



Engineering Foundations *(Project Lead the Way)*

The Engineering Foundations program of study focuses on occupational and educational opportunities associated with a wide range of skills applied in the Engineering industry. Students will design, test, and evaluate projects related to engines, machines, and structures. This program of study includes applying scientific, mathematical, and empirical evidence to solve problems through innovation, design, construction, operation, and maintenance of different engineering systems.



Courses for High School Credit

Level 1	• Introduction to Engineering Design
Level 2	• Engineering Science
Level 3	• Digital Electronics • Aerospace Engineering
Level 4	• Engineering Design and Development

Aligned Industry-Based Certifications

- Autodesk Associate (Certified User) Fusion 360

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities	<ul style="list-style-type: none"> • Intern at an engineering, robotics, or aerospace company. • Visit an engineering firm and shadow multiple types of engineers.
Expanded Learning Opportunities	<ul style="list-style-type: none"> • Participate in SkillsUSA or TSA • Join a local engineering association and attend meetings.



Example Postsecondary Opportunities

Apprenticeships

- Industrial Engineering Technician Apprenticeship



Associate Degrees

- Manufacturing Engineering Technology/Technician
- Robotics Technology/Technician

Bachelor's Degrees

- Electrical and Electronics Engineering
- Engineering, General

Master's, Doctoral, and Professional Degrees

- Electrical and Electronics Engineering
- Engineering, General

Additional Stackable IBCs/Licensures

- Professional Engineer (PE License)
- Engineer in Training Certification (EIT)

Example Aligned Occupations

(Based on statewide employment data)



Civil Engineering Technologists and Technicians

Median Wage: \$61,138
Annual Openings: 765
10-Year Growth: 11%

Aerospace Engineers

Median Wage: \$115,694
Annual Openings: 483
10-Year Growth: 18%

Mechanical Engineers

Median Wage: \$99,937
Annual Openings: 1,755
10-Year Growth: 19%



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



For more information visit:
<https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/programs-of-study-additional-resources>



Engineering Foundations Course Descriptions:

Introduction to Engineering - STE0120H (1 Credit)

Level: 1 Course Fee: None
Prerequisites: None GPA Weight: Advanced

Introduction to Engineering Design (IED) is an Activity-Project-Problem-Based course designed to build on foundational engineering concepts with an emphasis on the application of modeling in the engineering design process to develop solutions. Embedded throughout the course are important engineering concepts, such as engineering mindset, systems thinking, and computational thinking. Students will dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. Students will work both individually and in teams to design solutions to a variety of problems using 3-D modeling software and use an engineering notebook to document their work. This course prepares students for college, a career, or the military by developing their spatial reasoning, design thinking, problem-solving skills, and transportable skills and by exposing them to a variety of careers.

Engineering Science - STE0220H (1 credit)

Level: 2 Course Fee: None
Prerequisites: Algebra I, Biology, & Intro to Engineering GPA Weight: Advanced

Engineering Science is an engineering course designed to expose students to some of the major concepts and technologies that they will encounter in a postsecondary program of study in any engineering domain. Students will have an opportunity to investigate engineering and high-tech careers. In Engineering Science, students will employ science, technology, engineering, and mathematical concepts in the solution of real-world challenge situations. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will also learn how to document their work and communicate their solutions to their peers and members of the professional community.

Note: This course satisfies a science credit requirement for students on the Foundation High School Program

Aerospace Engineering - STE3100H (1 credit)

Level: 3 Course Fee: None
Prerequisites: None GPA Weight: Advanced

In this course, students explore the fundamentals of flight in air and space as they bring the concepts to life by designing and testing components, such as an airfoil, propulsion system, and a rocket. They learn orbital mechanics concepts and apply these by creating models using industry standard software. Students simulate a progression of operations to explore a planet, including creating a map of the terrain and using the map to execute a mission using an autonomous robot. Building enthusiasm while learning real-world skills related to the aerospace industry is a primary goal of the course. This course prepares students for college, a career, or the military by deepening their knowledge of aerospace concepts, developing students problem-solving skills, transportable skills (such as communication and ethical reasoning), and exposing them to a variety of careers.



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Digital Electronics - STE3000H (1 credit)

Level: 3 Course Fee: \$20
Prerequisites: Algebra I, Geometry GPA Weight: Advanced

Digital Electronics is the study of electronic circuits that are used to process and control digital signals. In contrast to analog electronics, where information is represented by a continuously varying voltage, digital signals are represented by two discrete voltages or logic levels. This distinction allows for greater signal speed and storage capabilities and has revolutionized the world of electronics. Digital electronics is the foundation of modern electronic devices such as cellular phones, digital audio players, laptop computers, digital cameras, and high-definition televisions. The primary focus of Digital Electronics is to expose students to the design process of combinational and sequential logic design, teamwork, communication methods, engineering standards, and technical documentation.

Note: This course satisfies a math credit requirement for students on the Foundation High School Program.

Engineering Design & Development - STE4000H (1 credit)

Level: 4 Course Fee: None
Prerequisites: 2 Courses in the Program of Study GPA Weight: Advanced

Engineering Design and Development (EDD) is an open-ended engineering research course in which students work in teams to design and develop an original solution to a well-defined and justified open-ended problem by applying an engineering design process using the knowledge and skills they developed in previous courses. EDD is appropriate for 11th and 12th-grade students. Students will perform research to select, define, and justify a problem. After carefully defining the design requirements and creating multiple solution approaches, teams of students select an approach, create, and test their solution prototype. Student teams will present and defend their original solution to an outside panel. This course prepares students for college, a career, or the military by helping them become better problem-solvers. Students learn how to manage projects and further develop their transferable skills, such as communication and ethical reasoning.



For more information visit:
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