

# WELDING

## TECHNICAL LIMITED ENROLLMENT

**CONTACT PERSON: Ken Paulus • Technical Center 113B  
224-5412 • Kenneth.Paulus@bsc.nodak.edu**

The welding program provides students with the basic welding skills needed for entry-level jobs and apprenticeship programs. Wage scales are average to above average for qualified people depending on experience.

The class uses the textbook “Arc Welding” for theory, along with workbooks in weld symbols and blueprint reading. Students spend a majority of their hours in school working in a modern, well-equipped laboratory. Shop time is divided between the practice of the different welding processes. In oxyacetylene welding, students develop skills in all positions of welding, brazing and the use of the oxyacetylene cutting torch and cutting machines.

In shielded metal arc welding, students learn to weld in all positions with a variety of electrodes developing skills needed to pass the welder’s certification test of the American Welding Society. Students also receive instruction in arc air cutting.

Gas tungsten arc welding, known as heliarc, is practiced on aluminum and steel. Students practice gas metal arc welding (wire feed welding), and flux cored arc welding on light and heavy metals. One of the most modern techniques, it is being used more and more in manufacturing and the construction industry.

Students are taught non-destructive testing. Students will learn the different tests used in the welding field. Radiographic testing will be done by the students on their own welding coupons.

A third semester of advanced welding courses is available to interested students.

**Enrollment:** Students are enrolled two times a year on a space available basis during the months of August and January. Summer session is optional depending on demand. Refer to the Admission section of this catalog beginning on page 10 for application procedures and requirements. A doctor’s examination and approval is required after acceptance into this program. Also refer to the limited enrollment program information on page 13.

### Required placement scores:

- ACT Math - 15 or higher
- COMPASS Math - (pre-algebra) 31 or higher
- ACT Reading - 15 or higher
- COMPASS Reading - 68 or higher

Students who do not meet the above requirements should arrange an interview with a welding instructor.

### Background in these areas helpful:

- Basic math (addition, subtraction, division)
- Metrics (conversion of)
- Geometry (areas, volume, circumference)
- Basic trigonometry (SIN, COSIN, TANG)
- Basic knowledge of drafting

FALL	CREDITS
Blueprint Symbols for Welding (WELD 165) .....	3
Arc Welding Operations (WELD 170) .....	2
Methods in Arc Welding Operations (WELD 173).....	4
Shielded Metal Arc Welding (WELD 180).....	2
Testing in Shielded Metal Arc Welding (WELD 183).....	4
Types of Non-Destructive Testing (WELD 187) .....	3
Total credits.....	18

SPRING	CREDITS
Oxyfuel Operations (WELD 110).....	2
Testing OA in Welding, Brazing, Cutting (WELD 118).....	2
Advanced Testing in OA Welding, Brazing, Cutting (WELD 130) .....	2
Welding Principles (WELD 135).....	2
Methods in GMA & FCA Welding (WELD 140).....	2
Advanced Methods in GMA & FCA Welding (WELD 145).....	2
Methods in GTA & PA Welding (WELD 150).....	2
Blueprint Reading for Welders (WELD 155) .....	3
Advanced Methods in GTA & PA Welding (WELD 160) .....	2
Total credits.....	19

<b>OPTIONAL</b> ( <i>offered fall only</i> )	<b>CREDITS</b>
Gas Tungsten Arc Pipe Welding (WELD 210) .....	3
Testing in Gas Tungsten Arc Pipe Welding (WELD 215) .....	3
Shielded Metal Arc Pipe Welding (WELD 220).....	3
Testing in Shielded Metal Arc Pipe Welding (WELD 225).....	3
Gas Metal Arc Pipe Welding (WELD 230).....	3
Testing in Gas Metal Arc Pipe Welding (WELD 235).....	3
Special Projects (WELD 240).....	3
Special Projects (WELD 245).....	3
Cooperative Education (WELD 197-297) .....	1-3

A program certificate is awarded to students upon successful completion of the fall and spring semesters.

A program diploma is awarded to students who complete the fall and spring semester, a minimum of 15 credit hours of specialty welding courses listed as Optional courses, and 9 credit hours of required general education.

An Associate in Applied Science degree is awarded to students who successfully complete fall and spring semesters, a minimum of 12 credit hours of specialty welding courses listed as Optional courses, and 15 credit hours of required general education.

See page 51-52 for general education requirements for program diploma and degree requirements.

## **WELDING (WELD)**

<b>WELD 110</b>	<b>Oxyfuel Operations</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality welds using the oxyacetylene welding, brazing, and cutting process on mild steel.			
<b>WELD 118</b>	<b>Testing OA in Welding, Brazing, Cutting</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the lab to develop the manual skills necessary to produce high quality welding using the oxyacetylene welding, brazing, and cutting processes on mild steel.			
<b>WELD 130</b>	<b>Advanced Testing in OA Welding, Brazing, Cutting</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the advanced lab to develop the manual skills necessary to produce high quality welding using the oxyacetylene welding, brazing, and cutting processes on mild steel.			
<b>WELD 135</b>	<b>Welding Principles</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality welds on mild steel plate using the gas metal and flux cored arc welding process in all positions.			
<b>WELD 140</b>	<b>Methods in GMA &amp; FCA Welding</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the lab to develop the manual skills necessary to produce high quality welds on mild steel plate using the gas metal and flux cored arc welding process in all positions.			
<b>WELD 145</b>	<b>Advanced Methods in GMA &amp; FCA Welding</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the advanced lab to develop the manual skills necessary to produce high quality welds on mild steel plate using the gas metal and flux cored arc welding process in all positions.			
<b>WELD 150</b>	<b>Methods in GTA &amp; PA Welding</b>	<b>Spring</b>	<b>2 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality welds using the gas tungsten and plasma arc cutting process on mild steel plate in all positions.			
<b>WELD 155</b>	<b>Blueprint Reading for Welders</b>	<b>F&amp;S</b>	<b>3 credits</b>
This program concentrates on the understanding and use of technical blueprints. This includes basic lines, geometric construction, orthographic projection, isometric projection, oblique projection, pictorial drawings, and structural sizes.			
<b>WELD 160</b>	<b>Advanced Methods in GTA &amp; PA Welding</b>	<b>Spring</b>	<b>2 credits</b>
This lab provides the advanced technical training to develop manual skills necessary to produce high quality welds on mild steel plate using the gas tungsten process in all positions according to the American Welding Society Standards and the plasma cutting process.			
<b>WELD 165</b>	<b>Blueprint Symbols for Welding</b>	<b>F&amp;S</b>	<b>3 credits</b>
This course is a continuation of WELD 155, and introduces the American Welding Society standardized welding symbols used on blueprints. Actual prints from industry are used during this course. Prerequisite: Welding 155.			
<b>WELD 170</b>	<b>Arc Welding Operations</b>	<b>Fall</b>	<b>2 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality welds using the shielded metal arc welding process in all positions, on thin and medium thickness mild steel, using single and multi pass welds with the E60 series electrodes.			
<b>WELD 173</b>	<b>Methods in Arc Welding Operations</b>	<b>Fall</b>	<b>4 credits</b>
This course provides the training to develop the testing skills necessary to produce high quality welds on mild steel plate in all positions using the shielded metal arc welding process according to the American Welding Society Standards.			

<b>WELD 180</b>	<b>Shielded Metal Arc Welding</b>	<b>Fall</b>	<b>2 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality welds using the shielded metal arc welding process on thin and medium thickness mild steel plates in all positions using the E70 series electrodes.			
<b>WELD 183</b>	<b>Testing in Shielded Metal Arc Welding</b>	<b>Fall</b>	<b>4 credits</b>
This course provides the training to develop the testing skills necessary to produce high quality welds using the shielded metal arc welding process on mild steel plate in all positions with E70 series electrodes according to the American Welding Society Standards.			
<b>WELD 187</b>	<b>Types of Non-Destructive Testing</b>	<b>Fall</b>	<b>3 credits</b>
This course studies non-destructive tests such as: magnetic particle, eddy current, visual, ultrasonic, dye penetrant, and radiographic.			
<b>WELD 210</b>	<b>Gas Tungsten Arc Pipe Welding</b>	<b>Fall</b>	<b>3 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality groove welds on four-inch diameter schedule 40 steel pipe in the 2G, 5G, and 6G positions. Department approval required.			
<b>WELD 215</b>	<b>Testing in Gas Tungsten Arc Pipe Welding</b>	<b>Fall</b>	<b>3 credits</b>
This course provides the training to develop the manual skills necessary to produce high quality groove welds on pipe in the 2G, 5G, and 6G positions using the gas tungsten arc welding process. All testing is in accordance with the American Society of Mechanical Engineer Standards. Department approval required.			
<b>WELD 220</b>	<b>Shielded Metal Arc Pipe Welding</b>	<b>Fall</b>	<b>3 credits</b>
This course provides the necessary training to make high quality groove welds on open root mild steel pipe in the 2G, 5G, and 6G positions using the shielded metal arc open root process. Department approval required.			
<b>WELD 225</b>	<b>Testing in Shielded Metal Arc Pipe Welding</b>	<b>Fall</b>	<b>3 credits</b>
This course provides the training to develop the testing skills necessary to produce high quality groove welds on pipe in the 2G, 5G, and 6G positions using the American Society Mechanical Engineer Standards. Department approval required.			