

WELDING

The welding program has a four semester degree program in advanced metal fabrication processes plus four, short-term certificates. Certificate options are designed so that coursework may be applied to the degree, should the student pursue additional study, and they allow for maximum flexibility which makes them ideal for those currently working in the field and for those who need to obtain greater specialization or more credentials.

Entrance Requirements

None

Program Requirements

Students are required to purchase all safety equipment and shop supplies outlined by the instructor. A complete list of supplies will be provided on first day of class.

- Operate safety equipment, use safe work habits; recognize, assess and address unsafe working conditions.
- Recognize, set-up, and operate hand and power tools common to the welding trade and fabrication industry, such as drills, clamps, grinders.
- Identify metals using basic inspecting techniques (visual, scratch test, spark test).
- Connect and adjust high pressure gas regulators to reach the desired flame configuration or desired psi/cfh.
- Ignite torches or start power supplies and strike arcs by touching electrodes to metals being welded, completing the electrical circuits.
- Select and install torches, torch tips, and filler rods according to the manufacturers specification chart for the thickness of metal being welded.
- Lay-out, position, align and secure parts and assemblies using proper tools (squares, calipers, combination squares and rulers); clamp, hold, tack-weld, heat-bend, grind components to obtain required configurations and position for welding.
- Weld components in all positions.
- Weld separately or in combination, using steel, aluminum, stainless steel, cast iron and other alloys.
- Perform multiple pass welds with GMAW, SMAW, GTAW in all positions.
- Examine weldments for defects and measure workpieces with straightedges or templates to ensure conformance with standards and specification.
- Set-up and properly adjust gas metal arc welders, gas tungsten arc welders, shielded metal arc welders, plasma cutters and oxygen and acetylene systems.
- Program and operate a CNC plasma cutting table.
- Construct weldments from a welding blueprint using proper AWS welding symbols.

Welding Fabrication Technology - Associate of Applied Science

Course	Title	Credit Hours
First Semester		
WEL 101	Welding I	2.5

WEL 120	Blueprint Reading for Welders	2
CAD 101 or CAD 120 or HAC 109	Introduction to Engineering Design or Introduction to SolidWorks or Basic Sheet Metal	3-4
Required Mathematics Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/associate-applied-science-degrees-general-education-requirements/)		3
Required Communications Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/associate-applied-science-degrees-general-education-requirements/)		3
Total		13.5-14.5

Second Semester		
WEL 102	Welding II	4
WEL 112	Applied Welding Theory	3
WEL 113	Welding Power Sources and Setup	3
Industrial Technology Electives		3
Required Communications Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/associate-applied-science-degrees-general-education-requirements/)		3
Total		16

Third Semester		
WEL 208	Welding III	4
WEL 221	Adv. Blueprint Reading for Welders	2
IMT 103	Industrial Manufacturing Tech I	3
WEL 215	Advanced Welding Techniques	4
Required Social or Behavioral Sciences Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/associate-applied-science-degrees-general-education-requirements/)		3
Total		16

Fourth Semester		
WEL 210	Welding IV	4
WEL 211 or WEL 212	TIG Welding Techniques or MIG Welding Techniques	4
WEL 213	Welding Metallurgy	3
WEL 214	Cutting Processes	2
Required Liberal Education Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/associate-applied-science-degrees-general-education-requirements/)		3
Total		16

Program Total 61.5-62.5

Industrial Technology Electives

Course	Title	Credits
CAD 101	Introduction to Engineering Design	4
CAD 105	Pro/ENGINEER Basic Design Training	3
CAD 120	Introduction to SolidWorks	3
HAC 109	Basic Sheet Metal	3
WEL 211	TIG Welding Techniques	4
WEL 212	MIG Welding Techniques	4
WEL 218	SMAW Qualification	3
WEL 220	GMAW Qualification	3
WEL 234	Special Topics in Welding	1-3

Welding - Vocational Specialist

Course	Title	Credit Hours
First Semester		
WEL 101	Welding I	2.5
IMT 103	Industrial Manufacturing Tech I	3
Required Mathematics Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/vocational-specialist-certificates-general-education-requirements/)		3
Total		8.5

Second Semester		
WEL 102	Welding II	4
Industrial Technology Elective		3
WEL 213	Welding Metallurgy	3
Total		10
Third Semester		
WEL 208	Welding III	4
WEL 120	Blueprint Reading for Welders	2
Required Communications Course (http://catalog.elgin.edu/degree-programs-certificates/career-technical/vocational-specialist-certificates-general-education-requirements/)		3
Total		9
Fourth Semester		
WEL 210	Welding IV	4
Industrial Technology Elective		3
Total		7
Program Total		34.5

Industrial Technology Electives

The student may choose an elective from any of the areas below as long as certificate requirements are met.

Course	Title	Credits
CAD 101	Introduction to Engineering Design	4
CAD 105	Pro/ENGINEER Basic Design Training	3
HAC 109	Basic Sheet Metal	3
HAC 114	Basic Electricity and HVACR Controls	3
WEL 211	TIG Welding Techniques	4
WEL 212	MIG Welding Techniques	4
WEL 218	SMAW Qualification	3
WEL 220	GMAW Qualification	3
WEL 234	Special Topics in Welding	1-3

Welding - Basic Vocational Specialist

Course	Title	Credits
WEL 101	Welding I	2.5
WEL 102	Welding II	4
WEL 208	Welding III	4
WEL 120	Blueprint Reading for Welders	2
WEL 213	Welding Metallurgy	3
WEL 218	SMAW Qualification	3
or WEL 220	GMAW Qualification	
Total Credit Hours		18.5

Arc Welding - Basic Vocational Specialist

Course	Title	Credits
WEL 101	Welding I	2.5
WEL 102	Welding II	4
WEL 120	Blueprint Reading for Welders	2
WEL 208	Welding III	4
WEL 218	SMAW Qualification	3
Total Credit Hours		15.5

Gas Metal Arc - Basic Vocational Specialist

Course	Title	Credits
WEL 101	Welding I	2.5
WEL 102	Welding II	4
WEL 120	Blueprint Reading for Welders	2
WEL 208	Welding III	4
WEL 220	GMAW Qualification	3
Total Credit Hours		15.5

Welding Courses

All WEL courses numbered 100 and above may be applied to the major field and elective requirement in the Associate in Arts and Associate in Science degrees.

WEL 101 Welding I (2.5) 1,3

An introduction to the welding industry including, safety, careers, and common terminology. Basic concepts of oxy-fuel welding, cutting, and shielded metal arc welding. Labs include shielded metal arc welding, oxy-fuel welding and brazing in the flat and horizontal positions. Further, oxy-fuel cutting in multiple positions will be covered. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Available.

In-District Tuition/Fees: \$395 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: None

Semester(s) Offered: Fall and Spring

WEL 102 Welding II (4) 2,4

Advanced techniques and skill improvement in oxy-acetylene welding and arc welding. The lab experiences in basic MIG and TIG (Heliarc) welding will be provided. An introduction to weld testing will be included. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Not Available.

In-District Tuition/Fees: \$613 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Grade of C or better in WEL 101 or consent of instructor

Semester(s) Offered: Fall and Spring

WEL 112 Applied Welding Theory (3) 2,2

A course which will provide both lab and classroom experiences to cover the basic theory of all major welding processes. Processes covered include: Shielded metal arc welding; gas metal arc welding; gas tungsten arc welding; flux cored arc welding; submerged arc welding; plasma arc welding and oxy-acetylene welding. (1.2) Proficiency Credit Available (3 EILMST) Pass/No Credit Not Available.

In-District Tuition/Fees: \$396 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: WEL 102 or concurrent enrollment in WEL 102

Semester(s) Offered: Varies

WEL 113 Welding Power Sources and Setup (3) 2,2

Designed to familiarize the student with the differences between various types of welding power sources. The student will learn through lab experiences proper set-up and maintenance, troubleshooting procedures, and minor repair techniques. (1.2) Proficiency Credit Not Available Pass/No Credit Not Available.

In-District Tuition/Fees: \$396 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: WEL 102 or concurrent enrollment in WEL 102

Semester(s) Offered: Varies

WEL 120 Blueprint Reading for Welders (2) 1,2

Prepares the student to interpret drawings as applied in the welding trade and to become familiar with welding symbols and their significance. (1.2) Proficiency Credit Available (3 LETSIR) Pass/No Credit Available.

In-District Tuition/Fees: \$264 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: None

Semester(s) Offered: Varies

WEL 208 Welding III (4) 2,4

The student will perform weld using mild steel in all positions and will include arc, gas tungsten arc (TIG), submerged arc welding (SAW), and gas metal arc (MIG) processes. The student will become comfortable in the operation of plasma arc cutting. Emphasis will be on development of a degree of skill necessary to pass welder qualification tests in all positions. (1.2) Proficiency Credit Available (3 LETSI) Pass/No Credit Not Available.

In-District Tuition/Fees: \$603 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Grade of C or better in WEL 102 or consent of instructor

Semester(s) Offered: Fall and Spring

WEL 210 Welding IV (4) 2,4

Students will construct welding projects employing arc, oxy-acetylene, gas metal arc (MIG), gas tungsten arc (TIG), or any combination of these welding processes using a welding blueprint as a guide. (1.2) Proficiency Credit Available (3 LETSI) Pass/No Credit Not Available.

In-District Tuition/Fees: \$603 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: WEL 120 and 208 or consent of instructor

Semester(s) Offered: Varies

WEL 211 TIG Welding Techniques (4) 2,4

This course is for students who need to develop skills in gas tungsten arc welding (TIG). The student will select appropriate machine settings. All position welds on hot and cold rolled and galvanized mild steel, stainless steel, and aluminum and cast iron will be produced. Process variations include standard and pulse mode operation. (1.2) Proficiency Credit Available Pass/No Credit Not Available.

In-District Tuition/Fees: \$603 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Effective Summer 2020 Grade of C or better in WEL 102 or consent of instructor. Prerequisite: WEL 101 or consent of instructor

Semester(s) Offered: Varies

WEL 212 MIG Welding Techniques (4) 2,4

This course is for students who need to develop skills in gas metal arc welding (MIG). The student will set up welding equipment and produce welds in all positions. Process variations to be used include short circuit and spray transfer with solid wire, flux cored (inner shield and dual shield) and submerged arc welding. Metals to be welded include mild steel, stainless steel, and aluminum. (1.2) Proficiency Credit Available Pass/No Credit Not Available.

In-District Tuition/Fees: \$603 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: WEL 101 or consent of instructor

Semester(s) Offered: Varies

WEL 213 Welding Metallurgy (3) 2,2

This course will cover the applications and concepts of basic metallurgy. Topics include characteristics of atoms, atomic structure of elements, properties of metals, crystal structures, and phase changes of metals. Further, students will learn about theory and application of metal identification, weldability of metals, heat treating processes. Testing and hands-on application will be a component of this course. Both ferrous and non-ferrous metals will be covered. (1.2) Proficiency Credit Not Available Pass/No Credit Not Available.

In-District Tuition/Fees: \$396 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: None

Semester(s) Offered: Fall and Spring

WEL 214 Cutting Processes (2) 1,2

This is a skill building course which will allow the student an opportunity to gain proficiency in all major industrial arc and oxy-fuel cutting processes-manual, semi-automatic and automatic. Processes include Plasma Arc, Air Carbon Arc, Shielded Metal Arc, Exothermic, and Oxy-Fuel Cutting. The student will also learn to operate an optical tracer and CNC controls. (1.2) Proficiency Credit Available (3 LETSI) Pass/No Credit Not Available.

In-District Tuition/Fees: \$339 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Grade of C or better in WEL 101 or consent of instructor

Semester(s) Offered: Varies

WEL 215 Advanced Welding Techniques (4) 2,4

This is a skill development course designed to help the student produce quality welds on cast iron, aluminum, medium carbon steel, and other metals requiring special weld treatment. Other weld troubleshooting techniques will be covered starting with precise metal identification, locating and eliminating cracks, visual inspection, and proper pre-and post-weld treatment. (1.2) Proficiency Credit Available (3 LETSI) Pass/No Credit Not Available.

In-District Tuition/Fees: \$603 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: WEL 102

Semester(s) Offered: Varies

WEL 218 SMAW Qualification (3) 2,2

Welder certification is required by an increasing number of area employers. The purpose of the Shielded Metal Arc Welding (SMAW) class is to help the student attain arc welder certification. Students must pass two guided bend tests to receive certification. This certification will meet the requirements of AWS D1.1 Structural Welding Code (limited thickness) and the needs of many area manufacturers. However, some employers may require additional or re-certification. Repeatable to nine credits. (1.2) Proficiency Credit Available Pass/No Credit Available.

In-District Tuition/Fees: \$486 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Prerequisite: (1) Grade of C or better in WEL 208 or concurrent enrollment in WEL 208; (2) or consent of instructor.

Semester(s) Offered: Fall and Spring

WEL 220 GMAW Qualification (3) 2,2

Welder certification is required by an increasing number of area employers. The purpose of the Gas Metal Arc Welding (GMAW) class is to help the student attain MIG welder certification. Students must pass two guided bend tests to receive certification. This certification will meet the requirements of AWS D1.1 Structural Welding Code (limited thickness) and the needs of many area manufacturers. However, some employers may require additional or re-certification. Repeatable to nine credits. (1.2) Proficiency Credit Available Pass/No Credit Available.

In-District Tuition/Fees: \$486 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: (1) Grade of C or better in WEL 208 or concurrent enrollment in WEL 208; (2) or consent of instructor

Semester(s) Offered: Fall and Spring

WEL 221 Adv. Blueprint Reading for Welders (2) 1,2

This course is designed to aid the student in becoming proficient in reading more complex welding blueprints. Emphasis will be on developing the ability to transfer the two-dimensional print to the actual three-dimensional object. The student will gain experience in related mathematical calculations. Students will learn spreadsheet manipulation by working up a job quote. (1.2) Proficiency Credit Available (3 LETSI) Pass/No Credit Not Available.

In-District Tuition/Fees: \$264 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Prerequisite: Grade of C or better in WEL 120.

Semester(s) Offered: Varies

WEL 234 Special Topics in Welding (1-3) .5,1

(.5-1, 1-4) Designed to satisfy specific needs or interests of students and the community. The following guidelines are to be used in selecting topics: 1) adequate and available material on specific topic; 2) comprehensive outlines for each topic; and, 3) course should be designed to increase skill and knowledge in field of welding. Course is repeatable to 12 credits. (1.2) Proficiency Credit Not Available Pass/No Credit Not Available.

In-District Tuition/Fees: \$436 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Consent of instructor

Semester(s) Offered: Varies

WEL 240 Independent Study in Welding (1-3) 1,2

The student is to identify a special project and request advice and direction from welding faculty. The course will be carried out under the direction of one or more faculty members who will modify the proposal in accordance with the departmental requirements and equipment limitations for credit involved. Special Note: Due to equipment and lab limitations instructor may deny project or welding process. (1.2) Proficiency Credit Not Available Pass/No Credit No.

In-District Tuition/Fees: \$396 (effective 2020/21 academic year)

In-district tuition is subject to change based on Board approval (<https://elgin.edu/pay-for-college/tuition-fees/>) (<https://elgin.edu/pay-for-college/tuition-fees/>).

Prerequisite: Grade C or better in WEL 102.+

Semester(s) Offered: Fall, Spring and Summer