



## Science, Technology, Engineering & Mathematics

### Principles of Applied Engineering

**TSDS PEIMS Code: 13036200 (PRAPPENG)**

**Grade Placement: 9–10**

**Credit: 1**

**Prerequisite: None.**

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. Upon completing this course, students will understand the various fields of engineering and will be able to make informed career decisions. Further, students will have worked on a design team to develop a product or system. Students will use multiple software applications to prepare and present course assignments.

### Fundamentals of Computer Science

**TSDS PEIMS Code: 03580140 (TAFCS)**

**Grade Placement: 9-12**

**Credit: 1**

**Prerequisite: None.**

Fundamentals of Computer Science is intended as a first course for those students just beginning the study of computer science. Students will learn about the computing tools that are used every day. Students will foster their creativity and innovation through opportunities to design, implement, and present solutions to real-world problems. Students will collaborate and use computer science concepts to access, analyze, and evaluate information needed to solve problems. Students will learn the problem-solving and reasoning skills that are the foundation of computer science. By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for

the task, synthesize knowledge, create solutions, and evaluate the results. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of the principles of computer science through the study of technology operations and concepts. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.

## Computer Science I CC

**TSDS PEIMS Code: 03580200 (TACS1)**

**Grade Placement: 9-12**

**Credit: 1**

**Prerequisite: Algebra I.**

Computer Science I will foster students' creativity and innovation by presenting opportunities to design, implement, and present meaningful programs through a variety of media. Students will collaborate with one another, their instructor, and various electronic communities to solve the problems presented throughout the course. Through data analysis, students will identify task requirements, plan search strategies, and use computer science concepts to access, analyze, and evaluate information needed to solve problems. By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of the principles of computer science through the study of technology operations, systems, and concepts. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.

**Note:** This course is offered as a dual credit course with STC.

## Computer Science II CC

**TSDS PEIMS Code: 03580300 (TACS2)**

**Grade Placement: 11-12**

**Credit: 1**

**Prerequisite: Algebra I and either Computer Science I or Fundamentals of Computer Science.**

Computer Science II will foster students' creativity and innovation by presenting opportunities to design, implement, and present meaningful programs through a variety of media. Students will collaborate with one another, their instructor, and various electronic communities to solve

the problems presented throughout the course. Through data analysis, students will identify task requirements, plan search strategies, and use computer science concepts to access, analyze, and evaluate information needed to solve problems. By using computer science knowledge and skills that support the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of computer science through the study of technology operations, systems, and concepts. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.

## Digital Electronics

**TSDS PEIMS Code: 13037600 (DIGELC)**

**Grade Placement: 10–12**

**Credit: 1**

**Prerequisites: Algebra I and Geometry.**

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.*

## Robotics I

**TSDS PEIMS Code: 13037000 (ROBOTIC1)**

**Grade Placement: 9–10**

**Credit: 1**

**Prerequisite: None.**

**Recommended Prerequisite: Principles of Applied Engineering.**

In Robotics I, students will transfer academic skills to component designs in a project-based environment through implementation of the design process. Students will build prototypes or

use simulation software to test their designs. Additionally, students will explore career opportunities, employer expectations, and educational needs in the robotic and automation industry.

## Robotics II

**TSDS PEIMS Code: 13037050 (ROBOTIC2)**

**Grade Placement: 10–12**

**Credit: 1**

**Prerequisite: Robotics I.**

In Robotics II, students will explore artificial intelligence and programming in the robotic and automation industry. Through implementation of the design process, students will transfer academic skills to component designs in a project-based environment. Students will build prototypes and use software to test their designs.

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

## Engineering Design and Problem Solving

**TSDS PEIMS Code: 13037300 (ENGDPRS)**

**Grade Placement: 11–12**

**Credit: 1**

**Prerequisites: Algebra I and Geometry.**

**Recommended Prerequisites: two Science, Technology, Engineering, and Mathematics Career Cluster credits.**

The Engineering Design and Problem-Solving course is the creative process of solving problems by identifying needs and then devising solutions. The solution may be a product, technique, structure, or process depending on the problem. Science aims to understand the natural world, while engineering seeks to shape this world to meet human needs and wants. Engineering design takes into consideration limiting factors or "design under constraint." Various engineering disciplines address a broad spectrum of design problems using specific concepts from the sciences and mathematics to derive a solution. The design process and problem solving are inherent to all engineering disciplines.

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

## Engineering Mathematics

**TSDS PEIMS Code: 13036700 (ENGMATH)**

**Grade Placement: 11–12**

**Credit: 1**

**Prerequisites: Algebra II.**

Engineering Mathematics is a course where students solve and model design problems. Students will use a variety of mathematical methods and models to represent and analyze problems that represent a range of real-world engineering applications such as robotics, data acquisition, spatial applications, electrical measurement, manufacturing processes, materials engineering, mechanical drives, pneumatics, process control systems, quality control, and computer programming.

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

## Practicum in Science, Technology, Engineering, and Mathematics

**TSDS PEIMS Code: 13037400 (First Time Taken) (PRCSTEM1)**

**13037410 (Second Time Taken) (PRCSTEM2)**

**Grade Placement: 12**

**Credit: 2**

**Prerequisites: Algebra I and Geometry.**

**Recommended Prerequisites: two Science, Technology, Engineering, and Mathematics (STEM) Career Cluster credits.**

Practicum in STEM is designed to give students supervised practical application of previously studied knowledge and skills.

## Texas Prefreshman Engineering Program I-IV

**TSDS PEIMS Code: N1303772 (EASCP)**

**Grade Placement: 9–12**

**Credit: 1 per course**

The Texas Prefreshman Engineering Program (TexPREP™) was established in 1979 at The University of Texas at San Antonio as the San Antonio Prefreshman Engineering Program (SAPREP). Beginning in 1986, SAPREP was replicated throughout Texas as TexPREP. TexPREP is offered as a formal out-of-school-time (OST) experience across four summers as students progress from TexPREP I through TexPREP IV. The mission of the program is to motivate and prepare middle and high school students for success in advanced studies leading to careers in science, technology, engineering or mathematics (STEM). Students receive 140+ contact hours

each summer. Over the four-year period students take a series of classes. Specific course content is enhanced by experiences designed to promote a clear understanding of how mathematical concepts are applied in STEM fields.