 2 - Credits: 3

Cisco 2: Routers and Routing Basics is the second of four CCNA courses leading to the Cisco Certified Network Associate (CCNA) designation. Cisco 2 focuses on initial router configuration, Cisco IOS software management, routing protocol configuration, TCP/IP, and access control lists (ACLs). Students will develop skills on how to configure a router, managing Cisco IOS software, configuring routing protocol on routers, and set the access lists to control the access to routers. PREREQUISITE: 10150111 Cisco 1.

## 10150117

### Microsoft LAN Administration - Credits: 3

This course provides students with training in the skills necessary to perform day-to-day network administration using Microsoft LAN Server products. At completion of this course students will be able to create and manage user and group accounts, determine account policies, troubleshoot login problems, and set up file system security. In addition, students will set up a printing environment, administer and troubleshoot network printers, use auditing functions and security logs, monitor network resources, and back up and restore files and folders. Client workstation connectivity and related administrative tasks will be covered. PREREQUISITE: 10154102 Microcomputer Operating Systems 1.

## 10150121

### Hardware/Software Installation - Credits: 2

This course will prepare students to install hardware and software. You will learn to properly install various types of hardware and software on an IBM-compatible personal computer. This lecture- and lab-based course will use both group and individual activities. PREREQUISITE: 10154102 Microcomputer Operating Systems 1.

## 10154102

### Microcomputer Operating Systems 1 - Credits: 2

A review of the most common command line operations and study of more advanced commands necessary to configure the Windows 2000 operating system for a variety of environments. Topics to be studied include creating directories, batch files, menus, custom configurations, file management, multitasking, windowing, security, and disk management utilities. There will be an introduction to usage, configuration, and tools of the Windows 9.X operating system.

## 10154103

### Microcomputer Operating Systems 2 - Credits: 3

In this course the Linux operating system is examined in-depth with emphasis on features, capabilities, tools, and configurations including an introduction to network configurations. Additional topics will examine other operating systems like MAC OS. PREREQUISITE: 10154102 Microcomputer Operating Systems 1.

## 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 stressed to reinforce electrical concepts related to practical applications dealing with computer networks. 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. COREQUISITE: 10804113 College Technical Mathematics 1A.

## 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 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 and digital devices, and control system applications. It also covers instrumentation symbols and the interpretation and use of process diagrams.

## 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 operate machines and processes in the modern manufacturing plant. The course includes the study and use of the oscilloscope and digital multimeter, thyristors, AC, DC, stepper and servo motor drive systems, photoelectric switches, and miscellaneous field devices. PREREQUISITE: 10605167 Electricity 1 or equivalent.

## 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. Students will be able to identify, connect, operate, troubleshoot, and perform preventive maintenance on the components that form a process control system. PREREQUISITE: 10605167 Electricity 1 or equivalent and COREQUISITE: 10631100 Introduction to Process 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. Students will be able to identify appropriate applications for smart instruments. PREREQUISITE: 10631100 Introduction to Process Control or equivalent.

## 10631105

### Industrial Networks & 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 exposure to networked distributed control systems and data acquisition systems. Included are PLCs, data acquisition systems, Single 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 and experience with an industrial process control or manufacturing automation system. Students will complete a project or research dealing with an existing process 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

PLC Programming and Interfacing offers students a hands-on approach to implementing industrial control by integrating typical plant floor electrical components with microprocessor-based controllers. Students will learn to identify and connect field inputs and outputs; communicate with, and program microprocessor-based controllers. Students will also connect, communicate with, and develop displays for computer-based operator interfaces. PREREQUISITE: 10605167 Electricity 1 or 32414358 (A) AC/DC Circuits or 32414359 (B) AC/DC Circuits.

## 10631109

### Industrial AC, Motor Control, and Pilot Devices - Credits: 3

This course gives students the opportunity to learn about AC theory, circuits, and control devices used in industry. The course begins with an overview of AC theory including resistance, inductance, and capacitance. The course includes topics on AC and DC motors, motor controls, and pilot devices. The student will engage in hands-on activities with real industrial components to enable them to recognize, select, apply, and troubleshoot industrial electrical control circuit components. PREREQUISITE: 10605167 Electricity 1 or equivalent.

## 10631110

### Advanced PLC Programming and Interfacing - Credits: 3

Advanced PLC offers students a hands-on approach to implementing industrial control using modern controllers to implement programs that utilize advanced functions. Students will complete hands-on activities with Allen Bradley Control Logix PLCs. The course will examine the use of basic instructions and addressing with RSLogix 5000 as well as more advanced PLC instructions in Ladder Logic and Function Block. Other topics include PLC configuration and commissioning, communications with RSLinx, OPC, and RSNetwork, HMI configuration using Wonderware and/or RSView. PREREQUISITE: 10631108 PLC Programming and Interfacing.

## Graduate Employment Information

(WITC Graduate Survey Responses 2005-2006)

Number of graduates	4	Number employed	4	% employed in WITC district	33%
Number of responses	4	Percent employed	100%	Range of yearly salary	-
Number available for employment	4	Employed in related field	3	Average yearly salary	-

*career vision*