

# Welding Technology

## Welding Technology Certificates (C50420)

The following certificates can be earned in the Welding Technology Program (A50420).

- Welding Technology Certificate with a Specialization in S.M.A.W. of Pipe Welding (C50420-C1) (p. 1)
- Welding Technology Certificate with a Specialization in Entry-Level Welding (C50420-C2) (p. 1)
- Welding Technology Certificate with a Specialization in Inert Gas Welding (C50420-C4) (p. 1)
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- Welding Technology Certificate Specialization in Advanced Pipe-Fitting (C50420-32) (p. 2)

## Admissions

Completion of a high school diploma or equivalent is encouraged as the foundation of a career in this area.

## Contact Information

For more information, call the Welding Technology Program Chair at 704.330.4426 or the Skilled Trades Division at 704.330.4445.

## Welding Technology Certificate with a Specialization in S.M.A.W. of Pipe Welding (C50420-C1)

### Major Requirements

|         |                            |     |
|---------|----------------------------|-----|
| WLD 110 | Cutting Processes          | 2.0 |
| WLD 115 | SMAW (Stick) Plate         | 5.0 |
| WLD 141 | Symbols and Specifications | 3.0 |
| WLD 116 | SMAW (stick) Plate/Pipe    | 4.0 |

|                      |                   |           |
|----------------------|-------------------|-----------|
| WLD 215              | SMAW (stick) Pipe | 4.0       |
| <b>Total Credits</b> |                   | <b>18</b> |

## Welding Technology Certificate with a Specialization in Entry-Level Welding (C50420-C2)

### Major Requirements

|                      |                            |           |
|----------------------|----------------------------|-----------|
| WLD 110              | Cutting Processes          | 2.0       |
| WLD 115              | SMAW (Stick) Plate         | 5.0       |
| WLD 121              | GMAW (MIG) FCAW/Plate      | 4.0       |
| WLD 131              | GTAW (TIG) Plate           | 4.0       |
| WLD 141              | Symbols and Specifications | 3.0       |
| <b>Total Credits</b> |                            | <b>18</b> |

## Welding Technology Certificate with a Specialization in Inert Gas Welding (C50420-C4)

### Major Requirements

|                      |                            |           |
|----------------------|----------------------------|-----------|
| WLD 110              | Cutting Processes          | 2.0       |
| WLD 121              | GMAW (MIG) FCAW/Plate      | 4.0       |
| WLD 131              | GTAW (TIG) Plate           | 4.0       |
| WLD 141              | Symbols and Specifications | 3.0       |
| <b>Total Credits</b> |                            | <b>13</b> |

## Welding Technology Certificate with a Specialization in Advanced Level Welding (C50420-C5)

### Major Requirements

|                      |                         |           |
|----------------------|-------------------------|-----------|
| WLD 116              | SMAW (stick) Plate/Pipe | 4.0       |
| WLD 122              | GMAW (MIG) Plate/Pipe   | 3.0       |
| WLD 132              | GTAW (TIG) Plate/Pipe   | 3.0       |
| WLD 261              | Certification Practices | 2.0       |
| <b>Total Credits</b> |                         | <b>12</b> |

## Welding Technology Certificate with a Specialization in Expert Level Welding (C50420-C6)

### Major Requirements

|                      |                      |           |
|----------------------|----------------------|-----------|
| WLD 231              | GTAW (TIG) Pipe      | 3.0       |
| WLD 215              | SMAW (stick) Pipe    | 4.0       |
| WLD 221              | GMAW (MIG) Pipe      | 3.0       |
| WLD 262              | Inspection & Testing | 3.0       |
| <b>Total Credits</b> |                      | <b>13</b> |

## Welding Technology Certificate with a Specialization in Robotic Welding and Cutting (C50420-C8)

### Major Requirements

|                      |                             |           |
|----------------------|-----------------------------|-----------|
| WLD 141              | Symbols and Specifications  | 3.0       |
| WLD 121              | GMAW (MIG) FCAW/Plate       | 4.0       |
| WLD 110              | Cutting Processes           | 2.0       |
| ELC 111              | Introduction to Electricity | 3.0       |
| WLD 265              | Automated Welding/Cutting   | 4.0       |
| <b>Total Credits</b> |                             | <b>16</b> |

### Welding Technology Certificate with a Specialization in Orbital GTAW Welding (C50420-C9)

**Major Requirements**

|                      |                             |           |
|----------------------|-----------------------------|-----------|
| WLD 141              | Symbols and Specifications  | 3.0       |
| WLD 110              | Cutting Processes           | 2.0       |
| WLD 131              | GTAW (TIG) Plate            | 4.0       |
| ELC 111              | Introduction to Electricity | 3.0       |
| WLD 270              | Orbital Welding TIG/Pipe    | 4.0       |
| <b>Total Credits</b> |                             | <b>16</b> |

### Welding Technology Certificate Specialization in G.M.A.W. of Pipe Welding (C50420-10)

**Major Requirements**

|                      |                            |           |
|----------------------|----------------------------|-----------|
| WLD 110              | Cutting Processes          | 2.0       |
| WLD 121              | GMAW (MIG) FCAW/Plate      | 4.0       |
| WLD 141              | Symbols and Specifications | 3.0       |
| WLD 122              | GMAW (MIG) Plate/Pipe      | 3.0       |
| WLD 221              | GMAW (MIG) Pipe            | 3.0       |
| <b>Total Credits</b> |                            | <b>15</b> |

### Welding Technology Certificate Specialization in S.M.A.W. Structure Steel Welding (C50420-11)

**Major Requirements**

|                      |                            |           |
|----------------------|----------------------------|-----------|
| WLD 110              | Cutting Processes          | 2.0       |
| WLD 115              | SMAW (Stick) Plate         | 5.0       |
| WLD 121              | GMAW (MIG) FCAW/Plate      | 4.0       |
| WLD 141              | Symbols and Specifications | 3.0       |
| <b>Total Credits</b> |                            | <b>14</b> |

### Welding Technology Certificate Specialization in Steel Fabrication (C50420-12)

**Major Requirements**

|                      |                            |           |
|----------------------|----------------------------|-----------|
| WLD 110              | Cutting Processes          | 2.0       |
| WLD 115              | SMAW (Stick) Plate         | 5.0       |
| WLD 121              | GMAW (MIG) FCAW/Plate      | 4.0       |
| WLD 122              | GMAW (MIG) Plate/Pipe      | 3.0       |
| WLD 141              | Symbols and Specifications | 3.0       |
| <b>Total Credits</b> |                            | <b>17</b> |

### Welding Technology Certificate Specialization in Advanced Welding Automation for Manufacturing (C50420-13)

This program is also available to high school students through Career and College Promise.

**Major Requirements**

|         |                            |     |
|---------|----------------------------|-----|
| WLD 110 | Cutting Processes          | 2.0 |
| WLD 121 | GMAW (MIG) FCAW/Plate      | 4.0 |
| WLD 131 | GTAW (TIG) Plate           | 4.0 |
| WLD 141 | Symbols and Specifications | 3.0 |

|                      |                           |           |
|----------------------|---------------------------|-----------|
| WLD 265              | Automated Welding/Cutting | 4.0       |
| <b>Total Credits</b> |                           | <b>17</b> |

### Welding Technology Certificate Specialization in Wrought Metals (C50420-14)

**Major Requirements**

|                      |                            |           |
|----------------------|----------------------------|-----------|
| WLD 110              | Cutting Processes          | 2.0       |
| WLD 112              | Basic Welding Processes    | 2.0       |
| WLD 152              | Wrought Metals I           | 4.0       |
| WLD 252              | Wrought Metals II          | 4.0       |
| WLD 141              | Symbols and Specifications | 3.0       |
| <b>Total Credits</b> |                            | <b>15</b> |

### Welding Technology Certificate Specialization in Entry Level Pipe-Fitting (C50420-30)

**Major Requirements**

|                      |                                       |           |
|----------------------|---------------------------------------|-----------|
| PFT 110              | Introduction to Pipe Fitting          | 4.0       |
| MAT 110              | Mathematical Measurement and Literacy | 3.0       |
| or MAT 143           | Quantitative Literacy                 |           |
| WLD 112              | Basic Welding Processes               | 2.0       |
| WLD 141              | Symbols and Specifications            | 3.0       |
| WOL 110              | Basic Construction Skills             | 3.0       |
| <b>Total Credits</b> |                                       | <b>15</b> |

### Welding Technology Certificate Specialization in Pipe-Fitting (C50420-31)

**Major Requirements:**

|                      |                              |           |
|----------------------|------------------------------|-----------|
| PFT 110              | Introduction to Pipe Fitting | 4.0       |
| WLD 110              | Cutting Processes            | 2.0       |
| WLD 112              | Basic Welding Processes      | 2.0       |
| WLD 141              | Symbols and Specifications   | 3.0       |
| MAC 118              | Machine Shop Basic           | 2.0       |
| <b>Total Credits</b> |                              | <b>13</b> |

Students must complete Welding Technology Certificate Specialization in Entry Level Pipe-Fitting (C50420-30) before being admitted.

### Welding Technology Certificate Specialization in Advanced Pipe-Fitting (C50420-32)

**Major Requirements**

|                      |                                     |           |
|----------------------|-------------------------------------|-----------|
| PFT 210              | Advanced Pipe Fitting               | 4.0       |
| WLD 115              | SMAW (Stick) Plate                  | 5.0       |
| WLD 131              | GTAW (TIG) Plate                    | 4.0       |
| WLD 143              | Welding Metallurgy                  | 2.0       |
| WLD 262              | Inspection & Testing                | 3.0       |
| or NDE 110           | Intro to Nondestructive Examination |           |
| <b>Total Credits</b> |                                     | <b>18</b> |

Advanced Pipe Fitting

**WLD 110. Cutting Processes. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces oxy-fuel and plasma-arc cutting systems. Topics include safety, proper equipment setup, and operation of oxy-fuel and plasma-arc cutting equipment with emphasis on straight line, curve and bevel cutting. Upon completion, students should be able to oxy-fuel and plasma-arc cut metals of varying thickness.

**WLD 111. Oxy-Fuel Welding. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the oxy-fuel welding process. Topics include safety, proper equipment setup, and operation of oxy-fuel welding equipment with emphasis on bead application, profile, and discontinuities. Upon completion, students should be able to oxy-fuel weld fillets and grooves on plate and pipe in various positions.

**WLD 112. Basic Welding Processes. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces basic welding and cutting. Emphasis is placed on beads applied with gases, mild steel fillers, and electrodes and the capillary action of solder. Upon completion, students should be able to set up welding and oxy-fuel equipment and perform welding, brazing, and soldering processes.

**WLD 115. SMAW (Stick) Plate. 5.0 Credits.** Class-2.0. Clinical-0.0. Lab-9.0. Work-0.0

This course introduces the shielded metal arc (stick) welding process. Emphasis is placed on padding, fillet, and groove welds in various positions with SMAW electrodes. Upon completion, students should be able to perform SMAW fillet and groove welds on carbon plate with prescribed electrodes.

**WLD 116. SMAW (stick) Plate/Pipe. 4.0 Credits.** Class-1.0. Clinical-0.0. Lab-9.0. Work-0.0

This course is designed to enhance skills with the shielded metal arc (stick) welding process. Emphasis is placed on advancing manipulative skills with SMAW electrodes on varying joint geometry. Upon completion, students should be able to perform groove welds on carbon steel with prescribed electrodes in the flat, horizontal, vertical, and overhead positions.

Prerequisites: Take WLD 115

**WLD 121. GMAW (MIG) FCAW/Plate. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course introduces metal arc welding and flux core arc welding processes. Topics include equipment setup and fillet and groove welds with emphasis on application of GMAW and FCAW electrodes on carbon steel plate. Upon completion, students should be able to perform fillet welds on carbon steel with prescribed electrodes in the flat, horizontal, and overhead positions.

**WLD 122. GMAW (MIG) Plate/Pipe. 3.0 Credits.** Class-1.0. Clinical-0.0. Lab-6.0. Work-0.0

This course is designed to enhance skills with the gas metal arc (MIG) welding process. Emphasis is placed on advancing skills with the GMAW process making groove welds on carbon steel plate and pipe in various positions. Upon completion, students should be able to perform groove welds with prescribed electrodes on various joint geometry.

Prerequisites: Take WLD 121

**WLD 131. GTAW (TIG) Plate. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course introduces the gas tungsten arc (TIG) welding process. Topics include correct selection of tungsten, polarity, gas, and proper filler rod with emphasis placed on safety, equipment setup, and welding techniques. Upon completion, students should be able to perform GTAW fillet and groove welds with various electrodes and filler materials.

**WLD 132. GTAW (TIG) Plate/Pipe. 3.0 Credits.** Class-1.0. Clinical-0.0. Lab-6.0. Work-0.0

This course is designed to enhance skills with the gas tungsten arc (TIG) welding process. Topics include setup, joint preparation, and electrode selection with emphasis on manipulative skills in all welding positions on plate and pipe. Upon completion, students should be able to perform GTAW welds with prescribed electrodes and filler materials on various joint geometry.

Prerequisites: Take WLD 131

**WLD 141. Symbols and Specifications. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces the basic symbols and specifications used in welding. Emphasis is placed on interpretation of lines, notes, welding symbols, and specifications. Upon completion, students should be able to read and interpret symbols and specifications commonly used in welding. Prerequisites: Take 1 group: Take DMA 010 DMA 020 DMA 030; Take MAT 003

**WLD 143. Welding Metallurgy. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces the concepts of welding metallurgy. Emphasis is placed on basic metallurgy, effects of welding on various metals, and metal classification and identification. Upon completion, students should be able to understand basic metallurgy, materials designation, and classification systems used in welding.

**WLD 145. Thermoplastic Welding. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-3.0. Work-0.0

This course introduces the thermoplastic welding processes and materials identification. Topics include filler material selection, identification, joint design, and equipment setup with emphasis on bead types and applications. Upon completion, students should be able to perform fillet and groove welds using thermoplastic materials.

**WLD 151. Fabrication I. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course introduces the basic principles of fabrication. Emphasis is placed on safety, measurement, layout techniques, cutting, joining techniques, and the use of fabrication tools and equipment. Upon completion, students should be able to perform layout activities and operate various fabrication and material handling equipment.

Prerequisites: Take WLD 110 WLD 121 WLD 131 WLD 141

**WLD 152. Wrought Metals I. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course provides a comprehensive overview of the history and the multifaceted skillsets that are required to join and shape ferrous and non-ferrous metals. Topics include heating methods and fire control, hand hammers, hand tools, forging, manual heating, heat treatment, and shaping functional and decorative metal objects. Upon completion, students should be able to select proper alloys, heat and use a variety of hand tools to create simple tools, and shape basic metal projects to produce functional and decorative metal objects, collars, and mortise and tenon joints.

Corequisites: Take WLD 112

**WLD 215. SMAW (stick) Pipe. 4.0 Credits.** Class-1.0. Clinical-0.0. Lab-9.0. Work-0.0

This course covers the knowledge and skills that apply to welding pipe. Topics include pipe positions, joint geometry, and preparation with emphasis placed on bead application, profile, and discontinuities. Upon completion, students should be able to perform SMAW welds to applicable codes on carbon steel pipe with prescribed electrodes in various positions. Prerequisites: Take WLD 115 WLD 116

**WLD 221. GMAW (MIG) Pipe. 3.0 Credits.** Class-1.0. Clinical-0.0. Lab-6.0. Work-0.0

This course covers the knowledge and skills that apply to welding pipe. Topics include pipe positions, joint geometry, and preparation with emphasis placed on bead application, profile, and discontinuities. Upon completion, students should be able to perform GMAW welds to applicable codes on pipe with prescribed electrodes in various positions. Prerequisites: Take WLD 122

**WLD 231. GTAW (TIG) Pipe. 3.0 Credits.** Class-1.0. Clinical-0.0. Lab-6.0. Work-0.0

This course covers gas tungsten arc welding on pipe. Topics include joint preparation and fit up with emphasis placed on safety, GTAW welding technique, bead application, and joint geometry. Upon completion, students should be able to perform GTAW welds to applicable codes on pipe with prescribed electrodes and filler materials in various pipe positions. Prerequisites: Take WLD 132

**WLD 251. Fabrication II. 3.0 Credits.** Class-1.0. Clinical-0.0. Lab-6.0. Work-0.0

This course covers advanced fabrication skills. Topics include advanced layout and assembly methods with emphasis on the safe and correct use of fabrication tools and equipment. Upon completion, students should be able to fabricate projects from working drawings. Prerequisites: Take WLD 151

**WLD 252. Wrought Metals II. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course covers ideas and techniques for designing, heating, shaping, and heat treatment of ferrous and non-ferrous metals, and the technical skills required for producing tools used in the welding studio. Topics include refined hammer control, power tool usage, metal lamination and differential hardening, tool design, alloy selection, hardening and tempering processes, and developing shop tooling. Upon completion, students should be able to identify and select appropriate metals and use traditional and contemporary metal-forming techniques to produce functional and decorative metal objects.

Corequisites: Take WLD 152

**WLD 261. Certification Practices. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers certification requirements for industrial welding processes. Topics include techniques and certification requirements for prequalified joint geometry. Upon completion, students should be able to perform welds on carbon steel plate and/or pipe according to applicable codes.

Prerequisites: Take all: WLD 115, WLD 121, and WLD 131

Corequisites: WLD 215 WLD 231

**WLD 262. Inspection & Testing. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-2.0. Work-0.0

This course introduces destructive and non-destructive testing methods. Emphasis is placed on safety, types and methods of testing, and the use of testing equipment and materials. Upon completion, students should be able to understand and/or perform a variety of destructive and non-destructive testing processes.

**WLD 265. Automated Welding/Cutting. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course introduces automated welding equipment and processes. Topics include setup, programming, and operation of automated welding and cutting equipment. Upon completion, students should be able to set up, program, and operate automated welding and cutting equipment. Prerequisites: Take all: WLD 110 and WLD 121

**WLD 268. Robotic Gas Metal Arc Welding. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course provides a comprehensive overview of the tasks and responsibilities required of the robotic welding technician. Topics include robotic and welding safety, proper equipment usage and care, robotic welding programming, various automated welding applications, automated Gas Metal Arc Welding (GMAW) processes, equipment controls and settings, and weld quality. Upon completion, students should be able to set up, program, operate, and successfully run robotic gas welding equipment for various welding applications.

**WLD 270. Orbital Welding TIG/Pipe. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course introduces automated tungsten inert gas (TIG) welding hardware, equipment, and processes required to apply specific, accurate, automated, and consistently repetitive pipe welds. Emphasis is placed on proper identification of automated welding process variables, how each relates to the functionality of orbital equipment and components, and how changes in variables directly influence weld quality. Upon completion, students should be able to produce quality pipe welds through the appropriate operation and control of automated TIG welding equipment.