

# Manufacturing

## Robotics and Automation

Associate of Applied Science Degree  
Sioux City Campus

### Program Overview and Opportunities:

The Robotics and Automation program prepares students to enter the field of high-tech automated manufacturing. In the new Advanced Manufacturing lab, students will explore the areas of electricity, robotic programming, motor control, sensors, and electromechanical devices. Programmable logic controllers, transmitters, transducers, sensors, and process controllers will be used to demonstrate control techniques. Most Robotics and Automation program graduates begin their careers as automation technicians or instrumentation technicians. Employment opportunities are the greatest with industrial manufacturers and processors.

According to the Bureau of Labor Statistics, technicians in this field of study are expected to have 10 percent employment growth between 2006 and 2016. As firms continue to seek new means of reducing costs and increasing productivity, demand for technicians to analyze and improve production processes should increase. This should lead to some job growth even in manufacturing industries with slowly growing or declining employment. (Occupational Outlook Handbook, Bureau of Labor Statistics 2006-2007.)

### Are You a Part-time Student?

See a program advisor for a list of available courses for part-time students and to develop an individualized plan of study.

Some suggested courses for a part-time student preparing for the program include: English, Math, CSC 110, Healthful Living, or Social/Behavioral Science, general education elective.



### Robotics and Automation Curriculum

Course #	Title	Credits
EGT 400	PLTW-Intro to Engineering Design .....	3
EGT 410	PLTW-Principles of Engineering .....	3
EGT 420	PLTW-Digital Electronics .....	3
CSC 110	Intro to Computers .....	3
MAT 772	Applied Math .....	3
ELT 154	Industrial Electronics .....	3
NET 143	Essentials of Networking .....	3
ELT 150	Basic Electrical Theory .....	2
EGT 450	PLTW-Computer Integrated Manufacturing .....	3
ATR 121	Automation Systems/Robotics Lab .....	3
ELT 118	Programmable Controllers .....	2
BPT 114	Instrumentation I .....	2
PEC, PEA, or PEH	Healthful Living/Leisure Gen. Ed. Elective .....	3
PSY or SOC	Social/Behavioral Science Gen. Ed. Elective .....	3
BPT 117	Industrial Systems Programming .....	3
BPT 118	Process Control Systems .....	3
BPT, CAD, EGT, ELE, IND, MFG, or WEL	Technical Support Elective .....	3
ATR 125	Advanced Automation Systems/Robotics .....	3
ELT 230	PLC Applications .....	3
ENG or SPC	English/Speech General Education Elective .....	3
ATR 131	Computer Integrated Manufacturing (CIM) Systems II .....	4
BPT 115	Instrumentation II .....	2
BPT 280	Process Technology Projects .....	4
<b>Program Total .....</b>		<b>67</b>

### Program Advisors

Carman Lynner, BSEE  
Ext. 1499      Room L415      lynnerc@witcc.edu

Greg Strong, BS, BA, Division Chair  
Ext. 1480      Room A111      strongg@witcc.edu

See course descriptions in the back of the catalog for more detailed information about course prerequisites and co-requisites.

The courses listed above are grouped in the order that they should be taken each semester. Please see a Robotics and Automation program advisor to ensure correct course sequence.

# Manufacturing

## Industrial Plant Technology

Diploma  
Sioux City Campus

### Program Overview and Opportunities:

This program was developed to prepare individuals as plant maintenance technicians. Students will learn basic principles and technical skills in maintaining and troubleshooting common electro-mechanical systems used in industry. Skills are developed in basic electrical and mechanical theory as well as specific skills needed for troubleshooting and repair of today's industrial systems.

There is a high demand for industrial maintenance technicians in the Siouxland area. Employers are seeking trained individuals with both mechanical and electrical maintenance aptitude and troubleshooting skills.

According to the Bureau of Labor Statistics, employment of industrial machinery mechanics is expected to grow 7 percent from 2006 to 2016. As factories become increasingly automated, these workers will be needed to maintain and repair the automated equipment. (Occupational Outlook Handbook. Bureau of Labor Statistics 2006-2007.)



### Industrial Plant Technology Curriculum

Course #	Title	Credits
<b>IND 111</b>	Industrial Safety Mechanical Systems .....	1
<b>ELT 102</b>	Blueprint Reading .....	2
<b>EGT 142</b>	Fluid Power I .....	2
<b>EGT 143</b>	Fluid Power II .....	2
<b>IND 141</b>	Power Transmission .....	2
<b>IND 180</b>	Industrial Heating & Cooling .....	2
<b>MFG 520</b>	Predictive Maintenance .....	2
	Math Gen Ed .....	3
<b>ELT 740</b>	Industrial Systems Electrical Systems .....	1
<b>ELT 150</b>	Basic Electrical Theory .....	2
<b>ELT 110</b>	Electronics .....	2
<b>ELT 208</b>	Motor Control .....	2
<b>ELT 780</b>	Electromechanical Control Systems .....	2
<b>ELT 118</b>	Programmable Controllers .....	2
<b>BPT 114</b>	Instrumentation I .....	2
<b>BPT 115</b>	Instrumentation II OR Technical Support Elective (ELT, MFG, or IND prefix) .....	2
	English Gen Ed .....	3
<b>Program Total .....</b>		<b>34</b>

### Are You a Part-time Student?

See a program advisor for a list of available courses for part-time students and to develop an individualized plan of study.

### Program Advisors

Tom Helzer, AAS  
Ext. 1373                      Room L415      helzert@witcc.edu

David McDonald, AAS  
Ext. 1281                      Room A146      mcdonad@witcc.edu

Greg Strong, BS, BA, Division Chair  
Ext. 1480                      Room A111      strongg@witcc.edu

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## Computer Numerical Control (CNC) Operator

Certificate  
Sioux City Campus

### Program Overview and Opportunities:

This certificate program provides students with the skills and knowledge required for entry-level employment as a Computer Numerical Control (CNC) operator. General areas of study will involve gaining a fundamental understanding of G-codes, M-codes, and the use of MasterCam™ software as these relate to programmable machine movement of CNC milling machines and lathes.

The demand for Computer Numerical Control (CNC) operators remains constant and future employment opportunities are expected to increase.

Prerequisite: Western Iowa Tech Machinist certificate, industry experience as a machinist, or instructor's approval.

### Computer Numerical Control (CNC) Operator Curriculum

Course #	Title	Credits
<b>MFG 249</b>	Fundamentals of Engine Lathe Operations .....	2
<b>MFG 269</b>	Basic Machine .....	2
<b>MFG 301</b>	Intro to Computer Numerical Control .....	2
<b>MFG 322</b>	Intro to CAD/CAM .....	3
<b>Program Total .....</b>		<b>9</b>

### Program Advisor

Greg Strong, BS, BA, Division Chair  
Ext. 1480                      Room A111      strongg@witcc.edu

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## Electrical Maintenance Technician

Certificate  
Sioux City Campus

### Program Overview and Opportunities:

This certificate program was developed to prepare individuals to apply basic principles and technical skills in maintaining and troubleshooting common electrical systems used in the industry. Skills are developed in basic electrical theory, motor control, drives, control systems, electronics, and PLCs. In addition, instrumentation and control of process measurement and process control will be studied.

There is a high demand for industrial maintenance technicians in the Siouxland area. Employers are seeking trained individuals with both mechanical and electrical maintenance aptitude and troubleshooting skills.

### Program Advisor

Greg Strong, BS, BA, Division Chair  
Ext. 1480                      Room A111      strongg@witcc.edu

### Electrical Maintenance Technician Curriculum

Course #	Title	Credits
<b>ELT 740</b>	Industrial Systems Electrical Systems .....	1
<b>ELT 150</b>	Basic Electrical Theory .....	2
<b>ELT 110</b>	Electronics .....	2
<b>ELT 208</b>	Motor Control .....	2
<b>ELT 780</b>	Electromechanical Control Systems .....	2
<b>ELT 118</b>	Programmable Controllers .....	2
<b>BPT 114</b>	Instrumentation I .....	2
<b>BPT 115</b>	Instrumentation II .....	2
<b>Program Total .....</b>		<b>15</b>

# Manufacturing

## Machine Operations

Certificate  
Sioux City Campus

### Program Overview and Opportunities:

The Machine Operations program provides students with the knowledge of the capabilities of various machines and to prepare them as machine operators. A balance of practical shop work and related instruction provides a solid foundation for future advancements in the trade. Related instruction includes computer numerical control (CNC), shop math, blueprint reading, digital readout, and machine technology. The practical shop work is individualized so that students can progress at their own rate.

Students learn the operation and maintenance of measuring and layout tools and develop skills on basic machine tools and production equipment.

### Program Advisor

Greg Strong, BS, BA, Division Chair  
Ext. 1480      Room A111      strongg@witcc.edu

### Machine Operations Curriculum

Course #	Title	Credits
ELT 102	Blueprint Reading .....	2
MFG 269	Basic Machine Tools .....	2
MFG 249	Fundamentals of Engine Lathe Operation .....	2
<b>Program Total .....</b>		<b>6</b>

See course descriptions in the back of the catalog for more detailed information about course prerequisites and co-requisites.

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## Mechanical Maintenance Technician

Certificate  
Sioux City Campus

### Program Overview and Opportunities:

This certificate program was developed to prepare individuals to apply basic principles and technical skills in maintaining and troubleshooting common mechanical systems used in the industry. Skills are developed in fluid power, power transmission, HVAC, boiler control and steam traps. In addition, predictive maintenance topics of vibration analysis, thermography, machinery oil analysis, and ultrasonics will also be included.

There is a high demand for industrial maintenance technicians in the Siouxland area. Employers are seeking trained individuals with both mechanical and electrical maintenance aptitude and troubleshooting skills.

### Program Advisor

Greg Strong, BS, BA, Division Chair  
Ext. 1480      Room A111      strongg@witcc.edu

### Mechanical Maintenance Technician Curriculum

Course #	Title	Credits
IND 111	Industrial Safety Mechanical Systems .....	1
ELT 102	Blueprint Reading .....	2
EGT 142	Fluid Power I .....	2
EGT 143	Fluid Power II .....	2
IND 141	Power Transmission .....	2
IND 180	Industrial Heating & Cooling .....	2
MFG 520	Predictive Maintenance .....	2
<b>Program Total .....</b>		<b>13</b>

See course descriptions in the back of the catalog for more detailed information about course prerequisites and co-requisites.

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