

# 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 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

- |                |  |
|----------------|--|
| <b>Level 1</b> | <ul style="list-style-type: none"> <li>Principles of Applied Engineering</li> <li>Principles of Technology</li> <li>Introduction to Computer-Aided Design and Drafting</li> <li>Introduction to Aerospace and Aviation</li> <li>Introduction to Engineering Design (PLTW)</li> <li>Engineering Essentials (PLTW)</li> </ul>  |
| <b>Level 2</b> | <ul style="list-style-type: none"> <li>Intermediate Computer-Aided Design and Drafting</li> </ul>  |
| <b>Level 3</b> | <ul style="list-style-type: none"> <li>Engineering Design and Presentation I</li> <li>Engineering Mathematics</li> <li>Engineering Science</li> <li>Aerospace Engineering (PLTW)</li> <li>Engineering Design and Development (PLTW)</li> <li>Aerospace Design I (TBD)</li> <li>Mechanical Design I (TBD)</li> </ul>  |
| <b>Level 4</b> | <ul style="list-style-type: none"> <li>Engineering Design and Problem Solving</li> <li>Engineering Design and Presentation II</li> <li>Practicum in Science, Technology, Engineering, and Mathematics</li> <li>Practicum in Science, Technology, Engineering, and Mathematics + Extended Practicum in Science, Technology, Engineering, and Mathematics</li> <li>Aerospace Design II (TBD)</li> <li>Mechanical Design II (TBD)</li> <li>Practicum in Engineering (TBD)</li> <li>Career Preparation for Programs of Study</li> <li>Career Preparation for Programs of Study + Extended Career Preparation</li> <li>Scientific Research and Design</li> <li>Career and Technical Education Project-Based Capstone</li> </ul> |

### Aligned Advanced Academic Courses

|                 |  |                               |                                |
|-----------------|--|-------------------------------|--------------------------------|
| <b>AP or IB</b> | AP Calculus AB<br>AP Calculus BC<br>AP Physics 1 | AP Physics 2<br>AP Statistics | IB Physics SL<br>IB Physics HL |
|-----------------|--|-------------------------------|--------------------------------|

**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

|  |   |
|--|---|
| <b>Work-Based Learning Activities</b>  | <ul style="list-style-type: none"> <li>Intern at an aviation or aerospace company</li> <li>Shadow a mechanical engineer to understand design and testing processes</li> <li>Complete a project to test and evaluate a new product design for a local company</li> </ul> |
| <b>Expanded Learning Opportunities</b> | <ul style="list-style-type: none"> <li>Tour an aerospace facility</li> <li>Participate in TSA or SkillsUSA</li> </ul>   |

### Aligned Industry-Based Certifications

- Engineering Technology Foundations
- Lean Six Sigma Green Belt Certification
- Pre-Engineering/Engineering Technology - Job Ready
- Aerospace Manufacturing Certification

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



### 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/Licensures

- Professional Engineer (PE License)
- Aerospace Engineering Certification



### Example Aligned Occupations

#### Aerospace Engineering and Operations Technologists and Technicians

Median Wage: \$48,204  
Annual Openings: 192  
10-Year Growth: 21%

#### Mechanical Engineers

Median Wage: \$99,937  
Annual Openings: 1,755  
10-Year Growth: 18%

#### Aerospace Engineers

Median Wage: \$115,694  
Annual Openings: 483  
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/programs-of-study-additional-resources>



# Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

## Course Information

Level 1

| Course  | Prerequisites   Corequisites   | Career Clusters |
|---|--|-----------------|
| <b>Principles of Applied Engineering*</b><br>13036200 (1 credit)                  | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None   |                 |
| <b>Principles of Technology*</b><br>13037100 (1 credit)                           | <b>Prerequisites:</b> One credit of high school science and Algebra I<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None  |                 |
| <b>Introduction to Computer-Aided Design and Drafting*</b><br>N1303769 (1 credit) | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> principles of Applied Engineering, Principles of Architecture and Design, or Principles of Manufacturing<br><b>Recommended Corequisites:</b> None |                 |
| <b>Introduction to Aerospace and Aviation</b><br>N1304672 (1 credit)              | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None   |                 |
| <b>Introduction to Engineering Design (PLTW)*</b><br>N1303742 (1 credit)          | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None   |                 |
| <b>Engineering Essentials (PLTW)*</b><br>N1303760 (1 credit)                      | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None   |                 |

Level 2

| Course   | Prerequisites   Corequisites   | Career Clusters |
|--|--|-----------------|
| <b>Intermediate Computer-Aided Design and Drafting*</b><br>N1303770 (1 credit) | <b>Prerequisites:</b> Architectural Design I or Introduction to Computer-Aided Design and Drafting<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None |                 |

Level 3

| Course   | Prerequisites   Corequisites  | Career Clusters |
|--|---|-----------------|
| <b>Engineering Design and Presentation I*</b><br>13036500 (1 credit) | <b>Prerequisites:</b> Algebra I and at least one credit in a course from the STEM career cluster<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> Principles of Applied Engineering<br><b>Recommended Corequisites:</b> None |                 |
| <b>Engineering Mathematics*</b><br>13036700 (1 credit)               | <b>Prerequisites:</b> Algebra II<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None  |                 |
| <b>Engineering Science*</b><br>13037500 (1 credit)                   | <b>Prerequisites:</b> Algebra I, one credit in Biology, and at least one credit in a course from the STEM Career Cluster<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> Geometry<br><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 **Engineering** career cluster, contact [cte@tea.texas.gov](mailto: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 Course Information

Level 3

| Course   | Prerequisites   Corequisites  | Career Clusters   |
|--|---|---|
| <b>Aerospace Engineering (PLTW)</b><br>N1303745 (1 credit)               | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> At least one credit in a Level 2 or higher course in the Engineering Career Cluster<br><b>Recommended Corequisites:</b> None |  |
| <b>Engineering Design and Development (PLTW)*</b><br>N1303749 (1 credit) | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> Engineering Design<br><b>Recommended Corequisites:</b> None  |  |
| <b>Aerospace Design I</b><br>TBD (TBD credit)                            | <b>Prerequisites:</b> TBD<br><b>Corequisites:</b> TBD<br><b>Recommended Prerequisites:</b> TBD<br><b>Recommended Corequisites:</b> None   |  |
| <b>Mechanical Design I</b><br>TBD (TBD credit)                           | <b>Prerequisites:</b> TBD<br><b>Corequisites:</b> TBD<br><b>Recommended Prerequisites:</b> TBD<br><b>Recommended Corequisites:</b> None   |  |

Level 4

| Course  | Prerequisites   Corequisites  | Career Clusters   |
|---|---|---|
| <b>Engineering Design and Problem Solving*</b><br>13037300 (1 credit)   | <b>Prerequisites:</b> Algebra I, Geometry, and at least one credit in a Level 2 or higher course in the STEM Career Cluster<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None |    |
| <b>Engineering Design and Presentation II*</b><br>13036600 (2 credits)  | <b>Prerequisites:</b> Principles of Applied Engineering or Engineering Design and Presentation I, Algebra I, and Geometry<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None   |  |
| <b>Practicum in Science, Technology, Engineering, and Mathematics</b><br>First Time Taken:<br>13037400 (2 credits)<br>Second Time Taken:<br>13037410 (2 credits)  | <b>Prerequisites:</b> Algebra I and Geometry<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None  |  |
| <b>Practicum in Science, Technology, Engineering, and Mathematics + Extended Practicum in Science, Technology, Engineering, and Mathematics*</b><br>First Time Taken:<br>13037405 (3 credits)<br>Second Time Taken:<br>13037415 (3 credits) | <b>Prerequisites:</b> Algebra I and Geometry<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None  |  |
| <b>Aerospace Design II</b><br>TBD (TBD credit)  | <b>Prerequisites:</b> TBD<br><b>Corequisites:</b> TBD<br><b>Recommended Prerequisites:</b> TBD<br><b>Recommended Corequisites:</b> TBD  |  |
| <b>Mechanical Design II</b><br>TBD (TBD credit)   | <b>Prerequisites:</b> TBD<br><b>Corequisites:</b> TBD<br><b>Recommended Prerequisites:</b> TBD<br><b>Recommended Corequisites:</b> TBD  |  |






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# Engineering Career Cluster

## Statewide Program of Study: Mechanical and Aerospace Engineering Course Information

Level 4

| Course   | Prerequisites   Corequisites   | Career Clusters   |
|--|--|---|
| <b>Practicum in Engineering*</b><br>TBD (TBD credit)   | <b>Prerequisites:</b> TBD<br><b>Corequisites:</b> TBD<br><b>Recommended Prerequisites:</b> TBD<br><b>Recommended Corequisites:</b> TBD   |    |
| <b>Career Preparation for Programs of Study</b><br>First Time Taken:<br>12701121 (2 credits)                               | <b>Prerequisites:</b> at least one Level 2 or higher Career and Technical Education course<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None |    |
| <b>Career Preparation for Programs of Study + Extended Career Preparation</b><br>First Time Taken:<br>12701141 (3 credits) | <b>Prerequisites:</b> at least one Level 2 or higher Career and Technical Education course<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None |    |
| <b>Scientific Research and Design</b><br>13037200 (1 credit)   | <b>Prerequisites:</b> Biology, Chemistry, Integrated Physics, Chemistry (IPC), or Physics<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None  |   |
| <b>Career and Technical Education Project-Based Capstone First Time Taken:</b><br>First Time Taken:<br>12701101 (1 credit) | <b>Prerequisites:</b> None<br><b>Corequisites:</b> None<br><b>Recommended Prerequisites:</b> None<br><b>Recommended Corequisites:</b> None   |  |

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