

WELDING



Thanks to a global boom in industrial manufacturing and the energy generation industry, skilled welders are in greater demand than ever. Companies can't find enough of them.

Technology is also creating more uses for welding in the workplace and expanding employment opportunities. New ways are being developed to bond dissimilar materials and nonmetallic materials, such as plastics, composites, and new alloys. Laser beam and electron beam welding, new fluxes, and other new technologies and techniques are improving the results of welding, making it useful in a wider assortment of applications.

The one-year Welding program at Bismarck State College provides students with basic skills for an entry-level job or apprenticeship program. Students spend most of their time in a modern, well-equipped laboratory practicing different welding techniques. In the process, they develop skill in all positions of welding and brazing, master blueprint reading, and learn non-destructive testing.

The program includes instruction in oxyacetylene, gas tungsten arc, flux cored arc, plasma arc, and gas metal arc welding, a modern technique being used more in manufacturing and the construction industry. In shielded metal arc welding, students develop skills needed to pass the Certified Welder (CW) test of the American Welding Society.

A \$100 deposit is required upon acceptance into the program and applies toward tuition. Students need a toolbox and tools the first week of class that meet program requirements, a locker padlock, four-function calculator, boots and safety glasses.

Welding is a limited enrollment program that offers graduates a certificate, diploma, or associate degree. Students are enrolled twice a year in August and January. Summer session is optional, depending on demand. A third semester of advanced welding is available to interested students. BSC requires a medical examination and physician approval after acceptance into the program. Graduates enter the workforce job ready.

APTITUDE/PREPARATION

High school courses in physical science, geometry, trigonometry, metrics and drafting are useful. Courses in physics, chemistry, electricity, and computer technology are also helpful, along with some knowledge of metallurgy.

Welders need good eyesight, hand-eye coordination, manual dexterity, and the ability to concentrate on detailed work for long periods. They should be physically fit and able to bend, stoop, and work in awkward positions. Welding, soldering, and brazing workers often are exposed to a number of hazards and must wear safety shoes, goggles, hoods with protective lenses, and other devices.

Welders increasingly need to be willing to receive training and perform tasks in other production jobs. They often become certified in standard skills set by industry associations. Overtime work is common.

GRADUATION

Students who complete fall and spring semesters receive a Program Certificate. Those who complete the Welding program and enroll in 15 credit hours of specialized welding courses and nine credits of general education courses receive a Diploma. Students who complete the program with 15 general education credits and 12 credits of specialized welding courses earn an Associate in Applied Science degree.

CAREERS

Six of every 10 welders work in manufacturing. Jobs are concentrated in fabricated metal product manufacturing, transportation equipment manufacturing (motor vehicle body and parts, ship and boat building), machinery manufacturing (agriculture, construction, mining machinery), architectural and structural metals manufacturing, and construction. Welders can advance to more skilled welding jobs with additional training and experience to become welding technicians, supervisors, inspectors, or instructors. Some experienced welders open their own repair shops.

BSC provides career counseling services to help students find employment. In recent years, placement of welding graduates has run between 90 and 100 percent.

EMPLOYMENT

Job prospects should be excellent as employers report difficulty finding enough qualified people, according to the U.S. Bureau of Labor Statistics. Many openings are expected as a large number of workers retire over the next decade. The construction industry should have solid growth with an increasing demand for welders. Government funding for shipbuilding as well as for infrastructure repairs and improvements are expected to generate additional welding jobs. Ironworkers, machinists, sheet metalworkers, plumbers, pipe fitters, and boilermakers are all in demand as production of industrial machinery continues near all-time levels. Automation will cut some job growth, but increased demand is expected for welding, soldering, and brazing machine setters, operators, and tenders.

FACULTY

For information about the Welding program, contact Bob Arso, Industrial Technology Department chairperson, at 701-224-5416 or R.Arso@bsc.nodak.edu.

HOW TO REACH US

- BSC Web site:** bismarckstate.edu
- Application information:** 1-800-445-5073 or 1-701-224-5429 or bismarckstate.edu/prospectivestudents/application.asp
- Financial Aid:** 1-701-224-5494 or bismarckstate.edu/student/finaid
- BSC Foundation Scholarships:** 1-701-224-2486 or bismarckstate.edu/scholarships

CURRICULUM

| 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 | 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 |

| OPTIONAL (offered fall only) | CREDITS |
|---|----------------|
| 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 | 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 catalog for general education requirements for program diploma and degree requirements.