

# Welding and Fabrication Technology

(A division of the Mechanical Engineering Department)



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## Welding and Fabrication Technology

The program of Welding Fabrication and Technology prepares students for a wide range of careers in a high-demand, rapidly growing and changing industry.

The demand for skilled and trained professionals is growing and increasing. Welding is a skill in high demand from a variety of industries: sheet metal workers, ironworkers, oil/natural gas industry, boilermakers, carpenters, marine construction, repair and maintenance personnel in applications ranging from artistic applications to fabrication of large structures and products (buildings, bridges, ships, etc.). As a welder, you may work for shipyards, manufacturers, contractors, federal or state government agencies, firms requiring maintenance mechanics, etc. Graduates may also find careers in management, sales and service areas.

The Welding Fabrication and Technology Program offers the following degree, minor and cluster options:

- 4 – Year Bachelor of Science in Welding Fabrication and Technology Management (474)
- 2 – Year Associate of Applied Science in Welding Fabrication and Technology (374)
- Minor in Welding Fabrication and Technology (217)
- Cluster in Welding (6302)

The 4-year Bachelor of Science program in Welding and Fabrication Technology Management (474) adds a curriculum of business management fundamentals to complement the technical courses offered in the associate program (374), providing graduates with increased career opportunities. The Bachelor of Science program in Welding and Fabrication Technology Management is available on the Fall/Winter and Winter/Spring tracks.

The 2-year associate program in Welding and Fabrication Technology (374) provides hands-on training in welding and manufacturing processes. The curriculum includes a solid foundation in welding theory, manufacturing processes, and material science. This program develops skills leading to welder certification and is designed for immediate employment in the welding, manufacturing, or fabrication industries. This program also prepares students to transfer to another institution to pursue a 4-Year degree in Welding Engineering Technology. The associate program in Welding and Fabrication Technology is available on the Fall/Winter and Winter/Spring tracks.

## Student Outcomes

Program Outcomes for the baccalaureate degree in welding and fabrication technology management are as follows. Students will:

1. Execute the correct welding process for a given application. [Welding Processes]
2. Accurately interpret and apply welding inspection procedures and code standards. [Inspection and Codes]
3. Apply the laws of physical science and math to fundamental design and fabrication problems. [Fundamentals]
4. Design, model, and fabricate components using modern CAD/CAM and other software tools and appropriate manufacturing processes. [CAD/CAM Tools]
5. Competently present technical findings in both oral and written format. [Communication]
6. Function as a contributing team member in a technical work environment. [Team Work]
7. Select the appropriate welding process for an application. [Process Selection]
8. Understand how to leverage technology in business to improve productivity, communication, and customer service. [Technological Literacy]
9. Understand international trade and financial systems. Core sources in marketing and organizational behavior will address cross-cultural issues. [Global Literacy]
10. Develop quantitative reasoning skills by utilizing business software and web-based applications to solve finance, marketing, and operational problems. [Quantitative Analysis]
11. Learn sound principles required to successfully operate and grow a business venture. [Entrepreneurial Spirit]
12. Learn and apply ethical principles in industry/business settings. [Ethics]

## General Information

Mathematics and physical sciences are critical components of any manufacturing technology curriculum. The normal entry-level mathematics class for the welding programs is Pre-Calculus (FDMAT 109) or College Algebra (FDMAT 110). Entering freshman students should consult with their advisor to ensure they are beginning with the mathematics course for which they are prepared. Students with weak mathematics skills are advised to enroll in a preparatory mathematics course to strengthen their skills. The normal entry-level chemistry course is Introduction to General Chemistry (Chem 101).

It is imperative that students develop and follow a plan of study that will allow them to complete all the required courses within the credit hour limits. Students should consult with their advisor/mentor early to make sure their educational plan is correct. Sample curriculum flow charts can be found on the department web page at

<http://www2.byui.edu/MechEngr/>.

## Welding

Brigham Young University-Idaho 2013-2014

### AAS in Welding and Fabrication Technology (374)

Take required Foundations courses (17 credits)

#### Major Requirements

*No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses*

Core Courses		Program Notes:
<i>Take these courses:</i>		
CHEM 101	3	
CHEM 101L	1	
MATH 111	2	
ME 101	1	
ME 172	3	
ME 231	3	
ME 250	3	
ME 299	1	
ME 332	3	
PH 105	4	
WELD 101	3	
WELD 120	3	
WELD 123	3	
WELD 229	3	
WELD 280	3	
WELD 350	3	
	42	

**Total Major Credits=42**

**Additional Elective Credits Required for Graduation=1**

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- NO

### BS in Welding and Fabrication Technology Management (474)

Take required Foundations courses

#### Major Requirements

*No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses*

Entry Courses	Core Courses	Supplemental Courses	Program Notes:
<i>Take these courses your first 2 semesters:</i>			
ME 172	3	B 398	2
ME 231	3	ME 299	1
WELD 101	3	ME 398R	1
	9		1
	ACCTG 180		
	3		
	B 101		
	3		
	B 301		
	3		
	B 321		
	3		
	B 341		
	3		
	B 361		
	3		
	CHEM 101		
	3		
	ECON 150		
	3		
	MATH 111		
	2		
	MATH 221A		
	3		
	ME 250		
	3		
	ME 331		
	3		
	ME 332		
	3		
	PH 105		
	4		
	WELD 120		
	3		
	WELD 123		
	3		
	WELD 229		
	3		
	WELD 280		
	3		
	WELD 350		
	3		
	57		

**Total Major Credits=67**

**Additional Elective Credits Required for Graduation=13**

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- NO

## Welding

Brigham Young University-Idaho 2013-2014

### Minor in Welding and Fabrication Technology (217)

#### Major Requirements

*No Double Counting of Major Courses - Students must maintain a minimum grade of C- in their major courses*

<b>Core Courses</b>		<b>Technical Electives</b>	<b>Program Notes:</b>	
<i>Take these courses:</i>		<i>Take 7 credits:</i>	<p><i>*FDMAT 110 need to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.</i></p>	
ME 231	3	CHEM 101		3
WELD 101	3	CHEM 101L		1
WELD 120	3	FDMAT 110		3
WELD 123	3	Math 111		2
WELD 280	3	ME 172		3
	<u>15</u>	ME 250		3
		ME 332		3
		WELD 229		3
		WELD 350		<u>3</u>
			7	

**Total Minor Credits=22**

This major is available on the following tracks:

Fall-Winter---- YES Winter-Spring---- YES Spring-Fall---- NO

#### Pre-approved Clusters

<b>Welding Cluster</b>	<b>6302</b>
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*Take these courses:*

WELD 101	Welding Fundamentals	3
WELD 123	Advanced Welding Processes	3

*Take 6 credits:*

ME 172	Visualization in Engineering Design	3
ME 231	Manufacturing Processes 1	3
WELD 120	Gas Tungsten Arc Welding	3
WELD 229	Code, Certification & Inspection	3
WELD 280	Welding Fabrication	<u>3</u>
	<b>Total Credits</b>	<b>12</b>

<b>Fabrication Cluster</b>	<b>6303</b>
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*Take these courses:*

ME 172	Visualization in Engineering Design	3
ME 231	Manufacturing Processes 1	3
WELD 101	Welding Fundamentals	3

*Take 3 credits:*

ME 331	Manufacturing Processes 2	3
ME 332	Advanced CNC	3
WELD 120	Gas Tungsten Arc Welding	3
WELD 123	Advanced Welding Processes	<u>3</u>
	<b>Total Credits</b>	<b>12</b>

**Course Descriptions****Credits\*****WELD 101 Welding Fundamentals****(3:3:12)**

Total Course Fees: \$30.00

A course in beginning welding designed to teach the fundamentals of arc welding including: safety, power sources, electrodes, oxyfuel cutting, and oxyacetylene welding with an introduction to weld symbols, metallurgy, and metal identification.

(Fall, Winter, Spring)

**WELD 120 Gas Tungsten Arc Welding****(3:2:4)**

Prerequisites: WELD 101; ME 105

Gas tungsten arc welding of carbon steel, stainless steel, and aluminum alloys. Students will be given instruction on theory and application for welding in all positions using the AWS EG3 standards.

(Fall, odd years, Spring, even years)

**WELD 123 Advanced Welding Processes****(3:2:4)**

Prerequisites: WELD 101; ME 105

Continued proficiency in the use of arc welding processes in accordance with AWS EG2 (qualifications of welding personnel). This is a competency-based curriculum detailing acceptable skill requirements for entry level welders.

(Fall, even years, Spring)

**WELD 229 Code, Certification and Inspection****(3:2:4)**

Prerequisites: WELD 123

Welding procedure, specification, and qualification according to standards of AWS D1.1, ASME Section IX, and API 1104. Interpretation of weldments, NDT inspection methods, and required reports, in accordance with AWS EG4 requirements.

(Winter)

**WELD 280 Welding Fabrication****(3:2:4)**

Prerequisites: WELD 123

The use and application of equipment, tools, fasteners, and processes used in fabrication practices in the welding industry. Interpretation of drawings for fabrication of small projects. Techniques for layout, fitting, squaring, tacking, and fabricating will be developed.

(Winter)

**WELD 350 Physical Metallurgy****(3:2:2)**

Prerequisites: ME 250

A study of physical metallurgy of metals with application to welding. Topics include: structure of metals, phase diagrams and phase transformations, strengthening mechanisms, heat treating, heat-affected zone, weldability, solidification principles and testing of metals.

(Winter)