

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: Robotics and Engineering

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.

Offered to: LMHS and TCHS



Secondary Courses for High School Credit

Level 1	<ul style="list-style-type: none"> Principles of Applied Engineering
Level 2	<ul style="list-style-type: none"> Engineering Design and Presentation I
Level 3	<ul style="list-style-type: none"> Robotics I Robotics II
Level 4	<ul style="list-style-type: none"> Practicum in Science, Technology, Engineering, and Mathematics

Aligned Advanced Academic Courses

Dual Credit Dual credit offerings will vary by local education agency.

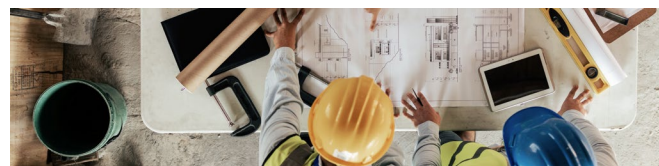
Students should be advised to consider these course opportunities to enrich their preparation. AP or IB courses not listed under the Secondary Courses for High School Credit section of this framework document do not count towards concentrator/completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities	<ul style="list-style-type: none"> Intern at an 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.

Aligned Industry-Based Certifications

- Certified SOLIDWORKS Associate (CSWA)
 - Mechanical Design



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

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%

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>

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Statewide Program of Study: Robotics and Engineering

Course Information

Level 1

Course	Prerequisites Corequisites	Local Course #
Principles of Applied Engineering 13036200 (1 credit)	Prerequisites: None Corequisites: None	7823

Principles of Applied Engineering provides an overview of the various fields of science, technology, engineering, and mathematics and their interrelationships. Students will develop engineering communication skills, which include computer graphics, modeling, and presentations, by using a variety of computer hardware and software applications to complete assignments and projects.

Level 2

Course	Prerequisites Corequisites	Local Course #
Engineering Design and Presentation I 13036500 (1 credit)	Prerequisites: Principles of Applied Engineering, Algebra I Corequisites: None	7824

Engineering Design and Presentation I is a continuation of knowledge and skills learned in Principles of Applied Engineering. Students enrolled in this course will demonstrate knowledge and skills of the design process as it applies to engineering fields using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Students will use a variety of computer hardware and software applications to complete assignments and projects. Through implementation of the design process, students will transfer advanced academic skills to component designs. Additionally, students explore career opportunities in engineering, technology, and drafting and what is required to gain and maintain employment in these areas.

Level 3

Course	Prerequisites Corequisites	Local Course #
Robotics I 13037000 (1 credit)	Prerequisites: Engineering Design and Presentation I Corequisites: Robotics II *Offered at STEM Building *Weighted points will be awarded	7820
Robotics II 13037050 (1 credit)	Prerequisites: Engineering Design and Presentation I Corequisites: Robotics I *Offered at STEM Building *Weighted points will be awarded	7821

Robotics I and II uses a competition format to teach scientific method and engineering design. In the fall and early spring, students enrolled in this course prepare for VEX robotics competitions by designing, building, and programming a robot that can complete specified tasks. Students use a variety of tools to build the robot and must document their work with an array of computer skills including, but not limited to, Word, PowerPoint, and RobotC. Tasks change from year to year and students may take this course more than once. Students taking this course should expect to attend 3-5 Saturday competition dates, and 2-3 after school shop periods per week during the competition season.

Level 4

Course	Prerequisites Corequisites	Local Course #
Practicum in Science, Technology, Engineering, and Mathematics 13037400 (2 credits)	Prerequisites: Robotics I and II Corequisites: None *Offered at STEM Building *Weighted points will be awarded	7819

This is a capstone course intended to provide students with the opportunity to apply the skills and knowledge learned in previous Engineering and Robotics courses. The course is highly customizable to meet local system needs: instruction may be delivered through school laboratory training or through work-based learning arrangements such as internships, cooperative education, service learning, mentoring, and job shadowing. Upon completion of the practicum, students will be prepared for postsecondary study in engineering and robotics fields. Students taking this course should expect to attend 3-5 Saturday competition dates, and 2-3 after school shop periods per week during the competition season.

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