

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 occupational and educational opportunities associated with the development and use of automatic and computer-controlled machines, tools, and robots that perform work on metal or plastic. This program of study addresses 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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|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level 1 | <ul style="list-style-type: none"> • Introduction to Welding • Principles of Manufacturing |
| Level 2 | <ul style="list-style-type: none"> • Occupational Safety and Environmental Technology I • Introduction to Film Interpretation of Weldments • Welding I • Entrepreneurship I |
| Level 3 | <ul style="list-style-type: none"> • Welding II • Welding II + Welding II Lab |
| Level 4 | <ul style="list-style-type: none"> • Practicum in Entrepreneurship • Practicum in Manufacturing • Practicum in Manufacturing + Extended Practicum in Manufacturing • Career Preparation for Programs of Study • Career Preparation for Programs of Study + Extended Career Preparation |

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 toward Completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

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

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



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>






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Statewide Program of Study: Welding

Course Information



Level 1

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

Level 2

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

Level 3

Course	Prerequisites Corequisites	Career Clusters
Welding II 13032400 (2 credits)	Prerequisites: Welding I Corequisites: None Recommended Prerequisites: Algebra I or Geometry Recommended Corequisites: None	
Welding II + Welding II Lab 13032410 (3 credits)	Prerequisites: Welding I Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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

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



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Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
Practicum in Entrepreneurship First Time Taken: 13011111 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: Entrepreneurship I and Entrepreneurship II or successful completion of at least two courses in a career and technical education (CTE) program of study Recommended Corequisites: None	
Practicum in Manufacturing First Time Taken: 13033000 (2 credits) Second Time Taken: 13033010 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Practicum in Manufacturing + Extended Practicum in Manufacturing* First Time Taken: 13033005 (3 credits) Second Time Taken: 13033015 (3 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Career Preparation for Programs of Study First Time Taken: 12701121 (2 credits)	Prerequisites: at least one Level 2 or higher Career and Technical Education Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Career Preparation for Programs of Study + Extended Career Preparation First Time Taken: 12701141 (3 credits)	Prerequisites: at least one Level 2 or higher Career and Technical Education Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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