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**Welding & Nondestructive Testing Technology**

**Academic Assessment Plan**

**Adopted by**

**The Welding & Nondestructive Testing Technology Faculty: April 2017**

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**Table of Contents**

[MISSION STATEMENT 4](#_Toc93593773)

[PROGRAM INTRODUCTION 4](#_Toc93593774)

[ASSESSMENT PROCESS INTRODUCTION 4](#_Toc93593775)

[PROGRAM STUDENT LEARNING OUTCOMES 5](#_Toc93593776)

[MEASURES 6](#_Toc93593777)

[Welding OEC 6](#_Toc93593778)

[Nondestructive Testing OEC 6](#_Toc93593779)

[Advanced Welding OEC 6](#_Toc93593780)

[Associate of Applied Science Degree in Welding and Nondestructive Testing Technology 7](#_Toc93593781)

[APPENDIX A: GENERAL OUTCOMES & MEASURES 8](#_Toc93593782)

[APPENDIX B: ASNT NATIONAL CERTIFICATION WRITTEN EXAMS 9](#_Toc93593783)

[APPENDIX C: ASNT NATIONAL CERTIFICATION SPECIFIC EXAMS 10](#_Toc93593784)

[APPENDIX D: ASNT NATIONAL CERTIFICATION PRACTICAL EXAMS 11](#_Toc93593785)

[APPENDIX E: AWS CODE QUALIFICATION PRACTICAL EXAMS 12](#_Toc93593786)

[APPENDIX F: API CODE QUALIFICATION PRACTICAL EXAMS 13](#_Toc93593787)

[APPENDIX G: SUMMATIVE MEASURES 14](#_Toc93593788)

[APPENDIX H: INDIVIDUAL PROGRAM MEASURES 16](#_Toc93593789)

[APPENDIX I: COURSE SUMMARIES 19](#_Toc93593790)

[APPENDIX J: INDUSTRY STANDARD & CODE SUMMARY 21](#_Toc93593791)

# MISSION STATEMENT

The mission of the Welding and Nondestructive Testing Technology program is to provide relevant technical training and industry recognized credentials for individuals aspiring toward careers in the welding and nondestructive testing workforce.

# PROGRAM INTRODUCTION

The program offers three Occupational Endorsement Certificates (OEC’s): Welding, Nondestructive Testing, and Advanced Welding. The UAA program also offers an Associate of Applied Science (AAS) degree in Welding and Nondestructive Testing Technology. Curriculum for the three OEC’s are embedded within the AAS degree.

In order to receive the AAS degree, students must complete the General Course Requirements for Associate of Applied Science degrees. Program instruction includes both consumable and non-consumable electrode welding and cutting processes. Learning objectives center on print reading and metallurgy, welding inspection, destructive and nondestructive testing methods, written and oral communications, and mathematics. These courses provide the student with industry-standard skills developed through classroom training and practical application, with emphasis placed on developing the skills necessary to obtain industry-level qualifications and or certifications in welding and nondestructive testing. Industry recognized welding qualifications are offered in the majority of the course offerings. The program also offers industry recognized Nondestructive Testing certifications in Liquid Penetrant (PT) and Magnetic Particle Testing (MT), Ultrasonic Testing (UT), and Radiographic Testing (RT).

Industrial welding technician students develop manual skills in the four primary welding and three thermal cutting processes. Students also gain a wide range of technical knowledge in welding application, procedure/welder qualification, reading plans and specifications, and applied metallurgy. American Welding Society (AWS) and American Petroleum Institute (API) welder qualification tests are administered as prescribed in AWS D1.1/D1.1M, API 1104, or American Society for Mechanical Engineers (ASME) BPVC, Section IX welding codes.

Qualifications and certifications offered in these courses and throughout this program support specific welding and nondestructive testing practices that are recognized by the oil and gas, maritime, manufacturing, construction and mining industries. All AWS and API qualification tests that meet standardized code requirements are conducted by UAA faculty, who also are AWS Certified Welding Inspectors (CWI) and or API Tank Inspectors.

Nondestructive Testing Technology students examine metallic components or weldments to locate and evaluate discontinuities by learning to apply PT, MT, ET, RT and UT test methods. Student qualification in each NDT method is based on general, specific and practical examinations administered as prescribed in the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A.

# ASSESSMENT PROCESS INTRODUCTION

This document defines the expected student learning outcomes for the Welding Occupational Endorsement Certificate, Advanced Welding Occupational Endorsement Certificate, Nondestructive Testing Occupational Endorsement Certificate, and Associate of Applied Science in Welding and Nondestructive Testing Technology degree. It outlines a plan for assessing the achievement of the stated outcomes.

The program currently is aligning itself toward national accreditation from the AWS, ASNT, and the API. The outcomes and nature of the assessment strategies are based on industry qualifications presented in specific courses. The assessment plan reflects these strategies and is based on the findings from various meetings with the program’s advisory board, faculty and staff as well as external partners. Discussions with these stake-holders focus on broader welding and nondestructive testing practices that are important for student employment purposes and the program’s desire to become a pipeline for the state’s entry-level workforce needs.

Program objectives are designed to produce graduates who can apply programmatic knowledge and continuously develop new skills for long-term career development, including in the design and manufacturing, specification and testing, installation, operation, maintenance, and documentation of welded structures and products. Selected outcomes are designed to support and compliment the GER outcomes for the university.

# PROGRAM STUDENT LEARNING OUTCOMES

Upon completion of the Welding OEC, students will:

* Demonstrate hazard assessment and best safety practices.
* Demonstrate entry-level technical skills in welding.
* Demonstrate introductory knowledge of the interrelationship between metallurgy and welding.
* Demonstrate effective oral and written communication.
* Demonstrate application of mathematical formulas as applied in the welding field.

Upon completion of the Nondestructive Testing OEC, students will:

* Demonstrate hazard assessment and best safety practices.
* Demonstrate entry-level technical skills in welding and nondestructive examination.
* Demonstrate technical knowledge of the interrelationship between metallurgy and inspection processes.
* Demonstrate advanced forms of effective oral and written communication.
* Demonstrate application of advanced mathematical computations as applied in the inspection and nondestructive examination fields.

Upon completion of the Advanced Welding OEC, students will:

* Demonstrate hazard assessment and best safety practices.
* Demonstrate enhanced levels of technical skills in welding.
* Demonstrate intermediate knowledge of the interrelationship between metallurgy, welding and inspection processes.
* Demonstrate advanced forms of effective technical, oral, and written communication.
* Demonstrate application of advanced mathematical formulas and computations as applied in the welding and inspection fields.

Upon completion of the Associate of Applied Science in Welding and Nondestructive Testing Technology degree, students will:

* Demonstrate hazard assessment and best safety practices.
* Demonstrate advanced technical skills that meet published industry standards in the welding and nondestructive examination fields.
* Demonstrate advanced technical knowledge of the interrelationship between metallurgy, welding and inspection processes.
* Demonstrate advanced forms of effective technical, oral, and written communication.
* Demonstrate application of advanced mathematical formulas and computations as applied in the welding, inspection and nondestructive examination fields.

# MEASURES

## Welding OEC

Industry approved qualification tests are integrated in each of the corresponding courses in this program. Students are required to pass a minimum of one complete welder qualification test in order to complete this OE. Qualification tests are conducted by UAA faculty who are AWS Certified Welding Inspectors.

In addition to those items listed above, other measures utilized in this program include the following: Safety assessments, lab projects, hands-on exams, classroom-based assignments and written exams, projects, and final reports (See Table 1, Appendix H).

## Nondestructive Testing OEC

Three national certifications and letters approved by the ASNT have been integrated into the nondestructive testing inspection OE program. In order to complete this program, students are required to demonstrate proficiency in a minimum of two ASNT recognized nondestructive examination methods. Proficiency is achieved only by passing exams in each of the following categories for a given method: General (written), Specific (written), Practical (hands-on). Testing is conducted for student certification in each method by qualified UAA faculty, who are certified in the area of nondestructive testing being taught

ASNT recognizes UAA as an approved training center for nondestructive testing technicians in accordance with ANSI/ASNT CP-105, “ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel.” Qualified faculty issue examinations in WELD A261, WELD A262, WELD A263, and WELD A264 based on the standards set forth by the ASNT in accordance with ANSI/ASNT CP-106, “Nondestructive Testing - Qualification and Certification of Personnel.” The UAA letters of completion offered for eligible students are recognized nationally and required for individuals to advance beyond the “Trainee” level in this field.

In addition to those items listed above, other measures utilized in this program include the following: Safety assessments, lab projects, hands-on exams, classroom-based assignments and written exams, projects, and final reports (See Table 2, Appendix H).

## Advanced Welding OEC

Industry approved qualification tests are integrated in each of the corresponding courses in this program. Students are required to pass a minimum of two complete welder qualification tests in order to complete this OE. Qualification tests are conducted by UAA faculty who are AWS CWIs and or API Tank Inspectors

In addition to those items listed above, other measures utilized in this program include the following: Safety assessments, lab projects, hands-on exams, classroom-based assignments and written exams, projects, and final reports (See Table 3, Appendix H).

## Associate of Applied Science Degree in Welding and Nondestructive Testing Technology

For eligible welding students, industry qualifications offered are recognized by the AWS, API, or the ASME, and have been integrated into most of the program courses. Industrial welding technician students must pass a minimum of three (3) separate all-position, industry-level welder qualification tests approved by the AWS and API in order to complete the AAS degree. Welding practical performance qualification tests are conducted by UAA faculty members that are certified as either an AWS CWI or API Tank Inspector (See Table 4, Appendix H).

Nondestructive Testing technician students must pass a minimum of two (2) separate industry-level NDT method certification tests approved by the ASNT in order to complete the AAS degree. UAA’s certified welding and nondestructive testing faculty issue examinations based on published standards set forth by ASNT. Nondestructive testing certifications are recognized by ASNT. ASNT recognizes UAA as an approved training center for nondestructive testing technicians. The UAA letters of completion offered for eligible students within the nondestructive testing courses are recognized nationally and required for individuals to advance beyond the “Trainee” level in this field.

In addition to all items listed above for the AAS degree, other measures utilized in this program include the following: Safety assessments, lab projects, hands-on exams, classroom-based assignments and written exams, projects, and final reports (See Table 4, Appendix H).

## APPENDIX A: GENERAL OUTCOMES & MEASURES

| **Student Learning Outcomes** | ASNT National Certif. General Exams | ASNT National Certif. Specific Exams | ASNT National Certif. Practical Exams | AWS Code Qualification Practical Exams | API Code Qualification Practical Exams | Summative Measures |
| --- | --- | --- | --- | --- | --- | --- |
| Entry-Level technical skills in welding and nondestructive examination. | **X** | **X** | **X** | **X** | **X** | **X** |
| Technical knowledge of the interrelationship between metallurgy, welding, and inspection processes. | **X** | **X** | **X** | **X** | **X** | **X** |
| Hazard assessment and best safety practices to avoid exposing themselves or others to risk of injury and avoiding damage to equipment. | **X** | **X** | **X** | **X** | **X** | **X** |
| Effective oral and written communication with other employees, customers, and management. | **X** | **X** | **O** | **O** | **O** | **X** |
| Application of mathematical formulas as applied in the welding, inspection, and nondestructive testing field. | **X** | **X** | **O** | **O** | **O** | **X** |

X = Measure is used to assess the associated Student Learning Outcome

O = Measure is not used to assess the associated Student Learning Outcome

## APPENDIX B: ASNT NATIONAL CERTIFICATION WRITTEN EXAMS

**Measuring Description:**

This is a national certification written exam distributed by the ASNT. The program has utilized these exams since 1996 and find them to be reliable and valid. The need for competent personnel to perform NDT tasks is paramount in all industries. In order to determine competency, systems have been devised to ensure that NDT personnel have the proper training, have passed written and practical examinations, and have enough experience to properly perform NDT tasks using the applicable test method or technique. Personnel that have met all three of these requirements are said to be “qualified,” and once qualified they can be certified, which is defined in several different ways under the various NDT systems.

Written exams are administered in each of the following NDT testing, or examination, concentrations: PT, MT, UT, RT and RT Safety. Each exam is 120 questions, all in multiple-choice format. The exam tool is sent to the instructor and must be strictly proctored. Exams are graded by ASNT approved and certified program faculty.

Attachments of the exam tools have not been provided because they are the property of the ASNT.

**How to interpret the data collected:**

For both program objectives and student learning outcomes, the data provides very accurate results. Tests are administered and scored internally. Result data is known within 1-2 days after the exams are administered. Analysis is based on reflection by program faculty and is used as a tool in guiding future instructional methodologies as needed.

The exam results also provide data that allows UAA student scores to be compared to national scores.

## APPENDIX C: ASNT NATIONAL CERTIFICATION SPECIFIC EXAMS

**Measuring Description:**

This is a national certification exam distributed by the ASNT. The program has utilized these exams since 1996 and find them to be reliable and valid. The need for competent personnel to perform NDT tasks is paramount in all industries. In order to determine competency, systems have been devised to ensure that NDT personnel have the proper training, have passed written and practical examinations, and have enough experience to properly perform NDT tasks using the applicable test method or technique. Personnel that have met all three of these requirements are said to be “qualified,” and once qualified they can be certified, which is defined in several different ways under the various NDT systems.

Specific exams are administered in each of the following NDT testing, or examination, concentrations: PT, MT, UT, RT and RT Safety. Each exam is 120 questions and are topically concentrated in each NDT area, specifically, listed above. The exam tool is sent to the instructor and must be strictly proctored. Exams are graded by ASNT approved and certified program faculty.

Attachments of the exam tools have not been provided because they are the property of the ASNT.

**How to interpret the data collected:**

For both program objectives and student learning outcomes, the data provides very accurate results. Tests are administered and scored internally. Result data is known within 1-2 days after the exams are administered. Analysis is based on reflection by program faculty and is used as a tool in guiding future instructional methodologies as needed.

The exam results also provide data that allows UAA student scores to be compared to national scores.

## APPENDIX D: ASNT NATIONAL CERTIFICATION PRACTICAL EXAMS

**Measuring Description:**

This is a national certification practical exam distributed by the ASNT. The program has utilized these practical exams since 1996 and find them to be reliable and valid. The need for competent personnel to perform NDT tasks is paramount in all industries. In order to determine competency, systems have been devised to ensure that NDT personnel have the proper training, have passed written and practical examinations, and have enough experience to properly perform NDT tasks using the applicable test method or technique. Personnel that have met all three of these requirements are said to be “qualified,” and once qualified they can be certified, which is defined in several different ways under the various NDT systems.

Practical exams are administered in each of the following NDT testing, or examination, concentrations: PT, MT, UT, RT and RT Safety. Each exam is hands-on and laboratory-based. Students completing these exams also must complete a well-written, technical report of the results of the practical examination experience. While program faculty have flexibility to vary specific components of the test method or technique being assessed, ASNT must approve these exams.

Practical exams are administered in strict accordance with ANSI/ASNT CP-106 (or most current) code. The exam tool must be strictly proctored and graded by ASNT certified program faculty.

**How to interpret the data collected:**

For both program objectives and student learning outcomes, the data provides very accurate results. Tests are administered and scored internally. Result data is known within 1-2 days after the exams are administered. Analysis is based on reflection by program faculty and is used as a tool in guiding future instructional methodologies as needed.

The exam results also provide data that allows UAA student practical exam passage rates to be compared to those on a national level for similar programs.

## APPENDIX E: AWS CODE QUALIFICATION PRACTICAL EXAMS

**Measuring Description:**

This is a national qualification practical exam approved by the AWS. The program has utilized these practical exams since 1996 and find them to be reliable and valid. AWS regularly monitors the performance of all exams to ensure the validity of exam results. The mission of AWS is to advance the science, technology, and application of welding and allied joining and cutting processes worldwide.

AWS qualifications are industry-recognized credentials that validate our program students’ knowledge and enhance their credibility across multiple industries. The need for well-trained personnel to perform AWS tasks in the field is of paramount importance. Students passing our AWS qualification practical exams demonstrate to colleagues, employers, business partners, and customers that they possess the skills necessary to use AWS in a variety of high skill, high demand areas.

Practical exams are administered for each of the following AWS approved common welding types, or methods: Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding-Self Shielded (FCAW-S), Flux Cored Arc Welding-Gas Shielded (FCAW-G), Gas Tungsten Arc Welding (GTAW). Each exam is hands-on and laboratory-based. Practical exams are administered in strict accordance with AWS D1.1/D1.1 and AWS D1.2 (or most current) codes. The exam tool must be strictly proctored and graded by program faculty that are AWS CWIs.

**How to interpret the data collected:**

For both program objectives and student learning outcomes, the data provides very accurate results. Tests are administered and scored internally. Result data is known within 1-2 days after the exams are administered. Analysis is based on reflection by program faculty and is used as a tool in guiding future instructional methodologies as needed.

The exam results also provide data that allows UAA student practical exam passage rates to be compared to those on a national level for similar programs.

## APPENDIX F: API CODE QUALIFICATION PRACTICAL EXAMS

**Measuring Description:**

This is a national qualification practical exam approved by the API. The program has utilized these practical exams since 1996 and find them to be reliable and valid. API regularly monitors the performance of all exams to ensure the validity of exam results. The API serves as the country's foremost trade association for the oil and natural gas industries. API also maintains certification programs for producers, drillers, refiners and other petroleum workers. Within these programs, API welding certification tests the skills of pipeline welders and ensures that they follow safety standards. API welding qualification and certification focuses on assessing pipeline welders or welders who work on large-scale petroleum transferring pipe systems such as the Alaska Pipeline. This also pertains to welders that work on petroleum vessels, including oil storage tanks and carbon dioxide spheres used in the oil and gas industries.

API welding qualification revolves around the API 1104 code. API 1104 details welding procedures for welds with filler-metal, explains design and prep techniques for joint and production welding and provides instructions for automatic welding procedures without the use of filler metals. API qualifications are industry-recognized credentials that validate our program students’ knowledge and enhance their credibility across multiple industries. The need for well-trained personnel to perform API tasks in the field is of paramount importance. Students passing our API qualification practical exams demonstrate to colleagues, employers, business partners, and customers that they possess the skills necessary to use API in a variety of high skill, high demand areas.

Practical exams are administered for the following API approved common welding type, or method: SMAW. Each exam is hands-on and laboratory-based. Practical exams are administered in strict accordance with API 1104 (or most current) code. The exam tool must be strictly proctored and graded by program faculty that are AWS CWIs or API Tank Inspectors.

**How to interpret the data collected:**

For both program objectives and student learning outcomes, the data provides very accurate results. Tests are administered and scored internally. Result data is known within 1-2 days after the exams are administered. Analysis is based on reflection by program faculty and is used as a tool in guiding future instructional methodologies as needed.

The exam results also provide data that allows UAA student practical exam passage rates to be compared to those on a national level for similar programs.

## APPENDIX G: SUMMATIVE MEASURES

**Measuring Description:**

Summative assessments are used by the program to evaluate, measure, and document the academic readiness, learning progress, and skill acquisition of students. Program faculty strongly support a variety of assessment types that support student scholarship throughout the learning process.

Summative assessments are utilized to identify both concepts and technical skills that students are struggling with, and student learning outcomes not yet achieved. Program faculty use this knowledge to make needed adjustments in lessons, instructional techniques, as well as to provide academic support that target these areas. These assessments also provide important feedback to students on an individual basis related to areas needing improvement in performance.

As a subset of inquiry learning, program faculty integrate a variety of project-based learning assessment tools through laboratory experiments and final projects, written technical reports, and presentations. Each of these allow students to become more engaged in learning when they are given the opportunity to dig into challenging, complex, and even ‘messy’ problems that more closely resemble real-life in their chosen field. While these measures can vary widely in scope and subject matter, they also place the student into an active learning role, including as the problem-solver, decision-maker, investigator, or documentarian.

Summative assessments, including project-based learning opportunities, encourage active inquiry and higher-level thinking. These stem from challenging questions that cannot be answered by rote learning alone. Students are provided opportunities to acquire enhanced understanding of the ‘how, what, when and why’ of classroom-based technical knowledge through meaningful problem-solving activities and investigations that culminate in authentic projects, and products. Key objectives of this form of measurement include different levels of student inquiry and, ultimately, the construction of new knowledge by the students. Students typically choose what course-related topic to study through projects, reports, and presentations. Because they design these projects, students pursue topics of interest that also engage their curiosity. In this way, students may investigate topics not originally identified by the faculty member as a learning goal.

Benefits of this measurement tool include the following: Increased attendance; access to a broader range of learning opportunities; opportunities to develop complex skills, such as higher-order thinking and problem-solving skills, collaborating, and communication; academic gains.

**Factors that affect the collected data:**

Program students are not required to complete a technical writing course, nor are they required to complete a communications course geared toward public speaking or presentations. Finally, program students are not required to complete a mathematics course above MATH 105. There are concerns that compiled data may be skewed using this measurement because some students may not be good at technical writing, work well in groups, exhibit project presentation anxiety, or possess the necessary math skills required for a number of courses in the program.

Program faculty currently do not collaborate with colleagues outside of the Transportation & Power Division to develop interdisciplinary project or report ideas. On a program level, integration of technology where appropriate also has not been a consistent feature of this measurement tool.

**How to interpret the data:**

The overall objective is to determine if student learning outcomes are being met for each of our courses. To determine this, data is reviewed by individual course faculty to determine the progress of each student, and the overall progress of each class as a whole. This information then is analyzed by program faculty to assess possible revisions in teaching methodologies and, if needed, curriculum revision. For both program objectives and student learning outcomes, the data provides very accurate results.

## APPENDIX H: INDIVIDUAL PROGRAM MEASURES

**Table 1: Welding Occupational Endorsement**

***(\*Industry Qualification Approved for Eligible Students)***

| **Course Description** | **Measures** | **Industry Standard/Code(s)** |
| --- | --- | --- |
| WELD A112: Shielded Metal Arc Welding | \*SMAW 3F, 4F | AWS D1.1/D1.1 (Most Current) |
| WELD A157: Technical Drawings for Welders | Summative assessments, including project-based learning, written technical reports, laboratory experiments, and presentations | N/A |
| WELD A161: Gas Metal Arc Welding | \*2G, 3G, 4G GMAW | ASME BPVC, Section IX (Most Current) |
| WELD A162: F**l**ux Cored Arc Welding | \*3G, 4G 1" FCAW-S \*3G, 4G .375" FCAW-S \*3G, 4G, 1" FCAW-G \*3G, 4G .375" FCAW-G | AWS D1.1/D1.1(Most Current) |
| WELD A174: Gas Tungsten Arc Welding | \*GTAW-3 1G Aluminum\*GTAW-2 1G Stainless\*GTAW-1 1G Carbon Steel | AWS D1.2 ASME BPVC, Section IX (Most Current) |

**Table 2: Nondestructive Testing Occupational Endorsement**

***(\*Industry Qualification & Certification Approved for Eligible Students)***

| **Course Description** | **Measures** | **Industry Standard/Code(s)** |
| --- | --- | --- |
| WELD A112: Shielded Metal Arc Welding | \*SMAW 3F, 4F | AWS D1.1/D1.1(Most Current) |
| WELD A261: Ultrasonic Testing | \*Letter Equivalent to the ASNT Recommended Practice Exam | ANSI/ASNT CP-106ASNT-SNT-TC-1A(Most Current) |
| WELD A262: General Nondestructive Testing | \*Letter Equivalent to the ASNT Recommended Practice Exam | ANSI/ASNT CP-106ASNT-SNT-TC-1A(Most Current) |
| WELD A263: Radiographic Testing WELD A264: Safety/Radiographic Testing | \*Letter Equivalent to the ASNT Recommended Practice Exam | ANSI/ASNT CP-106ASNT-SNT-TC-1A(Most Current) |

**Table 3: Advanced Welding Occupational Endorsement Industry Qualification List**

***(\*Industry Qualification Approved for Eligible Students)***

| **Course Description** | **Measures** | **Industry Standard/Code(s)** |
| --- | --- | --- |
| Weld A112: Shielded Metal Arc Welding | \*SMAW 3F, 4F | AWS D1.1/D1.1(Most Current) |
| Weld A114: Welding of High Strength Steels | \*SMAW 3G, 4G 1" \*SMAW 3G, 4G .375" | AWS D1.1/D1.1(Most Current) |
| Weld A117: Basic Pipefitting | Summative assessments, including project-based learning, written technical reports, laboratory experiments, and presentations | N/A |
| WELD A121: Pipe Vertical-Down SMAW | \*6G \*6G Combo | API 1104(Most Current) |
| WELD A122: Pipe Welding Vertical-Up SMAW | \*API 6.3 Unlimited | API 1104(Most Current) |

**Table 4: Associate of Applied Science in Welding and Nondestructive Testing Technology**

***(\*Industry Qualification & Certification Approved for Eligible Students)***

| **Course Description** | **Measures** | **Industry Standard/Code(s)** |
| --- | --- | --- |
| WELD A112: Shielded Metal Arc Welding | \*SMAW 3F, 4F \*SMAW 3G, 4G 1" \*SMAW 3G, 4G .375" | AWS D1.1/D1.1 (Most Current) |
| WELD A117: Basic Pipefitting | Summative assessments, including project-based learning, written technical reports, laboratory experiments, and presentations | N/A |
| WELD A121: Pipe Vertical-Down SMAW | \*6G \*6G Combo | API 1104 (Most Current) |
| WELD A122: Pipe Welding Vertical-Up SMAW | \*API 6.3 Unlimited | API 1104 ASME BPVC, Section IX (Most Current) |
| WELD A157: Technical Drawings for Welders | Summative assessments, including project-based learning, written technical reports, laboratory experiments, and presentations | N/A |
| WELD A161: Gas Metal Arc Welding | \*2G, 3G, 4G GMAW | ASME BPVC, Section IX (Most Current) |
| WELD A162: Flux Cored Arc Welding | \*3G, 4G 1" FCAW-S \*3G, 4G .375" FCAW-S \*3G, 4G, 1" FCAW-G \*3G, 4G .375" FCAW-G  | AWS D1.1/D1.1 (Most Current) |
| WELD A174: Gas Tungsten Arc Welding | \*GTAW-3 1G Aluminum \*GTAW-2 1G Stainless \*GTAW-1 1G Carbon Steel | AWS D1.2 ASME BPVC, Section IX (Most Current) |
| WELD A261: Ultrasonic Testing | \*Letter Equivalent to the ASNT Recommended Practice Exam | ANSI/ASNT CP-106 ASNT-SNT-TC-1A (Most Current) |
| WELD A262: General Nondestructive Testing | \*Letter Equivalent to the ASNT Recommended Practice Exam | ANSI/ASNT CP-106 ASNT-SNT-TC-1A (Most Current) |
| WELD A263: Radiographic Testing Safety WELD A264: Radiographic Testing | \*Letter Equivalent to the ASNT Recommended Practice Exam | ANSI/ASNT CP-106 ASNT-SNT-TC-1A (Most Current) |
| WELD A281: Weld Inspection & Code Review | Summative assessments, including project-based learning, written technical reports, laboratory experiments, and presentations | N/A |
| WELD A287: Metallurgy Applications | Summative assessments, including project-based learning, written technical reports, laboratory experiments, and presentations | N/A |

## APPENDIX I: COURSE SUMMARIES

WELD A112 includes industry recognized qualifications in Shielded Metal Arc Welding (SMAW) at both the 3F and 4F certification levels for eligible students. These qualifications are in accordance with the standards set forth by AWS D1.1/D1.1 “Structural Welding Code – Steel.”

WELD A114 includes industry recognized qualifications in Shielded Metal Arc Welding (SMAW) at both the 3G and 4G Unlimited certification levels for eligible students. These qualifications are in accordance with the standards set forth by AWS D1.1/D1.1 “Structural Welding Code – Steel.”

WELD A117 includes a variety of measures utilized by course instructors to track concept/content mastery and student learning outcomes through formative (individual daily/weekly assignments and quizzes), interim (periodic small group exercises and classroom exams), and summative (unit and final exams, capstone projects) assessments.

Both WELD A121 and Weld A122 are focused on pipe welding. Industry qualifications are provided to eligible students who successfully pass examinations given by certified faculty members. Qualifications awarded meets the standards set forth by API 1104: “Standard for Welding Pipelines and Related Facilities” and ASME BPVC, Section IX.

WELD A157 includes a variety of measures utilized by course instructors to track concept/content mastery and student learning outcomes through formative (individual daily/weekly assignments and quizzes), interim (periodic small group exercises and classroom exams), and summative (unit and final exams, capstone projects) assessments.

WELD A161 includes industry recognized qualifications in Gas Metal Arc Welding (GMAW) for 2G, 3G, and 4G for eligible students. Testing procedures and student qualifications are based on American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC), Section IX.

WELD A162 includes industry recognized qualifications for eligible students in Flux Cored Arc Welding that meets the standards of AWS D1.1/D1.1 “Structural Welding Code – Steel.”

WELD A174 includes industry recognized qualifications for eligible students in Gas Tungsten Arc Welding that meet the requirements of both AWS D1.1/D1.1 “Structural Welding Code – Steel” and American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC), Section IX.

WELD A261, WELD A262, WELD A263, and WELD A264 meet training and certification requirements for the ASNT under both ANSI/ASNT CP-105, “ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel” and ANSI/ASNT CP-106, “Nondestructive Testing - Qualification and Certification of Personnel.” ASNT recognizes UAA as an approved training center for nondestructive testing technicians in accordance with ANSI/ASNT CP-105, “ASNT Standard Topical Outlines for Qualification of Nondestructive Testing Personnel.”. UAA’s certified welding faculty issue examinations in WELD A261, WELD A262, WELD A263, and WELD A264 based on the standards set forth by the ASNT in accordance with ANSI/ASNT CP-106, “Nondestructive Testing - Qualification and Certification of Personnel.” The UAA letters of completion offered for eligible students are recognized nationally and required for individuals to advance beyond the “Trainee” level in this field.

WELD A281 includes a variety of measures utilized by course instructors to track concept/content mastery and student learning outcomes through formative (individual daily/weekly assignments and quizzes), interim (periodic small group exercises and classroom exams), and summative (unit and final exams, capstone projects) assessments.

WELD A287 includes a variety of measures utilized by course instructors to track concept/content mastery and student learning outcomes through formative (individual daily/weekly assignments and quizzes), interim (periodic small group exercises and classroom exams), and summative (unit and final exams, capstone projects) assessments.

## APPENDIX J: INDUSTRY STANDARD & CODE SUMMARY

ANSI/ASNT CP-105: “RECOMMENDED PRACTICE NO. SNT-TC-1A” and “ASNT STANDARD TOPICAL OUTLINES FOR QUALIFICATION OF NONDESTRUCTIVE TESTING PERSONNEL”

Recommended Practice No. SNT-TC-1A: “Personnel Qualification and Certification in Nondestructive Testing” provides guidelines for employers to establish in-house certification programs for the qualification and certification of nondestructive testing personnel. Nondestructive testing personnel shall be certified to Level I, II or III in accordance with the recommendations of American Society for Nondestructive Testing, Recommended Practice No. SNT-TC-1A.

ANSI/ASNT CP-106: “NONDESTRUCTIVE TESTING – QUALIFICATION AND CERTIFICATION OF PERSONNEL”

This document was prepared by the ASNT, and approved by the ASNT Standards Development Committee, a consensus body organized in accordance with the requirements of the American National Standards Institute (ANSI) for Standards Developing Organizations. The purpose of developing this document is to provide the United States with an American National Standard for certification on nondestructive testing personnel.

AWS D1.1/D1.1: “STRUCTURAL WELDING CODE – STEEL”

This code covers the welding requirements for any type of welded structure made from the commonly used carbon and low-alloy constructional steels. Clauses 1 through 9 constitute a body of rules for the regulation of welding in steel construction. There are nine normative and eleven informative annexes in this code.

API 1104: “STANDARD FOR WELDING PIPELINES AND RELATED FACILITIES”

The purpose of this standard is to present methods for the production of high-quality welds through the use of qualified welders using approved welding procedures, materials, and equipment. Its purpose is also to present inspection methods to ensure the proper analysis of welding quality through the use of qualified technicians and approved methods and equipment. It applies to both new construction and in-service welding.

ASME BOILER AND PRESSURE VESSEL CODE (BPVC), SECTION IX

The International Boiler and Pressure Vessel Code establishes rules of safety governing the design, fabrication, and inspection of boilers and pressure vessels, and nuclear power plant components during construction. A pressure component designed and fabricated in accordance with this standard will have a long, useful service life, and one that ensures the protection of human life and property.

SECTION IX: “WELDING AND BRAZING QUALIFICATIONS” of the ASME BPVC contains rules relating specifically to the qualification of welding and brazing procedures as required by other BPVC Sections. It also covers rules relating to the qualification of welders, brazers, and welding and brazing operators who are required to perform welding or brazing in component manufacturing.