

# WELDING & METAL FABRICATION (WMET), AAS

At Dunwoody College of Technology, the Welding & Metal Fabrication program provides students with the unique opportunity to combine skills from both welding and machining. Students gain the entry-level skills and theoretical knowledge to machine parts, layout assemblies for fabrication, weld assemblies, and finish weldments utilizing various welding processes and machine tools.

Graduates from this program are prepared to enter the industry as welders, fabricators, machinists, and machine operators.

The course of study includes: manual milling and turning; measurement and materials; job planning and layout; metallurgy; oxygen-fuel welding and cutting; shielded metal arc welding (SMAW-stick); gas metal arc welding (GMAW-MIG); gas tungsten arc welding (GTAW-TIG); and the various fabrication processes.

The program's curriculum is closely aligned with standards set forth by National Institute of Metalworking Skills (NIMS) and the American Welding Society (AWS).

Arts & Sciences curriculum supports the technical coursework by enhancing the students' communication, mathematics, and critical thinking skills.

A shorter certificate option (<https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/robotics-manufacturing/welding-technology-certificate/>) that focuses only on welding is also available.

**Credential Earned:** AAS

**Length of Program:** 2 years (4 semesters)

**Classes Offered:** Day

**Available Starts:** Fall Semester

**Bachelor's Completion Option(s):** Industrial Engineering Technology (IENG), Bachelor of Science (<https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/engineering/industrial-engineering-technology-ieng-bachelor-science/>) | Business Management Leadership (AMGT), Bachelor of Science (<https://catalog.dunwoody.edu/catalog-student-handbook/academic-programs/engineering/industrial-engineering-technology-ieng-bachelor-science/>)

## Program Outcomes

- Demonstrate required industry safety standards.
- Interpret welding blueprints and symbols.
- Fabricate weldments using multiple processes and positions.
- Analyze weldments for quality.
- Create professional documentation using appropriate methods.
- Develop a relationship between fit, form, and function using ergonomics to ensure a working product.
- Demonstrate proper use of manufacturing and fabrication equipment.

## Degree Requirements

Code	Title	Credits
<b>General Requirements</b>		
ARTS1000	Introduction to Drawing	3
MATH1010	Algebra I	3

MATH1020	Algebra II	3
Communications		3
Social Sciences		3
General Science Elective		3
<b>Technical Requirements</b>		
MACH1110	Machine Tool Fundamentals Lab	5
MACH1120	Machine Tool Fundamentals Theory	4
MDES1110	Engineering Drawings with SolidWorks	4
MDES2130	Advanced SolidWorks	4
WELD1110	Introduction to Welding Lab	5
WELD1120	Introduction to Welding Theory	4
WELD1130	Welding Math, Prints & Symbols	4
WELD1210	Advanced Welding Lab	5
WELD1220	Advanced Welding Theory	4
WELD2210	Welding & Metal Fabrication Lab	5
WELD2221	Weld Fabrication & Production	8
<b>Total Credits</b>		<b>70</b>

## Courses

### Descriptions

#### **MACH1110 | Machine Tool Fundamentals Lab | Laboratory (5 Credits)**

Manufacturing of parts through layout and bench work, includes the use of band saws, drill presses, surface grinders, manual lathes and vertical mills. Basic principles in metal-cutting technology includes threading, tapers, knurling, boring, radii cutting and milling procedures such as squaring stock, the use of rotary table and the many other milling and turning operations.

**Corequisite(s):** MACH1120

#### **MACH1120 | Machine Tool Fundamentals Theory | Lecture (4 Credits)**

Identification, recognition and calculations associated with basic principles in metal-cutting technology including machine feeds and speeds, threading, tapers, knurling, boring, radii cutting and milling and turning procedures.

**Corequisite(s):** MACH1110

#### **MDES1110 | Engineering Drawings with SolidWorks | Lecture (4 Credits)**

Creation of 3D solid models, assemblies and related engineering documentation using SolidWorks. Blueprint reading and application of ASME/ANSI standards to CAD drawings.

#### **MDES2130 | Advanced SolidWorks | Lecture (4 Credits)**

Simulation (Finite Element Analysis) and advanced surface modeling techniques. Culminates in testing for CSWA certification.

**Prerequisite(s):** MDES1110

#### **WELD1110 | Introduction to Welding Lab | Laboratory (5 Credits)**

Perform welding of standard joint designs on various thicknesses of steel plate. Practice oxyacetylene welding and cutting (OAW), stick welding (SMAW), and wire feed welding (GMAW). Introduction to tungsten inert gas (TIG) welding. Demonstrate shop safety, setup and troubleshooting of welding equipment and applications.

**Corequisite(s):** WELD1120 WELD1130

**WELD1120 | Introduction to Welding Theory | Lecture (4 Credits)**

Identification, recognition and calculations associated with weld joint designs and weld materials. Examine various weld processes: oxyacetylene welding and cutting (OAW), stick welding (SMAW), wire feed welding (GMAW). Introduction to tungsten inert gas (TIG) welding. Examine shop safety, setup and troubleshooting of welding equipment and applications.

**Corequisite(s):** WELD1110 WELD1130

**WELD1130 | Welding Math, Prints & Symbols | Lecture (4 Credits)**

Principles of weld print reading, measuring systems, decimal/fraction conversions, dimensioning, layout, orthographic views, technical math, and section views.

**Corequisite(s):** WELD1110 WELD1120

**WELD1210 | Advanced Welding Lab | Laboratory (5 Credits)**

Practice welding of steel plate and aluminum alloys using stick welding (SMAW), wire feed welding (GMAW) and tungsten inert gas (TIG) welding. Demonstrate shop safety, grinding, finishing, and cutting practices in a final fabrication project.

**Prerequisite(s):** WELD1110

**WELD1220 | Advanced Welding Theory | Lecture (4 Credits)**

Identification, recognition and calculations associated with weld joint designs, weld gasses, and metallurgy. Examine various weld processes including oxyacetylene welding and cutting (OAW), stick welding (SMAW), wire feed welding (GMAW), and tungsten inert gas (TIG) welding. Examine shop safety, setup and troubleshooting of welding equipment and applications.

**Prerequisite(s):** WELD1120

**WELD2210 | Welding & Metal Fabrication Lab | Laboratory (5 Credits)**

The identification, maintenance and setup of welding and fabrication tools to perform layout, fixturing, forming, cutting and finishing of real-world weldments and assemblies. Utilize all aspects of prior coursework to design and build projects using multiple tools.

**Prerequisite(s):** WELD1210

**WELD2221 | Weld Fabrication & Production | Lecture (8 Credits)**

Identification, recognition, and calculations associated with the layout, fixturing, forming, cutting, and finishing of real-world weldments and assemblies. Explore optimal production, project management techniques, and principles of lean manufacturing. Study the properties of metals and how these properties are affected by the heat of welding, brazing, and hard surfacing.

**ARTS1000 | Introduction to Drawing | Lecture (3 Credits)**

Analyze basic drawing concepts and techniques through demonstrations, discussions, critiques, slide lectures, and the use of a sketchbook. Work from observation using line, tone and other elements of art to solve spatial, compositional and light problems to accurately render the illusion of 3-dimensional form on a 2-dimensional surface.

**General Education:** Humanities

**MATH1010 | Algebra I | Lecture (3 Credits)**

Foundational algebra is applied in the context of geometry and trigonometry. Topics include rules of exponents, simplifying expressions, solving equations, computing measurements of two and three dimensional shapes, solving right triangles, and solving oblique triangles.

**General Education:** Mathematics

**MATH1020 | Algebra II | Lecture (3 Credits)**

Algebraic and trigonometric skills are developed further. Topics include, functions, graphing, factoring, advanced solving techniques, systems of linear equations, coordinate trigonometry, and vectors.

**Prerequisite(s):** MATH1010

**General Education:** Mathematics