

# Manufacturing Career Cluster

The Manufacturing career cluster focuses on planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance, and process engineering. This career cluster includes occupations ranging from welder and machinist to industrial engineering technician and semi-conductor processing technician.

## Statewide Program of Study: Welding

The Welding Program of Study focuses on the development and use of automatic and computer-controlled machines, tools, and robots that perform work on metal or plastic. CTE learners will learn how to modify parts to make or repair machine tools or maintain individual machines and how to use hand-welding or flame-cutting equipment.



### Secondary Courses for High School Credit

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|----------------|---|
| <b>Level 1</b> | <ul style="list-style-type: none"> <li>Principles of Manufacturing</li> <li>Introduction to Welding</li> </ul>  |
| <b>Level 2</b> | <ul style="list-style-type: none"> <li>Introduction to Film Interpretation of Weldments</li> <li>Welding I</li> <li>Occupational Safety and Environmental Technology I</li> <li>Entrepreneurship I</li> </ul>   |
| <b>Level 3</b> | <ul style="list-style-type: none"> <li>Welding II</li> <li>Welding II + Welding II Lab</li> </ul>   |
| <b>Level 4</b> | <ul style="list-style-type: none"> <li>Practicum in Manufacturing</li> <li>Practicum in Manufacturing + Extended Practicum in Manufacturing</li> <li>Practicum in Entrepreneurship</li> <li>Practicum in Entrepreneurship + Extended Practicum in Entrepreneurship</li> <li>Career Preparation for Programs of Study</li> <li>Career Preparation for Programs of Study + Extended Career Preparation</li> </ul> |

### Aligned Advanced Academic Courses

**Dual Credit** Dual credit offerings will vary by local education agency.

Students should be advised to consider these course opportunities to enrich their preparation. AP or IB courses not listed under the Secondary Courses for High School Credit section of this framework document do not count towards concentrator/completer status for this program of study.

### Work-Based Learning and Expanded Learning Opportunities

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| <b>Work-Based Learning Activities</b>  | <ul style="list-style-type: none"> <li>Job shadow a welder</li> <li>Intern for a local welding company</li> </ul>  |
| <b>Expanded Learning Opportunities</b> | <ul style="list-style-type: none"> <li>Tour a welding shop</li> <li>Participate in SkillsUSA or TSA</li> <li>Participate in a welding project that benefits the community</li> </ul> |

### Aligned Industry-Based Certifications

- API 1104 Welding Pipelines and Related Facilities
- AWS Certified Welder
- AWS D1.1 Structural Steel
- AWS D9.1 Sheet Metal Welding
- AWS SENSE Level I: Entry Welder
- Industrial Technology Maintenance (ITM)
- Maintenance Welding
- NCCER Construction Technology Certification Level I
- NCCER Core
- NCCER Welding Level I
- Welding - Job Ready



### Example Postsecondary Opportunities

#### Apprenticeships

- Welding

#### Associate Degrees

- Welding Technology
- Building/Construction Site Management
- Operations Management and Supervision

#### Bachelor's Degrees

- Welding Technology
- Construction Management
- Project Management
- Building/Construction Site Management

#### Master's, Doctoral, and Professional Degrees

- Engineering
- Engineering/Industrial Management
- Manufacturing Engineering
- Construction Engineering



### Example Aligned Occupations

#### Welders, Cutters, Solderers, and Brazers

Median Wage: \$48,177  
Annual Openings: 6,792  
10-Year Growth: 23%

#### First-Line Supervisors of Production and Operating Workers

Median Wage: \$62,584  
Annual Openings: 5,926  
10-Year Growth: 17%

#### Industrial Production Managers

Median Wage: \$119,691  
Annual Openings: 1,296  
10-Year Growth: 19%

Data Source: TexasWages, Texas Workforce Commission. Retrieved 3/8/2024.



For more information visit:




<https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/programs-of-study-additional-resources>

# Manufacturing Career Cluster
















## Statewide Program of Study: Welding

### Course Information


Level 1

Course	Prerequisites   Corequisites	Career Clusters
<b>Principles of Manufacturing*</b> 13032200 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I or Geometry <b>Recommended Corequisites:</b> None	
<b>Introduction to Welding*</b> 13032250 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I <b>Recommended Corequisites:</b> None	 

Level 2

Course	Prerequisites   Corequisites	Career Clusters
<b>Introduction to Film Interpretation of Weldments</b> N1303687 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I <b>Recommended Corequisites:</b> None	
<b>Welding I*</b> 13032300 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I, Principles of Manufacturing, Introduction to Precision Metal Manufacturing, or Introduction to Welding <b>Recommended Corequisites:</b> None	
<b>Occupational Safety and Environmental Technology I*</b> N1303680 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of Transportation Systems, Principles of Distribution and Logistics, or Principles of Manufacturing <b>Recommended Corequisites:</b> None	  
<b>Entrepreneurship I</b> 13011101 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of Business, Marketing, and Finance <b>Recommended Corequisites:</b> None	         

Level 3

Course	Prerequisites   Corequisites	Career Clusters
<b>Welding II</b> 13032400 (2 credits)	<b>Prerequisites:</b> Welding I <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I or Geometry <b>Recommended Corequisites:</b> None	

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\* Indicates course is included in more than one program of study.

For additional information on the **Manufacturing** career cluster, contact [cte@tea.texas.gov](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>



# Manufacturing Career Cluster

## Statewide Program of Study: Welding

### Course Information

Level 3

Course	Prerequisites   Corequisites	Career Clusters
<b>Welding II + Welding II Lab</b> 13032410 (3 credits)	<b>Prerequisites:</b> Welding I <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Practicum in Manufacturing*</b> First Time Taken: 13033000 (2 credits) Second Time Taken: 13033010 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

<b>Practicum in Manufacturing + Extended Practicum in Manufacturing*</b> First Time Taken: 13033005 (3 credits) Second Time Taken: 13033015 (3 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
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<b>Practicum in Entrepreneurship*</b> First Time Taken: 13011111 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Entrepreneurship I and II or successful completion of at least two courses in a CTE program of study <b>Recommended Corequisites:</b> None	
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<b>Practicum in Entrepreneurship + Extended Practicum in Entrepreneurship*</b> First Time Taken: 13011121 (3 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Entrepreneurship I and II or successful completion of at least two courses in a CTE program of study <b>Recommended Corequisites:</b> None	
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## Statewide Program of Study: Welding

### Course Information

Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Career Preparation for Programs of Study*</b> First Time Taken: 12701121 (2 credits)	<b>Prerequisites:</b> At least one Level 2 or higher CTE course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Career Preparation for Programs of Study + Extended Career Preparation*</b> First Time Taken: 12701141 (3 credits)	<b>Prerequisites:</b> At least one Level 2 or higher CTE course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

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