WEL WELDING

**Courses**

**WEL.101 Fundamentals of Welding Theory**

This course provides a convenient source of know-how or information that is needed by all persons going into the field of welding. Much information provides aids in selecting the correct process since this is directly related to the metal being welded. The processes are explained in detail. In addition, the course provides quality control data and reference material that is of high interest to welding personnel. The information is purely technical in nature and there is nothing included on actual welding technique. Areas of concentration will include welding processes and definitions, the shielded metal-arc (stick) welding process, the gas metal-arc (MIG) welding process, the gas tungsten-arc (TIG) welding process, the oxyacetylene (gas) welding process, weld quality control and other related welding information.

Offered: Fall
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.

**WEL.103 Welding Survey**

This course is designed to allow those who have an interest in the welding trade (but are not sure of the skills involved, the environment, or their abilities to meet the demands of this profession) an opportunity to sample a variety of the skills a student in welding would be exposed to. Areas of study would be determined in joint agreement with the student and the instructor. Areas of study could include a variety of arc skills, gas shielded skills and/or oxyacetylene skills.

Offered: Fall or Spring or Summer
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.

**WEL.123 Work Experience**

This work experience is designed as a culminating experience for the student pursuing the Welding Certificate program. It provides a significant opportunity for the student to apply previously learned principles in the employment setting. This work experience requires 120 hours or more of on-the-job activities.

Offered: As Needed
Prerequisites: All courses in the Welding Certificate curriculum
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.

**WEL.124 Auto Body Welding**

This course is a continuation of WEL 118 with concentration on auto body applications. The types of joints and welds used on thin, high strength steel automobiles will be emphasized. An additional fee is required.
Offered: Fall
Prerequisites: WEL.118
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.

**WEL.125 Welding Blueprints**

This course provides an introduction to blueprint reading and related math for those individuals with limited or no background. Emphasis will be on welding prints, symbols, and mathematics pertinent to the welding field. Current welding prints from local businesses will be utilized throughout the course. This course is intended for welding majors or current welding employees seeking to improve their skills in these areas.
Offered: Fall or Spring
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.

**WEL.126 Weld Test Evaluation**

This course is designed to prepare students for employment by allowing them to practice skills already learned in preparation for acceptable completion of entry level qualification tests given in various welding processes at local welding businesses. The final exam for this course is the level 1 - AWS certification examination.
Offered: Fall or Spring
Prerequisites: Take WEL.110
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable General Education – Not Applicable

**WEL.127 Welding Theory/Welding Evaluation**

This course provides a convenient source of know-how or information that is needed by all persons going into the field of welding. Much information provides aids in selecting the correct process since this is directly related to the metal being welded. The processes are explained in detail and the course provides quality control data and reference material that is of high interest to welding personnel. Areas of concentration will include: Review of the major processes associated with surrounding industries. Nomenclature and definitions specific to this process.
Offered: Fall or Spring
Prerequisites: Take wel.102 wel.109 wel.111 wel.112 wel.114 wel.115 wel.116 wel.117 wel.118 wel.119 wel.120 wel.121 wel.122 and wel.129
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS and Certificates where applicable.
General Education – Not Applicable
WEL.129 Flux Cored Arc Welding

This course is designed to enable students to produce quality fillet and groove welds in all positions using the flux cored arc welding process. Students will learn proper electrode selection, equipment set-up, and proper techniques used in industrial applications.

Offered: Fall or Spring

Prerequisites: Take WEL.107 WEL.118 and WEL.119 grade of C or better
Take WEL.108 WEL.120;
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.130 Industrial Safety

This course provides the student with specific instruction to facilitate safe work practices in industrial environments. Students will be introduced to different safety philosophies and terminology. Students will also become acquainted with OSHA policy and with the Right to Know laws. Also covered are units specific to fire safety, pressurized gases and welding, electrical hazards, and safe machine usage. Students will have the opportunity to earn the OSHA ten hour safety certification.

Offered: Summer

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.131 Electrical Principles of Welding

This course introduces the fundamentals of electricity used in welding. Basic theory including Ohm's law, circuit characteristics, and power calculations as applied to power source selection for welding is covered. Some lab work will include testing meters and procedures used in trouble shooting power sources.

Offered: Spring

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.149 Automated Welding Applications

This course is designed to help students develop basic knowledge and skills related to automated welding and cutting processes used in commercial applications. The topics of the course will include CNC plasma cutting and robotic welding, including basic programming, system operation and maintenance. Safety procedures in automated operations will be emphasized.

Offered: Summer

Prerequisites: WEL.102, WEL.118, WEL.119 and WEL.120

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.150 Robotic Applications in Welding

This course is designed to introduce the welder to the components of the welding robot and the application of robotics in production welding. Emphasis will be directed at the topics of robotic safety, robotic welding programming and robotic system maintenance.

Offered: As Needed

Prerequisites: WEL.118, WEL.119 and WEL.120

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable Elective Only

WEL.151 Introduction to Pipe Welding 1G Rolled

This is the first of a series of courses designed to prepare the student for entry-level employment as a pipe welder in the energy and infrastructure industries. The student will develop proficiency in the safe operation of the shielded metal arc welding processes on pipe to meet commercial quality standards. Emphasis will be on introductory skills, safety, and proper techniques used on welding pipe in the 1G (Flat rolled) position.

Offered: Fall or Spring or Summer

Prerequisites: WEL.101, WEL.102, WEL.111, WEL.112, WEL.114, WEL.115, WEL.116, and WEL.117 Take WEL.125;

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.152 Pipe Welding 2G Horizontal

This is the second of a series of courses designed to prepare the student for entry-level employment as a pipe welder in the energy and infrastructure industries. The student will develop proficiency in the safe operation of the shielded metal arc and gas tungsten arc welding processes on pipe to meet commercial quality standards. Emphasis will be on welding pipe in the 2G position (Horizontal) using SMAW and GTAW with various electrodes.

Offered: Fall or Spring or Summer

Prerequisites: WEL.151

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.153 Pipe Welding 5G Vertical

This is the third of a series of courses designed to prepare the student for entry-level employment as a pipe welder in the energy and infrastructure industries. The student will develop proficiency in the safe operation of the shielded metal arc and gas tungsten arc welding processes on pipe to meet commercial quality standards. Emphasis will be on welding pipe in the 5G (vertical up and down) position using SMAW and GTAW with various electrodes.

Offered: Fall or Spring or Summer

Prerequisites: WEL.152

Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable
**WEL.154 Pipe Welding 6G Inclined**  
1 1 1.5

This is the final pipe welding course designed to prepare the student for entry-level employment as a pipe welder in the energy and infrastructure industries. The student will develop proficiency in the safe operation of the shielded metal arc and gas tungsten arc welding processes on pipe to meet commercial quality standards. Emphasis will be on welding pipe in the 6G (inclined 45 degrees) position using SMAW and GTAW with various electrodes.

Offered: Fall or Spring or Summer

Prerequisites: WEL.153

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS, and Certificates where applicable.

General Education – Not Applicable

**WEL.160 Oxyacetylene Welding & Metal Preparation**  
1 4 3

This course is designed to develop proficiency in metal preparation and cutting techniques, as well as develop basic welding skills. Information provides aid in selecting the correct process since this is directly related to the metal being cut and/or welded. Emphasis will be placed upon: Oxy-fuel cutting (OFC), plasma arc-cutting (PAC), carbon arc-cutting (CAC-A) and oxy-acetylene welding (OAW) processes, Nomenclature specific to these processes, and safety, weld quality control, and other related welding information.

Offered: Fall or Spring

Prerequisites: Take MFG.100 with a grade of C or better or concurrent enrollment.

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS, and Certificates where applicable.

General Education – Not Applicable

**WEL.162 Arc Welding Basics**  
1 4 3

This course is designed to prepare the student for entry level employment as a production arc welding operator in the steel fabricating and machinery building industry. The student will develop proficiency in the safe operation of the manual metallic shielded arc welding processes to meet commercial quality standards and is devoted to welding mild steel in the down hand positions. Areas of concentration will include: SMAW process, Nomenclature and definitions specific to this process, and Safety, weld quality control, and other related welding information.

Offered: Fall or Spring

Prerequisites: Take WEL.160 with a grade of C or better.

Applicable toward graduation at Sandburg where program structure permits: Degree or Certificate: AAS, AGS, and Certificates where applicable.

General Education – Not Applicable

**WEL.164 Arc Welding Advanced**  
1 4 3

This course is a continuation of WEL.162 and provides information that is needed by all persons advancing in the field of welding. The focus of this course is correctly matching the welding process to the metal being welded. The processes are explained in detail and the course provides quality control data and reference material that is of high interest to welding personnel. Areas of concentration will include: Shielded Metal Arc Welding (SMAW) process and advanced welding techniques, Nomenclature and definitions specific to this process, and safety, weld quality control, and other related welding information.

Offered: Fall or Spring

Prerequisites: Take WEL.162 with a grade of C or better.

Applicable toward graduation at Sandburg where program structure permits: Degree or Certificate: AAS, AGS, and Certificates where applicable.

General Education – Not Applicable

**WEL.166 Gas Shielded Arc Tig**  
1 4 3

This course provides information that is needed by all persons going into the field of welding. Much information provides aids in selecting the correct process since this is directly related to the metal being welded. The processes are explained in detail and the course provides quality control data and reference material that is of high interest to welding personnel. Areas of concentration will include: GTAW process, Nomenclature and definitions specific to this process, and safety, weld quality control, and other related welding information.

Offered: Fall or Spring

Prerequisites: Take WEL.164 with a grade of C or better.

Applicable toward graduation at CSC where program structure permits: Degree or Certificate: AAS, AGS, and Certificates where applicable.

General Education: Not Applicable

General Education – Not Applicable

**WEL.168 Gas Shielded Arc Mig**  
1 4 3

This course provides information that is needed by all persons going into the field of welding. Much information provides aids in selecting the correct process since this is directly related to the metal being welded. The processes are explained in detail and the course provides quality control data and reference material that is of high interest to welding personnel. Areas of concentration will include: GMAW process, nomenclature and definitions specific to this process, and Safety, weld quality control, and other related welding information.

Offered: Fall or Spring

Prerequisites: Take WEL.166 with a grade of C or better.

Applicable toward graduation at Sandburg where program structure permits: Degree or Certificate: AAS, AGS, and Certificates where applicable.

General Education – Not Applicable
WEL.170 Applications of GMAW & FCAW 1 4 3

This course provides information that is needed by all persons going into the field of welding. The focus of this course is correctly matching the welding process to the metal being welded. The processes are explained in detail and the course provides quality control data and reference material that is of high interest to welding personnel. Areas of concentration will include: Advanced gas metal arc welding (GMAW) and flux cored arc welding (FCAW) processes, nomenclature and definitions specific to this process, and safety, weld quality control, and other related welding information.

Offered: Fall or Spring
Prerequisites: Take WEL.168 with a grade of C or better.
Applicable toward graduation at Sandburg where program structure permits: Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.172 Welding Applications 1 4 3

This course provides information that is needed by all persons going into the field of welding. The focus of this course is correctly matching the welding process to the metal being welded. The processes are explained in detail and the course provides quality control data and reference material that is of high interest to welding personnel. Areas of concentration will include: Fabrication and layout, nomenclature and definitions specific to this process, and safety, weld quality control, and other related welding information.

Offered: Fall or Spring
Prerequisites: Take WEL.170 with a grade of C or better.
Applicable toward graduation at Sandburg where program structure permits: Degree or Certificate: AAS, AGS, and Certificates where applicable.
General Education – Not Applicable

WEL.202 Production and Inventory Control 1 1

This course is designed for students in the welding program, and it will help them to effectively work in environments from small jobbing shops to major manufacturing plants. They will receive a broad overview of planning and control factors involved in controlling inventory as well as managing production. Students will learn the essentials of forecasting and the variety of ways forecasters attempt to minimize error, including the use of software programs. They will learn about Master Production Schedules (MPS) and Material Requirements Planning (MRP) as well as Capacity Management and required planning for input and output. Kanban, the Theory of Constraints, Lean Production, and Just-In-Time (JIT) will be introduced. Finally, they will consider the benefit of partnering functions in purchasing and distribution, as well as integrating various systems for efficiency and effectiveness.

Offered: Fall or Spring
Applicable toward graduation at Sandburg where program structure permits:
Degree or Certificate: AAS, AGS and Certificates where applicable.
General Education – Not Applicable