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

Level 1
- Principles of Manufacturing
- Principles of Applied Engineering

Level 2
- Robotics I
- Manufacturing Engineering Technology I
- Occupational Safety and Environmental Technology I
- Programmable Logic Controller I

Level 3
- Robotics II
- Manufacturing Engineering Technology II
- Programmable Logic Controller II
- Engineering Design and Presentation

Level 4
- 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

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

- Applied Industrial Motor Controls
- Applied PLC Technology II: Allen-Bradley/Siemens
- Applied Robotics
- C-101 Certified 4.0 Associate I - Basic Operations
- C-103 Certified 4.0 Associate III - Robot System Operations
- C-200 Certified Industry 4.0 Automation Systems Specialist I - 216 Robotic System Integration 1
- C-200 Certified Industry 4.0 Automation Systems Specialist I - 208 Programmable Controller Troubleshooting 1
- C-200 Certified Industry 4.0 Automation Systems Specialist I - 215 Robotic Operations 1
- Certified Automation Technician Level 1
- Certified Automation Technician Level 2
- Certified Automation Technician Level 3
- Certified Industrial Robotics Programmer (CIRP)
- Certified Industry 4.0 Associate Fundamentals
- Certified Industry 4.0 Technician Level 1
- Certified Industry 4.0 Technician Level 2
- Certified Industry 4.0 Technician Level 3
- Certified Logistics Technician (CLT)
- Certified Manufacturing Associate (CMfgA)
- Certified Mechanical Technician Level 1
- Certified Mechanical Technician Level 2
- Certified Mechanical Technician Level 3
- Certified Process Control Technician Level 1
- Certified Process Control Technician Level 2
- Certified Process Control Technician Level 3
- Certified Production Technician (CPT) 4.0
- Certified Robotics Technician Level 1
- Certified Robotics Technician Level 2
- Certified Robotics Technician Level 3
- Certified SOLIDWORKS Professional (CSWA) - Additive Manufacturing
- Certified SOLIDWORKS Professional (CSWP) - CAM
- Certified Technician-Supply Chain Automation (CT-SCA)
- CNC 5-Axis Mill Setup and Operations
- CNC Lathe Operations
- CNC Milling II
- CNC Turning II
- FANUC Certified Robot Operator with ROBOGUIDE
- FDM Certification for EDU - Level 1
- Fundamentals of PLCs - Allen-Bradley/Siemens
- Fundamentals of Robotics
- I4.0 Smart System Operation
- Industrial Technology Maintenance (ITM) - Process Control Systems
- Lean Six Sigma Green Belt Certification
- CNC Lathe Programming Setup and Operations
- Machining CNC Mill Operations
- Machining CNC Mill Programming Setup and Operations
- Machining Drill Press I
- Machining Grinding I
- Machining Milling I
- Robot Operations I

Successful completion of the Robotics and Automation Technology program of study will fulfill requirements the STEM endorsement if the math and science requirements are met or of the Business and Industry endorsement.

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: $62,156
Annual Openings: 220
10-Year Growth: 10%

Semiconductor Processing Technicians

Median Wage: $35,963
Annual Openings: 592
10-Year Growth: 9%

Industrial Engineers

Median Wage: $102,022
Annual Openings: 1,996
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/m-robotics-and-automation-technology-extendedpptx.pdf

Robotics and Automation Technology

Manufacturing Career Cluster

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 in this career cluster.*

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

Manufacturing Career Cluster

Statewide Program of Study: Robotics and Automation Technology

Course Information

Level 3

Course	Prerequisites | Corequisites	Career Clusters
Manufacturing Engineering Technology II 13032950 (1 credit)	**Prerequisites:** Manufacturing Engineering Technology I **Corequisites:** None **Recommended Prerequisites:** Algebra II, Computer Science I, or physics **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 13036500 (1 credit)	**Prerequisites:** Algebra I and at least one credit in a course from the Engineering career cluster **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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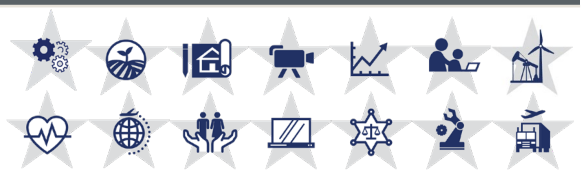
Manufacturing Career Cluster

Statewide Program of Study: Robotics and Automation Technology

Level 4

Course Information

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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