

Career & Technical Education Programs

Automotive Service Technician

| | |
|--|-------|
| Automotive Service Technician AAS Degree (72 Credits) | 63-64 |
| Automotive Service Technician Diploma (56 Credits) | 65 |

Cabinetmaking

| | |
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| Cabinetmaking Diploma (34 Credits) | 66 |
|--|----|

Carpentry

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| Carpentry Diploma (42 Credits) | 67 |
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| | |
|---|----|
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|---|----|
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|---|----|
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|---|----|

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|--|----|
| Sheet Metal/HVAC Ducts & Fittings AAS Degree (60 Credits) | 79 |
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|--|----|
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|--|----|
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Automotive Service Technician AAS DEGREE

Program Overview

Automotive repair requires trained technicians skilled in the use of testing equipment, special tools, and the latest information and specifications to service the many types of automobiles. Technicians diagnose trouble in any one of thousands of automotive components. They work with many new systems each year that require new service techniques and training. Some of these include air conditioning units, emission control devices, alternators, electronic ignition, and electronic fuel injection.

Students are prepared to take the ASE certification tests when they have completed the program. ASE certifies technicians nationwide.

Students should have good mechanical aptitude, be in good physical condition and have the ability to get along with others. Students also need to be able to read and process technical information.

Career Opportunities

Opportunities are expected to be plentiful for automotive technicians with technical training according to the U.S. Department of Labor. The department also states that the growing complexity of automotive technology, such as the use of electronic and emissions control equipment increasingly necessitates that cars be serviced by professionals.

The auto technician may work in a dealership garage, an independent garage, or as a specialist. Opportunities exist for a technician to become a shop service sales person, new car dealership service manager, or shop owner.

Program Outcomes

1. Graduates will be prepared to pass all 8 ASE tests.
2. Graduates will have knowledge and skills in use of testing equipment, special tools, and specifications for servicing automobiles.
3. Graduates will have the knowledge and skills to diagnose problems in automotive systems.
4. Graduates will be prepared for employment as Automotive Service Technicians.
5. Graduates will have proficient communication skills for customer service.
6. Graduates will have business and management skills required of an automotive service technician.

Program Faculty

- Llewellyn Olivier
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- John Purcell
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- David Vorderbruggen
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- Jake Yernberg
jake.yernberg@saintpaul.edu

Program Requirements

- Check off when completed

Successful completion of each semester in this program is a prerequisite for participation in the following semester.

| Course | Cr |
|---|-----------|
| <input type="checkbox"/> AUTO 1415 Introduction to Automotive Technology | 4 |
| <input type="checkbox"/> AUTO 1430 Brakes | 4 |
| <input type="checkbox"/> AUTO 1441 Alignment & Suspension | 4 |
| <input type="checkbox"/> AUTO 1510 Clutch/Driveline Manual Transmission | 3 |
| <input type="checkbox"/> AUTO 1523 Four Wheel Drive Differential | 3 |
| <input type="checkbox"/> AUTO 1530 Basic Electrical & Battery | 3 |
| <input type="checkbox"/> AUTO 1540 Basic Engine Management | 3 |
| <input type="checkbox"/> AUTO 1550 Heating & Air Conditioning | 4 |
| <input type="checkbox"/> AUTO 2410 Starting & Charging Systems | 3 |
| <input type="checkbox"/> AUTO 2420 Electrical Accessories | 3 |
| <input type="checkbox"/> AUTO 2430 Engine Theory & Repair | 4 |
| <input type="checkbox"/> AUTO 2440 Engine Installation | 2 |
| <input type="checkbox"/> AUTO 2450 Introduction to Auto Computers | 2 |
| <input type="checkbox"/> AUTO 2513 Fuel Systems | 3 |
| <input type="checkbox"/> AUTO 2520 Engine Drivability | 3 |
| <input type="checkbox"/> AUTO 2530 Automatic Transmission Theory | 2 |
| <input type="checkbox"/> AUTO 2542 Automatic Transmission Diagnosis & Repair | 4 |
| <input type="checkbox"/> AUTO 2550 Specialized Lab 1 | 2 |
| Subtotal | 56 |
| General Education/MnTC Requirements | |
| Refer to the Minnesota Transfer Curriculum Course List for each Goal Area | |
| <input type="checkbox"/> Goal 1: Communication | 7 |
| ENGL 1711 Composition 1 – 4 cr COMM 17XX – 3 cr | |
| <input type="checkbox"/> Goal 3 or Goal 4 | 3 |
| Goal 3: Natural Sciences OR Goal 4: Mathematical/Logical Reasoning | |
| <input type="checkbox"/> Goal 5: History, Social Science, and Behavioral Sciences | 3 |
| <input type="checkbox"/> Goal 6: Humanities and Fine Arts | 3 |
| General Education Requirements | 16 |
| Total Program Credits | 72 |

Tool Costs

Students will need to supply their own basic tools and tool box. The estimated cost for professional quality tools and tool box is approximately \$2,000–\$3,000. Tool vendors will be on campus during the first week.

Program Start Dates

Fall (AAS General Education credits can be taken any term)

Length of Program

This is a full-time, day and evening program. The program can be completed in four semesters. Students can enroll in the program only in the fall.

See back of this guide for Course Sequence & Transfer Opportunities

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+

Shop/classroom visit recommended; student must have a valid driver's license.

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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Information is subject to change. This Program Requirements Guide is not a contract.

Automotive Service Technician AAS DEGREE *(continued)*

Course Sequence

The following sequence is recommended; however, this sequence is not required. Contact Program Faculty with questions.

First Semester

| | |
|---|-----------|
| AUTO 1415 Introduction to Automotive Technology | 4 |
| AUTO 1430 Brakes | 4 |
| AUTO 1510 Clutch/Driveline Manual Transmission . . . | 3 |
| AUTO 1530 Basic Electrical & Battery | 3 |
| ENGL 1711 Composition 1 | 4 |
| Total Semester Credits. | 18 |

Second Semester

| | |
|---|-----------|
| AUTO 1441 Alignment & Suspension | 4 |
| AUTO 1523 Four Wheel Drive Differential | 3 |
| AUTO 1540 Basic Engine Management | 3 |
| AUTO 1550 Heating & Air Conditioning | 4 |
| Goal 1: COMM 17XX | 3 |
| Total Semester Credits. | 17 |

Third Semester

| | |
|--|-----------|
| AUTO 2410 Starting & Charging Systems | 3 |
| AUTO 2420 Electrical Accessories | 3 |
| AUTO 2430 Engine Theory & Repair | 4 |
| AUTO 2440 Engine Installation | 2 |
| AUTO 2450 Introduction to Auto Computers | 2 |
| Goal Area 3 or 4 | 3 |
| Goal Area 5 | 3 |
| Total Semester Credits. | 20 |

Fourth Semester

| | |
|--|-----------|
| AUTO 2513 Fuel Systems | 3 |
| AUTO 2520 Engine Drivability | 3 |
| AUTO 2530 Auto Transmission Theory | 2 |
| AUTO 2542 Auto Tran Diagnosis & Repair | 4 |
| AUTO 2550 Specialized Lab 1 | 2 |
| Goal Area 6 | 3 |
| Total Semester Credits. | 17 |

Any Semester

General Education requirement courses may be taken before, after or concurrently with the Automotive Service Technician courses.

| | |
|---|-----------|
| General Education Requirements | 16 |
|---|-----------|

| | |
|--|-----------|
| Total Program Credits | 72 |
|--|-----------|

Transfer Opportunities

Saint Paul College has transfer agreements & partnerships between many post-secondary institutions. For more information please go to saintpaul.edu/Transfer.

Automotive Service Technician DIPLOMA

Program Overview

Automotive repair requires trained technicians skilled in the use of testing equipment, special tools, and the latest information and specifications to service the many types of automobiles. Technicians diagnose trouble in any one of thousands of automotive components. They work with many new systems each year that require new service techniques and training. Some of these include air conditioning units, emission control devices, alternators, electronic ignition, and electronic fuel injection. Students are prepared to take the ASE certification tests when they have completed the program. ASE certifies technicians nationwide.

Students should have good mechanical aptitude, be in good physical condition and have the ability to get along with others. Students also need to be able to read and process technical information.

Career Opportunities

Opportunities are expected to be plentiful for automotive technicians with technical training according to the U.S. Department of Labor.

The department also states that the growing complexity of automotive technology, such as the use of electronic and emissions control equipment increasingly necessitates that cars be serviced by professionals.

The auto technician may work in a dealership garage, an independent garage, or as a specialist. Opportunities exist for a technician to become shop service sales person, new car dealership service manager, or shop owner.

Program Outcomes

1. Graduates will be prepared to pass all 8 ASE tests.
2. Graduates will have knowledge and skills in use of testing equipment, special tools, and specifications for servicing automobiles.
3. Graduates will have the knowledge and skills to diagnose problems in automotive systems.
4. Graduates will be prepared for employment as Automotive Service Technicians.

Program Faculty

- Llewellyn Olivier
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- John Purcell
john.purcell@saintpaul.edu
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- Jake Yernberg
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Length of Program

This is a full-time, day and evening program. The program can be completed in four semesters. Students can enroll in the program only in the fall.

Tool costs

Students will need to supply their own basic tools and tool box. The estimated cost for professional quality tools and tool box is approximately \$2,000–\$3,000.

Tool vendors will be on campus during the first week.

Program Requirements

Check off when completed

Successful completion of each semester in this program is a prerequisite for participation in the following semester.

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> AUTO 1415 Introduction to Automotive Technology | 4 |
| <input type="checkbox"/> AUTO 1430 Brakes | 4 |
| <input type="checkbox"/> AUTO 1441 Alignment & Suspension | 4 |
| <input type="checkbox"/> AUTO 1510 Clutch/Driveline Manual Transmission | 3 |
| <input type="checkbox"/> AUTO 1523 Four Wheel Drive Differential | 3 |
| <input type="checkbox"/> AUTO 1530 Basic Electrical & Battery | 3 |
| <input type="checkbox"/> AUTO 1540 Basic Engine Management | 3 |
| <input type="checkbox"/> AUTO 1550 Heating & Air Conditioning | 4 |
| <input type="checkbox"/> AUTO 2410 Starting/Charging Systems | 3 |
| <input type="checkbox"/> AUTO 2420 Electrical Accessories | 3 |
| <input type="checkbox"/> AUTO 2430 Engine Theory & Repair | 4 |
| <input type="checkbox"/> AUTO 2440 Engine Installation | 2 |
| <input type="checkbox"/> AUTO 2450 Introduction to Auto Computers | 2 |
| <input type="checkbox"/> AUTO 2513 Fuel Systems | 3 |
| <input type="checkbox"/> AUTO 2520 Engine Drivability | 3 |
| <input type="checkbox"/> AUTO 2530 Automatic Transmission Theory | 2 |
| <input type="checkbox"/> AUTO 2542 Automatic Transmission Diagnosis & Repair | 4 |
| <input type="checkbox"/> AUTO 2550 Specialized Lab 1 | 2 |
| Total Program Credits | 56 |

*Information is subject to change.
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Program Start Dates

Fall

Course Sequence

The course sequence listed on the back of this guide is recommended for a full-time student; however, this sequence is not required. Contact Program Faculty with questions.

First Semester

| | |
|--|-----------|
| AUTO 1415 Intro to Automotive Technology | 4 |
| AUTO 1430 Brakes | 4 |
| AUTO 1510 Clutch/Driveline Manual Transmission | 3 |
| AUTO 1530 Basic Electrical & Battery | 3 |
| Total Semester Credits | 14 |

Second Semester

| | |
|---|-----------|
| AUTO 1441 Alignment & Suspension | 4 |
| AUTO 1523 Four Wheel Drive & Differential | 3 |
| AUTO 1540 Basic Engine Management | 3 |
| AUTO 1550 Heating & Air Conditioning | 4 |
| Total Semester Credits | 14 |

Third Semester

| | |
|--|-----------|
| AUTO 2410 Starting & Charging Systems | 3 |
| AUTO 2420 Electrical Accessories | 3 |
| AUTO 2430 Engine Theory & Repair | 4 |
| AUTO 2440 Engine Installation | 2 |
| AUTO 2450 Introduction to Auto Computers | 2 |
| Total Semester Credits | 14 |

Fourth Semester

| | |
|--|-----------|
| AUTO 2513 Fuel Systems | 3 |
| AUTO 2520 Engine Drivability | 3 |
| AUTO 2530 Auto Transmission Theory | 2 |
| AUTO 2542 Auto Tran Diagnosis & Repair | 4 |
| AUTO 2550 Specialized Lab 1 | 2 |
| Total Semester Credits | 14 |

Total Program Credits 56

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Shop/classroom visit recommended; student must have a valid driver's license.

Assessment Results and Prerequisites: Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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Cabinetmaking DIPLOMA

Program Overview

Cabinetmakers are skilled in the phases of cabinet construction from the initial drafting and layout, to material cutting, assembly, finishing and installation. The principles used in building kitchen cabinets are also used in building store fixtures, furniture and all other types of woodworking. The program prepares students to work for cabinet manufacturers and custom cabinet shops.

Career Opportunities

New construction in housing and industry, and the renovation and modernization of existing structures are expected to increase the demand for cabinetmakers.

Cabinetmaking graduates find positions in kitchen cabinet shops, lumber companies, sash and door factories, store fixture manufacturers, display shops, wood specialty shops, and furniture repair shops. Some graduates operate their own business.

Program Outcomes

1. Practice safe use of woodworking tools and equipment.
2. Build both framed and frameless cabinets to industry standards.
3. Design parts using CAD/CAM software and generate the part using the cnc router.
4. Fabricate laminate products.
5. Explain project details specified through plans.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 250+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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Program Faculty

Thomas Hillstead
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Full-time enrollment is required

This is a full-time day program. Students should plan for a full day of classes.

Textbook, tool, and supply costs

Additional program costs total approximately \$1,250 for the following:

- Tools: \$500.00
- Books & Supplies: \$350.00
- Projects (costs vary) about: \$400.00

Program Requirements

Check off when completed

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> CABT 1450 Print Reading | 2 |
| <input type="checkbox"/> CABT 1455 Traditional Machining Methods | 5 |
| <input type="checkbox"/> CABT 1460 Wood Technology | 2 |
| <input type="checkbox"/> CABT 1465 Furniture & Residential Cabinetry | 5 |
| <input type="checkbox"/> CABT 1470 CAD/CNC | 2 |
| <input type="checkbox"/> CABT 1475 Industrial Machining Methods | 4 |
| <input type="checkbox"/> CABT 2450 Surface Applications | 4 |
| <input type="checkbox"/> CABT 2455 Casework & Millwork | 5 |
| <input type="checkbox"/> CABT 2515 CNC Cabinet Design | 3 |
| <input type="checkbox"/> Choose one of the following | 2 |
| CABT 2690 Capstone Project/Open Lab | |
| CABT 2695 Internship | |
| Total Program Credits | 34 |

Additional Requirements/Recommendations

Mathematics and drawing skills are helpful.

Students need to be alert, physically fit and have good vision.

Students are expected to attend all classes and be prompt.

It is necessary to have good hand and eye coordination. Safety will be a major factor in operating all equipment. Safety is taught and students must pass all safety tests before operating equipment.

Course Sequence

The following sequence is recommended for a full-time student; however, this sequence is not required. Not all courses are offered each semester.

Fall Semester

| | |
|---|-----------|
| CABT 1450 Print Reading | 2 |
| CABT 1455 Traditional Machining Methods | 5 |
| CABT 1460 Wood Technology | 2 |
| CABT 1465 Furniture & Residential Cabinetry | 5 |
| CABT 1470 CAD/CNC | 2 |
| Total Semester Credits | 16 |

Spring Semester

| | |
|--|-----------|
| CABT 1475 Industrial Machining Methods | 4 |
| CABT 2450 Surface Applications | 4 |
| CABT 2455 Casework & Millwork | 5 |
| CABT 2515 CNC Cabinet Design | 3 |
| Choose one of the following | 2 |
| CABT 2690 Capstone Project/Open Lab | |
| CABT 2695 Internship | |
| Total Semester Credits | 18 |

Total Program Credits 34

Program Start Dates

Fall, Spring

*Information is subject to change.
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Carpentry DIPLOMA

Program Overview

Construction is the largest industry in terms of investment and manpower expended. Carpenters make up the largest trade group in the construction industry. They erect the wood framework in buildings; they install wood paneling, cabinets, door and window frames, and hardware; and they build stairs and frame roofs. Carpenters work under a wide variety of conditions, indoors and out, in all types of weather. They use many different hand and power tools working with wood, concrete, metals, plastics, and other construction materials.

Good work habits, mechanical aptitude, and strong communication and math skills are necessary to become a successful carpenter. Carpenters must be able to climb, lift, carry, measure, calculate, and plan their work. They often work at considerable heights.

Career Opportunities

Construction activity continues to be strong. Demand for quality carpenters exists in residential, commercial, and heavy construction. Increased activity in infrastructure and building renovation has provided additional opportunities for carpenters.

Carpenters can be involved in the many different phases of a building project or choose to specialize in areas such as framing, drywall, acoustic ceilings, concrete form building, hardware, and millwork. Many graduates continue their training by entering a formal apprentice program. Carpenter apprentices advance to journeyman by working on the job and attending classes related to their work. Advancement can continue to lead carpenter, carpenter foreman, and job superintendent. Carpenters are employed by a wide variety of construction contractors, or they may choose to become self-employed in their own business.

Program Outcomes

1. Graduates will have the knowledge and skills to safely use hand and portable power tools used by carpenters in the construction industry.
2. Graduates will be able to work with wood, plastics, concrete, metals, gypsum, and various fiber composite products used by carpenters in the construction industry.
3. Graduates will have practiced procedures used by carpenters in framing layout, stair construction, wood and steel framing, and installation of doors, windows, and cabinets.
4. Graduates will be familiar with forming systems and types of scaffold used in concrete construction.
5. Graduates will be familiar with and have practiced job site safety requirements.
6. Graduates will be able to operate instruments and demonstrate procedures used in building layout.
7. Graduates will display effective work habits deemed necessary by employers.
8. Graduates will be prepared for entry level employment as carpenters and admission to the Carpenters Apprentice Training Program.

Full-time enrollment is required

This is a full-time day program. Students should plan for a full day of classes.

Special supplies and tool costs

Students should expect to spend approximately \$1,100, beyond the cost of tuition, fees, and books, for special supplies and tools. A list is available from the advisor.

Program Requirements

Check off when completed

| Course | Cr |
|---|-----------|
| <input type="checkbox"/> CARP 1410 Project Estimating | 3 |
| <input type="checkbox"/> CARP 1420 Construction Blueprint Reading | 2 |
| <input type="checkbox"/> CARP 1430 Intro to Carpentry & Hand Tools | 3 |
| <input type="checkbox"/> CARP 1510 Intermediate Carpentry | 5 |
| <input type="checkbox"/> CARP 1521 Building Technology | 5 |
| <input type="checkbox"/> CARP 1522 Power Tool and Shop Procedures | 5 |
| <input type="checkbox"/> CARP 2410 Advanced Carpentry | 6 |
| <input type="checkbox"/> CARP 2421 Fieldwork and Carpentry Procedures | 5 |
| <input type="checkbox"/> CARP 2422 Carpentry Concrete Technology and Installation | 5 |
| <input type="checkbox"/> MATH 1411 Applied Mathematics | 3 |
| Total Program Credits | 42 |

Program Faculty

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 651.846.1405

Program Start Dates

Summer

Course Sequence

The following sequence is required.

First Term

| | |
|---|----------|
| CARP 1410 Project Estimating | 3 |
| CARP 1420 Construction Blueprint Reading | 2 |
| CARP 1430 Intro to Carpentry & Hand Tools | 3 |
| Total Semester Credits | 8 |

Second Semester

| | |
|--|-----------|
| CARP 1510 Intermediate Carpentry | 5 |
| CARP 1521 Building Technology | 5 |
| CARP 1522 Power Tool and Shop Procedures | 5 |
| MATH 1411 Applied Mathematics | 3 |
| Total Semester Credits | 18 |

Third Semester

| | |
|--|-----------|
| CARP 2410 Advanced Carpentry | 6 |
| CARP 2421 Fieldwork and Carpentry Procedures | 5 |
| CARP 2422 Carpentry Concrete Technology and Installation | 5 |
| Total Semester Credits | 16 |

Total Program Credits 42

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 250+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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CNC Toolmaking DIPLOMA

Program Overview

This area produces skilled craftspeople who make precision metal parts that are highly specialized and not mass produced. Machinists produce parts from metal castings, forgings, stampings, or from solid metal stock. They make parts to exact specifications by removing excess metal with the aid of machine tools, numerically controlled machines, computer assisted machinery, and precise measuring and gauging equipment.

Career Opportunities

As the economy expands, so will the demand for manufactured goods that need machine metal parts. CNC Toolmaking graduates are hired by industries that manufacture automobiles, industrial machinery, military equipment, and other metal products. At many places of employment, graduates can apply training received at the College towards the completion of apprenticeship requirements.

Program Outcomes

1. Graduates will have the knowledge and skills to make precision-machined parts and tooling.
2. Graduates will have the knowledge and skills to program and operate CNC equipment using CAD and CAM.
3. Graduates will have the knowledge and skills to operate and set-up inspection and gauging equipment.
4. Graduates will have the knowledge and skills to meet national entry-level skills standards.
5. Graduates will have acquired shop communication skills such as blueprint reading, practical geometric dimensioning, and shop CAD/CAM skills.
6. Graduates will have successfully mastered the general education program requirements for work and life skills.
7. Graduates will use SolidWorks, design parts and collaborate with engineers.

Program Faculty

- Garrett Byrne
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- Ben Johnson
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- Scott Nordahl
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- Ker Xiong
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Estimated Cost for Student Supplies

The estimated cost for student supplies is \$850.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> CNCT 1410 Introduction to Manufacturing Processes | 4 |
| <input type="checkbox"/> CNCT 1420 Engineering Drawings | 4 |
| <input type="checkbox"/> CNCT 1430 Materials Processes 1 | 4 |
| <input type="checkbox"/> CNCT 1431 Materials Processes 2 | 4 |
| <input type="checkbox"/> CNCT 1710 Shop Calculations | 2 |
| <input type="checkbox"/> CNCT 1720 Geometric Dimensioning | 2 |
| <input type="checkbox"/> CNCT 1730 CNC 1 | 4 |
| <input type="checkbox"/> CNCT 1731 CNC 2 | 4 |
| <input type="checkbox"/> CNCT 1744 Metrology | 4 |
| <input type="checkbox"/> CNCT 2412 Tool Design | 4 |
| <input type="checkbox"/> CNCT 2421 Mechanical Systems/EDM | 4 |
| <input type="checkbox"/> CNCT 2431 Mold/Plastic Technology | 4 |
| <input type="checkbox"/> CNCT 2441 CNC Applications | 4 |
| <input type="checkbox"/> CNCT 2520 CAD | 4 |
| <input type="checkbox"/> CNCT 2530 CNC Lathe | 4 |
| <input type="checkbox"/> CNCT 2540 Computer Aided Manufacturing | 4 |
| Subtotal | 60 |

General Education/MnTC Requirements

Refer to the Minnesota Transfer Curriculum Course List for each Goal Area

- Any college level general education course3
General Education Requirements 3

Total Program Credits 63

*Information is subject to change.
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Program Start Dates

Fall, Spring

Course Sequence

The following sequence is recommended for a full-time student; however, this sequence is not required.

First Semester

| | |
|---|-----------|
| CNCT 1410 Introduction to Manufacturing Processes | 4 |
| CNCT 1420 Engineering Drawings | 4 |
| CNCT 1430 Materials Processes 1 | 4 |
| CNCT 1431 Materials Processes 2 | 4 |
| CNCT 2520 CAD | 4 |
| Total Semester Credits | 20 |

Second Semester

| | |
|--|-----------|
| CNCT 1710 Shop Calculations | 2 |
| CNCT 1720 Geometric Dimensioning | 2 |
| CNCT 1730 CNC 1 | 4 |
| CNCT 1731 CNC 2 | 4 |
| CNCT 1744 Metrology | 4 |
| CNCT 2540 Computer Aided Manufacturing | 4 |
| Total Semester Credits | 20 |

Summer Term

General Education Requirement (any) 3

May be taken any semester, but Summer Term is recommended.

Total Credits 3

Third Semester

| | |
|-----------------------------------|-----------|
| CNCT 2412 Tool Design | 4 |
| CNCT 2421 Mechanical Systems/EDM | 4 |
| CNCT 2431 Mold/Plastic Technology | 4 |
| CNCT 2441 CNC Applications | 4 |
| CNCT 2530 CNC Lathe | 4 |
| Total Semester Credits | 20 |

Total Program Credits 63

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

Machine Operator CERTIFICATE

Right Skills Now for Manufacturing

Program Overview

The Right Skills Now (for Manufacturing) certificate is designed to provide training in the following areas: Job planning, benchwork, materials, manual milling, manual turning, blue print reading, CNC milling and CNC turning. This program was designed to address the current shortage of CNC operators. Graduates from this program are prepared to enter the industry as entry-level manual and CNC machine tool production operators with minimum skills.

The Right Skills Now (for Manufacturing) certificate will introduce manufacturing workplace safety, blueprint reading, general manufacturing processes, basic production manual machining skills, and introduction to operations.

The curriculum closely aligns with standards set forth by the National Institute of Metalworking Skills (NIMS). Students may choose to apply these credits towards a CNC Toolmaking Diploma. The additional coursework will enhance the students' communication, mathematics, machining, CAD/CAM, and critical thinking skills.

Career Opportunities

Right Skills Now is a pathway of the National Association of Manufacturers (NAM)—Endorsed Manufacturing Skills Certification System, which includes nationally portable, industry-recognized certifications that are combined with for-credit education programs. These education pathways are directly aligned to career pathways in manufacturing, so students progressing through the programs earn college credit towards a degree, have an opportunity to earn a national certification with labor market value, and the hands-on technical experience to be successful on the job.

Program Outcomes

1. Students will have skills to operate computer- controlled machine tools; lathes, drills, and milling machines.
2. Graduates will acquire knowledge of workplace safety.
3. Graduates will have on the job learning opportunities through an internship.



Program Faculty

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Scott Nordahl
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Estimated Cost for Student Supplies

The estimated cost for student supplies is \$850.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|----|
| <input type="checkbox"/> CNCT 1410 Introduction to Manufacturing Processes | 4 |
| <input type="checkbox"/> CNCT 1420 Engineering Drawing | 4 |
| <input type="checkbox"/> CNCT 1430 Materials Processes 1 | 4 |
| <input type="checkbox"/> CNCT 1431 Materials Processes 2 | 4 |
| <input type="checkbox"/> CNCT 2550 Industry Internship | 4 |

Total Program Credits 20

Program Start Dates

Fall, Spring

Course Sequence

The following sequence is recommended.

First Semester

| | |
|---|-----------|
| CNCT 1410 Introduction to Manufacturing Processes | 4 |
| CNCT 1420 Engineering Drawing | 4 |
| CNCT 1430 Materials Processes 1 | 4 |
| CNCT 1431 Materials Processes 2 | 4 |
| Total Semester Credits | 16 |

Second Semester

| | |
|---|----------|
| CNCT 2550 Industry Internship* | 4 |
| Prerequisite CNCT 1410, 1420, 1430, and 1431 must be completed with a grade of "C" or better. | |
| Total Semester Credits | 4 |

Total Program Credits 20

* Students are responsible for their own transportation to and from the internship site. Internship locations may not be accessible through public transportation.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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*Information is subject to change.
This Program Requirements Guide is not a contract.*

Electrical Technology DIPLOMA

Program Overview

An electrician is employed to install electrical wiring and equipment for lighting, heating, cooling and other power requirements in residential, commercial and industrial buildings. Using blueprints, diagrams and specifications, students perform installations in accordance with national, state and local safety codes. Considerable physical exertion is often required and the work may be performed outdoors or under such hazardous conditions as heights, unfinished construction or high voltages.

Students should have an interest and aptitude in applied algebra, trigonometry, drawing and science. Good eyesight and color vision are important.

Career Opportunities

According to the U.S. Department of Labor, "As the population and the economy grow... more electricians will be needed to maintain the electrical systems used by industry and to install electrical devices and wiring in new homes, factories, offices and other structures."

Graduates are employed as apprentices by electrical construction firms. Upon completion of apprenticeship and the obtaining of a journey person's license, students are open to opportunities as master electricians, inspectors, contractors, estimators and repair persons.

Program Outcomes

1. Graduates will have the ability to communicate and conduct themselves in a professional manner with the customers and co-workers.
2. Graduates will have the skills for performing entry level tasks required of an apprentice electrician in residential, commercial and industrial construction.
3. Graduates will have knowledge of the National Electric Code, enabling them to legally and safely install electrical services with supervision.
4. Graduates will have the ability to apply electrical theory to practical applications.
5. Graduates will meet the MN Department of Labor and Industry's electrical program requirement of specific curriculum and 95% course attendance policy.

Apprenticeship opportunity

Completion of the Electrical Technology Diploma program meets the Minnesota Department of Labor and Industry requirements. 95% attendance in each course and completion of the diploma may qualify for one year of apprenticeship credit.

*Information is subject to change.
This Program Requirements Guide is not a contract.*

Program Faculty

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Textbook, tool, and supply costs

- Textbooks are required the first day of class. Go to www.saintpaulcollegebookstore.com for textbook information.
- Multimeter and hand tools, approximately \$500 new.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> ELTN 1410 National Electrical Code 1 and Trade Calculations | 4 |
| <input type="checkbox"/> ELTN 1422 Direct Current Circuit Analysis | 5 |
| <input type="checkbox"/> ELTN 1432 Alternating Current Circuit Analysis | 5 |
| <input type="checkbox"/> ELTN 1442 Single-Phase Motors and Generators | 5 |
| <input type="checkbox"/> ELTN 1512 Three-Phase Systems Motors and Generators | 5 |
| <input type="checkbox"/> ELTN 1522 Introduction to Electronics and Test Equipment | 5 |
| <input type="checkbox"/> ELTN 1532 Intermediate Electronics and PLC's | 5 |
| <input type="checkbox"/> ELTN 1540 Low Voltage Systems and Job Site Safety | 4 |
| <input type="checkbox"/> ELTN 2410 Distribution Power and Specialty Transformers | 4 |
| <input type="checkbox"/> ELTN 2420 Motor Controls | 4 |
| <input type="checkbox"/> ELTN 2430 Residential Wiring and Blueprint Reading | 4 |
| <input type="checkbox"/> ELTN 2440 Heating and Cooling System Controls | 4 |
| <input type="checkbox"/> ELTN 2510 Wiring Methods and Systems | 4 |
| <input type="checkbox"/> ELTN 2522 Commercial Wiring Methods | 5 |
| <input type="checkbox"/> ELTN 2532 Industrial Wiring Methods and Service Entrance | 5 |
| <input type="checkbox"/> ELTN 2540 National Electrical Code 2 | 4 |
| <input type="checkbox"/> ELTN 2550 Renewable Energy | 2 |
| Total Program Credits | 74 |

Program Start Dates

Fall, Spring

Students must attend orientation.

Technical Electives

Select the course below to meet the MN DOLI 95% attendance requirement:

ELTN 1470 Electrical Technology Operations

See back of this guide for Course Sequence

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 250+ or grade of "C" or better in READ 0722 or READ 0724 or EAPP 0900

Writing: Score of 250+ or grade of "C" or better in ENGL 0922 or EAPP 0900

Arithmetic: Score of 250+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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Electrical Technology DIPLOMA *(continued)*

Course Sequence

The course sequence listed on the back of this guide is recommended for a full-time student; however, this sequence is not required. Contact Program Faculty with questions.

First Semester

| | |
|---|-----------|
| ELTN 1410 National Electrical Code 1 and Trade Calculations | 4 |
| ELTN 1422 Direct Current Circuit Analysis | 5 |
| ELTN 1432 Alternating Current Circuit Analysis | 5 |
| ELTN 1442 Single-Phase Motors and Generators | 5 |
| Total Semester Credits | 19 |

Second Semester

| | |
|---|-----------|
| ELTN 1512 Three-Phase Systems Motors and Generators | 5 |
| ELTN 1522 Introduction to Electronics and Test Equipment. | 5 |
| ELTN 1532 Intermediate Electronics and PLC's | 5 |
| ELTN 1540 Low Voltage Systems and Job Site Safety | 4 |
| Total Semester Credits | 19 |

Third Semester

| | |
|---|-----------|
| ELTN 2410 Distribution Power and Specialty Transformers | 4 |
| ELTN 2420 Motor Controls | 4 |
| ELTN 2430 Residential Wiring and Blueprint Reading | 4 |
| ELTN 2440 Heating and Cooling System Controls | 4 |
| Total Semester Credits | 16 |

Fourth Semester

| | |
|--|-----------|
| ELTN 2510 Wiring Methods and Systems | 4 |
| ELTN 2522 Commercial Wiring Methods | 5 |
| ELTN 2532 Industrial Wiring Methods and Service Entrance | 5 |
| ELTN 2540 National Electrical Code 2 | 4 |
| ELTN 2550 Renewable Energy | 2 |
| Total Semester Credits | 20 |

| | |
|--|-----------|
| Total Program Credits | 74 |
|--|-----------|

Electromechanical Automation Systems AAS DEGREE

Program Overview

Electromechanical systems, also referred to as mechatronics, is a high demand field that integrates electronics, mechanics, hydraulics, pneumatics, and computer control systems to create new and improved automated manufacturing production systems. This program is designed for people who are interested in industrial maintenance, process set up, installation, and upgrades.

Electromechanical Systems moves beyond simply cross-training employees, as the discipline recognizes that individuals need to be trained in five areas: mechanical, electrical, fluid power, process control, and industrial programming.

Students should have an interest and aptitude in math, science, and problem solving. Good eyesight and color vision are important.

Career Opportunities

The Electromechanical Systems program prepares students for careers requiring specialized skills in electricity, electronics, instrumentation, programmable logic controllers, microprocessors, automation and robotics. Students will become multi-skilled technicians capable of solving the many complex problems of manufacturing automation. Students will be prepared for a wide variety of careers including: Instrument Technician, Electrical Technician, Electromechanical Technician, Robotics Technician, Electronics Mechanic, Machine Repair & Maintenance, Motor Installer, Instrumentation Calibration Technician, Industrial Programmer, PLC Programmer, and Field Service.

These jobs are found in a wide range of fields including: electrical utilities, oil refineries, water treatment, waste water treatment, manufacturing plants, chemical, medical, electronics, agriculture, biotechnology and automotive industries.

Program Outcomes

1. Demonstrate business and management skills necessary to move into a lead technician position.
2. Build various systems that will harness mechanical, electrical, pneumatic, and hydraulic power.
3. Program using multiple, industry specific, languages.
4. Build various electric, pneumatic, and hydraulic circuits.

Program Faculty

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651.403.4163

Cory Stammer
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651.403.4163

Program Delivery

This program was designed with the nontraditional student in mind. The core technical classes are delivered in a hybrid program which means that the course work is delivered online and students coming in to complete lab work.

Additional Program Requirements/Costs

- Student must attend orientation.
- Textbooks are required the first day of class. Visit saintpaulcollegebookstore.com for textbook information.
- Students are responsible for having their own Personal Protective Equipment (PPE) to participate in the labs.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> EMEC 1511 AC/DC Fundamentals | 4 |
| <input type="checkbox"/> EMEC 1521 Electrical Motors | 4 |
| <input type="checkbox"/> EMEC 1530 Motor Controls | 4 |
| <input type="checkbox"/> EMEC 1540 Motor Drives | 4 |
| <input type="checkbox"/> EMEC 2400 Industrial Basics | 4 |
| <input type="checkbox"/> EMEC 2620 Mechanical Fundamentals 1 | 4 |
| <input type="checkbox"/> EMEC 2625 Mechanical Fundamentals 2 | 4 |
| <input type="checkbox"/> EMEC 2500 Fluid System Fundamentals | 4 |
| <input type="checkbox"/> EMEC 2751 Automated Process Control | 4 |
| <input type="checkbox"/> EMEC 2760 Programming for Robotic Manufacturing | 4 |
| <input type="checkbox"/> EMEC 2770 Advanced PLC Programming | 4 |
| Subtotal | 44 |

General Education/MnTC Requirements

Refer to the Minnesota Transfer Curriculum Course List for each Goal Area

| | |
|---|-----------|
| <input type="checkbox"/> Goal 1: Communication | 7 |
| ENGL 1711 Composition 1 – 4 cr | |
| COMM 17XX – 3 cr | |
| <input type="checkbox"/> Goal 3 or Goal 4 | 3 |
| Goal 3: Natural Sciences OR | |
| Goal 4: Mathematical/Logical Reasoning | |
| <input type="checkbox"/> Goal 5: History, Social Science, and Behavioral Sciences | 3 |
| <input type="checkbox"/> Goal 6: Humanities and Fine Arts | 3 |
| General Education Requirements | 16 |

Total Program Credits 60

Program Start Dates

Fall or Spring Semester

*Information is subject to change.
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Course Sequence

This course sequence is recommended for a full-time student; however, this sequence is not required. Students should consult with the Program Advisor each semester.

Not all courses are offered each semester.

First Semester

| | |
|-------------------------------|-----------|
| EMEC 1511 AC/DC Fundamentals | 4 |
| EMEC 1521 Electrical Motors | 4 |
| EMEC 1530 Motor Controls | 4 |
| EMEC 1540 Motor Drives | 4 |
| Total Semester Credits | 16 |

Second Semester

| | |
|-------------------------------------|-----------|
| EMEC 2400 Industrial Basics | 4 |
| EMEC 2500 Fluid System Fundamentals | 4 |
| EMEC 2620 Mechanical Fundamentals 1 | 4 |
| EMEC 2625 Mechanical Fundamentals 2 | 4 |
| Total Semester Credits | 16 |

Third Semester

| | |
|---|-----------|
| EMEC 2751 Automated Process Controls | 4 |
| EMEC 2760 Programming for Robotic Manufacturing | 4 |
| EMEC 2770 Advanced PLC Programming | 4 |
| Total Semester Credits | 12 |

Fourth Semester

| | |
|-------------------------------|-----------|
| ENGL 1711 Composition 1 | 4 |
| Goal 1: COMM 17XX | 3 |
| Goal Area 3 or 4 | 3 |
| Goal Area 5 | 3 |
| Goal Area 6 | 3 |
| Total Semester Credits | 16 |

Any Semester

General Education requirement courses may be taken before, after or concurrently with the EMEC courses.
General Education Requirements 16

Total Program Credits 60

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+ or grade of "C" or better in MATH 0745

Assessment Results and Prerequisites: Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

401A

Electromechanical Automation Systems DIPLOMA

Program Overview

Electromechanical systems, also referred to as mechatronics, is a new and rapidly growing field that integrates electronics, mechanics, pneumatics, hydraulics, and computer control systems to create new and improved automated manufacturing production systems. This program is designed for people who are interested in plant maintenance (troubleshooting & repair), process set up, installation, and commissioning.

Electromechanical Systems move beyond simply cross-training employees, as the discipline recognizes that individuals need to be trained in five areas: mechanical, electrical, fluid power, process control, and industrial programming.

Students/electricians that previously acquired a diploma/AAS degree in the study of electricity may transfer in credits toward the Electromechanical Systems diploma. Students should have an interest and aptitude in applied algebra, trigonometry, drawing and science. Good eyesight and color vision are important.

Career Opportunities

The Electromechanical Systems program prepares students for careers requiring specialized skills in electricity, electronics, instrumentation, programmable logic controllers, microprocessors, automation and robotics. Students will become multi-skilled technicians capable of solving the many complex problems of manufacturing automation. Students will be prepared for a wide variety of careers including: Instrument Technician, Electrical Technician, Electromechanical Technician, Robotics Technician, Electronics Mechanic, Machine Repair & Maintenance, Motor Installer, Instrumentation Calibration Technician, Industrial Programmer, PLC Programmer, and Field Service.

These jobs are found in a wide range of fields including: oil refineries, water treatment, wastewater treatment, manufacturing plants, chemical, medical, electronics, agriculture, biotechnology and automotive industries.

Program Outcomes

1. Graduates will have the ability to communicate and conduct themselves in a professional manner with the customers and co-workers.
2. Graduates will be able to work on various styles of drives and pumps.
3. Graduates will be able to program using specialized industrial languages.
4. Graduates will have an understanding of machine logic and how electric, pneumatic, and hydraulic circuits interact with it.
5. Graduates will be able to work with various process controls systems.

Program Faculty

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Cory Stammer
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Program Delivery

Class work for this program consists of online course delivery with hands-on labs to reinforce that lessons learned as well as one-on-one with instructors.

Additional Program Requirements/Costs

Students must attend orientation.

- Textbooks are required the first day of class. Go to saintpaulcollegebookstore.com for textbook information.
- Students are responsible for having their own Personal Protective Equipment (PPE) to participate in the labs.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|----|
| <input type="checkbox"/> EMEC 1511 AC/DC Fundamentals | 4 |
| <input type="checkbox"/> EMEC 1521 Electrical Motors | 4 |
| <input type="checkbox"/> EMEC 1530 Motor Controls | 4 |
| <input type="checkbox"/> EMEC 1540 Motor Drives | 4 |
| <input type="checkbox"/> EMEC 2400 Industrial Basics | 4 |
| <input type="checkbox"/> EMEC 2500 Fluid System Fundamentals | 4 |
| <input type="checkbox"/> EMEC 2620 Mechanical Fundamentals I | 4 |
| <input type="checkbox"/> EMEC 2625 Mechanical Fundamentals 2 | 4 |
| <input type="checkbox"/> EMEC 2741 Electromechanical Troubleshooting & Maintenance | 4 |
| <input type="checkbox"/> EMEC 2751 Automated Process Control | 4 |
| <input type="checkbox"/> EMEC 2760 Programming for Robotic Manufacturing | 4 |
| <input type="checkbox"/> EMEC 2770 Advanced PLC Programming | 4 |

Total Program Credits48

*Information is subject to change.
This Program Requirements Guide is not a contract.*

Program Start Dates

Fall, Spring

Course Sequence

This course sequence is recommended for a full-time student; however, this sequence is not required. Students should consult with the Program Advisor each semester.

Not all courses are offered each semester.

First Semester

| | |
|-------------------------------|-----------|
| EMEC 1511 AC/DC Fundamentals | 4 |
| EMEC 1521 Electrical Motors | 4 |
| EMEC 1530 Motor Controls | 4 |
| EMEC 1540 Motor Drives | 4 |
| Total Semester Credits | 16 |

Second Semester

| | |
|-------------------------------------|-----------|
| EMEC 2400 Industrial Basics | 4 |
| EMEC 2500 Fluid System Fundamentals | 4 |
| EMEC 2620 Mechanical Fundamentals I | 4 |
| EMEC 2625 Mechanical Fundamentals 2 | 4 |
| Total Semester Credits | 16 |

Third Semester

| | |
|---|-----------|
| EMEC 2741 Electromechanical Troubleshooting & Maintenance | 4 |
| EMEC 2751 Automated Process Controls | 4 |
| EMEC 2760 Programming for Robotic Manufacturing | 4 |
| EMEC 2770 Advanced PLC Programming | 4 |
| Total Semester Credits | 16 |

Total Program Credits48

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+ or grade of "C" or better in MATH 0745

Assessment Results and Prerequisites: Students admitted into Saint Paul College programs may need to complete additional course based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

401D

Electromechanical Systems: Electrical CERTIFICATE

Program Overview

Electromechanical systems, also referred to as mechatronics, is a new and rapidly growing field that integrates electronics, mechanics, pneumatics, hydraulics, and computer control systems to create new and improved automated manufacturing production systems. This program is designed for people who are interested in plant maintenance (troubleshooting & repair), process set up, installation, and commissioning.

Electromechanical Systems move beyond simply cross-training employees, as the discipline recognizes that individuals need to be trained in five areas: mechanical, electrical, fluid power, process control, and industrial programming.

The Electromechanical Systems Certificate program requires a high school diploma or equivalent. Students/electricians that previously acquired a diploma/AAS degree in the study of electricity may transfer in credits toward the Electromechanical certificate. Students should have an interest and aptitude in applied algebra, trigonometry, drawing and science. Good eyesight and color vision are important.

Career Opportunities

The Electromechanical Systems program prepares students for careers requiring specialized skills in electricity, electronics, instrumentation, programmable logic controllers, microprocessors, automation and robotics. Students will become multi-skilled technicians capable of solving the many complex problems of manufacturing automation. Students will be prepared for a wide variety of careers including: Instrument Technician, Electrical Technician, Electromechanical Technician, Robotics Technician, Electronics Mechanic, Machine Repair & Maintenance, Motor Installer, Instrumentation Calibration Technician, Industrial Programmer, PLC Programmer, and Field Service.

These jobs are found in a wide range of fields including: electrical utilities, oil refineries, water treatment, wastewater treatment, manufacturing plants, chemical, medical, electronics, agriculture, biotechnology and automotive industries.

Program Outcomes

1. Graduates will have the ability to communicate and conduct themselves in a professional manner with the customers and co-workers.
2. Graduates will be able to work on various styles of drives and pumps.
3. Graduates will be able to program using specialized industrial languages.
4. Graduates will have an understanding of machine logic and how electric, pneumatic, and hydraulic circuits interact with it.
5. Graduates will be able to work with various process controls systems.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|----|
| <input type="checkbox"/> EMEC 1511 AC/DC Fundamentals. | 4 |
| <input type="checkbox"/> EMEC 1521 Electrical Motors. | 4 |
| <input type="checkbox"/> EMEC 1530 Motor Controls. | 4 |
| <input type="checkbox"/> EMEC 1540 Motor Drives. | 4 |

Total Program Credits 16

Program Faculty

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Program Start Dates

Fall

Class work for this program consist of online course delivery with hands-on labs to reinforce that lessons learned as well as one-on-one with instructors.

Additional Program Materials Costs

- Students must attend orientation.
- Textbooks are required the first day of class. Go to www.saintpaulcollegebookstore.com for textbook information.
- Students are responsible for having their own Personal Protective Equipment (PPE) to participate in the labs.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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Electromechanical Systems: Mechanical CERTIFICATE

Program Overview

Electromechanical systems, also referred to as mechatronics, is a new and rapidly growing field that integrates electronics, mechanics, pneumatics, hydraulics, and computer control systems to create new and improved automated manufacturing production systems. This program is designed for people who are interested in plant maintenance (troubleshooting & repair), process set up, installation, and commissioning.

Electromechanical Systems move beyond simply cross-training employees, as the discipline recognizes that individuals need to be trained in five areas: mechanical, electrical, fluid power, process control, and industrial programming.

The Electromechanical Systems Certificate program requires high school graduation or equivalent. Students/electricians that previously acquired a diploma/AAS degree in the study of electricity may transfer in credits toward the Electromechanical certificate. Students should have an interest and aptitude in applied algebra, trigonometry, drawing and science. Good eyesight and color vision are important.

Career Opportunities

The Electromechanical Systems program prepares students for careers requiring specialized skills in electricity, electronics, instrumentation, programmable logic controllers, microprocessors, automation and robotics. Students will become multi-skilled technicians capable of solving the many complex problems of manufacturing automation. Students will be prepared for a wide variety of careers including: Instrument Technician, Electrical Technician, Electromechanical Technician, Robotics Technician, Electronics Mechanic, Machine Repair & Maintenance, Motor Installer, Instrumentation Calibration Technician, Industrial Programmer, PLC Programmer, and Field Service.

These jobs are found in a wide range of fields including: electrical utilities, oil refineries, water treatment, wastewater treatment, manufacturing plants, chemical, medical, electronics, agriculture, biotechnology and automotive industries.

Program Outcomes

1. Graduates will have the ability to communicate and conduct themselves in a professional manner with the customers and co-workers.
2. Graduates will be able to work on various styles of drives and pumps.
3. Graduates will be able to program using specialized industrial languages.
4. Graduates will have an understanding of machine logic and how electric, pneumatic, and hydraulic circuits interact with it.
5. Graduates will be able to work with various process controls systems.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|----|
| <input type="checkbox"/> EMEC 2400 Industrial Basics | 4 |
| <input type="checkbox"/> EMEC 2500 Fluid System Fundamentals | 4 |
| <input type="checkbox"/> EMEC 2620 Mechanical Fundamentals 1 | 4 |
| <input type="checkbox"/> EMEC 2625 Mechanical Fundamentals 2 | 4 |

Total Program Credits 16

Program Faculty

Travis Schachtner
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Cory Stammer
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651.403.4163

Program Start Dates

Spring

Class work for this program consist of online course delivery with hands-on labs to reinforce that lessons learned as well as one-on-one with instructors.

Additional Program Materials Costs

- Students must attend orientation.
- Textbooks are required the first day of class. Go to www.saintpaulcollegebookstore.com for textbook information.
- Students are responsible for having their own Personal Protective Equipment (PPE) to participate in the labs.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+ or grade of "C" or better in MATH 0745

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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*Information is subject to change.
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Electromechanical Systems: Industrial Programming CERTIFICATE

Program Overview

Electromechanical systems, also referred to as mechatronics, is a new and rapidly growing field that integrates electronics, mechanics, pneumatics, hydraulics, and computer control systems to create new and improved automated manufacturing production systems. This program is designed for people who are interested in plant maintenance (troubleshooting & repair), process set up, installation, and commissioning.

Electromechanical Systems move beyond simply cross-training employees, as the discipline recognizes that individuals need to be trained in five areas: mechanical, electrical, fluid power, process control, and industrial programming.

The Electromechanical Systems Certificate program requires high school graduation or equivalent. Students/electricians that previously acquired a diploma/AAS degree in the study of electricity may transfer in credits toward the Electromechanical certificate. Students should have an interest and aptitude in applied algebra, trigonometry, drawing and science. Good eyesight and color vision are important.

Career Opportunities

The Electromechanical Systems program prepares students for careers requiring specialized skills in electricity, electronics, instrumentation, programmable logic controllers, microprocessors, automation and robotics. Students will become multi-skilled technicians capable of solving the many complex problems of manufacturing automation. Students will be prepared for a wide variety of careers including: Instrument Technician, Electrical Technician, Electromechanical Technician, Robotics Technician, Electronics Mechanic, Machine Repair & Maintenance, Motor Installer, Instrumentation Calibration Technician, Industrial Programmer, PLC Programmer, and Field Service.

These jobs are found in a wide range of fields including: electrical utilities, oil refineries, water treatment, wastewater treatment, manufacturing plants, chemical, medical, electronics, agriculture, biotechnology and automotive industries.

Program Outcomes

1. Graduates will have the ability to communicate and conduct themselves in a professional manner with the customers and co-workers.
2. Graduates will be able to work on various styles of drives and pumps.
3. Graduates will be able to program using specialized industrial languages.
4. Graduates will have an understanding of machine logic and how electric, pneumatic, and hydraulic circuits interact with it.
5. Graduates will be able to work with various process controls systems.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|----|
| <input type="checkbox"/> EMEC 2741 Electromechanical Troubleshooting & Maintenance | 4 |
| <input type="checkbox"/> EMEC 2751 Automated Process Control | 4 |
| <input type="checkbox"/> EMEC 2760 Programming for Robotic Manufacturing | 4 |
| <input type="checkbox"/> EMEC 2770 Advanced PLC Programming | 4 |

Total Program Credits 16

Program Faculty

- Travis Schachtner
travis.schachtner@saintpaul.edu
651.403.4163
- Cory Stammer
cory.stammer@saintpaul.edu
651.403.4163

Program Start Dates

Fall, Spring

Class work for this program consist of online course delivery with hands-on labs to reinforce that lessons learned as well as one-on-one with instructors.

Additional Program Materials Costs

- Students must attend orientation.
- Textbooks are required the first day of class. Go to www.saintpaulcollegebookstore.com for textbook information.
- Students are responsible for having their own Personal Protective Equipment (PPE) to participate in the labs.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+ or grade of "C" or better in MATH 0745

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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*Information is subject to change.
This Program Requirements Guide is not a contract.*

Pipefitting DIPLOMA

Program Overview

Pipefitters install, maintain, and repair high and low pressure steam systems, high and low pressure hot water systems, snow melting systems, refrigeration systems, heating, gas and oil piping, pneumatic, electronic controls, air conditioning and also provide instrumentation and valve repair. These skills are used working in residential, commercial, and industrial installations. These systems are installed in all types of weather conditions.

Applicants must be high school graduates or the equivalent and should enjoy working in a demanding trade that requires both mental alertness and physical stamina. Pipefitters do heavy lifting and are required to work both indoors and outside, often times in confined spaces.

Career Opportunities

Pipefitters, Steamfitters, and HVACR Technicians work in all aspects of the heating, air conditioning, refrigeration, and temperature control fields. They are also employed at oil refineries, chemical plants, food processing facilities, manufacturing plants, retail and wholesale food stores, and ice rinks. Maintenance pipefitters work in a variety of environments such as universities, schools, government agencies and utility companies.

Program Outcomes

1. Apply math and science skills to designing and operating process piping systems.
2. Install, maintain, and repair heating and cooling systems under supervision of a licensed pipefitter.
3. Install and repair process piping systems under supervision of a licensed pipefitter.

Program Faculty

Wyatt Carlson
wyatt.carlson@saintpaul.edu

Student supplies and tools costs

Text rental \$100.00

PPE-Tools estimated at \$150.00

All classes must be completed with a grade of "C" or better.

Program Requirements

Check off when completed

| Course | Cr |
|---|----|
| <input type="checkbox"/> PIPE 1410 Pipe Science/Math | 5 |
| <input type="checkbox"/> PIPE 1451 Pipe Shop 1 | 4 |
| <input type="checkbox"/> PIPE 1452 Pipe Shop 2 | 4 |
| <input type="checkbox"/> PIPE 1540 Electric Controls | 3 |
| <input type="checkbox"/> PIPE 1550 Basic Gas | 3 |
| <input type="checkbox"/> PIPE 1555 Basic Electricity | 2 |
| <input type="checkbox"/> PIPE 1560 Basic Refrigeration | 4 |
| <input type="checkbox"/> PIPE 1565 Heating and Cooling 1 | 4 |
| <input type="checkbox"/> PIPE 1570 Heating and Cooling 2 | 4 |
| <input type="checkbox"/> PIPE 1575 Pipe Blueprint Reading | 2 |
| <input type="checkbox"/> PIPE 1580 Pipe Welding 1 | 3 |
| <input type="checkbox"/> PIPE 1585 Pipe Welding 2 | 2 |

Total Program Credits40

Restricted Enrollment

The Pipefitting Diploma is a restricted enrollment joint program offered through the St. Paul Pipefitters Local 455 and Saint Paul College. Admission to the Pipefitters Apprenticeship program is required for enrollment in this program.

Contact Wyatt Carlson at wyatt.carlson@saintpaul.edu for application information.

Program Start Dates

Fall

Course Sequence

The following sequence is required.
This program begins fall semester.

First Semester

| | |
|----------------------------------|-----------|
| PIPE 1410 Pipe Science/Math | 5 |
| PIPE 1451 Pipe Shop 1 | 4 |
| PIPE 1555 Basic Electricity | 2 |
| PIPE 1565 Heating and Cooling 1 | 4 |
| PIPE 1575 Pipe Blueprint Reading | 2 |
| PIPE 1580 Pipe Welding 1 | 3 |
| Total Semester Credits | 20 |

Second Semester

| | |
|---------------------------------|-----------|
| PIPE 1452 Pipe Shop 2 | 4 |
| PIPE 1560 Basic Refrigeration | 4 |
| PIPE 1540 Electric Controls | 3 |
| PIPE 1550 Basic Gas | 3 |
| PIPE 1570 Heating and Cooling 2 | 4 |
| PIPE 1585 Pipe Welding 2 | 2 |
| Total Semester Credits | 20 |

Total Program Credits40

Information is subject to change.
This Program Requirements Guide is not a contract.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 261+

Arithmetic: Score of 250+

Assessment Results and Prerequisites:

Students must maintain a GPA of 2.5 to continue in the program.

Students are accepted through St. Paul Pipefitters Local 455 JAC; 651.846.1699 or www.local455jatc.com.

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Plumbing DIPLOMA

Program Overview

The Plumbing program trains apprentices in commercial, residential and industrial plumbing.

Plumbers install and maintain the water, waste disposal, soil and vent, drainage and gas systems in homes and in commercial and industrial buildings. Plumbers also install faucets, bathtubs, sinks and toilets, and such appliances as dishwashers and water heaters. Plumbers often work from blueprints and specifications and are knowledgeable about building and plumbing codes which govern installations.

Applicants must be high school graduates or equivalent. High school courses in mathematics, science, mechanical drawing and wood or metal shop will be helpful.

Career Opportunities

According to the U.S. Department of Labor, employment of plumbers is expected to grow as fast as the average for all occupations.

Before becoming a journeyman plumber, the apprentice must pass the Minnesota State Plumbing Examination. Licensing is by the State Board of Health.

Program Outcomes

1. Apply math and science skills in the plumbing field.
2. Apply code knowledge to install piping in commercial, residential, and industrial buildings.
3. Assemble fittings, fixtures, and piping used in multiple piping systems.

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 248+

Writing: Any

Arithmetic: Score of 250+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional course based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

097D

Program Faculty

Adjunct faculty members, who are experienced in plumbing and represent private practice, local government, and industry sectors.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> PLMB 2610 Pre-Apprentice Plumbing | 2 |
| <input type="checkbox"/> PLMB 2612 Job Safety & Health | 2 |
| <input type="checkbox"/> PLMB 2614 Applied Math for Plumbing | 4 |
| <input type="checkbox"/> PLMB 2616 Plumbing Welding | 4 |
| <input type="checkbox"/> PLMB 2618 Basic Drawing | 4 |
| <input type="checkbox"/> PLMB 2621 Plumbing 1 | 4 |
| <input type="checkbox"/> PLMB 2622 Plumbing 2 | 4 |
| <input type="checkbox"/> PLMB 2623 Plumbing 3 Gas Installations and Gas Controls | 4 |
| <input type="checkbox"/> PLMB 2624 Plumbing 4 Commercial and Residential Service | 4 |
| <input type="checkbox"/> PLMB 2640 Advanced Plan Reading and Heavy Rigging | 4 |
| <input type="checkbox"/> PLMB 2631 Plumbing Code 1 | 2 |
| <input type="checkbox"/> PLMB 2632 Plumbing Code 2 | 2 |
| <input type="checkbox"/> PLMB 2633 Plumbing Code 3 | 2 |
| <input type="checkbox"/> PLMB 2634 Plumbing Code 4 | 2 |
| Total Program Credits | 44 |

Program Start Dates

The Plumbing Diploma program is a part-time, evening program that starts each spring.

Contact the One Stop at 651.846.1555 or admissions@saintpaul.edu for questions about the application, deadlines and the enrollment process.

Call Rick Gale, Program Coordinator, St. Paul Plumbers JATC, at 651.846.1389 for questions about the program.

*Information is subject to change.
This Program Requirements Guide is not a contract.*

Restricted Enrollment

The Plumbing Diploma program is a restricted enrollment program offered through the Plumbers and Gasfitters Local 34 and Saint Paul College. Admission to the Plumbing Apprenticeship program is required for enrollment in this diploma program. Those enrolled in the Plumbing Diploma program are subject to the St. Paul Plumbers & Gasfitters Apprenticeship Standards, as well as the Saint Paul College Student Code of Conduct and Academic Integrity Policy. Violations of these standards or policies may result in removal from both the apprenticeship program and the plumbing diploma classes. Concurrent enrollment in both the apprenticeship program and plumbing classes is required.

Course Sequence

Spring Semester

Students must complete the Pre-Apprenticeship classes (PLMB 2610 and PLMB 2612) prior to work eligibility.

PLMB 2610 Pre-Apprentice Plumbing2
 PLMB 2612 Job Safety and Health2

1st Year Apprentice

PLMB 2614 Applied Math for Plumbers4

2nd Year Apprentice

PLMB 2622 Plumbing 24

3rd Year Apprentice

PLMB 2624 Plumbing 4 Commercial and Residential Service4

4th year Apprentice

PLMB 2640 Advanced Plan Reading and Heavy Rigging4

5th Year Apprentice

PLMB 2633 Plumbing Code 32
 PLMB 2634 Plumbing Code 42

Fall Semester

1st Year Apprentice

PLMB 2621 Plumbing 14

2nd Year Apprentice

PLMB 2616 Plumbing Welding4

3rd year Apprentice

PLMB 2623 Plumbing 3 Gas Installations and Gas Controls4

4th Year Apprentice

PLMB 2618 Basic Drawing4

5th Year Apprentice

PLMB 2631 Plumbing Code 12
 PLMB 2632 Plumbing Code 22

Total Program Credits44

Sheet Metal-HVAC Ducts and Fittings AAS DEGREE

Program Overview

The sheet metal worker reads blueprints, prepares layouts and operates fabricating devices such as special hand tools, power shears, nibbler, brake, bar folder, turning machines, spot and arc welders, soldering equipment and plasma cutting systems. The skilled sheet metal worker gathers general information and specifications from blueprints for the fabrication and installation of ducts for heating, cooling, filtering and humidifying air. Also, sheet metal workers fabricate and install metal roofing and siding, stainless steel equipment for homes and industry, chutes for material transfer, signs and rain dispersal equipment. Satisfactory preparation for the sheet metal program may include high school courses in algebra and geometry. Other helpful courses are mechanical drafting and metal shop. Much of the sheet metal work starts with two-dimensional objects and ends with a three-dimensional product. Sheet metal work requires good spatial perception.

Career Opportunities

According to the U.S. Department of Labor, employment of sheet metal workers in construction is expected to increase about as fast as the average for all occupations. Graduates may go to work for firms that fabricate sheet metal products and become skilled production, precision, or construction sheet metal workers.

Program Outcomes

1. Graduates will have the knowledge and skills to layout, fabricate, and assemble all types of sheet metal products.
2. Graduates will have the ability to safely operate all types of sheet metal fabricating equipment.
3. Graduates will have the knowledge and skills to complete sheet metal welding and soldering processes.
4. Graduates will have the knowledge and skills to use computer-aided drafting for the design and fabrication of sheet metal products.
5. Graduates will have the knowledge and skills to use drafting and blueprint reading to design HVAC duct systems.

Transfer Opportunities

Saint Paul College has transfer agreements & partnerships between many post-secondary institutions. For more information please go to saintpaul.edu/Transfer.

Program Faculty

Viangsavanh Paborriboon
 viangsavanh.paborriboon@saintpaul.edu
 651.846.1367

Program Requirements

Check off when completed

Special supplies, tools, and estimated costs

The list for required tools is supplied by the program advisor. The cost of tools for the program is approximately \$300. Contact program faculty for more information.

| Course | Cr |
|---|-----------|
| <input type="checkbox"/> SMET 1410 Sheet Metal Fitting Layout and Design | 4 |
| <input type="checkbox"/> SMET 1415 OSHA 30 HR Training | 2 |
| <input type="checkbox"/> SMET 1420 Sheet Metal Fitting Fabrication | 4 |
| <input type="checkbox"/> SMET 1430 Sheet Metal Drafting & Blueprint Reading | 2 |
| <input type="checkbox"/> SMET 1440 Sheet Metal Welding | 5 |
| <input type="checkbox"/> SMET 1450 Sheet Metal Practical Problem Solving | 2 |
| <input type="checkbox"/> SMET 1510 Duct System Layout & Design | 4 |
| <input type="checkbox"/> SMET 1520 Duct System Fabrication | 4 |
| <input type="checkbox"/> SMET 1530 Architectural Sheet Metal | 4 |
| <input type="checkbox"/> SMET 1540 Power Machine Operation | 3 |
| <input type="checkbox"/> SMET 1550 Sheet Metal CAD/CAM Systems | 3 |
| Subtotal | 37 |

General Education/MnTC Requirements

Refer to the Minnesota Transfer Curriculum Course List for each Goal Area

| | |
|--|---|
| <input type="checkbox"/> Goal 1: Communication | 7 |
| ENGL 1711 Composition 1 – 4 cr | |
| COMM 17XX – 3 cr | |
| <input type="checkbox"/> Goal 3 or Goal 4 | 6 |
| Goal 3: Natural Sciences OR | |
| Goal 4: Mathematical/Logical Reasoning | |
| <input type="checkbox"/> Goal 5: History, Social Science and Behavioral Sciences | 3 |
| <input type="checkbox"/> Goal 6: Humanities and Fine Arts | 3 |
| Select a minimum of 4 additional credits | |
| <input type="checkbox"/> Goals 1 – 10 of the Minnesota Transfer Curriculum | 4 |
| Select a minimum of 4 additional credits | |

General Education Requirements 23
 General Education requirement courses may be taken before, after or concurrently with Sheet Metal courses.

Total Program Credits 60

*Information is subject to change.
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Program Start Dates

Fall

Full-time enrollment is required

Students must be enrolled full-time with a cohort of students. Technical courses only offered during days.

Course Sequence

The following sequence is recommended.

First Semester

| | |
|--|-----------|
| SMET 1410 Sheet Metal Fitting Layout and Design | 4 |
| SMET 1415 OSHA 30 HR Training | 2 |
| SMET 1420 Sheet Metal Fitting Fabrication | 4 |
| SMET 1430 Sheet Metal Drafting & Blueprint Reading | 2 |
| SMET 1440 Sheet Metal Welding | 5 |
| SMET 1450 Sheet Metal Practical Problem Solving | 2 |
| Goal 1: COMM 17XX | 3 |
| Total Semester Credits | 22 |

Second Semester

| | |
|---------------------------------------|-----------|
| SMET 1510 Duct System Layout & Design | 4 |
| SMET 1520 Duct System Fabrication | 4 |
| SMET 1530 Architectural Sheet Metal | 4 |
| SMET 1540 Power Machine Operation | 3 |
| SMET 1550 Sheet Metal CAD/CAM Systems | 3 |
| Total Semester Credits | 18 |

General Education Requirements (20 additional credits)

Total Program Credits 60

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 240+ or grade of "C" or better in ENGL 0921 or EAPP 0870

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional course based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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Sheet Metal-HVAC Ducts and Fittings DIPLOMA

Program Overview

The sheet metal worker reads blueprints, prepares layouts, and operates fabricating devices such as special hand tools, power shears, nibbler, brake, bar folder, turning machines, spot and arc welders, soldering equipment, and plasma cutting systems. The skilled sheet metal worker gathers general information and specifications from blueprints for the fabrication and installation of ducts for heating, cooling, filtering, and humidifying air. Also, sheet metal workers fabricate and install metal roofing and siding, stainless steel equipment for homes and industry, chutes for material transfer, signs, and rain dispersal equipment.

Satisfactory preparation for the sheet metal program may include high school courses in algebra and geometry. Other helpful courses are mechanical drafting and metal shop. Much of the sheet metal work starts with two-dimensional objects and ends with a three-dimensional product. Sheet metal work requires good spatial perception.

Career Opportunities

According to the U.S. Department of Labor, employment of sheet metal workers in construction is expected to increase about as fast as the average for all occupations. Graduates may go to work for firms that fabricate sheet metal products and become skilled production, precision, or construction sheet metal workers.

Program Outcomes

1. Graduates will have the knowledge and skills to layout, fabricate, and assemble all types of sheet metal products.
2. Graduates will have the ability to safely operate all types of sheet metal fabricating equipment.
3. Graduates will have the knowledge and skills to complete sheet metal welding and soldering processes.
4. Graduates will have the knowledge and skills to use computer-aided drafting for the design and fabrication of sheet metal products.
5. Graduates will have the knowledge and skills to use drafting and blueprint reading to design HVAC duct systems.

Program Faculty

Viangsavanh Paborriboon
 viangsavanh.paborriboon@saintpaul.edu
 651.846.1367

Special supplies, tools, and estimated costs

The list for required tools is supplied by the program advisor. The cost of tools for the program is approximately \$300. Contact program faculty for more information.

Program Requirements

Check off when completed

| Course | Cr |
|---|-----------|
| <input type="checkbox"/> SMET 1410 Sheet Metal Fitting Layout and Design | 4 |
| <input type="checkbox"/> SMET 1415 OSHA 30 HR Training | 2 |
| <input type="checkbox"/> SMET 1420 Sheet Metal Fitting Fabrication | 4 |
| <input type="checkbox"/> SMET 1430 Sheet Metal Drafting & Blueprint Reading | 2 |
| <input type="checkbox"/> SMET 1440 Sheet Metal Welding | 5 |
| <input type="checkbox"/> SMET 1450 Sheet Metal Practical Problem Solving | 2 |
| <input type="checkbox"/> SMET 1510 Duct System Layout & Design | 4 |
| <input type="checkbox"/> SMET 1520 Duct System Fabrication | 4 |
| <input type="checkbox"/> SMET 1530 Architectural Sheet Metal | 4 |
| <input type="checkbox"/> SMET 1540 Power Machine Operation | 3 |
| <input type="checkbox"/> SMET 1550 Sheet Metal CAD/CAM Systems | 3 |
| Subtotal | 37 |

General Education/MnTC Requirements

Refer to the Minnesota Transfer Curriculum Course List for each Goal Area

| | |
|--|----------|
| <input type="checkbox"/> Goal 1: Communication | 3 |
| COMM 17XX – 3 cr | |
| General Education Requirements | 3 |

Total Program Credits **40**

Program Start Dates

Fall

Full-time enrollment is required

Students must be enrolled full-time with a cohort of students. Technical courses only offered during days.

Course Sequence

The following sequence is recommended.

First Semester

| | |
|--|-----------|
| SMET 1410 Sheet Metal Fitting Layout and Design | 4 |
| SMET 1415 OSHA 30 HR Training | 2 |
| SMET 1420 Sheet Metal Fitting Fabrication | 4 |
| SMET 1430 Sheet Metal Drafting & Blueprint Reading | 2 |
| SMET 1440 Sheet Metal Welding | 5 |
| SMET 1450 Sheet Metal Practical Problem Solving | 2 |
| Goal 1: COMM 17XX | 3 |
| Total Semester Credits | 22 |

Second Semester

| | |
|---------------------------------------|-----------|
| SMET 1510 Duct System Layout & Design | 4 |
| SMET 1520 Duct System Fabrication | 4 |
| SMET 1530 Architectural Sheet Metal | 4 |
| SMET 1540 Power Machine Operation | 3 |
| SMET 1550 Sheet Metal CAD/CAM Systems | 3 |
| Total Semester Credits | 18 |

Total Program Credits **40**

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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*Information is subject to change.
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Truck Technician DIPLOMA

Program Overview

Truck Technicians diagnose trouble accurately with the use of modern testing equipment. They repair and service the entire truck and trailer including gas and diesel engines. They also work on air brakes, multi-speed transmissions, differentials, electrical systems, chassis and engine electronics, cooling systems, air conditioning and refrigeration, and many more components of today's modern truck.

Career Opportunities

Maintenance departments, which have the responsibility for the repair and the maintenance of the entire truck, need skilled graduates to fill truck technician positions. Many technicians find employment with companies that own a fleet of vehicles such as truck lines, bus lines, and construction companies. Other technicians work for small repair shops, truck dealerships, heavy equipment dealers and the government. Employment of truck technicians is expected to increase faster than average according to the U.S. Department of Labor.

Program Outcomes

1. Graduates will diagnose problems that occur in all major truck systems.
2. Graduates will service and repair medium/heavy duty trucks and trailers.
3. Graduates will communicate effectively with customers, supervisors, colleagues, and industry professionals.
4. Graduates will inspect commercial vehicles based upon MN DOT Standards.

Additional Requirements/Recommendations

The student should be capable of passing a rigorous physical examination with emphasis on eyesight, color vision, hearing, back condition and motor coordination.

Applicants should be high school graduates or equivalent with good reading ability and an understanding of basic mathematics in order to understand and apply technical information.

Drug test, background check, driving record, and a commercial drivers license may also be required by many employers.

Program Faculty

Joel Pearson
joel.pearson@saintpaul.edu
651.846.1795

Textbook and supply costs

The following are estimated costs:

- Textbooks: \$450
- Tools: \$1,000–\$2,000 depending on brand of tools purchased.

Program Requirements

Check off when completed

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> TRKM 1400 Introduction and Safety | 1 |
| <input type="checkbox"/> TRKM 1445 Truck Welding 1 | 2 |
| <input type="checkbox"/> TRKM 1455 Truck Welding 2 | 2 |
| <input type="checkbox"/> TRKM 1521 Electrical 1 | 5 |
| <input type="checkbox"/> TRKM 1522 Electrical 2 | 5 |
| <input type="checkbox"/> TRKM 1551 Clutch and Transmission | 5 |
| <input type="checkbox"/> TRKM 1552 Driveshafts and Differentials | 4 |
| <input type="checkbox"/> TRKM 1553 Automatic and Automated Transmissions | 4 |
| <input type="checkbox"/> TRKM 1560 Truck Brake Systems | 6 |
| <input type="checkbox"/> TRKM 2401 Steering and Suspension Systems | 6 |
| <input type="checkbox"/> TRKM 2425 Truck Cab Climate Control Systems | 3 |
| <input type="checkbox"/> TRKM 2440 Gasoline Engines | 6 |
| <input type="checkbox"/> TRKM 2511 Diesel Engines 1 | 6 |
| <input type="checkbox"/> TRKM 2512 Diesel Engines 2 | 6 |
| <input type="checkbox"/> TRKM 2540 Preventive Maintenance | 3 |
| Subtotal | 64 |

General Education/MnTC Requirements

Refer to the Minnesota Transfer Curriculum Course List for each Goal Area

| | |
|---|----------|
| <input type="checkbox"/> Any college level general education course | 3 |
| General Education Requirements | 3 |

Total Program Credits 67

Minimum Program Entry Requirements
Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Assessment Results and Prerequisites:
Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

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*Information is subject to change.
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Program Start Dates

Fall

Full-time enrollment is required

This is a two-year, full-time day program.

- Introduction and Safety must be taken concurrently with the other truck technician classes at the start of the program.
- It is recommended that the general education requirements be taken in the summer term before the first year or between the first and second years.

Course Sequence

The course sequence listed on the back of this guide is recommended for a full-time student; however, this sequence is not required. Contact Program Faculty with questions.

Course Sequence

This diploma program generally includes four semesters of full-time study. The course sequence will depend upon when a student starts the Truck Technician program. Each of the four required semester blocks is offered once every other year. Students beginning Fall Semester will follow the following sequence outlined.

First Semester

| | |
|---|-----------|
| TRKM 1400 Introduction and Safety | 1 |
| TRKM 1445 Truck Welding 1 | 2 |
| TRKM 1521 Electrical 1 | 5 |
| TRKM 1522 Electrical 2 | 5 |
| TRKM 1552 Driveshafts and Differentials | 4 |
| Total Semester Credits | 17 |

Second Semester

| | |
|---|-----------|
| TRKM 1455 Truck Welding 2 | 2 |
| TRKM 1551 Clutch and Transmission | 5 |
| TRKM 1553 Automatic and Automated Transmissions | 4 |
| TRKM 1560 Truck Brake Systems | 6 |
| Total Semester Credits | 17 |

Third Semester

| | |
|---|-----------|
| TRKM 2401 Steering and Suspension Systems | 6 |
| TRKM 2425 Truck Cab Climate Control Systems | 3 |
| TRKM 2440 Gasoline Engines | 6 |
| Total Semester Credits | 15 |

Fourth Semester

| | |
|----------------------------------|-----------|
| TRKM 2511 Diesel Engines 1 | 6 |
| TRKM 2512 Diesel Engines 2 | 6 |
| TRKM 2540 Preventive Maintenance | 3 |
| Total Semester Credits | 15 |

General Education Requirement (any) 3
May be taken any semester, but Summer Term is recommended.

Total Program Credits 67

Welding Technology DIPLOMA

Program Overview

Welding and fabrication operations require skilled workers who are well-trained in the use of advanced arc welding process, layout fabrication techniques, blueprint reading and measuring devices. Skilled welding fabricators are thoroughly familiar with both welding and shop equipment, understanding the breakdown and setup procedures, test standards, and knowledge of the various types of metals. Physical requirements include good eyesight, good hand and eye coordination and the ability to perform heavy, physical work.

Career Opportunities

According to the U.S. Department of Labor, it is projected within the next 10 years to see a 15% growth rate, adding 50,000 new jobs. Welders and fabricators work in manufacturing plants both in structural and non-structural settings as production welders, maintenance welders, specialty welders, layout fabricators, press brake operators, CNC plasma/laser cutting operators, and robotic welding operators. Welding fabrication is widely used in the aircraft, automobile, trucking, shipbuilding, pipefitting, plumbing, sheetmetal, ironworking and other trades that use metals. Skilled welders may become layout specialists, engineers, technicians, supervisors, Certified Welding Inspectors or private shop owners.

Program Outcomes

1. Identify correct welding techniques for multiple processes.
2. Follow safety requirements in the set-up, operation, and break down of metal shop equipment.
3. Produce weldments to AWS/Industry standards for multiple processes.
4. Analyze the quality of welds to determine if proper techniques/settings are being used.
5. Use blueprints and measuring devices to aid in welding.
6. Distinguish between the characteristics of commonly used metal types.
7. Apply mathematical tools to metalworking techniques.
8. Construct projects using metalworking fabrication techniques.

Program Faculty

- Todd Hankel
todd.hankel@saintpaul.edu
- Caleb Paulson
caleb.paulson@saintpaul.edu
- Riley Pease
riley.pease@saintpaul.edu

Supply costs

Estimated cost for student supplies \$520.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|-----------|
| <input type="checkbox"/> WLDG 1402 Industrial Shop Practices 1 | 4 |
| <input type="checkbox"/> WLDG 1410 Welding Basics | 2 |
| <input type="checkbox"/> WLDG 1420 SMAW: E6010 | 2 |
| <input type="checkbox"/> WLDG 1431 SMAW: E7018 | 2 |
| <input type="checkbox"/> WLDG 1441 GMAW: Short Arc | 3 |
| <input type="checkbox"/> WLDG 1450 Intro to Blueprint/Measuring Devices | 3 |
| <input type="checkbox"/> WLDG 1502 Industrial Shop Practices | 4 |
| <input type="checkbox"/> WLDG 1510 GMAW Spray and Pulse Spray | 3 |
| <input type="checkbox"/> WLDG 1520 GMAW Core Wires | 3 |
| <input type="checkbox"/> WLDG 1530 Intro to GTAW | 3 |
| <input type="checkbox"/> WLDG 1540 Blueprint Welding Symbols/Math/Welder Qualification | 3 |
| <input type="checkbox"/> WLDG 2402 Industrial Shop Practices 3 | 4 |
| <input type="checkbox"/> WLDG 2411 GMAW: Aluminum and Stainless Steel | 3 |
| <input type="checkbox"/> WLDG 2420 GTAW: Aluminum and Stainless Steel | 4 |
| <input type="checkbox"/> WLDG 2430 Grinding and Finishing | 2 |
| <input type="checkbox"/> WLDG 2442 Intro to Robotics | 3 |
| Subtotal | 48 |

Total Program Credits48

Program Start Dates

Fall, Spring

Course Sequence

The following sequence is recommended for a full-time student.

First Semester

| | |
|--|-----------|
| WLDG 1402 Industrial Shop Practices 1 | 4 |
| WLDG 1410 Welding Basics | 2 |
| WLDG 1420 SMAW: E6010 | 2 |
| WLDG 1431 SMAW: E7018 | 2 |
| WLDG 1441 GMAW: Short Arc | 3 |
| WLDG 1450 Intro to Blueprint/Measuring Devices | 3 |
| Total Semester Credits | 16 |

Second Semester

| | |
|---|-----------|
| WLDG 1502 Industrial Shop Practices | 4 |
| WLDG 1510 GMAW Spray and Pulse Spray | 3 |
| WLDG 1520 GMAW Core Wires | 3 |
| WLDG 1530 Intro to GTAW | 3 |
| WLDG 1540 Blueprint Welding Symbols/Math/Welder Qualification | 3 |
| Total Semester Credits | 16 |

Third Semester

| | |
|--|-----------|
| WLDG 2402 Industrial Shop Practices 3 | 4 |
| WLDG 2411 GMAW: Aluminum and Stainless Steel | 3 |
| WLDG 2420 GTAW: Aluminum and Stainless Steel | 4 |
| WLDG 2430 Grinding and Finishing | 2 |
| WLDG 2442 Intro to Robotics | 3 |
| Total Semester Credits | 16 |

Total Program Credits48

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

324D

*Information is subject to change.
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Robotic Welding CERTIFICATE

Program Overview

Professional fabricators and CNC operators are highly skilled individuals who excel in math, geometry, formulations, programming, critical thinking and blueprint reading. Physical requirements include good eyesight, good hand and eye coordination, standing for long periods of time and the ability to perform heavy, physical work.

Robotic welding is an exciting and growing part of the welding profession. Robotic tools can automate some high production applications, such as resistance spot welding and arc welding.

Students must be a graduate of the Welding Technology Diploma (WLDG) or have instructor approval.

Career Opportunities

Fabricators and CNC operators work in manufacturing plants as production welders, specialist welders, layout engineers, press brake and CNC operators both in structural and non-structural settings. Welding/fabricating is widely used in the aircraft, automotive, heavy equipment, sheet metal, and other trades that use fabrication and CNC equipment.

Program Outcomes

1. Graduates will have the knowledge and skills in setup and break-down procedures of CNC equipment including press brake, CNC plasma cutting and robotic welding.
2. Graduates will have knowledge and skills in sheet metal bend deduction formulation.
3. Graduates will have acquired supervised hands-on experience in using various welding and finishing processes and fabrication equipment.
4. Graduates will be prepared for employment in the welding industry and related fabrication fields.

Program Faculty

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Supply Costs

Estimated cost for student supplies \$520.

Program Requirements

Students must have a Welding Diploma or instructor approval.

Check off when completed

| Course | Cr |
|---|----|
| <input type="checkbox"/> WLDG 2500 2D CAD | 2 |
| <input type="checkbox"/> WLDG 2510 Safety | 1 |
| <input type="checkbox"/> WLDG 2520 CNC Plasma | 2 |
| <input type="checkbox"/> WLDG 2530 Press Brake Operations | 3 |
| <input type="checkbox"/> WLDG 2540 Robotic Welding Operations | 3 |
| <input type="checkbox"/> WLDG 2550 Industrial Equipment | 2 |
| <input type="checkbox"/> WLDG 2560 Layout Practices | 4 |

Total Program Credits 17

Program Start Dates

Spring

Course Sequence

The following sequence is recommended for a full-time student.

First Semester

| | |
|--------------------------------------|-----------|
| WLDG 2500 2D CAD | 2 |
| WLDG 2510 Safety | 1 |
| WLDG 2520 CNC Plasma | 2 |
| WLDG 2530 Press Brake Operations | 3 |
| WLDG 2540 Robotic Welding Operations | 3 |
| WLDG 2550 Industrial Equipment | 2 |
| WLDG 2560 Layout Practices | 4 |
| Total Semester Credits | 17 |

Total Program Credits 17

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 240+ or grade of "C" or better in READ 0721 or READ 0724 or EAPP 0860

Writing: Score of 225+

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

350C

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Production Technologies CERTIFICATE

An eTECH 360° Program

Program Overview

This certificate will provide students with the training, education, and skills to build a base knowledge of manufacturing processes and plant operations, generally for entry-level positions. Graduates can use the knowledge gained in this Certificate to build upon a manufacturing career path leading to higher-level careers like Automation, Machining, and Welding. Students will engage in coursework topics of career success skills, technical mathematics, introductory computer skills, print interpretation, manufacturing processes, quality control, maintenance, and safety.

Career Opportunities

The nationwide Manufacturing Skills Standards Council (MSSC) System, based upon industry-defined and federally-endorsed national standards, offers both entry-level and incumbent workers the opportunity to demonstrate that they have acquired the skills increasingly needed in the high-growth, technology-intensive jobs of the 21st century. The MSSC System awards certificates to individuals who pass any of its four Production modules: Safety; Quality Practices & Measurement; Manufacturing Processes & Production; and Maintenance Awareness and a full Certified Production Technician (CPT) Certification to those who pass all four. Students completing the Production Technologies Certificate will have gained the knowledge required to pass the MSSC full-certified Production Technician Certification.

According to the Manufacturing Career Network, manufacturing is the second largest industry in Minnesota, second only to educational services, healthcare and social assistance. Minnesota manufacturers employ 390,435 people, which represents 14.4 percent of total employment. Further, manufacturing jobs in the state pay wages that are approximately 8 percent higher than those paid to the rest of the workforce. These numbers are evidence that a thriving manufacturing sector is critical to the state economy.

Program Outcomes

Graduates will be able to:

1. Identify and apply appropriate safety procedures.
2. Use technical mathematics to solve problems.
3. Demonstrate use of common computer software.
4. Analyze and apply specific manufacturing process procedures.
5. Identify and apply specific quality procedures.
6. Interpret symbols and blueprints accurately for a variety of projects.
7. Identify appropriate and inappropriate professional behavior.

Program Faculty

This program is taught by a variety of faculty from consortium schools.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|--|----|
| <input type="checkbox"/> CMAE 1502 Technical Math | 3 |
| <input type="checkbox"/> CMAE 1510 Print Reading | 2 |
| <input type="checkbox"/> CMAE 1518 Manufacturing Processes | 2 |
| <input type="checkbox"/> CMAE 1514 Safety Awareness | 2 |
| <input type="checkbox"/> CMAE 1506 Intro to Computers | 2 |
| <input type="checkbox"/> CMAE 1528 Career Success Skills | 1 |
| <input type="checkbox"/> CMAE 1526 Maintenance Awareness | 2 |
| <input type="checkbox"/> CMAE 1522 Quality Practices | 2 |

Total Program Credits 16

eTECH Programs

The eTECH programs are offered by a group of partner institutions working together integrates traditional classroom learning with partial on-site lab work for the online delivery of courses where learners can advance their skills in manufacturing and engineering, while continuing to work in their current profession. Many courses are available online. The programs are designed to offer entry-level and operator-level skills and knowledge, which prepares them for a career, instead of just an entry-level job. Because eTECH is part of the 360° consortium of two-year colleges and a four-year university, it provides a unique ability to implement seamless career pathways from secondary to two-year college to four-year university.



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Program Start Date

Fall, Spring

Course Sequence

First Semester

(First 8 weeks)

| | |
|--------------------------|---|
| CMAE 1502 Technical Math | 3 |
| CMAE 1510 Print Reading | 2 |

(Second 8 weeks)

| | |
|-----------------------------------|----------|
| CMAE 1518 Manufacturing Processes | 2 |
| CMAE 1514 Safety Awareness | 2 |
| Total Semester Credits | 9 |

Second Semester

(First 8 Weeks)

| | |
|---------------------------------|---|
| CMAE 1506 Intro to Computers | 2 |
| CMAE 1528 Career Success Skills | 1 |

(Second 8 Weeks)

| | |
|---------------------------------|----------|
| CMAE 1526 Maintenance Awareness | 2 |
| CMAE 1522 Quality Practices | 2 |
| Total Semester Credits | 7 |

Total Program Credits 16

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 234+

Writing: Any

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional courses based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

Welding Technology CERTIFICATE

An eTECH 360^o Program

Program Overview

This certificate will provide students with knowledge of manufacturing processes and plant operations, along with an advanced skill set in welding technology and processes. Students will engage in topics of technical mathematics, introductory computer skills, print interpretation, manufacturing processes, quality control, maintenance, and safety. Also included in coursework, students will engage in topics of welding symbols, metallurgy, Plasma Arc Cutting and Air Carbon Arc Cutting (OxyFuel), Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW) and Flux Cord Arc Welding (FCAW), and Gas Tungsten Arc Welding (GTAW).

Career Opportunities

The nationwide Manufacturing Skills Standards Council (MSSC) System, based upon industry-defined and federally-endorsed national standards, offers both entry-level and incumbent workers the opportunity to demonstrate that they have acquired the skills increasingly needed in the high-growth, technology-intensive jobs of the 21st century. The MSSC System awards certificates to individuals who pass any of its four Production modules: Safety; Quality Practices & Measurement; Manufacturing Processes & Production; and Maintenance Awareness and a full Certified Production Technician (CPT) Certification to those who pass all four. Students completing this Certificate will have gained the knowledge required to pass the MSSC full-certified Production Technician Certification. According to the Manufacturing Career Network, manufacturing is the second largest industry in Minnesota, second only to educational services, healthcare and social assistance. Minnesota manufacturers employ 390,435 people, which represents 14.4 percent of total employment. Further, manufacturing jobs in the state pay wages that are approximately 8 percent higher than those paid to the rest of the workforce. These numbers are evidence that a thriving manufacturing sector is critical to the state economy.

Program Outcomes

Graduates will be able to:

1. Identify and apply appropriate safety procedures.
2. Analyze and apply specific manufacturing process procedures.
3. Identify and apply specific quality procedures.
4. Identify and select the proper filler metal dependent on base metal to be welded.
5. Troubleshoot and solve common problems involved with everyday use of a welding machine.
6. Fabricate several different welding projects to demonstrate expected skills required by industry standards.
7. Interpret symbols and blueprints accurately for a variety of projects.

Program Faculty

This program is taught by a variety of faculty from consortium schools.

Program Requirements

Check off when completed

Certain classes must be taken concurrently and certain classes are prerequisites to other classes.

| Course | Cr |
|---|-----------|
| <input type="checkbox"/> CMAE 1502 Technical Math | 3 |
| <input type="checkbox"/> CMAE 1510 Print Reading | 2 |
| <input type="checkbox"/> CMAE 1518 Manufacturing Processes | 2 |
| <input type="checkbox"/> CMAE 1562 Oxy Fuel | 2 |
| <input type="checkbox"/> CMAE 1506 Intro to Computers | 2 |
| <input type="checkbox"/> CMAE 1564 SMAW | 3 |
| <input type="checkbox"/> CMAE 1526 Maintenance Awareness | 2 |
| <input type="checkbox"/> CMAE 1570 Metallurgy | 1 |
| <input type="checkbox"/> CMAE 1566 GMAW/FCAW | 3 |
| <input type="checkbox"/> CMAE 1514 Safety Awareness | 2 |
| <input type="checkbox"/> CMAE 1560 Interpreting Welding Symbols | 2 |
| <input type="checkbox"/> CMAE 1568 GTAW | 3 |
| <input type="checkbox"/> CMAE 1522 Quality Practices | 2 |
| Total Program Credits | 30 |

eTECH Programs

The eTECH programs are offered by a group of partner institutions working together integrates traditional classroom learning with partial on-site lab work for the online delivery of courses where learners can advance their skills in manufacturing and engineering, while continuing to work in their current profession. Many courses are available online. The programs are designed to offer entry-level and operator-level skills and knowledge, which prepares them for a career, instead of just an entry-level job. Because eTECH is part of the 360^o consortium of two-year colleges and a four-year university, it provides a unique ability to implement seamless career pathways from secondary to two-year college to four-year university.



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Program Start Date

Fall, Spring

Course Sequence

First Semester

(First 8 weeks)

| | |
|--------------------------|---|
| CMAE 1502 Technical Math | 3 |
| CMAE 1510 Print Reading | 2 |

(Second 8 weeks)

| | |
|-----------------------------------|-----------|
| CMAE 1518 Manufacturing Processes | 2 |
| CMAE 1562 Oxy Fuel | 2 |
| Total Semester Credits | 10 |

Second Semester

(First 8 Weeks)

| | |
|------------------------------|---|
| CMAE 1506 Intro to Computers | 2 |
| CMAE 1564 SMAW | 3 |

(Second 8 Weeks)

| | |
|---------------------------------|----------|
| CMAE 1526 Maintenance Awareness | 2 |
| CMAE 1570 Metallurgy | 1 |
| Total Semester Credits | 8 |

Third Semester

(First 8 Weeks)

| | |
|---------------------|---|
| CMAE 1566 GMAW/FCAW | 3 |
|---------------------|---|

(Second 8 Weeks)

| | |
|--|----------|
| CMAE 1514 Safety Awareness | 2 |
| CMAE 1560 Interpreting Welding Symbols | 2 |
| Total Semester Credits | 7 |

Fourth Semester

First 8 Weeks)

| | |
|----------------|---|
| CMAE 1568 GTAW | 3 |
|----------------|---|

(Second 8 Weeks)

| | |
|-------------------------------|----------|
| CMAE 1522 Quality Practices | 2 |
| Total Semester Credits | 5 |

Total Program Credits 30

Minimum Program Entry Requirements

Students entering this program must meet the following minimum program entry requirements:

Reading: Score of 234+

Writing: Any

Arithmetic: Score of 237+

Assessment Results and Prerequisites:

Students admitted into Saint Paul College programs may need to complete additional course based on assessment results and course prerequisite requirements. Certain MATH, READ, and ENGL courses have additional prerequisites.

375C