Engineering Career Cluster

The Engineering career cluster focuses on planning, designing, testing, building, and maintaining of machines, structures, materials, systems, and processes using empirical evidence and science, technology, and math principles. This career cluster includes occupations ranging from mechanical engineer and drafter to electrical engineer and to mapping technician.

Statewide Program of Study: Mechanical and Aerospace Engineering

The Mechanical and Aerospace Engineering program of study focuses on occupational and educational opportunities associated with the design, development, maintenance, and testing of engines, machines, and structures related to aircraft and spacecraft. Students will design, test, and evaluate projects related to aerodynamics, structural, and mechanical design. This program of study includes applying scientific, mathematical, and empirical evidence to solve problems related to navigation, mechanics, robotics, propulsion, and combustion.

Secondary Courses for High School Credit

Level 1
- Principles of Applied Engineering
- Engineering Design Process

Level 2
- Aerospace Design I

Level 3
- Engineering Science

Level 4
- Advanced Engineering Design and Presentation



Example Postsecondary Opportunities

Apprenticeships
- Mechanical Engineering Technician Apprenticeship

Associate Degrees
- Mechanical Engineering
- Aeronautics/Aviation/Aerospace Science and Technology, General

Bachelor's Degrees
- Aeronautical/Aerospace Engineering Technology/Technician
- Aeronautics/Aviation/Aerospace Science and Technology, General

Master's, Doctoral, and Professional Degrees
- Electrical and Electronics Engineering
- Aerospace, Aeronautical, and Astronautical/Space Engineering, General

Additional Stackable IBCs/License
- Professional Engineer (PE License)
- Aerospace Engineering Certification

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities	• Intern at an aviation or aerospace company • Shadow a mechanical engineer to understand design and testing processes • Complete a project to test and evaluate a new product design for a local company
Expanded Learning Opportunities	• Tour an aerospace facility • Participate in SkillsUSA or TSA

Aligned Industry-Based Certifications

- Aerospace Manufacturing Certification
- Autodesk Certified Professional in AutoCAD for Design and Drafting
- Autodesk Certified Professional in Civil 3D for Infrastructure Design
- Autodesk Certified Professional in Inventor for Mechanical Design
- Autodesk Certified Professional in Revit for Architectural Design
- Autodesk Certified Professional in Revit for Electrical Design
- Autodesk Certified Professional in Revit for Structural Design
- Autodesk Certified User AutoCAD
- Autodesk Certified User Fusion 360
- Autodesk Certified User Inventor
- Autodesk Certified User Revit
- Certified SOLIDWORKS Additive Manufacturing Associate (CSWA-AM)
- Certified SOLIDWORKS Associate (CSWA) - Academic
- Certified SOLIDWORKS Associate (CSWA) - Electrical
- Certified SOLIDWORKS CAD Design Associate (CSWA) - Academic
- Certified SOLIDWORKS CAD Design Professional (CSWP) - Academic
- Certified SOLIDWORKS Professional (CSWP) - Model Based Design
- Certified SOLIDWORKS Professional (CSWP) - Simulation
- Certified SOLIDWORKS Professional (CSWPA) - Drawing Tools
- Engineering Technology Foundations
- FDM Certification for EDU - Level 1
- Introduction to Aerodynamics
- Introduction to Electricity
- Intuit Design for Delight Innovator
- Lean Six Sigma Green Belt Certification
- Pre-Engineering/Engineering Technology - Job Ready
- Tosa Certification for Autodesk AutoCAD (Advanced or Expert)

Example Aligned Occupations

Aerospace Engineering and Operations Technologists and Technicians
Median Wage: $75,660
Annual Openings: 85
10-Year Growth: 21%

Mechanical Engineers
Median Wage: $103,189
Annual Openings: 1,455
10-Year Growth: 18%

Aerospace Engineers
Median Wage: $127,870
Annual Openings: 429
10-Year Growth: 18%

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/eng-mechanical-and-aerospace-engineering-extended.pdf

Successful completion of the Mechanical and Aerospace Engineering program of study will fulfill requirements of STEM endorsement if the math and science requirements are met or the Business and Industry endorsement.

Texas Education Agency

Mechanical and Aerospace Engineering

Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

Level 1

Course	Prerequisites | Corequisites	Career Clusters
Principles of Applied Engineering* 13036200 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Physics for Engineering* 13037150 (1 credit)	**Prerequisites:** One credit of Algebra I and one credit of chemistry, physics, or Integrated Physics and Chemistry (IPC) **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	
Introduction to Aerospace and Aviation* N1304672 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Introduction to Computer-Aided Design and Drafting* 13037350 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of Applied Engineering, Principles of Architecture and Design, or Principles of Manufacturing **Recommended Corequisites:** None	
Engineering Design Process* 12756001 (1 credit)	**Prerequisites:** Algebra I **Corequisites:** None **Recommended Prerequisites:** Principles of Applied Engineering **Recommended Corequisites:** None	

Level 2

Course	Prerequisites | Corequisites	Career Clusters
Intermediate Computer-Aided Design and Drafting* 13037360 (1 credit)	**Prerequisites:** Architectural Design I, Introduction to Computer-Aided Design and Drafting, or Engineering Design and Presentation **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Aerospace Design I* 12756040 (1 credit)	**Prerequisites:** Algebra I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** Geometry	

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

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

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Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

Level 3

Course Information

Course	Prerequisites | Corequisites	Career Clusters
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	
Engineering Mathematics* 13036700 (1 credit)	**Prerequisites:** Algebra II **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Engineering Science* 13037500 (1 credit)	**Prerequisites:** Algebra I, one credit in biology, and at least one credit in a course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** Geometry, Integrated Physics and Chemistry (IPC), one credit in chemistry, or one credit in physics **Recommended Corequisites:** None	
Mechanical Design I 12756030 (1 credit)	**Prerequisites:** Algebra I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** Geometry	
Aerospace Design II* 12756045 (2 credits)	**Prerequisites:** Geometry and Aerospace Design I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	

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Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

Level 4

Course Information

Course	Prerequisites | Corequisites	Career Clusters
Engineering Design and Problem Solving* 13037300 (1 credit)	**Prerequisites:** Algebra I, Geometry, and at least one credit in a Level 2 or higher course in the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** Engineering Science, chemistry, or physics **Recommended Corequisites:** Engineering Science, chemistry, or physics	
Advanced Engineering Design and Presentation* 13036600 (2 credits)	**Prerequisites:** Algebra I, Geometry, and Engineering Design and Presentation **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Mechanical Design II 12756035 (2 credits)	**Prerequisites:** Mechanical Design I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Career and Technical Education Project-Based Capstone* First Time Taken: 12701101 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Practicum in Engineering* First Time Taken: 12756080 (2 credits) Second Time Taken: 12756090 (2 credits)	**Prerequisites:** Algebra I and Geometry and a minimum of two credits with at least one course in a Level 2 or higher course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Practicum in Engineering + Extended Practicum in Engineering* First Time Taken: 12756085 (3 credits) Second Time Taken: 12756095 (3 credits)	**Prerequisites:** Algebra I and Geometry and a minimum of two credits with at least one course in a Level 2 or higher course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	

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Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

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* First Time Taken: 12701141 (3 credits)	**Prerequisites:** At least one Level 2 or higher CTE course **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Scientific Research and Design* 13037200 (1 credit)	**Prerequisites:** Biology, and one credit of the following: Physics for Engineering, chemistry, Integrated Physics and Chemistry (IPC), or physics **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	

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