Engineering

Business & Industry or STEM Endorsement

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

To complete the Program of Study, students must earn four credits in the Program of Study and one of the credits must be an Advanced Level course.

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	

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Aerospage Engineers	$110,843	481	9%
Industrial Engineers	$97,074	1,263	10%
Mechanical Engineers	$91,707	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:
Participate in competitions like Skills USA

Career Preparation Activities:
Engineering internship
Job shadow a machinist

Courses in this Program of Study

PRINCIPLES OF APPLIED ENGINEERING Course # 07228230

Recommended Grade Placement 8 **1 CREDIT**

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.

INTRODUCTION TO ENGINEERING DESIGN (IED) – *Project Lead the Way* Course # 07228000

Recommended Grade Placement 9-10 **1 CREDIT**

Designed for 9th or 10th grade students and serves as the foundation for all PLTW courses, the major focus of the IED course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards and technical documentation. Students use 3D solid modeling design software to help them design solutions to solve proposed problems and learn how to document their work and communicate solutions to peers and members of the professional community. Students will have an opportunity to test for college credit through UT Tyler. The college course credit is for Engineering 1201: Introduction to Engineering. *PLTW courses may count for college credit and will receive additional weight using the Dual Credit scale for the weighted GPA*

ENGINEERING SCIENCE (formerly Principles of Engineering) Course # 07228120

Prerequisite: Algebra I and Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics. Recommended prerequisite: Geometry.

Recommended Grade Placement 10-11 **1 CREDIT**

This survey course of engineering exposes students to major concepts they'll encounter in a postsecondary engineering course of study. Students employ engineering and scientific concepts in the solution of engineering design problems. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, documenting their work and communicating solutions to peers and members of the professional community. *PLTW courses may count for college credit and will receive additional weight using the Dual Credit scale for the weighted GPA*

AEROSPACE ENGINEERING (AE) - *Project Lead the Way* Course # 07228210

Recommended Grade Placement 11-12 **1 CREDIT**

Aerospace Engineering engages students in engineering design problems related to aerospace information systems, astronautics, rocketry, propulsion, the physics of space science, space life sciences, the biology of space science, principles of aeronautics, structures and materials, and systems engineering. Using 3-D design software, students work in teams utilizing hands-on activities, projects and problems and are exposed to various situations encountered by aerospace engineers. This course is designed for 11th or 12th grade students. *PLTW courses may count for college credit and will receive additional weight using the Dual Credit scale for the weighted GPA*

DIGITAL ELECTRONICS (DE) - *Project Lead the Way* Course # 07228150

Prerequisite: Algebra I and Geometry

Recommended Grade Placement 11-12 **1 CREDIT**

Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras and high-definition televisions. The major focus of the DE course is to expose students to the process of combinational and sequential logic design, teamwork, communication methods, engineering standards and technical documentation. This course is designed for 10th or 11th grade students. *PLTW courses may count for college credit and will receive additional weight using the Dual Credit scale for the weighted GPA*

PRACTICUM OF STEM Course # 07228920

Prerequisite: Algebra I and Geometry

Recommended Prerequisite: Two credits in STEM Pathway

Recommended Grade Placement 11-12 **2 CREDITS**

This course is designed to give students supervised practical application of previously studied knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience. A student may repeat this

course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.

Recommended Sequence of Courses (Prerequisites noted in course descriptions)

To complete the Program of Study, students must earn four credits in the Program of Study and one of the credits must be an Advanced Level course.

Entry Level Courses	Advanced Courses
Principles of Applied Engineering **Introduction to Engineering Design**	**Aerospace Engineering** **Digital Electronics** **Engineering Science** **Practicum in STEM**

Programming and Software Development

Business & Industry or STEM Endorsement

The Programming and Software Development program of study explores the occupations and education opportunities associated with researching, designing, developing, and testing operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computer applications. This program of study may also include exploration into creating, modifying, and testing the codes, forms, and script that allows computer applications to run.

To complete the Program of Study, students must earn four credits in the Program of Study and one of the credits must be an Advanced Level course.