

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

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| Level 1 | <ul style="list-style-type: none"> Principles of Applied Engineering 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 | <ul style="list-style-type: none"> Intermediate Computer-Aided Design and Drafting |
| Level 3 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 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
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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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Tour an aerospace facility Participate in SkillsUSA or TSA

Aligned Industry-Based Certifications

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| <ul style="list-style-type: none"> Engineering Technology Foundations Pre-Engineering/Engineering Technology - Job Ready Lean Six Sigma Green Belt Certification Aerospace Manufacturing Certification Autodesk Associate (Certified User) AutoCAD Autodesk Associate (Certified User) Fusion 360 Autodesk Associate (Certified User) Inventor for Mechanical Design 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 Design Autodesk Certified Professional in Inventor for Mechanical Design | <ul style="list-style-type: none"> Autodesk Certified Professional in Revit for Architectural Design Autodesk Certified Professional in Revit for Electrical Design Autodesk Certified Professional in Revit for Structural Design Certified SOLIDWORKS Associate (CSWA) - Academic Certified SOLIDWORKS Associate (CSWA) - Electrical Certified SOLIDWORKS Associate (CSWA) - Mechanical Design Certified SOLIDWORKS Associate (CSWA) - Simulation Certified SOLIDWORKS Associate (CSWA) - Sustainability Certified SOLIDWORKS Professional (CSWP) - Academic Certified SOLIDWORKS Professional (CSWP) - Mechanical Design Certified SOLIDWORKS Professional (CSWP) - Model Based Definition Certified SOLIDWORKS (CSWP) - Simulation Certified SOLIDWORKS (CSWPA) - Drawing Tools |
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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.



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-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
Principles of Applied Engineering* 13036200 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Principles of Technology* 13037100 (1 credit)	Prerequisites: One credit of high school science and Algebra I 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	
Introduction to Engineering Design (PLTW)* N1303742 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Engineering Essentials (PLTW)* N1303760 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

Level 2

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.






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

Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

Level 3

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	
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	
Mechanical Design I TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: None	

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Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

Level 4

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 STEM career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	 
Engineering Design and Presentation II* 13036600 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Aerospace Design II TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: TBD	
Mechanical Design II TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: TBD	
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 Science, Technology, Engineering, and Mathematics* First Time Taken: 13037400 (2 credits) Second Time Taken: 13037410 (2 credits)	Prerequisites: Algebra I and Geometry Corequisites: None Recommended Prerequisites: Two Science, Technology, Engineering, and Mathematics (STEM) career cluster credits Recommended Corequisites: None	   
Practicum in Science, Technology, Engineering, and Mathematics + Extended Practicum in Science, Technology, Engineering, and Mathematics* First Time Taken: 13037405 (3 credits) Second Time Taken: 13037415 (3 credits)	Prerequisites: Algebra I and Geometry Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	   

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Engineering Career Cluster

Statewide Program of Study: Mechanical and Aerospace Engineering

Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
Practicum in Engineering* TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: TBD	
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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