SCIENCE, TECHNOLOGY, ENGINEERING, TECH, & MATH

Contact the Dean: Dr. Dan Burklo
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dburklo@northweststate.edu
Science, Technology, Engineering Tech, and Math Division

Mission: To serve by providing an excellent educational experience, with genuine interest in our students’ success and personal growth for their entire college career and beyond.

Vision: To be an integral part of NSCC as a recognized leader in the STEM fields, not only in the community but the region and the state.

Northwest State Community College offers a variety of degree and certificate programs in the field of Engineering Technologies. Students enrolled in an Engineering Technologies program will benefit from the small classroom sizes as they learn to analyze problems and, more importantly, how to fix them.

Through the Engineering Technologies Division, students will be prepared to enter the workforce immediately after graduation. They will also have the option of transferring into a four-year degree program at a partnering college or university.

Degree and certificate programs offered through the Engineering Technologies Division include:

Associate of Applied Science
- Computer Science Engineering Technology
- Electro-Mechanical Engineering (pending)
- Electrical Engineering Technology
- Mechanical Engineering Technology
- Project Management Technology

Information Technology
- Computer Programming
- Internet Security
- Network Administration

Mechanical Engineering Technology
- CAD/CAM
- Plastics (pending)

Certificate Programs
- Computer Aided Design
- Computer Technician
- Plastics Manufacturing
- Quality Control

Course Sequence
The suggested sequence of courses is for full-time students. If you are a part-time student or have transferred courses in from another school, you should generally complete the courses listed under semester 1 before moving on to semester 2, 3, and then 4. Elective courses may be taken at any time. Please meet with your advisor if you need assistance to register. Your advisor can help you make any necessary changes to this recommended sequence.

General Education
For Northwest State Core Requirements for all graduates, see page 31. Unless specified on the program page, Humanities and Social Behavioral Science electives should be selected from the Core Requirements list while Communication and Natural Science electives should be selected from the following elective lists.

Communications
- ENG113 Speech
- ENG210 Technical Communications

Natural Science
- CHM101 Principles of Chemistry
- CHM201 General Chemistry I
- PHY101 Principles of Physical Science
- PHY251 Physics: Mechanics & Heat
- PHY252 Physics: Electricity & Magnetism

Technical Electives
- Any AET, CAD, CET, EET, IND, INT, MET, PET, PLC or QCT course

Prerequisites
All students are required to demonstrate proficiencies in reading, writing, and mathematics based on scores on the assessment test or take the recommended classes. If you have not taken these tests, stop by the Admissions Office in C106 or call (419) 267-1320 for information or referral to testing.

Some courses listed in this program have specific prerequisites. See prerequisites required for each course in the Course Description section of this publication.
The CAD/CAM graduate will earn an Associate of Applied Science degree in the Mechanical Engineering Technology. Students completing the associate degree are qualified to play a support role to the engineering professionals in industry preparing blueprints, layouts, bills of materials, manufacturing and product support documentations. The CAD/CAM major will also prepare the student to interpret designs and to design components and tooling used in manufacturing and to operate production machines and program CNC machines, using G Codes and state-of-the-art CAM software.

**Career Outlook**
Job seekers who have a two-year degree should have the best prospects for employment. With the shortage of skilled metalworkers in the United States today, the job opportunities are favorable for the CAD/CAM Technician.

**Program Learning Outcomes**
Students earning an Associate degree from this program will:

1. Interpolate and complete engineered drawings using orthographic projection, isometric views, and proper dimensioning practices, then employ the use of Computer-Aided-Design (CAD) software.
2. Describe the different manufacturing processes and demonstrate proper use of precision measuring devices and instruments.
3. Demonstrate machining projects with an emphasis on safety, fixturing, feeds and speeds, tooling, precision, and accuracy.

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CAD111</td>
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<tr>
<td>+ IND140</td>
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<tr>
<td>MET100</td>
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<tr>
<td>+ MET107</td>
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**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>CAD213</td>
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<td>ENG112</td>
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<tr>
<td>+ MET222</td>
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**Third Semester**

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<thead>
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<tr>
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<td>3</td>
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<tr>
<td>+ QCT100</td>
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<tr>
<td>Social/Behavioral Science Elective</td>
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<tr>
<td>Communications Elective</td>
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**Fourth Semester**

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<tr>
<td>+ MET260</td>
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<td>+ MET262</td>
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<td>PHY251</td>
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<tr>
<td>+ CET115</td>
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<td>MET121</td>
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<tr>
<td>MET134</td>
<td>2</td>
</tr>
<tr>
<td>Humanities Elective</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total Program Hours** 64

*Students must attain a minimum grade of “C” in all courses with a ‘+’ to progress in the program and to graduate.*

See page 31 for a list of Humanities and Social/Behavioral Science Electives.

See page 40 for a list of Communications and Technical Electives.
A Computer Aided Design Certificate prepares the individual to create engineering drawings using CAD software. Typically these individuals will work closely with mechanical engineers, sometimes receiving objectives and technical advice from supervisors and/or engineers (both Electrical and Mechanical), displaying both their knowledge of the software and current knowledge of drafting and design standards. It is expected by employers that individuals demonstrate excellent verbal, written and interpersonal communication skills.

Coursework (100 level or higher) completed in this certificate directly applies toward the associate degree in mechanical engineering technology with a CAD/CAM major.

Career Outlook
Graduates of this program may find employment as an entry-level CAD operator/technician or as a detailer working under the direction of a design engineer. Some of the typical duties of a CAD operator/technician will include: compiling and computing a variety of engineering data; developing and preparing schematics from designs made by you and/or others; making preliminary designs from rough specifications and/or verbal directions; generating and revising current engineering prints and three-dimensional patterns for parts and products; designing and modifying equipment used for manufacturing; building a bill of material for new or revised designs, revising drawings and checking prints for accuracy.

Job opportunities for CAD technicians will remain stable through the next several years, with most of the positions occurring from replacing workers who leave the profession or retire.

Program Learning Outcomes
Students earning a certificate from this program should demonstrate:

1. Demonstrate file handling and management
2. Demonstrate familiarity with computer software, CAD, computer hardware, and component terminologies
3. Interpret and apply the Cartesian coordinate system
4. Demonstrate setup, display, drawing, inquiry, and modify commands
5. Develop, modify, and manipulate symbols, crosshatching, and various types of dimensioning
6. Demonstrate inquiry commands and develop industrial-type detail and assembly drawings as well as produce finished projects

Gainful employment information for NSCC’s certificate programs can be found online at NorthwestState.edu/GainfulEmployment. Gainful employment information includes: estimated cost of the program, average student loan debt and types of jobs available.

Students must attain a minimum grade of “C” in all courses with a ‘+’ to progress in the program and to graduate.
Computers play a part in nearly all phases of our life today. Businesses and governmental agencies, large and small, require trained computer specialists. The computer programming degree prepares computer programmers and computer operators to work with a wide variety of computers and languages used by area employers. Emphasis is placed upon business-oriented computer languages. Programming and practical applications of business data are stressed. In the laboratory, hands-on experience is provided using the Internet and PC compatible computers.

Graduates may find employment in entry-level positions with typical titles such as Computer Operator, Application Programmer, Maintenance Programmer, Software Developer or in Technical Support. A career path may include Lead or Senior Programmer and Data Processing Manager.

Career Outlook
Employment of computer programmers is expected to be quite good. Opportunities should be especially favorable for those programmers who know several programming languages.

Program Learning Outcomes
Student will be able to:

1. Demonstrate the ability to apply structured programming concepts.
2. Install and troubleshoot current Personal Computer hardware and current Operating System software.
3. Demonstrate software skills.
4. Write and debug programs.

Mathematics Electives:
MTH105 Quantitative Reasoning
MTH109 College Algebra
STA120 Introduction to Statistics
STA222 Business Statistics

See page 31 for Natural Science, Humanities and Social Behavioral Science Electives.

Students must attain a 2.00 grade point average in these technical courses to graduate.
The Computer Science Engineering Technology program prepares graduates for the field of computer science with a comprehensive understanding of computer hardware and software at the machine and system level. The program combines curriculum in electronics and computer programming addressing both hardware and software aspects of computer design and applications. The design aspect places emphasis on computer structures, computer architectures, microcomputer systems, digital design, and computational applications. The applications part of the program includes a general knowledge of computer operating systems, utilization of software in engineering technologies, low- and hi-level programming techniques, and the use of mathematical algorithms.

Career Outlook
With an increasing utilization of computer systems and programming, demand for technicians with a computer science background is ever increasing. Graduates of this program will have the foundational coursework leading into four year computer science and electrical engineering programs at various universities, as well as being qualified for entry level engineering technicians in product design, engineering support, and other technical support positions. Typical job titles with this degree would include Application Specialist, Computer Systems Specialist, Computer Maintenance Technician, Field Service Representative, Field Engineer, Installation Technician, and Systems Integrator.

Program Learning Outcomes
Students earning an Associate degree from this program will be able to:
1. Apply fundamental electrical and magnetic theory and reduce to practice direct current (DC) circuits.
2. Discuss the foundations of digital logic.
3. Implement logic circuits using electronic and microprocessor hardware.
4. Write and debug software using high- and low-level structured programming techniques.
5. Utilize foundational algorithms and mathematical constructs.
6. Design and manage data network systems, including routers, switches, and data cable installations.

See page 31 for Humanities and Social Behavioral Science Electives.

See page 40 for Communications Electives.

Students must attain a minimum grade of “C” in all courses with a ‘+’ to progress in the program and to graduate.
The computer technician must have experience working on personal computers, experience working on networks and some programming experience. Technicians are acquainted with software packages such as word processors and spreadsheets. The computer technician must be knowledgeable in computer operations and computer systems.

**Career Outlook**
Students can earn the associate degree by completing one year of full-time study beyond the Computer Technician Certificate. Graduates may find employment in entry-level positions such as computer technician, peripheral equipment operator, help desk technician or technical support.

**Program Learning Outcomes**
Students earning a certificate from this program will be able to:
1. Demonstrate the ability to apply structured programming concepts.
2. Install and troubleshoot current Personal Computer hardware and current Operating System software.
3. Demonstrate software skills.
4. Write and debug programs.

**Mathematics Electives:**
- MTH105 Quantitative Reasoning
- MTH109 College Algebra
- STA120 Introduction to Statistics
- STA222 Business Statistics

**Technical Electives:**
- CAD111 CAD I
- CIS109 Database Management
- CIS155 Linux Networking I
- CIS192 Microsoft Workstation Technology
- CIS195 Networking Essentials
- CIS194 IT Security Fundamentals
- CIS255 Linux Networking II
- CIS284 Microsoft Infrastructure Technology
- CIS285 Microsoft Directory Services Technology
- CIS290 Information Technology Internship
- EET272 Cisco Networking 1

**Programming Electives:**
- CIS108 Internet Scripting
- CIS150 Programming C++
- CIS161 C#
- CIS165 Java Programming

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**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>BUS101</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>+ CIS111</td>
<td>Visual Basic Programming</td>
<td>4</td>
</tr>
<tr>
<td>+ CIS191</td>
<td>Computer Operations</td>
<td>3</td>
</tr>
<tr>
<td>+ CIS193</td>
<td>Microsoft Server Technology</td>
<td>3</td>
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<tr>
<td>ENG111</td>
<td>Composition I</td>
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**Second Semester**

<table>
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<th>Course</th>
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<tbody>
<tr>
<td>BUS211</td>
<td>Business Communications</td>
<td>3</td>
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<tr>
<td>CIS114</td>
<td>Microsoft Applications</td>
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<tr>
<td>Mathematics Elective</td>
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<tr>
<td>+ Programming Elective</td>
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<tr>
<td>+ Technical Elective</td>
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<td></td>
<td></td>
<td>16</td>
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**Total Program Credit Hours**

| Count   | 32   |

Gainful employment information for NSCC's certificate programs can be found online at NorthwestState.edu/GainfulEmployment. Gainful employment information includes: estimated cost of the program, average student loan debt and types of jobs available.

+ Students must attain a 2.00 grade point average in these technical courses to graduate.
Electro-Mechanical Engineering Technology (Pending)
Associate of Applied Science

Science, Technology, Engineering Tech, and Math Division

Graduates of this program will have the foundational coursework leading into four year mechanical and/or electrical engineering technology programs at various universities, including a direct transfer into the Miami University degree completion program, as well as being qualified for entry level engineering technicians in product design, engineering support, and other technical support positions. This program, as well, is aligned to provide an option for college credit plus students who may be interested in an engineering technology field.

Career Outlook
The demand for technicians and engineering technologists remains high, with two of the main areas of interest in mechanical and electrical. While positions have historically been described as either mechanical or electrical, today many companies are looking for mechanical engineering technologists with some electrical background or electrical with some mechanical aptitude. Companies are looking for individuals with both mechanical and electrical skills. This has also been recognized by universities, who now offer Bachelor of Science degrees in electro-mechanical engineering technology. Graduates from this program will have the foundational coursework leading into four year mechanical and/or electrical engineering technology programs at various universities, including a direct transfer into the Miami University degree completion program. Graduates will also be qualified for entry level engineering technicians in product design, engineering support, and other technical support positions.

Program Learning Outcomes
Students earning an Associate degree from this program will be able to:

1. Understand fundamental electrical and magnetic theory and reduce to practice direct current (DC) and alternating current (AC) circuits.
2. Interpret electrical diagrams and schematics to predict behavior and to assess functionality using handheld and bench-top measurement instruments.
3. Implement computer-based instrumentation, and control of digital and analog electronics.
4. Interpolate and complete engineered drawings using orthographic projection, isometric views, and proper dimensioning practices, then employ the use of Computer-Aided-Design (CAD) software.
5. Describe the different manufacturing processes and demonstrate proper use of precision measuring devices and instruments.
6. Analyze and calculate the resolution of forces on rigid bodies; determine the stress, strain, and deflection.

See page 31 for a list of Humanities and Social/Behavioral Science Electives.
See page 40 for Communications Elective.

+ Students must attain a minimum grade of “C” in all courses with a “+” to progress in the program and to graduate.

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Electrical Engineering Technology (EET) is a comprehensive electrical technologies program that prepares graduates for employment as skilled technicians, or for pursuit of a Bachelor of Science degree in Engineering Technology. The EET program provides a foundation of electrical and electronics theory and practice applicable to a variety of subject areas including, but not limited to, Alternative energy systems, automation and control and electric drive technology. A focus on laboratory experience gives students the technical hand skill and problem solving insight to employ solutions in the field. The curriculum includes algebra-based courses with emphasis on applied science and engineering.

Students in the EET program have opportunity to participate in applied research and testing activities to supplement coursework.

Career Outlook
Demand is growing for technicians in the electrical-related fields in northwest Ohio and across the country who possess diverse technical skills and problem solving acumen. The career outlook for graduates of the EET program is promising, with special opportunities in Alternative Energy and Electric Vehicle manufacturing and product improvement.

Program Learning Outcomes
Students earning an Associate degree from this program will be able to:
1. Understand fundamental electrical and magnetic theory and reduce to practice direct current (DC) and alternating current (AC) circuits.
2. Interpret electrical diagrams and schematics to predict behavior and to assess functionality using handheld and benchtop measurement instruments.
3. Analyze electrical circuits using Ohm’s Law and theorems for specifying conductors and components, and for calculating power and energy.
4. Fabricate electrical circuits, modules, and systems using industry-accepted practices.

See page 31 for a list of Humanities and Social/Behavioral Science Electives.

See page 40 for a list of Communications Electives.
INTERNET SECURITY
ASSOCIATE OF APPLIED BUSINESS IN INFORMATION TECHNOLOGY

SCIENCE, TECHNOLOGY, ENGINEERING TECH, AND MATH DIVISION

An Internet Security professional assists in securing networks and computers from unauthorized activity. This program will teach students how to monitor networks using packet sniffing, secure networks using firewalls, secure network file systems, manage passwords, encrypt files, encrypt network traffic and deal with threats such as spyware, malware and viruses.

Career Outlook
Career opportunities are numerous for individuals in this field. All organizations, large and small, use the computer as an integral part of their business. Workers need both software and hardware support to do their jobs. Graduates may find employment in entry-level positions with typical titles such as Internet Security Specialist, Network Security Analyst, Security Administrator or Computer Security Specialist.

Program Learning Outcomes
Students earning an Associate degree from this program will be able to:
1. Demonstrate the ability to apply structured programming concepts.
2. Install and troubleshoot current Personal Computer hardware and current Operating System software.
3. Demonstrate software skills.
4. Implement procedures designed to counteract current Computer and Network security risks.

Mathematics Electives:
- MTH105 Quantitative Reasoning
- MTH109 College Algebra
- STA120 Introduction to Statistics
- STA222 Business Statistics

Programming Electives:
- CIS108 Internet Scripting
- CIS111 Visual Basic Programming
- CIS150 Programming C++
- CIS161 C#
- CIS165 Java Programming

Technical Electives:
- CAD111 CAD I
- CIS109 Database Management
- CIS192 Microsoft Workstation Technology
- CIS255 Linux Networking II
- CIS285 Microsoft Directory Services Technology
- CIS290 Information Technology Internship
- EET272 Cisco Networking I

Mathematics Electives:
- MTH105 Quantitative Reasoning
- MTH109 College Algebra
- STA120 Introduction to Statistics
- STA222 Business Statistics

Programming Electives:
- CIS108 Internet Scripting
- CIS111 Visual Basic Programming
- CIS150 Programming C++
- CIS161 C#
- CIS165 Java Programming

Technical Electives:
- CAD111 CAD I
- CIS109 Database Management
- CIS192 Microsoft Workstation Technology
- CIS255 Linux Networking II
- CIS285 Microsoft Directory Services Technology
- CIS290 Information Technology Internship
- EET272 Cisco Networking I

See page 31 for Natural Science, Humanities and Social Behavioral Science Electives.

First Semester
- BUS101 Introduction to Business.......... 3
  + CIS191 Computer Operations ............ 3
  + CIS193 Microsoft Server Technology .... 3
  + CIS195 Networking Essentials ............ 3
  ENG111 Composition I ...................... 3

Second Semester
- CIS114 Microsoft Applications ............ 3
  + CIS194 IT Security Fundamentals ....... 3
  ENG112 Composition II ..................... 3
  Natural Science Elective .................... 3
  + Technical Elective ....................... 2

Third Semester
- ACC111 Financial Accounting ............. 3
  + CTJ130 Criminal Justice Principles .... 3
  Mathematics Elective ...................... 3
  Programming Elective ..................... 4
  + Technical Elective ....................... 2

Fourth Semester
- BUS211 Business Communications ........ 3
  + CIS155 Linux Networking I .............. 4
  + CIS284 Microsoft Infrastructure Technology 3
  Humanities Elective ....................... 3
  Social Behavioral Science Elective .... 2

Total Program Credit Hours 62

Students must attain a 2.00 grade point average in these technical courses to graduate.
The machinery of modern industry consists of mechanical devices, levers that move, wheels that spin and cogs that must mesh. The mechanical engineering technology degree is designed to educate students in technology based, entry-level occupations related to the mechanical and manufacturing engineering fields. Graduates will be able to assist engineers and other professional staff engaged in plant and facilities maintenance and other plant engineering and management functions.

All aspects of industry are dependent on the production and reading of drawings to convey information.

The mechanical engineering technology degree provides students the opportunity to study engineering topics associated with the design and installation of mechanical equipment and systems with the option of transferring to another institution to pursue a four-year bachelor degree in Mechanical Engineering Technology.

The student who follows this course of study will be trained to function as a Mechanical Technician in a number of industrial situations which require knowledge of mechanical systems, engineering materials and equipment. The student may find himself/herself working closely with engineers engaged in designing, testing, servicing or assembly and installation of machinery and industrial equipment.

**Career Outlook**

Many diverse occupations find their origins in the mechanical field. These occupations include a variety of titles in the areas of drafting, production, testing, design and analysis, to name a few. Employment in the mechanical field should be quite good with job opportunities growing as fast as average nationally and in the state of Ohio.

The largest need for mechanical engineering technicians will be in manufacturing, with companies continually wanting new or improved machinery.

**Program Learning Outcomes**

Students earning an Associate degree from this program will:

1. Interpolate and complete engineered drawings using orthographic projection, isometric views, and proper dimensioning practices, then employ the use of Computer-Aided-Design (CAD) software.
2. Describe the different manufacturing processes and demonstrate proper use of precision measuring devices and instruments.
3. Examine the physical and chemical properties of engineering materials, analyze and calculate the properties of fluids.
4. Analyze and calculate the resolution of forces on rigid bodies; determine the stress, strain, and deflection, then design machines and mechanisms.

**First Semester**

<table>
<thead>
<tr>
<th>Credits</th>
<th>ENG111 Composition I</th>
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<tbody>
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<tr>
<td>+ MET107 Engineering Graphics</td>
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<tr>
<td>+ MET121 Manufacturing Processes</td>
<td>3</td>
<td></td>
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<tr>
<td>MTH109 College Algebra</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Second Semester**

| Credits | CAD213 CAD III | 4 |
|---------|----------------|
| ENG112 Composition II | 3 |
| + MET134 Engineering Materials | 3 |
| MTH112 Trigonometry | 3 |
| PHY251 Physics: Mechanics and Heat | 4 |

**Third Semester**

| Credits | QCT100 Quality Concepts | 3 |
|---------|-------------------------|
| + MET234 Strength of Materials | 3 |
| + MET235 Statics | 3 |
| Natural Science Elective | 4 |
| Communications Elective | 3 |

**Fourth Semester**

| Credits | MET255 Fluid Mechanics | 3 |
|---------|------------------------|
| + MET265 Machine Design | 3 |
| + CAD II CADII or EET121 DC Circuits or CET115 Project Management | 3 |
| + EET121 DC Circuits | 3 |
| + CET115 Project Management | 2 |
| Social/Behavioral Science Elective | 3 |
| Humanities Elective | 2 |

**Total Program Hours**

62

See page 31 for a list of Humanities and Social/Behavioral Science Electives.

See page 40 for a list of Communications, Natural Science and Technical Electives.

+ Students must attain a minimum grade of “C” in all courses with a ‘+’ to progress in the program and to graduate.
Network Administration
Associate of Applied Business in Information Technology

Science, Technology, Engineering Tech, and Math Division

The Network Administration major provides the skills and training necessary to install and maintain networks using Microsoft and Linux Operating Systems. The program provides the student with training in current programming languages such as C++, Java, C#, and Visual Basic. Training is provided which will help students to prepare for certification tests offered by organizations such as CompTIA and Microsoft.

Career Outlook
Career opportunities are numerous for individuals in this field. All organizations, large and small, use computers as an integral part of how they do business. Workers need both software and hardware support to do their jobs. Graduates may find employment in entry-level positions with typical titles such as Network Administrator, Network Engineer, Network Installation Engineer, Computer Programmer, Technical Support or Help Desk. A career path may include Enterprise Network Administration, Lead or Senior Programmer, Systems Programmer and Data Processing Manager.

Program Learning Outcomes
Students earning an Associate degree from this program will be able to:
1. Demonstrate the ability to apply structured programming concepts.
2. Install and troubleshoot current Personal Computer hardware and current Operating System software.
3. Demonstrate software skills.

Mathematics Electives:
- MTH105 Quantitative Reasoning
- MTH109 College Algebra
- STA120 Introduction to Statistics
- STA222 Business Statistics

Programming Electives:
- CIS108 Internet Scripting
- CIS111 Visual Basic Programming
- CIS150 Programming C++
- CIS161 C#
- CIS165 Java Programming

Technical Electives:
- CAD111 CAD I
- CIS109 Database Management
- CIS194 IT Security Fundamentals
- CIS255 Linux Networking II
- CIS290 Information Technology Internship
- EET272 Cisco Networking I

See page 31 for a list of Humanities and Social/Behavioral Science Electives.

See page 40 for a list of Communications Electives.

First Semester
- BUS101 Introduction to Business
- CIS191 Computer Operations
- CIS193 Microsoft Server Technology
- CIS195 Networking Essentials
- ENG111 Composition I

Second Semester
- CIS155 Linux Networking I
- CIS284 Microsoft Infrastructure Technology
- ENG112 Composition II
- Social Behavioral Science Elective
- Technical Elective

Third Semester
- ACC111 Financial Accounting
- CIS114 Microsoft Applications
- CIS192 Microsoft Workstation Technology
- Programming Elective
- Mathematics Elective

Fourth Semester
- BUS211 Business Communications
- CIS285 Microsoft Directory Services
- Humanities Elective
- Natural Science Elective
- Technical Elective

Total Program Credit Hours 62

Students must attain a 2.00 grade point average in these technical courses to graduate.
Plastics is one of the fastest growing manufacturing industries today. The plastics program at Northwest State Community College was created in response to the industry demand in northwest Ohio for employee training and student education in plastics manufacturing. Students will receive specialized training in thermoplastic materials, injection molding and plastics testing. Graduates will also be skilled in various processes such as blow molding, extrusion and thermoforming.

Career Outlook

While consumer demand for convenient, plastic products increases, so will the need for highly-skilled plastics technicians. Job titles in this field can include Molding Technician, Production Supervisor, design and development and quality control technician to name a few. Employment of plastic processing workers is expected to grow as fast as the average both nationally and in the state of Ohio. An increase in workers trained in the field will stem from manufacturers substituting plastic parts for those that had been manufactured from metal in the past.

Program Learning Outcomes

Students earning an Associate degree from this program will:

1. Discuss and explain polymers including history, current industry, recycling, types of polymers and properties, as well as analyze various polymeric structures and applications based on those structures.
2. Explain, compare, and contrast common manufacturing processes used in the plastics industry and select the appropriate process depending on the product, as well as the ability to outline major plastics process and establish a production intent process and troubleshoot various defects.
3. Demonstrate and explain the various properties and test associated with plastics materials, as well as the ability to make decisions on part requirements based on various properties and tests.
4. Explain secondary operations used in the plastics industry primarily for assembly and decoration and select appropriate secondary operations based on production requirements.
5. Evaluate and design a mold and die for dimensional stability, process ability, flow characteristics for production intent.

First Semester

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<thead>
<tr>
<th>Course</th>
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Total Program Hours 64

See page 31 for a list of Humanities and Social/Behavioral Science Electives.

See page 40 for a list of Communications Electives.

+ Students must attain a minimum grade of “C” in all courses with a “+” to progress in the program and to graduate.
PLASTICS MANUFACTURING CERTIFICATE

Sciences, Technology, Engineering Tech, and Math Division

A Plastics Manufacturing Certificate prepares the individual to setup and maintain injection molding processes; plastics testing processes and ensure quality control. Individuals may also be skilled in various processes such as blow molding, extrusion, and thermoforming. Typically these individuals report to manufacturing supervisors, receiving daily objectives from them.

Technicians work on assignments and tasks with minimum supervision and guidance, often requiring the technician to interface and pass down information to personnel on incoming and outgoing shifts. It is expected by employers that technicians demonstrate excellent verbal, written and interpersonal communication skills.

Coursework (100 level or higher) completed in this certificate directly applies toward the associate degree in plastics engineering technology.

Career Outlook
Graduates of this program may find employment as entry-level mold technicians, mold setters, job setters and material handlers working under the direction of the manufacturing department. Some of the typical duties of these technicians will include performing: mold insert changes; material color changes; press start-ups and shut downs; mold changes and planned maintenance (PMs) on the molds; performing product inspections to verify conformance to specifications, ensuring quality control; and directing and performing adjustments of molding equipment, working closely with the production and the quality control departments.

Program Learning Outcomes
Students earning a certificate from this program should demonstrate:

1. Discuss and explain polymers including history, current industry, recycling, types of polymers and properties.
2. Explain, compare, and contrast common manufacturing processes used in the plastics industry. Select the appropriate process depending on the product, as well as the ability to outline major plastics process and establish a production intent process and troubleshoot various defects.
3. Produce design concepts and orthographic projection. Interpolate dimensioning practices and read blueprints, as well as explain the various properties associated with plastics and the ability to perform functional tests used to determine properties.
4. Explain the theory of common secondary operations used in the plastics industry primarily for assembly and decorating.

Gainful employment information for NSCC’s certificate programs can be found online at NorthwestState.edu/GainfulEmployment. Gainful employment information includes: estimated cost of the program, average student loan debt and types of jobs available.

+ Students must attain a minimum grade of “C” in all courses with a “+” to progress in the program and to graduate.
This program is designed to prepare graduates for careers as technicians, management trainees or supervisors in manufacturing. Courses include a mixture of business management topics with an emphasis on engineering technologies.

Career Outlook
The demand for educated Project Managers continues to grow nationally and in the State of Ohio. Time management, hands on engineering, and refined communication skills are required by several industries in order to meet tight profit margins. Construction, Engineering, Logistics, and Manufacturing will be the strongest areas of employment for Project Management Technology.

Program Learning Outcomes
Students earning an Associate degree from this program should demonstrate:

1. Interpolate and complete and complete engineered drawings using orthographic projection, isometric views, and proper dimensioning practices, as well as employ the use of Computer-Aided-Design (CAD) software.
2. Demonstrate proper use of precision measuring devices and instruments and the ability to apply SPC practices to various processes within the industry.
3. Efficiently and effectively manage projects, including scheduling, monitoring, and analyzing with respect to cost, time, and resources.
4. Basic knowledge of Engineering Technology based on the selected track

Engineering Technology Tracks (Choose a track):
Alternative Energy: AET 100 Intro. to Alternative Energy and AET 200 Sustainable Building Design

Construction: CET 100 Construction Methods and Materials and CET 120 Construction Materials Testing

Electrical: EET 121 DC Circuits and EET 122 AC Circuits

Mechanical: MET 121 Manufacturing Processes and MET 134 Engineering Materials

Plastics: PET115 Plastics Processes I and PET215 Plastics Processes II

First Semester

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Total Program Hours 62

See page 31 for a list of Humanities and Social/Behavioral Science Electives.

See page 40 for Communications Electives.

+ Students must attain a minimum grade of “C” in all courses with a “+” to progress in the program and to graduate.
Quality Control Certificate

Science, Technology, Engineering Tech, and Math Division

A Manufacturing Quality Certificate prepares the student for a career as a quality specialist (supplier quality engineer, green belt, mechanical inspector, quality technician, auditor and similar roles).

Twenty-first century manufacturing operations link productivity to quality. Lean manufacturing quality concepts are essential to modern competitiveness. Accordingly, persons seeking greater responsibility should consider the quality curriculum.

This program of study prepares the student to sit for American Society for Quality Technician exam. ASQ certifications are widely recognized and favorably impact hiring and compensation decisions.

Career Outlook
The greatest demand for engineering technicians will be in manufacturing. Companies need improved machinery, up-to-date processes, and lean manufacturing methods to compete on a global basis. Quality skills apply during all phases of the product cycle – from concept to production to distribution and service.

ISO/TS/OSHA certifications are becoming a common prerequisite for doing business, worldwide. This course of study imparts the skills needed to comply with many certification system requirements. Skills learned in this course form a solid foundation on which to build if your goal is to become a Quality Assurance Manager, Quality Engineer, or Quality Auditor.

Program Learning Outcomes
Students earning a certificate from this program should demonstrate:

1. Basic knowledge leading to quality from management, practitioner and customer perspectives.
2. Concentration on quality problem solving and process control tools.
3. Basic understanding of probability and philosophies espoused by Deming, Crosby, and Juran.
4. Basic knowledge of quality, measurement system analysis and control charting principles.
5. Proper selection and use of measuring tools for the feature based upon the print specification.
6. Proficiency for dealing with tolerance stacks, another layer of G D & T.
7. Basic understanding of more complex quality improvement methods by studying at least three of the following topics: Advanced SPC, Six Sigma Start-Up, DOE: Screening Experiments, Measurement Systems Analysis or Problem Solving.

First Semester

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Total Program Hours 37

See page 40 for a list of Communications Electives.

Gainful employment information for NSCC’s certificate programs can be found online at NorthwestState.edu/GainfulEmployment. Gainful employment information includes: estimated cost of the program, average student loan debt and types of jobs available.

* Prior to taking IND110, students should have basic computer literacy in Windows and at least one Windows application.

+ Students must attain a minimum grade of “C” in all courses with a “+” to progress in the program and to graduate.