

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: Robotics and Automation Technology

The Robotics and Automation Technology program of study focuses on occupational and educational opportunities associated with the assembly, operation, maintenance, and repair of electromechanical equipment or devices. This program of study includes exploration of a variety of mechanical fields, including robotics, refinery and pipeline systems, deep ocean exploration, and hazardous waste removal.



Secondary Courses for High School Credit

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|----------------|--|
| Level 1 | <ul style="list-style-type: none"> Principles of Manufacturing Principles of Applied Engineering |
| Level 2 | <ul style="list-style-type: none"> Robotics I Manufacturing Engineering Technology I Occupational Safety and Environmental Technology I Programmable Logic Controller I |
| Level 3 | <ul style="list-style-type: none"> Robotics II Manufacturing Engineering Technology II Occupational Safety and Environmental Technology II Programmable Logic Controller II Engineering Design and Presentation I |
| Level 4 | <ul style="list-style-type: none"> 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 towards concentrator/completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities

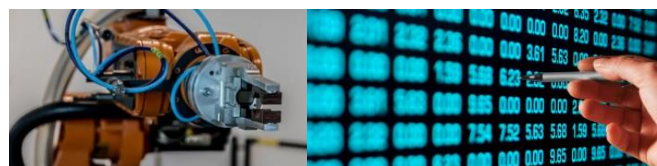
- Intern with a robotics technician working at a manufacturing plant
- Shadow a PLC programmer

Expanded Learning Opportunities

- Tour a manufacturing facility
- Participate in SkillsUSA or TSA
- Build a robot and participate in a robotics competition

Aligned Industry-Based Certifications

- | | |
|---|--|
| <ul style="list-style-type: none"> C-101 Certified Industry 4.0 Associate - Basic Operations C-103 Certified Industry 4.0 Associate - Robot System Operations C-200 Certified Industry 4.0 Automation System Specialist I - 216 Robotic System Integration 1 C-200 Certified Industry 4.0 Automation Systems Specialist I - 208 Programmable Controller Troubleshooting I C-200 Certified Industry 4.0 Automation Systems Specialist I - 215 Robotic Operations I Certified Manufacturing Associate Certified SOLIDWORKS Professional (CSWP) - Additive Manufacturing Certified SOLIDWORKS Professional (CSWP) – CAM CNC Lathe Operations CNC Lathe Set Up and Operations | <ul style="list-style-type: none"> FANUC Robot Operator I FESTO Certified Industry 4.0 Associate Fundamentals Industrial Technology Maintenance (ITM) - Process Control Systems Machining CNC Mill Operations Level I Machining CNC Mill Programming Setup and Operations Level I Machining CNC Milling Skills Level II Machining CNC Turning Level II Certified Logistics Technician (CLT) Certified Production Technician (CPT) 4.0 Lean Six Sigma Green Belt Certification Certified Technician-Supply Chain Automation (CT-SCA) Machining Milling Level I Machining Drill Press Level I Machining Grinding Level I |
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Example Postsecondary Opportunities

Associate Degrees

- Instrumentation Technology
- Industrial Technology
- Robotics Technology
- Automation Engineer Technology

Bachelor's Degrees

- Mechanical Engineering
- Electrical Electronics Engineering
- Electrical, Electronic, and Communications Engineering Technology
- Electromechanical Engineering Technology

Master's, Doctoral, and Professional Degrees

- Mechanical Engineering
- Engineering/Industrial Management
- Industrial Engineering
- Electrical and Electronics Engineering



Example Aligned Occupations

Computer Numerically Controlled Tool Operators

Median Wage: \$46,353
Annual Openings: 1,146
10-Year Growth: 10%

Semiconductor Processing Technicians

Median Wage: \$36,902
Annual Openings: 621
10-Year Growth: 9%

Industrial Engineers

Median Wage: \$100,000
Annual Openings: 1,898
10-Year Growth: 26%

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: Robotics and Automation Technology

Course Information

Level 1

Course	Prerequisites Corequisites	Career Clusters
Principles of Manufacturing* 13032200 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Algebra I or Geometry Recommended Corequisites: None	
Principles of Applied Engineering* 13036200 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

Level 2

Course	Prerequisites Corequisites	Career Clusters
Robotics I 13037000 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Applied Engineering Recommended Corequisites: None	
Manufacturing Engineering Technology I 13032900 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Algebra I Recommended Corequisites: None	
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	
Programmable Logic Controller I N1303689 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Applied Engineering or Principles of Manufacturing Recommended Corequisites: None	

Level 3

Course	Prerequisites Corequisites	Career Clusters
Robotics II 13037050 (1 credit)	Prerequisites: Robotics I Corequisites: None Recommended Prerequisites: None Recommended Corequisites: 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 or visit <https://tea.texas.gov/cte>



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Level 3

Course	Prerequisites Corequisites	Career Clusters
Manufacturing Engineering Technology II 13032950 (1 credit)	Prerequisites: Manufacturing Engineering I Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Occupational Safety and Environmental Technology II* N1303681 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Occupational Safety and Environmental Technology I Recommended Corequisites: None	
Programmable Logic Controller II N1303690 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Applied Engineering or Principles of Manufacturing and Programmable Logic Controllers (PLC) I Recommended Corequisites: None	
Engineering Design and Presentation I 13036500 (1 credit)	Prerequisites: Algebra I Corequisites: None Recommended Prerequisites: Principles of Applied Engineering Recommended Corequisites: None	

Level 4

Course	Prerequisites Corequisites	Career Clusters
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	

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Level 4

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

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