

Career & Technical Education Programs

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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. To profit from the training offered, the students must read well enough to understand the technical information presented.

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

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David Vorderbruggen
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Admission Requirement

Admission requires completion of the Automotive Service Technician Diploma, or concurrent enrollment in the second year Auto Technician program.

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 pre-requisite 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 Cr

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

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

Total Program Credits 72

Program Start Dates

Fall, (Spring - if space available and with instructor permission)

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.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institutions for the baccalaureate degree programs listed below.

For more information please go to saintpaul.edu/Transfer.

Automotive Service Technician AAS

- BS Operations Management
Minnesota State University-Moorhead
- BS Automotive Engineering Technology
Minnesota State University-Mankato

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 60+ or grade of "C" or better in READ 0721

Writing: Score of 60+ or grade of "C" or better in ENGL 0921

Arithmetic: Score of 31+

Spatial assessment required: Score 10+

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.

278A (7164)

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

Automotive Service Technician AAS DEGREE *(continued)*

Course Sequence

The following full-time sequence is recommended.

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 5	3
Goal Area 3 or 4	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
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Total Program Credits	72
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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. To profit from the training offered, the students must read well enough to understand the technical information presented.

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.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Automotive Service Technician Diploma

- BS Operations Management
- Minnesota State University-Moorhead

*Information is subject to change.
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Program Faculty

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Jake Yernberg
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David Vorderbruggen
david.vorderbruggen@saintpaul.edu

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 pre-requisite 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

Program Start Dates

Fall

Course Sequence

The following full-time sequence is recommended.

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
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 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

Spatial assessment required: Score 10+

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.

084D (7004)

Truck Technician DIPLOMA

Program Overview

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, the chassis, 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 have the knowledge and skills to service and repair medium and heavy duty trucks and trailers.
2. Graduates will have acquired supervised work experience servicing and repairing medium and heavy duty trucks and trailers.
3. Graduates will be prepared for employment as entry level truck technicians and truck preventative maintenance technicians.
4. Graduates will have mastered the general education program requirements for work and life roles.

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

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Joel Pearson joel.pearson@saintpaul.edu
651.846-1795

Full-time enrollment is required

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

- Intro 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.

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

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Truck Technician Diploma

BS Operations Management
Minnesota State University-Moorhead

Program Start Dates

Fall

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)

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

Total Program Credits 67

Minimum Program Entry Requirements

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

Reading: Score of 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

Spatial assessment required: Score 10+

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.

100D (7066)

*Information is subject to change.
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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. Graduates will have acquired supervised hands-on experience building framed and frameless cabinetry.
2. Graduates will have knowledge, skill, and hands-on experience in the use of CAD/CAM software and CNC equipment.
3. Graduates will have knowledge, skill, and hands-on experience with wood stains, finishes and finishing equipment.
4. Graduates will have knowledge, skill, and hands-on experience in plastic laminate technology and fabrication.
5. Graduates will have acquired supervised hands-on experience in raised panel door layout, machinery set up, and production.
6. Graduates will have the knowledge, skills, and hands-on experience on the safe operation of woodworking equipment.

Program Faculty

Thomas Hillstead thomas.hillstead@saintpaul.edu

Part-time/Full-time options

Part-time and full-time options available. Technical courses are offered during days.

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

MATH 1411 – Applied Math is required for program graduation. It should be taken by the end of the first semester.

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	
<input type="checkbox"/> MATH 1411 Applied Math	3
Total Program Credits	37

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.

Program Start Dates

Fall, Spring

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
MATH 1411 Applied Math	3
Total Semester Credits	19

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 37

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Cabinetmaking Diploma

BS Operations Management
Minnesota State University-Moorhead

Minimum Program Entry Requirements

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

Reading: Score of 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

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.

085D (7040)

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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 journeyperson 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.

Program Faculty

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651.846.1391

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 \$1,100.00, beyond the cost of tuition, fees, and books, for special supplies and tools. A list is available from the advisor.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Carpentry Diploma

BS Operations Management
Minnesota State University-Moorhead

*Information is subject to change.
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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 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 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

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.

086D (7039)

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 journeyman'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

Julie Selton	julie.selton@saintpaul.edu 651.846.1770
Keith Setley	keith.setley@saintpaul.edu 651.846.1539
Dean Weikle	dean.weikle@saintpaul.edu 651.846.1790
George Schaus	george.schaus@saintpaul.edu 651.846.1631

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 Credits74

Additional Program Requirements/Costs

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

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Electrical Technology Diploma

BS Operations Management
Minnesota State University-Moorhead

Program Start Dates

Fall, Spring

Course Sequence

The following full-time sequence is recommended.

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 Credits74

Minimum Program Entry Requirements

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

Reading: Score of 60+ or a grade of "C" or better in READ 0721

Writing: Score of 60+ or a grade of "C" or better in ENGL 0921

Arithmetic: Score of 31+

Assessment Results and Prerequisites:

Students admitted to 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.

309D (7158)

Electromechanical 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 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.

Program Faculty

Travis Schachtner travis.schachtner@saintpaul.edu
651.403.4163

Program Delivery

While addressing the general education needs of the program, students will be working within the Electrical Technology program in second semester. Third and fourth semester consist of online course delivery with hands-on labs to reinforce the lessons learned as well as one-on-one with instructors.

Additional Program Requirements/Costs

- Student 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"/> CMAE 1514 Safety Awareness	2
<input type="checkbox"/> CMAE 1518 Manufacturing Process and Production	2
<input type="checkbox"/> CMAE 1522 Quality Practices	2
<input type="checkbox"/> CMAE 1526 Maintenance Awareness	2
<input type="checkbox"/> EMEC 1510 AC/DC Fundamentals	3
<input type="checkbox"/> EMEC 1520 Electrical Motors	3
<input type="checkbox"/> EMEC 1530 Motor Controls	4
<input type="checkbox"/> EMEC 1540 Motor Drives	4
<input type="checkbox"/> EMEC 2610 Fluid System Fund. - Pneumatics	3
<input type="checkbox"/> EMEC 2615 Fluid System Fund. - Hydraulics	3
<input type="checkbox"/> EMEC 2620 Mechanical Fundamentals I	4
<input type="checkbox"/> EMEC 2625 Mechanical Fundamentals 2	4
<input type="checkbox"/> EMEC 2740 Electromechanical Troubleshooting & Maintenance	3
<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	51

General Education/MnTC Requirements Cr

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

<input type="checkbox"/> ENGL 1730 Introduction to Technical Writing	3
<input type="checkbox"/> Goal 4: Mathematical/Logical Reasoning	3
General Education Requirements	6

Total Program Credits 57

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; a selection of courses is offered summer term.

Fall Semester

CMAE 1514 Safety Awareness	2
CMAE 1518 Manufacturing Process and Production	2
CMAE 1522 Quality Practices	2
CMAE 1526 Maintenance Awareness	2
ENGL 1730 Introduction to Technical Writing	3
Goal 4	3
Total Semester Credits	14

Spring Semester

EMEC 1510 AC/DC Fundamentals	3
EMEC 1520 Electrical Motors	3
EMEC 1530 Motor Controls	4
EMEC 1540 Motor Drives	4
Total Semester Credits	14

Fall Semester

EMEC 2610 Fluid System Fund. - Pneumatics	3
EMEC 2615 Fluid System Fund. - Hydraulics	3
EMEC 2620 Mechanical Fundamentals I	4
EMEC 2625 Mechanical Fundamentals 2	4
Total Semester Credits	14

Spring Semester

EMEC 2740 Electromechanical Troubleshooting & Maintenance	3
EMEC 2751 Automated Process Controls	4
EMEC 2760 Programming for Robotic Manufacturing	4
EMEC 2770 Advanced PLC Programming	4
Total Semester Credits	15

Total Program Credits 57

*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 60+ or grade of "C" or better in READ 0721

Writing: Score of 60+ or grade of "C" or better in ENGL 0921

Arithmetic: Score of 52+

Assessment Results and Prerequisites:
Students admitted to 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.

349D (7224)

Electromechanical Systems CERTIFICATE

Program Overview

Note: Students must be a journeyman electrician, have a Construction Electricity (CNEL) or Electrical Technology (ELTN) Diploma/AAS, or have Instructor approval.

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 control systems.

Program Delivery

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.

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 2610 Fluid System Fund. - Pneumatics	3
<input type="checkbox"/> EMEC 2615 Fluid System Fund. - Hydraulics	3
<input type="checkbox"/> EMEC 2620 Mechanical Fundamentals I	4
<input type="checkbox"/> EMEC 2625 Mechanical Fundamentals 2	4
<input type="checkbox"/> EMEC 2730 Advanced PLC Programming	4
<input type="checkbox"/> EMEC 2740 Electromechanical Troubleshooting & Maintenance	3
<input type="checkbox"/> EMEC 2751 Automated Process Control	4
<input type="checkbox"/> EMEC 2760 Programming for Robotic Manufacturing	4
Total Program Credits	29

Additional Program Materials Costs

- Student 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.

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

Program Faculty

Travis Schachtner travis.schachtner@saintpaul.edu
651.403.4163

Program Start Dates

Fall, Spring

Course Sequence

The following part-time sequence is recommended; however, this sequence is not required.

Not all courses are offered each semester; a selection of courses is offered summer term.

Students should consult with the Program Advisor each semester.

First Semester

EMEC 2610 Fluid System Fund. - Pneumatics	3
EMEC 2615 Fluid System Fund. - Hydraulics	3
EMEC 2620 Mechanical Fundamentals 1	4
EMEC 2625 Mechanical Fundamentals 2	4
Total Semester Credits	14

Second Semester

EMEC 2770 Advanced PLC Programming	4
EMEC 2740 Electromechanical Troubleshooting & Maintenance	3
EMEC 2751 Automated Process Control	4
EMEC 2760 Programming for Robotic Manufacturing	4
Total Semester Credits	15

Total Program Credits 29

Minimum Program Entry Requirements

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

Reading: Score of 60+ or grade of "C" or better in READ 0721

Writing: Score of 60+ or grade of "C" or better in ENGL 0921

Arithmetic: Score of 52+

Assessment Results and Prerequisites:

Students admitted to 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.

349C

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. Graduates will have the science and math skills needed in the piping systems.
2. Graduates will have the basic knowledge and skills necessary to install piping systems in commercial and industrial buildings.
3. Graduates will have basic knowledge to properly install and operate low and high pressure steam systems.

Program Faculty

Wyatt Carlson wyatt.carlson@saintpaul.edu

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.

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 1420 Pipe Blueprint Reading	3
<input type="checkbox"/> PIPE 1430 Pipe Welding 1	5
<input type="checkbox"/> PIPE 1441 Basic Heating 1	3
<input type="checkbox"/> PIPE 1442 Basic Heating 2	3
<input type="checkbox"/> PIPE 1451 Pipe Shop 1	4
<input type="checkbox"/> PIPE 1452 Pipe Shop 2	4
<input type="checkbox"/> PIPE 1522 Basic Air Conditioning and Refrigeration	2
<input type="checkbox"/> PIPE 1530 Pipe Welding 2	5
<input type="checkbox"/> PIPE 1540 Electric Controls	3
<input type="checkbox"/> PIPE 1550 Basic Gas	3

Total Program Credits40

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Pipefitting Diploma

BS Operations Management
Minnesota State University-Moorhead

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 1420 Pipe Blueprint Reading	3
PIPE 1430 Pipe Welding 1	5
PIPE 1441 Basic Heating 1	3
PIPE 1451 Pipe Shop 1	4
Total Semester Credits	20

Second Semester

PIPE 1442 Basic Heating 2	3
PIPE 1452 Pipe Shop 2	4
PIPE 1522 Basic Air Conditioning and Refrigeration	2
PIPE 1530 Pipe Welding 2	5
PIPE 1540 Electric Controls	3
PIPE 1550 Basic Gas	3
Total Semester Credits	20

Total Program Credits40

Minimum Program Entry Requirements

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

Reading Comprehension: Score of 85+

Arithmetic: Score of 72 or better

Spatial: 70% or better

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.

096D (7073)

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

Pipefitting Apprenticeship Building Trades 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.

We also have maintenance pipefitters working at the University of Minnesota, Saint Paul School District, Metropolitan Council, Imation, Saint Paul Government Center, and Energy Park. We have pipefitters installing and maintaining refrigeration trucks, trailers, and buses at Thermo King Sales and Service.

Program Outcomes

1. Graduates will have the science and math skills needed in the piping systems.
2. Graduates will have the basic knowledge and skills necessary to install piping systems in commercial and industrial buildings.
3. Graduates will have basic knowledge to properly install and operate low- and high-pressure steam systems.

Program Faculty

Bill Lombard, Training Coordinator
bill.lombard@local455jatc.com

Restricted Enrollment

The Pipefitting Apprenticeship Building Trades 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. Courses are offered only as part-time evening and cannot be combined with any other apprenticeship program. Call 651.455.5282 for application information.

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

Program Requirements

Check off when completed

Course	Cr
<input type="checkbox"/> PIPE 2606 Pipefitting 2.	2
<input type="checkbox"/> PIPE 2615 Pipe Layout & Installation 1.	2
<input type="checkbox"/> PIPE 2616 Pipe Layout & Installation 2.	2
<input type="checkbox"/> PIPE 2625 Steam, Hot Water & Gas Controls	2
<input type="checkbox"/> PIPE 2631 Industrial Pneumatics	2
<input type="checkbox"/> PIPE 2641 Foreman Leadership	1
<input type="checkbox"/> PIPE 2642 Piping Design	1
<input type="checkbox"/> PIPE 2651 Refrigeration Code	1
<input type="checkbox"/> PIPE 2652 Oil Code	1
<input type="checkbox"/> PIPE 2653 Gas Code	2
<input type="checkbox"/> PIPE 2654 Hot Water Code	2
<input type="checkbox"/> PIPE 2655 Ammonia Code	2
<input type="checkbox"/> PIPE 2656 High Pressure Steam Code	2
<input type="checkbox"/> PIPE 2658 OSHA30/Pro10/UA Heritage	2
<input type="checkbox"/> PIPE 2660 Industrial Rigging	2
<input type="checkbox"/> RWLD 2621 Apprentice Pipe Weld 1.	2
<input type="checkbox"/> RWLD 2622 Apprentice Pipe Weld 2.	2
<input type="checkbox"/> RWLD 2623 Apprentice Pipe Weld 3.	2
<input type="checkbox"/> RWLD 2624 Apprentice Pipe Weld 4.	2
<input type="checkbox"/> RWLD 2660 Apprentice Pipe Weld 1 Advanced	2
<input type="checkbox"/> RWLD 2661 Apprentice Pipe Weld 2 Advanced	2
<input type="checkbox"/> RWLD 2662 Apprentice Pipe Weld 3 Advanced	2
<input type="checkbox"/> RWLD 2663 Apprentice Pipe Weld 4 Advanced	2

Total Program Credits 40

Special Features

Students are employed by contractors who are signatory with UA Local Union 455 St. Paul Pipefitters.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Pipefitting Apprenticeship Service Diploma

BS Operations Management
Minnesota State University-Moorhead

Course Sequence

The following sequence is subject to Training Coordinator/Committee approval. This program begins fall semester.

1st year - Fall	
RWLD 2621 Apprentice Pipe Weld 1	2
PIPE 2658 OSHA30/Pro10/UA Heritage.	2
1st year - Spring	
RWLD 2660 Apprentice Pipe Weld 1 Advanced	2
PIPE 2615 Pipe Layout & Installation 1.	2
2nd year - Fall	
RWLD 2622 Apprentice Pipe Weld 2	2
PIPE 2616 Pipe Layout & Installation 2.	2

2nd year - Spring

RWLD 2661 Apprentice Pipe Weld 2 Advanced	2
PIPE 2660 Industrial Rigging.	2

3rd year - Fall

RWLD 2623 Apprentice Pipe Weld 3	2
PIPE 2625 Steam, Hot Water & Gas Controls.	2

3rd year - Spring

RWLD 2662 Apprentice Pipe Weld 3 Advanced	2
Plus one of the following:	
PIPE 2631 Industrial Pneumatics.	2
PIPE 2606 Pipefitting 2	2

4th year - Fall

RWLD 2624 Apprentice Pipe Weld 4	2
PIPE 2642 Piping Design.	2

4th year - Spring

RWLD 2663 Apprentice Pipe Weld 4 Advanced.	2
PIPE 2641 Foreman Leadership	2

5th year - Fall

PIPE 2655 Ammonia Code	2
PIPE 2656 High Pressure Steam Code	2

5th year - Spring

PIPE 2653 Gas Code.	1
PIPE 2651 Refrigeration Code	1
PIPE 2652 Oil Code.	1
PIPE 2654 Hot Water Code.	1

Any combination of the following courses also fulfills the program requirements with Training Coordinator or Committee approval:

PIPE 2614 Boiler Systems	2
PIPE 2661 Pipefitting for HVAC	2
PIPE 2623 Refrigeration/AC	2
PIPE 2626 Basic Service Applications	2
PIPE 2627 Basic Electricity	2
PIPE 2628 Commercial Pneumatics	2
PIPE 2632 Commercial Refrigeration	2
PIPE2636 Electrical Controls/Diagrams	2
PIPE 2638 Computer Controls	2
PIPE 2639 Steam, Hot Water & Gas Controls	2
PIPE 2642 Piping Design.	2
PIPE 2643 Start/Test/Balance of Systems	2
PIPE 2644 Power Burners & Controls	2
PIPE 2643 Start/Test/Balance of Systems	2
PIPE 2645 DDC	2
PIPE 2657 Advanced Boiler Systems	2
PIPE 2659 Commercial Building Systems	2
PIPE 2657 Advanced Boiler Systems	2
PIPE 2659 Commercial Building Systems	2

Minimum Program Entry Requirements

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

Reading Comprehension: Score of 85+

Arithmetic: Score of 72 or better

Spatial: 70% or better

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.

305D

Pipefitting Apprenticeship Service DIPLOMA

Program Overview

HVACR Technicians 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 have completed an accredited two-year HVACR program or equivalent. HVACR Technicians must have a clean driving record and be able to pass job site specific drug testing. HVACR Technicians spend a lot of time outside in extreme weather and are often under stress to get a piece of mechanical equipment back on line. There may be times when an HVACR Technician is required to perform heavy lifting.

Career Opportunities

HVACR Technicians work in all aspects of the heating, air conditioning, refrigeration, and temperature control fields. We are employed at oil refineries, chemical plants, food processing facilities, manufacturing plants, retail and wholesale food stores, and ice rinks.

The University of Minnesota, Saint Paul School District, Metropolitan Council, Imation, Saint Paul Government Center, and Energy Park also employ maintenance HVACR Technicians to keep their systems on line.

We have pipefitters installing and maintaining refrigeration trucks, trailers, and buses at Thermo King Sales and Service.

Program Outcomes

1. Graduates will have the science and math skills needed in the piping systems.
2. Graduates will have the basic knowledge and skills necessary to install piping systems in commercial and industrial buildings.
3. Graduates will have basic knowledge to properly install and operate low- and high-pressure steam systems.

Program Faculty

Bill Lombard, Training Coordinator
bill.lombard@local455jatc.com

Restricted Enrollment

The Pipefitting Apprenticeship Service 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. Call 651.455.5282 for application information.

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

Program Requirements

Check off when completed

Course	Cr
<input type="checkbox"/> PIPE 2614 Boiler Systems	2
<input type="checkbox"/> PIPE 2615 Pipe Layout & Installation 1	2
<input type="checkbox"/> PIPE 2623 Apprenticeship Refrigeration/AC	2
<input type="checkbox"/> PIPE 2626 Basic Service Applications	2
<input type="checkbox"/> PIPE 2627 Basic Electricity	2
<input type="checkbox"/> PIPE 2628 Commercial Pneumatics	2
<input type="checkbox"/> PIPE 2632 Commercial Refrigeration	2
<input type="checkbox"/> PIPE 2636 Electrical Controls/Diagrams	2
<input type="checkbox"/> PIPE 2638 Computer Controls	2
<input type="checkbox"/> PIPE 2642 Piping Design	2
<input type="checkbox"/> PIPE 2643 Start/Test/Balance of Systems	2
<input type="checkbox"/> PIPE 2644 Power Burners & Controls	2
<input type="checkbox"/> PIPE 2645 DDC	2
<input type="checkbox"/> PIPE 2651 Refrigeration Code	1
<input type="checkbox"/> PIPE 2652 Oil Code	1
<input type="checkbox"/> PIPE 2653 Gas Code	1
<input type="checkbox"/> PIPE 2654 Hot Water Code	1
<input type="checkbox"/> PIPE 2655 Ammonia Code	2
<input type="checkbox"/> PIPE 2656 High Pressure Steam Code	2
<input type="checkbox"/> PIPE 2657 Advanced Boiler Systems	2
<input type="checkbox"/> PIPE 2658 OSHA30/Pro10/UA Heritage	2
<input type="checkbox"/> PIPE 2659 Commercial Building Systems	2

Total Program Credits40

Special Features

Students are employed by contractors who are signatory with UA Local Union 455 St. Paul Pipefitters.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Pipefitting Apprenticeship Service Diploma

BS Operations Management
Minnesota State University-Moorhead

Course Sequence

The following sequence is subject to Training Coordinator/Committee approval. This program begins fall semester.

1st year-Fall	
PIPE 2658 OSHA 30/Pro10/UA Heritage/Standard for Excellence	2
PIPE 2615 Pipe Layout & Inst	2
1st year-Spring	
PIPE 2627 Basic Electricity	2
PIPE 2623 Apprenticeship Refrigeration/AC	2
2nd year-Fall	
PIPE 2628 Commercial Pneumatics	2
PIPE 2636 Electrical Controls/Diagrams	2

2nd year-Spring

PIPE 2659 Commercial Building Systems	2
PIPE 2626 Basic Service Applications	2

3rd year-Fall

PIPE 2614 Boiler Systems	2
PIPE 2657 Boiler Systems Advanced	2

3rd year-Spring

PIPE 2638 Computer Controls	2
PIPE 2632 Commercial Refrigeration	2

4th year-Fall

PIPE 2642 Piping Design	2
PIPE 2644 Oil Burners/Controls	2

4th year-Spring

PIPE 2643 Start/Test/Balance	2
PIPE 2645 DDC	2

5th year-Fall

PIPE 2655 Ammonia Code	2
PIPE 2656 High Pressure Steam Code	2

5th year-Spring

PIPE 2653 Gas Code	1
PIPE 2651 Refrigeration Code	1
PIPE 2652 Oil Code	1
PIPE 2654 Hot Water Code	1

Any combination of the following courses also fulfills the program requirements with Training Coordinator or Committee approval:

PIPE 2606 Pipefitting 2	2
PIPE 2615 Pipe Layout & Installation 1	2
PIPE 2616 Pipe Layout & Installation 2	2
PIPE 2625 Steam, Hot Water & Gas Controls	2
PIPE 2631 Industrial Pneumatics	2
PIPE 2641 Foreman Leadership	1
PIPE 2660 Industrial Rigging	2
RWLD 2621 Apprentice Pipe Weld 1	2
RWLD 2622 Apprentice Pipe Weld 2	2
RWLD 2623 Apprentice Pipe Weld 3	2
RWLD 2624 Apprentice Pipe Weld 4	2
RWLD 2660 Apprentice Pipe Weld 1 Advanced	2
RWLD 2661 Apprentice Pipe Weld 2 Advanced	2
RWLD 2662 Apprentice Pipe Weld 3 Advanced	2
RWLD 2663 Apprentice Pipe Weld 4 Advanced	2

Minimum Program Entry Requirements

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

Reading Comprehension: Score of 85+

Arithmetic: Score of 72 or better

Spatial: 70% or better

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.

306D

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. Graduates will demonstrate safe and proper use of tools used in the plumbing field.
2. Graduates will have knowledge and skills to install piping in commercial, residential and industrial buildings.
3. Graduates will demonstrate knowledge in blueprint reading.
4. Graduates will demonstrate knowledge in code and proper installation practices.
5. Graduates will demonstrate science and math skills needed in the plumbing field.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Plumbing Diploma

BS Operations Management
Minnesota State University-Moorhead

Program Start Dates

This part-time, evening program starts each spring. Please check with Rick Gale, Program Coordinator, at 651-846-1389 for information on application deadlines for this program.

Program Faculty

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

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.

Contact Rick Gale at 651-846-1389 for application information.

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 OR	4
PLMB 2650 Industrial Plumbing	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

Course Sequence

SPRING SEMESTER

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

PLMB 2610 Pre-Apprentice Plumbing	2
PLMB 2612 Job Safety and Health	2

1st Year Apprentice

PLMB 2614 Applied Math for Plumbers	4
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2nd Year Apprentice

PLMB 2622 Plumbing 2	4
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3rd Year Apprentice

PLMB 2623 Plumbing 3 Gas Installations and Gas Controls OR	
PLMB 2650 Industrial Plumbing	4

4th year Apprentice

PLMB 2640 Advanced Plan Reading and Heavy Rigging	4
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5th Year Apprentice

PLMB 2633 Plumbing Code 3	2
PLMB 2634 Plumbing Code 4	2

FALL SEMESTER

1st Year Apprentice

PLMB 2621 Plumbing 1	4
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2nd Year Apprentice

PLMB 2616 Plumbing Welding	4
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3rd year Apprentice

PLMB 2624 Plumbing 4 Commercial and Residential Service	4
---	---

4th Year Apprentice

PLMB 2618 Basic Drawing	4
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5th Year Apprentice

PLMB 2631 Plumbing Code 1	2
PLMB 2632 Plumbing Code 2	2

Total Program Credits 44

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

Reading: Score of 74+

Writing: Any

Arithmetic: Score of 49+

Spatial assessment required: Score of 50+

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.

097D (7036)

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

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 a transfer articulation agreement between the following program and post-secondary institutions for the baccalaureate degree programs listed below.

For more information please go to saintpaul.edu/Transfer.

Sheet Metal/HVAC Ducts & Fittings AAS

- BA Individualized Studies
Metropolitan State University
- BS Operations Management
Minnesota State University-Moorhead

Program Faculty

Donaven Chase donaven.chase@saintpaul.edu
651.846.1367

Full-time enrollment is required

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

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 Cr

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

- Goal 1: Communication7
ENGL 1711 Composition 1 – 4 cr
COMM 17XX – 3 cr
- Goal 3 or Goal 46
Goal 3: Natural Sciences OR
Goal 4: Mathematical/Logical Reasoning
- Goal 5: History, Social Science and Behavioral Sciences3
- Goal 6: Humanities and Fine Arts.3
Select a minimum of 4 additional credits
- 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

Program Start Dates

Fall

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 60+ or grade of "C" or better in READ 0721

Writing: Score of 60+ or grade of "C" or better in ENGL 0921

Arithmetic: Score of 31+

Spatial assessment required: Score 50+ on spatial assessment

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.*

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.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Sheet Metal-HVAC Ducts and Fittings Diploma

- BS Operations Management
Minnesota State University-Moorhead

Program Faculty

Donaven Chase donaven.chase@saintpaul.edu
651.846.1367

Full-time enrollment is required

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

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

Goal 1: Communication 3
COMM 17XX – 3 cr
General Education Requirements 3

Total Program Credits 40

Program Start Dates

Fall

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 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

Spatial assessment required: Score 50+ on spatial assessment

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.

368D

*Information is subject to change.
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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. Graduates will have the knowledge and skills in setup and break-down procedures, test standards, and different types of metals in the fabrication and welding industry.
2. Graduates will have knowledge and skills in OAC (Oxyacetylene Cutting) PAC (Plasma Arc Cutting), SMAW (Shielded Metal Arc Welding), GMAW (Gas Metal Arc Welding), GTAW (Gas Tungsten Arc Welding), FCAW (Flux Core Arc Welding).
3. Graduates will have acquired supervised hands-on experience in various welding processes.
4. Graduates will be prepared for entry level employment in the welding industry and related fields based on skills acquired in welding, blueprint reading, related math and measuring devices.
5. Graduates will have successfully completed the educational program requirements for welding & fabrication through discipline and hard work.
6. Graduates of Welding Technology Program will become critical thinkers in relationship to the welding trades as it pertains to real life roles.

Program Faculty

Todd Hankel todd.hankel@saintpaul.edu
 William Schuldt william.schuldt@saintpaul.edu
 Caleb Paulson caleb.paulson@saintpaul.edu
 Victoria LeMay victoria.lemay@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"/> CMAE 1514 Safety Awareness	.2
<input type="checkbox"/> CMAE 1518 Manufacturing Processes	.2
<input type="checkbox"/> CMAE 1522 Quality Practices	.2
<input type="checkbox"/> CMAE 1526 Maintenance Awareness	.2
<input type="checkbox"/> WLDG 1401 Industrial Shop Practices 1	.2
<input type="checkbox"/> WLDG 1410 Welding Basics	.2
<input type="checkbox"/> WLDG 1420 SMAW: E6010	.2
<input type="checkbox"/> WLDG 1430 SMAW: E7018	.3
<input type="checkbox"/> WLDG 1440 GMAW Short Arc	.2
<input type="checkbox"/> WLDG 1450 Intro to Blueprint/Measuring Devices	.3
<input type="checkbox"/> WLDG 1501 Industrial Shop Practices 2	.2
<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 2401 Industrial Shop Practices 3	.2
<input type="checkbox"/> WLDG 2410 GMAW Aluminum and SST	.2
<input type="checkbox"/> WLDG 2420 GTAW Aluminum and SST	.4
<input type="checkbox"/> WLDG 2430 Grinding and Finishing	.2
<input type="checkbox"/> WLDG 2441 Intro to Robotic Welding & Fabrication	.2
Subtotal	48

Total Program Credits48

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

Welding Technology Diploma

BS Operations Management
 Minnesota State University-Moorhead

*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.

First Semester

CMAE 1514 Safety Awareness	.2
WLDG 1401 Industrial Shop Practices 1	.2
WLDG 1410 Welding Basics	.2
WLDG 1420 SMAW: E6010	.2
WLDG 1430 SMAW: E7018	.3
WLDG 1440 GMAW Short Arc	.2
WLDG 1450 Intro to Blueprint/Measuring Devices	.3
Total Semester Credits	16

Second Semester

CMAE 1518 Manufacturing Processes	.2
WLDG 1501 Industrial Shop Practices 2	.2
WLDG 1510 GMAW Spray & 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

CMAE 1522 Quality Practices	.2
CMAE 1526 Maintenance Awareness	.2
WLDG 2401 Industrial Shop Practices 3	.2
WLDG 2410 GMAW Aluminum and SST	.2
WLDG 2420 GTAW Aluminum and SST	.4
WLDG 2430 Grinding and Finishing	.2
WLDG 2441 Intro to Robotic Welding & Fabrication	.2
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 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

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.

Degree option may have a greater requirement than this diploma.

324D (7187)

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

Todd Hankel todd.hankel@saintpaul.edu
 Caleb Paulson caleb.paulson@saintpaul.edu

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

Fall, 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 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

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.

Degree option may have a greater requirement than this certificate.

350C

*Information is subject to change.
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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.

Transfer Opportunities

Saint Paul College has a transfer articulation agreement between the following program and post-secondary institution for the baccalaureate degree program listed below.

For more information please go to saintpaul.edu/Transfer.

CNC Toolmaking Diploma

- BS Operations Management
Minnesota State University-Moorhead

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

Program Faculty

Ben Johnson	ben.johnson@saintpaul.edu
Allen Smith	allen.smith@saintpaul.edu
Garrett Byrne	garrett.byrne@saintpaul.edu
Scott Nordahl	scott.nordahl@saintpaul.edu

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 2410 Tool Design	.4
<input type="checkbox"/> CNCT 2420 Mechanical Systems/EDM	.4
<input type="checkbox"/> CNCT 2430 Mold/Plastic Technology	.4
<input type="checkbox"/> CNCT 2440 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 Cr

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 63

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 1744 Metrology 4	.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 2410 Tool Design	.4
CNCT 2420 Mechanical Systems/EDM	.4
CNCT 2430 Mold/Plastic Technology	.4
CNCT 2440 CNC Applications 4	.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 60+ or grade of "C" or better in READ 0721

Writing: Score of 38+

Arithmetic: Score of 31+

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.

249D (7120)

Individualized Studies AAS DEGREE

Program Overview

The Individualized Studies degree is a personalized degree which provides students the opportunity to fulfill a unique career goal that cannot be met through the completion of any single technical program offered by the College. An example would be the combination of a technical program (e.g. automotive technology) with technical coursework in business for those planning to open their own automotive repair business. In the first semester of the Individualized Studies degree, students work to design a degree plan that meets their individualized educational needs while also fulfilling 16 credits within the Minnesota Transfer Curriculum. Students will develop an individualized program sequence through a structured advising process with faculty and college advisor, to facilitate meeting the requirements of the AAS degree in Individualized Studies.

Career Opportunities

The Individualized Studies AAS degree is intended for students who select a unique degree that meets their career interests. Career opportunities include personally owned business; advancement to middle management, sales, and training in the area of their discipline.

Program Outcomes

1. Graduates will have designed an individualized studies learning plan that focuses on work and life goals.
2. Graduates will recognize the need for and develop an ability to engage in life-long professional development and learning.

Program Dean

Career and Technical Education
Rainer Haarbusch
rainer.haarbusch@saintpaul.edu

Health Sciences and Service
Brendan L. Ashby brendan.ashby@saintpaul.edu

Program Requirements

Check off when completed

Recommended Courses	Cr
<input type="checkbox"/> INDS 1401 Study Skills and Strategies for Individualized Studies Planning	3
Subtotal	3

Program Focus: Approved Course Plan Cr

Specific plan will be determined after meeting with the Program Faculty or Dean. Courses will be selected from existing technical coursework on campus.

Subtotal	41
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General Education/MnTC Requirements Cr

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: Natural Sciences OR	
Goal 4: Mathematical/Logical Reasoning	3
<input type="checkbox"/> Goal 5 History, Social Science and Behavioral Sciences	3
<input type="checkbox"/> Goal 6: Humanities & Fine Arts	3
General Education Requirements	16

Total Program Credits	60
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Note: Any changes or modification of the program plan must be approved by the Dean.

Program Start Dates

Fall, Spring, Summer

Course Sequence

First Semester

INDS 1401 Study Skills and Strategies for Individualized Studies Planning	3
Total Semester Credits	3

First, Second, Third and Fourth Semesters

Specific plan will be determined after meeting with the Program Faculty or Dean. Courses will be selected from existing technical coursework on campus.

Total Program Credits	60
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Minimum Program Entry Requirements

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

Reading: Score of 78+ or grade of "C" or better in READ 0722

Writing: Score of 78+ or grade of "C" or better in ENGL 0922

Arithmetic: Score of 20+

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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Automation Technologies CERTIFICATE

An eTECH 360° Program

Program Overview

This certificate will provide students with knowledge of manufacturing processes and plant operations, along with an advanced skill set in electronic and automotive systems. Students will engage in coursework topics of technical mathematics, introductory computer skills, print interpretation, manufacturing processes, quality control, maintenance and safety. Also included in coursework is an advanced skill set of AC/DC power, digital electronics, analog circuits, and motor controls.

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.

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.

Program Outcomes

Graduates will be able to:

1. Identify and apply appropriate safety procedures.
2. Apply knowledge and skills in electrical systems.
3. Use and understand test equipment for analysis.
4. Design, build, and troubleshoot circuits.
5. Analyze and apply specific manufacturing process procedures.
6. Identify and apply specific quality procedures.
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.

Rainer Haarbush rainer.haarbush@saintpaul.edu

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 1550 DC Power	3
<input type="checkbox"/> CMAE 1518 Manufacturing Processes	2
<input type="checkbox"/> CMAE 1514 Safety Awareness	2
<input type="checkbox"/> CMAE 1552 AC Power	3
<input type="checkbox"/> CMAE 1506 Intro to Computers	2
<input type="checkbox"/> CMAE 1554 Digital Electronics	3
<input type="checkbox"/> CMAE 1556 Analog Circuits	3
<input type="checkbox"/> CMAE 1526 Maintenance Awareness	2
<input type="checkbox"/> CMAE 1522 Quality Practices	2
<input type="checkbox"/> CMAE 1558 Motor Controls	3

Total Program Credits 30

Program Start Date

Fall, Spring

Course Sequence

First Semester (First 8 weeks)

CMAE 1502 Technical Math	3
CMAE 1510 Print Reading	2
CMAE 1550 DC Power	3

(Second 8 weeks)

CMAE 1518 Manufacturing Processes	2
CMAE 1514 Safety Awareness	2
CMAE 1552 AC Power	3
Total Semester Credits	15

Second Semester (First 8 Weeks)

CMAE 1506 Intro to Computers	2
CMAE 1554 Digital Electronics	3
CMAE 1556 Analog Circuits	3

(Second 8 Weeks)

CMAE 1526 Maintenance Awareness	2
CMAE 1522 Quality Practices	2
CMAE 1558 Motor Controls	3
Total Semester Credits	15

Total Program Credits 30



Minimum Program Entry Requirements

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

Reading: Score of 52+

Writing: Any

Arithmetic: Score of 45+

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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Machine Technologist CERTIFICATE

An eTECH 360° Program

Program Overview

This certificate will provide students with knowledge of manufacturing processes and plant operations, along with an advanced skill set in machine tool technology. 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 machine tool print reading, machine tool technology theory and lab principles, machining math, introduction to computer numerical control, and geometric dimensioning and tolerancing.

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.

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.

Program Outcomes

Graduates will be able to:

1. Identify and apply appropriate safety procedures.
2. Apply knowledge and skills to make precision-machined parts and tooling.
3. Apply knowledge and skills to operate and set-up inspection and gauging equipment.
4. Demonstrate an understanding of computer numerically controlled machining centers.
5. Analyze and apply specific manufacturing process procedures.
6. Identify and apply specific quality procedures.
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.

Rainer Haarbushch rainer.haarbushch@saintpaul.edu

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 1530 Machining Math	2
<input type="checkbox"/> CMAE 1532 Machine Tool Print Reading	2
<input type="checkbox"/> CMAE 1506 Intro to Computers	2
<input type="checkbox"/> CMAE 1534 Machine Tool Technology Theory	2
<input type="checkbox"/> CMAE 1536 Machine Tool Technology Lab 1	2
<input type="checkbox"/> CMAE 1542 Geo Dimensioning and Tolerancing	2
<input type="checkbox"/> CMAE 1526 Maintenance Awareness	2
<input type="checkbox"/> CMAE 1522 Quality Practices	2
<input type="checkbox"/> CMAE 1538 Machine Tool Technology Lab 2	2
<input type="checkbox"/> CMAE 1540 Introduction to CNC	3

Total Program Credits 30

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
CMAE 1530 Machining Math	2
CMAE 1532 Machine Tool Print Reading	2
Total Semester Credits	13

Second Semester (First 8 Weeks)

CMAE 1506 Intro to Computers	2
CMAE 1534 Machine Tool Technology Theory	2
CMAE 1536 Machine Tool Technology Lab 1	2
CMAE 1542 Geo Dimensioning and Tolerancing	2

(Second 8 Weeks)

CMAE 1526 Maintenance Awareness	2
CMAE 1522 Quality Practices	2
CMAE 1538 Machine Tool Technology Lab 2	2
CMAE 1540 Introduction to CNC	3
Total Semester Credits	17

Total Program Credits 30



Minimum Program Entry Requirements

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

Reading: Score of 52+

Writing: Any

Arithmetic: Score of 45+

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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Machining and Automation DIPLOMA

An eTECH 360° Program

Program Overview

This diploma will provide students with a valuable skill set designed to meet the needs of the advanced manufacturing industry. Students may choose the Machining and Automation emphasis. Through coursework, the student will develop fundamental knowledge of manufacturing processes, safety, quality, machine tool technology, and automation technology.

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 Diploma 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.

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.



Program Outcomes

Graduates will be able to:

1. Identify and apply appropriate safety procedures.
2. Apply knowledge and skills in electrical systems.
3. Apply knowledge and skills to make precision-machined parts and tooling.
4. Apply knowledge and skills to operate and set-up inspection and gauging equipment.
5. Analyze and apply specific manufacturing process procedures.
6. Identify and apply specific quality procedures.
7. Interpret symbols and blueprints accurately for a variety of projects.
8. Demonstrate effective oral and written communications.

Program Faculty

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

Rainer Haarbush rainer.haarbush@saintpaul.edu

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 1550 DC Power	3
<input type="checkbox"/> CMAE 1518 Manufacturing Processes	2
<input type="checkbox"/> CMAE 1514 Safety Awareness	2
<input type="checkbox"/> CMAE 1552 AC Power	3
<input type="checkbox"/> CMAE 1506 Intro to Computers	2
<input type="checkbox"/> CMAE 1554 Digital Electronics	3
<input type="checkbox"/> CMAE 1556 Analog Circuits	3
<input type="checkbox"/> CMAE 1526 Maintenance Awareness	2
<input type="checkbox"/> CMAE 1522 Quality Practices	2
<input type="checkbox"/> CMAE 1558 Motor Controls	3
<input type="checkbox"/> CMAE 1530 Machining Math	2
<input type="checkbox"/> CMAE 1532 Machine Tool Print Reading	2
<input type="checkbox"/> CMAE 1534 Machine Tool Technology Theory	2
<input type="checkbox"/> CMAE 1536 Machine Tool Technology Lab 1	2
<input type="checkbox"/> CMAE 1542 Geo Dimensioning and Tolerancing	2
<input type="checkbox"/> CMAE 1538 Machine Tool Technology Lab 2	2
<input type="checkbox"/> CMAE 1540 Introduction to CNC	3
Subtotal	45
General Education	
<input type="checkbox"/> MATH 1730 College Algebra	3
<input type="checkbox"/> ENGL 1711 Composition 1	4
Total General Education	7
Total Program Credits	52

*Information is subject to change.
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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
CMAE 1550 DC Power	3

(Second 8 weeks)

CMAE 1518 Manufacturing Processes	2
CMAE 1514 Safety Awareness	2
CMAE 1552 AC Power	3
Total Semester Credits	15

Second Semester (First 8 Weeks)

CMAE 1506 Intro to Computers	2
CMAE 1554 Digital Electronics	3
CMAE 1556 Analog Circuits	3

(Second 8 Weeks)

CMAE 1526 Maintenance Awareness	2
CMAE 1522 Quality Practices	2
CMAE 1558 Motor Controls	3
Total Semester Credits	15

Third Semester (First 8 Weeks)

MATH 1730 College Algebra	3
ENGL 1711 Composition 1	4

(Second 8 Weeks)

CMAE 1530 Machining Math	2
CMAE 1532 Machine Tool Print Reading	2
Total Semester Credits	11

Fourth Semester (First 8 Weeks)

CMAE 1534 Machine Tool Technology Theory	2
CMAE 1536 Machine Tool Technology Lab 1	2
CMAE 1542 Geo Dimensioning and Tolerancing	2

(Second 8 Weeks)

CMAE 1538 Machine Tool Technology Lab 2	2
CMAE 1540 Introduction to CNC	3
Total Semester Credits	11

Total Program Credits 52

Minimum Program Entry Requirements

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

Reading: Score of 52+

Writing: Any

Arithmetic: Score of 45+

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.

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.

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.

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.

Rainer Haarbush rainer.haarbush@saintpaul.edu

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

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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 52+

Writing: Any

Arithmetic: Score of 45+

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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Welding Technology CERTIFICATE

An eTECH 360° 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.

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.

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.

Rainer Haarbushch rainer.haarbushch@saintpaul.edu

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 Symbols	2
<input type="checkbox"/> CMAE 1568 GTAW	3
<input type="checkbox"/> CMAE 1522 Quality Practices	2

Total Program Credits 30

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
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(Second 8 Weeks)

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

Fourth Semester (First 8 Weeks)

CMAE 1568 GTAW	3
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(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 52+

Writing: Any

Arithmetic: Score of 45+

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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