

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 Principles of Applied Engineering

| | Level 1 | Principles of Technology Introduction to Aerospace and Aviation Introduction to Computer-Aided Design and Drafting Introduction to Engineering Design (PLTW) Engineering Essentials (PLTW) |
|--|-----------------------------------|--|
| | Level 2 | Intermediate Computer-Aided Design and Drafting |
| | Level 3 | Engineering Design and Presentation I Engineering Mathematics Engineering Science Aerospace Engineering (PLTW) Engineering Design and Development (PLTW) Aerospace Design I (TBD) Mechanical Design I (TBD) |
| | Level 4 | Engineering Design and Problem Solving Engineering Design and Presentation II Aerospace Design II (TBD) Mechanical Design II (TBD) Career and Technical Education Project-Based Capstone Practicum in Science, Technology, Engineering, and Mathematics Practicum in Science, Technology, Engineering, and Mathematics + Extended Practicum in Science, Technology, Engineering, and Mathematics Practicum in Science, Technology, Engineering, and Mathematics Practicum in Science, Technology, Engineering, and Mathematics Practicum in Engineering (TBD) Career Preparation for Programs of Study Career Preparation for Programs of Study + Extended Career Preparation Scientific Research and Design |
| | Aligned Advanced Academic Courses | |

| AP or IB | AP Calculus AB AP Calculus BC AP Physics 1 | AP Physics 2 AP Statistics | IB Physics SL 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



- Autodesk Associate (Certified User) Inventor for Mechanical
- esign Autodesk Associate (Certified User) Revit Architecture
- Autodesk Associate (Certified User) Revit for Electrical
- Autodesk Associate (Certified User) Revit for Structural Design Autodesk Certified Professional Fusion 360
- Autodesk Certified Professional in AutoCAD for Design and
- Drafting Autodesk Certified Professional in Civil 3D for Infrastructure
- Autodesk Certified Professional in Inventor for Mechanical



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.

Definition

Certified SOLIDWORKS Professional (CSWP) - Academi

Certified SOLIDWORKS (CSWP) - Simulation Certified SOLIDWORKS (CSWPA) - Drawing Tools

Certified SOLIDWORKS Professional (CSWP) - Mechanical Design Certified SOLIDWORKS Professional (CSWP) - Model Based



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



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-militaryprep/career-and-technical-education/programs-of-studyadditional-resources

Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

| Course | Prerequisites Corequisites | Career Clusters |
|--|---|-----------------|
| Principles of Applied Engineering* 13036200 (1 credit) | Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | A * 2 |
| Principles of Technology* 13037100 (1 credit) | Prerequisites: One credit of high school science and Algebra I Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | 0 |
| 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 | |
| Introduction to Engineering Design (PLTW)* N1303742 (1 credit) | Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | O |
| Engineering Essentials (PLTW)* N1303760 (1 credit) | Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | Ö |

| Course | Prerequisites Corequisites | Career Clusters |
|---|---|-----------------|
| Intermediate Computer- Aided Design and Drafting* 13037360 (1 credit) | Prerequisites: Architectural Design I and Introduction to Computer-Aided Design and Drafting Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | • |

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

Level 2

[LEA name] does not discriminate on the basis of race, color, national origin, sex, or disability in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: [title], [address], [telephone number], [email]. Further nondiscrimination information can be found at <u>Notification of Nondiscrimination in Career and Technical Education Programs</u>.

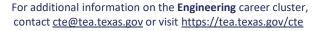
For additional information on the **Engineering** career cluster, contact <u>cte@tea.texas.gov</u> or visit <u>https://tea.texas.gov/cte</u>

Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

| Course | Prerequisites Corequisites | Career Clusters |
|--|--|-----------------|
| Engineering Design and Presentation I* 13036500 (1 credit) | Prerequisites: Algebra I 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 | 0 |
| Engineering Science* 13037500 (1 credit) | Prerequisites: Algebra I, one credit in Biology, and at least one credit in a course from the STEM career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | • |
| Aerospace Engineering (PLTW)* N1303745 (1 credit) | Prerequisites: None Corequisites: None Recommended Prerequisites: At least one credit in a Level 2 or higher course in the Engineering career cluster Recommended Corequisites: None | |
| Engineering Design and Development (PLTW)* N1303749 (1 credit) | Prerequisites: None Corequisites: None Recommended Prerequisites: At least two courses in engineering with at least one being a Level 2 or higher course Recommended Corequisites: None | \$ |
| Aerospace Design I TBD (TBD credit) | Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: None | 0 |
| Mechanical Design I TBD (TBD credit) | Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: None | O |

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Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

| Prerequisites Corequisites | Career Cluster |
|--|---|
| Prerequisites: Algebra I, Geometry, and at least one credit in a Level 2 or higher course in the STEM career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | |
| Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | © |
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| Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: TBD | Ö ği |
| Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | |
| Prerequisites: Algebra I and Geometry Corequisites: None Recommended Prerequisites: Two Science, Technology, Engineering, and Mathematics (STEM) career cluster credits Recommended Corequisites: None | |
| Prerequisites: Algebra I and Geometry Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | |
| | Prerequisites: Algebra I, Geometry, and at least one credit in a Level 2 or higher course in the STEM career clusterCorequisites: NoneRecommended Prerequisites: NoneRecommended Corequisites: NoneRecommended Prerequisites: TBDRecommended Corequisites: TBDRecommended Prerequisites: TBDRecommended Prerequisites: TBDRecommended Prerequisites: TBDRecommended Corequisites: TBDRecommended Prerequisites: TBDRecommended Prerequisites: TBDRecommended Prerequisites: TBDRecommended Prerequisites: NoneCorequisites: NoneCorequisites: NoneRecommended Prerequisites: NoneRecommended Prerequisites: NoneRecommended Prerequisites: NoneRecommended Prerequisites: NoneRecommended Prerequisites: TwoScience, Technology, Engineering, and Mathematics (STEM) career cluster creditsRecommended Corequisites: NonePrerequisites: Algebra I and Geometry Corequisites: RoneRecommended Corequisites: NoneRecommended Corequisites: NoneRec |

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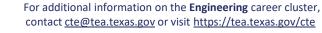
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Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

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|---|--|-----------------|
| Practicum in Engineering* TBD (TBD credit) | Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: TBD | O |
| 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, Chemistry, Integrated Physics and Chemistry (IPC), or Physics Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None | |

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Level 4

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