



**2023-2024**  
**NWKTC Catalog and Student Handbook**

Welding

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<p><b>Description:</b> The Welding Program is designed to teach specific skills in all aspects of the welding trade. This includes arc welding, oxyacetylene welding, TIG, MIG, brazing, and semi-automatic cutting. Other related areas of study will include blueprint reading, job layout, shop math, hard surfacing (ARC as well as powder torch), and pipe welding.</p> <p>Students learn welding processes that allow them to work with mild steel, cast iron, brass, aluminum, stainless steel, and some alloy metals. The curriculum is directly related to the welding industry and employment opportunities for graduates. As the technology advances with new materials, fabrication procedures, equipment, tools, and new design methods, the curriculum is continually updated to provide the latest in training.</p> <p>Instruction will include in-shop training, on-the-job site work, and classroom situations, with the majority of the program devoted to actual “hands-on” experience. Each student will have the opportunity to get involved in group welding projects and individualized projects. Applied work situations will allow students to use the portable welder service truck in a variety of off-campus projects.</p>
<p><b>Degree/Certificates awarded:</b>                  AAS optional with the completion of general education coursework                  Tech Cert A, Tech Cert B, Tech Cert C</p>
<p><b>Accreditation/Certification:</b></p>
<p><b>Program Learning Outcomes:</b>                  Upon successful completion of the program, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Demonstrate welding safety and proper use of shop tools.</li> <li>2. Demonstrate oxy-acetylene and cutting skills.</li> <li>3. Demonstrate shielded metal arc welding skills.</li> <li>4. Demonstrate gas metal arc welding skills.</li> <li>5. Perform braze welding.</li> <li>6. Demonstrate gas tungsten welding.</li> </ol> <ul style="list-style-type: none"> <li>• Demonstrate mathematical and reasoning skills.</li> <li>• Demonstrate effective reading, writing, speaking, listening, and time management skills.</li> </ul>
<p><b>Program Schedule:</b>                  Students will attend class from 7:00 a.m.- 2:30 p.m., Monday through Friday</p>
<p><b>Miscellaneous Notes:</b>                  Welding is a one-year programs at Northwest Tech. Students who wish to earn the AAS degree must complete (5) credits of internship and an additional (9) credits as shown in the program guide.</p>

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PROGRAM GUIDE

YEAR I: FIRST SEMESTER W1

Course #	Course Name	Credits
MATH 105 or 107	Technical Math (or Math Elective)	3
WD 101 or 102	OSHA 10 (or <b>OSHA 30</b> )	1
WD 112	Oxy Fuel Welding	2
WD 115	Cutting Processes	3
WD 133	Welding Blueprint Reading I	3
WD 141	SMAW	3
WD 146	GMAW	3
WD 148	Automated Cutting Processes	2
WD 154	Practicum in Fabrication I	2
WD 195	Core Wire Welding	3
SO 100	Student Success Seminar (Required)	1

YEAR I: SECOND SEMESTER W2

Course #	Course Name	Credits
AE 205	Forklift Operator Training*	1
BA 215	Personal Finance (Required)	3
CF 101	Computer Fundamentals and Applications (or Science Elective)	3
WD 150	Pipe Welding - SMAW	3
WD 153	Welding Blueprint Reading II	3
WD 170	GTAW	3
WD 175	SMAW II	4
WD 180	GMAW II	4
WD 184	Practicum in Fabrication II	2
WD 185	Pipe Welding/TIG	2

ADDITIONAL CREDITS FOR AAS DEGREE

Course #	Course Name	Credits
COMM 150	Interpersonal Communications <b>Online</b> (or Communications Elective)	3
HUM 102	Workplace Ethics <b>Online</b> (or Gen Ed Elective)	3
PE 145	Personal Wellness (or Gen Ed Elective)	3

COURSE DESCRIPTIONS

WD 101 OSHA 10

1 CR

Through a variety of classroom and/or lab learning and assessment activities, student in this course will: explain job/site safety and precautions for job/site hazards; determine the uses of personal protective equipment (PPE); identify the safety equipment and procedures related to safe work practices and environment; identify fire prevention and protection techniques; explore Hazardous Communications (HazCom) including Material Safety Data Sheets (MSDS).

## WD 112 OXY FUEL WELDING

2 CR

This course introduces the basic principles and fundamentals of the oxy- acetylene welding process, safety and methods of producing and handling industrial gases. Welding of the standard basic joints in all positions, as well as fusion welding of steel pipe with the oxy-acetylene welding process in the out-of-position is the main thrust of this course. Joint preparation, welding procedures, inspection, and testing of welded pipe joints according to API (American Petroleum Institute) 1104 code requirements are included.

## WD 115 CUTTING PROCESSES

3 CR

Through classroom and/or shop/lab learning and assessment activities, students in this course will: distinguish several types of mechanical and thermal cutting equipment and processes used in the welding trade; demonstrate the safe and correct set up, operation and shut down of the oxy-fuel (OFC) workstation; demonstrate the safe and correct set up, operation and shut down of the Plasma Arc (PAC) workstation;

## WD 115B CUTTING PROCESSES

2 CR

Through classroom and/or shop/lab learning and assessment activities, students in this course will: distinguish several types of mechanical and thermal cutting equipment and processes used in the welding trade; demonstrate the safe and correct set up, operation and shut down of the oxy-fuel (OFC) workstation; demonstrate the safe and correct set up, operation and shut down of the Plasma Arc (PAC) workstation; demonstrate the safe and correct set up, operation and shut down of the Carbon Arc Cutting with Air (CAC-A) workstations; demonstrate safe and proper operation of several types of mechanical cutting equipment; and inspect quality and tolerance of cuts according to industry standards.

## WD 133 WELDING BLUEPRINT READING I

3 CR

Through a variety of classroom and/or shop/lab learning and assessment activities, the students in this course will: identify basic lines, views, and abbreviations used in blueprints; interpret basic 3D sketches using orthographic projection and blueprints; solve applicable mathematical equations; use basic measuring tools; interpret scale ratios on a blueprint; identify basic welding joints and structural shapes; interpret a Bill of Materials; identify standard AWS weld symbols.

## WD 141 SMAW

3CR

Through classroom and/or lab/shop learning and assessment activities, students in this course will: describe the Shielded Metal Arc Welding process (SMAW); demonstrate the safe and correct set up of the SMAW workstation; associate SMAW electrode classifications with base metals and joint criteria; demonstrate proper electrode selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes in the flat position; build pads of weld beads with selected electrodes in the horizontal position; perform basic SMAW welds on selected weld joints; and perform visual inspection of welds.

## WD 146 GMAW

3 CR

Through classroom and/or shop/lab learning and assessment activities, students in this course will: explain gas metal arc welding process (GMAW); demonstrate the safe and correct set up of the GMAW workstation.; correlate GMAW electrode classifications with base metals and joint criteria; demonstrate proper electrode selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes in the flat position; build pads of weld beads with selected electrodes in the horizontal position; produce basic GMAW welds on selected weld joints; and conduct visual inspection of GMAW welds.

## WD 148 AUTOMATED CUTTING PROCESS

2 CR

This course will introduce students to CNC plasma cutter techniques with the intent to ensure technicians exits with comprehensive skill sets.

## WD 150 PIPE WELDING-SMAW

3 CR

This course will cover pipe welding and fit up on pipe.

## WD 153 WELDING BLUEPRINT READING II

3 CR

This is an introduction to blueprint reading and drawing procedures used in the industries of production and fabrication. This course involves shape description, size description, instrument drawing, pictorial drawing (isometric and oblique drawing), and freehand sketching. Also included are the reading and drawing of welding symbols as well as interpretation of industrial drawings used in the welding industry.

## WD 154 PRACTICUM IN FABRICATION I

2 CR

This course will introduce students to live work in fabrication brought in from the community and surrounding area. It is also possible to do an internship in fabrication at an area business that matches our competency profiles.

## WD 170 GTAW

3 CR

Through classroom and/or lab/shop learning and assessment activities, students in this course will: explain the gas tungsten arc welding process (GTAW); demonstrate the safe and correct set up of the GTAW workstation; relate GTAW electrode and filler metal classifications with base metals and joint criteria; build proper electrode and filler metal selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes and filler material in the flat position; build pads of weld beads with selected electrodes and filler material in the horizontal position; perform basic GTAW welds on selected weld joints; and perform visual inspection of GTAW welds.

## WD 175 SMAW II

4 CR

Students will construct, fabricate, repair and engineer projects using Shielded Metal Arc Weld process.

## WD 180 GMAW II

4 CR

Students will construct, design and engineer projects using MG processes.

## WD 184 PRACTICUM IN FABRICATION II

2CR

This course will introduce students to live work in fabrication brought in from the community and surrounding area. It is also possible to do an internship in fabrication at an area business that matches our competency profiles.

## WD 185 PIPE WELDING/TIG

2CR

The course will be hands on welding with the TIG machines on stainless steel, and mild steel pipe in all pipe positions.

## WD 194 WELDING PRACTICES I

3CR

This course will cover the basics of structural welding as well as the types of welds encountered in today's industries. Students will be required to pass weld tests in both GMAW and SMAW.

WD 195 CORE WIRE WELDING

2 CR

This course will cover Flux core wire welding.