



Career Cluster: STEM

Career Program of Study: Engineering

JUNIOR HIGH

[College and Career Readiness](#)

Exploring STEM

HIGH SCHOOL

EXPLORER COURSES: Choose one or more of the following courses.

Introduction to Engineering Design Project Lead the Way*	Engineering Science Project Lead the Way*
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CONCENTRATOR COURSES: To be a concentrator you must pass one of the following **AND** one explorer course.

Civil Engineering & Architecture Project Lead the Way*

COMPLETER COURSES: To be a completer you must pass enough courses to earn 3.0 credits in this Program of Study

Engineering Design & Development Project Lead the Way+	Career Prep+
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POSTSECONDARY:

Texas Higher Education Coordinating Board	Apply for College
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Trade Schools	
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*Required to Complete the POS and test for Autodesk Certified Professional User +Recommended

HIGH SCHOOL TO POSTSECONDARY EDUCATION AND TRAINING

There are several options for education and training beyond high school, depending on your career goals.

High School Certifications	2 -Year Associates or Tech. Degree	4-Year Bachelor's Degree
<ul style="list-style-type: none"> Autodesk Certified User OSHA- 30 Generalist 	<ul style="list-style-type: none"> Electrical & Electronics Engineering Drafting & Design Technology/Technician Generalist 	<ul style="list-style-type: none"> CTE Teacher Bioengineering & Bimedical Engineering Construction Engineering Technology/Technician

LEARN MORE ABOUT
 OCCUPATION & WAGES

Texas CTE Engineering:
[Engineering](#)

Skills US is a Career & Technical Student Organization(CTSO)
 for Students in the Engineering POS: [skillsusa](#)

Engineering

Students who have chosen the Engineering program of study will complete the following courses and will earn a **STEM** Endorsement.

9th Grade: Introduction to Engineering Design Project Lead the Way (1 credit)

Students study the engineering design process, applying math, science, and engineering standards to identify and design solutions to a variety of real problems. They work both individually and in collaborative teams to identify, research, test, refine, develop, and communicate design solutions using industry practices, standards, and tools. Utilizing PLTW's activity-project-problem-based teaching and learning strategies students' progress from structured activities to complex projects that require detailed planning, documentation, and communication. The course's rigorous pace requires students to develop an engineering mindset. Students apply industry accepted technical communication skills in visual representation using industry-standard 3D design technology as well as professional and industry specific documentation processes. The development of computational methods in engineering problem solving, including statistical analysis and mathematical modeling are emphasized.

10th Grade: Engineering Science Project Lead the Way (1 credit)

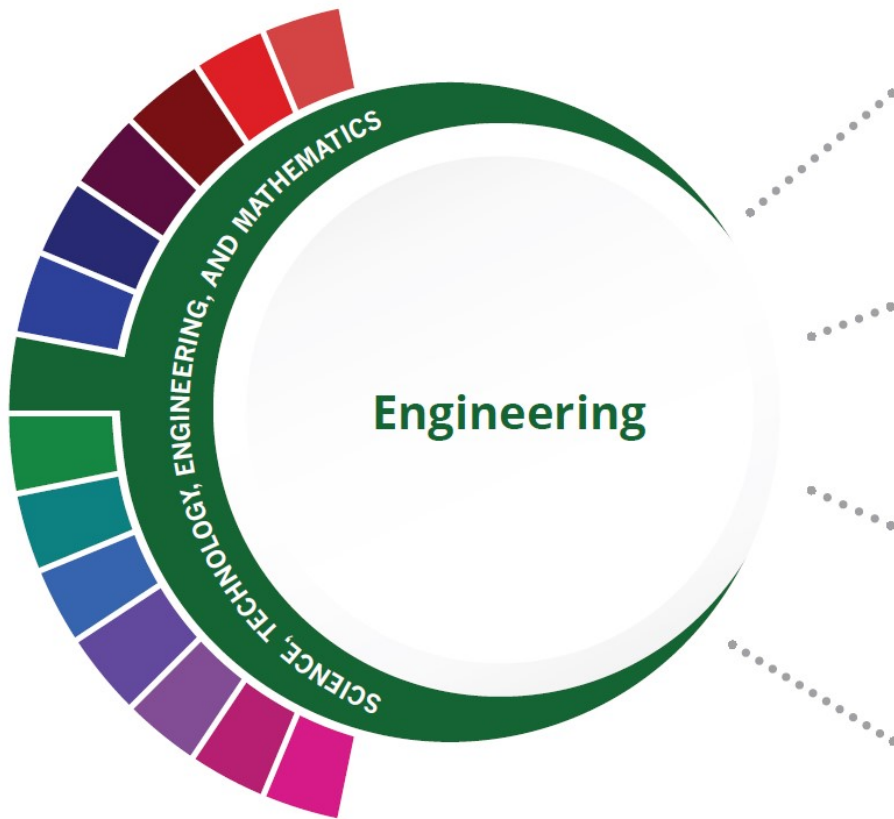
A NEW experience in PLTW Engineering, Engineering Science offers a multidisciplinary approach to teaching and learning foundational concepts of engineering practice, providing students opportunities to explore the breadth of engineering career opportunities and experiences and solve engaging and challenging real-world problems. By inspiring and empowering students with an understanding of engineering and career opportunities, Engineering Science broadens participation in engineering education and the engineering profession.

11th Grade: Civil Engineering & Architecture Project Lead the Way (1 credit)

Civil Engineering and Architecture (CEA) is a high school level specialization course in the PLTW Engineering Program. In CEA students are introduced to important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3D architectural design software. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students' progress from completing structured activities to solving open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills. Through both individual and collaborative team activities, projects, and problems, student's problem solve as they practice common design and development protocols such as project management and peer review. Students develop skill in engineering calculations, technical representation, documentation of design solutions according to accepted technical standards, and use of current 3D architectural design and modeling software to represent and communicate solutions.

12th Grade: Engineering Design & Development Project Lead the Way (1 credit)

Engineering Design and Development is the capstone course in the PLTW high school engineering program. It is an open-ended engineering research course in which students design and develop an original solution to a well-defined and justified open-ended problem by applying an engineering design process. Students perform research to select, define, and justify a problem. After carefully defining the design requirements and creating multiple solutions, students select an approach, create, and test the solution prototype. Students present and defend their solution to an outside panel. While progressing through the engineering design process, students work closely with experts and continually hone their organizational, communication and interpersonal skills, and their creative and problem-solving abilities. Engineering Design and Development is appropriate for 11th and 12th grade students and should be taken as the capstone PLTW course since it requires application of the knowledge and skills learned in the PLTW foundation courses.



Level 1	Principles of Applied Engineering Computer Aided Drafting and Manufacturing (TBD) Introduction to Engineering Design (PLTW) Engineering Essentials (PLTW) Manufacturing Engineering Technology I
Level 2	
Level 3	Engineering and Design and Development (PLTW) Engineering Design and Presentation I Computer Integrated Manufacturing (PLTW) Aerospace Engineering (PLTW) Digital Electronics Civil Engineering and Architecture (PLTW) Engineering Science Environmental Sustainability (PLTW)
Level 4	Engineering Design and Problem Solving Engineering Design and Presentation II Practicum in STEM Scientific Research and Design

HIGH SCHOOL/INDUSTRY CERTIFICATION	CERTIFICATE/LICENSE*	ASSOCIATE S DEGREE	BACHELOR'S DEGREE	MASTER S/ DOCTORAL PROFESSIONAL DEGREE
Autodesk Certified Professional or User (ACU)-Inventor	Engineer, Professional	Electrical and Electronics Engineering	Electrical and Electronics Engineering	Electrical and Electronics Engineering
Certified SolidWorks Associate (CSWA)	Fluid Power Systems Designer	Drafting and Design Technology/ Technician, General	CAD/CADD Drafting and/or Design Technology/ Technician	Mechanical Engineering
Certified Engineering Technician-Audio Systems	Certified Biomedical Auditor	Engineering Technology	Bioengineering and Biomedical Engineering	Bioengineering and Biomedical Engineering
	Certified Cost Estimator/ Analyst		Construction Engineering Technology/ Technician	

Occupations	Median Wage	Annual Openings	% Growth
Aerospace Engineers	\$110,843	481	9%
Industrial Engineers	\$97,074	1,263	10%
Mechanical Engineers	\$91,107	1,535	11%
Chemical Engineers	\$112,819	474	9%
Electrical Engineers	\$98,405	1,137	10%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES	
Exploration Activities:	Work Based Learning Activities:
Participate in competitions like Skills USA	Engineering internship Job shadow a machinist

Additional industry-based certification information is available on the TEA CTE website. For more information on postsecondary options for this program of study, visit TXCTE.org.

The Engineering program of study focuses on the design, development, and use of engines, machines, and structures. CTE learners will learn how to apply science, mathematical methods, and empirical evidence to the innovation, design, construction, operation, and maintenance of different manufacturing systems.



The Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing, scientific research and professional and technical services, including laboratory and testing services, and research and development services.

Successful completion of the Engineering program of study will fulfill requirements of the Business and Industry or STEM endorsement if the math and science requirements are met. Revised - July 2020



COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITS (PREQ) COREQUISITES (CREQ)	Grade
Principles of Applied Engineering	13036200 (1 credit)	None	9-10
Computer Aided Drafting for Manufacturing (TBD)	TBD	TBD	TBD
Introduction to Engineering Design (PLTW)	N1303742 (1 credit)	None	9-12
Engineering Essentials (PLTW)	N1303760 (1 credit)	None	9-10
Manufacturing Engineering Technology I	13032900 (1 credit)	None	10-12
Engineering Design and Development (PTLW)	N1303749 (1 credit)	None	9-12
Engineering Design and Presentation I	13036500 (1 credit)	PREQ: Algebra I	10-12
Computer Integrated Manufacturing (PLTW)	N1303748 (1 credit)	None	9-12
Aerospace Engineering (PLTW)	N1303745 (1 credit)	None	9-12
Digital Electronics	13037600 (1 credit)	PREQ: Algebra I and Geometry	10-12
Civil Engineering & Architecture (PLTW)	N1303747 (1 credit)	None	9-12
Engineering Science	13037500 (1 credit)	PREQ: Algebra I and Biology Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	10-12
Environmental Sustainability (PLTW)	N1303746 (1 credit)	None	9-12
Engineering Design & Problem Solving	13037300 (1 credit)	PREQ: Algebra I and Geometry	11-12
Engineering Design and Presentation II	13036600 (2 credits)	PREQ: Algebra I and Geometry	11-12
Practicum in Science, Technology, Engineering, and Mathematics	13037400 (2 credits) 13037405 (3 credits) 13037410 (2 credits) 13037415 (2 credits)	PREQ: Algebra I and Geometry	12
Scientific Research & Design	13037200 (1 credit)	PREQ: Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	11-12

FOR ADDITIONAL INFORMATION ON THE SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS CAREER CLUSTER, PLEASE CONTACT:

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<https://tea.texas.gov/cte>