

# Science, Technology, Engineering, and Mathematics Career Cluster

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.

## Engineering Statewide Program of Study



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.

### Secondary Courses for High School Credit

#### Level 1

- Introduction to Engineering Design

#### Level 2

- Engineering Science

#### Level 3

- Aerospace Engineering
- Digital Electronics

#### Level 4

- Engineering and Design and Development

### Industry-Based Certifications

- Autodesk Associate Certified User Inventor for Mechanical Design
- Autodesk Associate Certified User Fusion 360

#### Introduction to Engineering Design (1)

Introduction to Engineering Design (IED) is a high school level course that is appropriate for students who are interested in design and engineering. The major focus of the IED course is to expose students to design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards, and technical documentation. IED gives students the opportunity to develop skills and understanding of course concepts through activity, project, and problem-based (APPB) learning. Used in combination with a teaming approach, APPB-learning challenges students to continually hone their interpersonal skills, creative abilities and understanding of the design process. It also allows students to develop strategies to enable and direct their own learning.

#### Engineering Science\* (1)

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 (1)

This course propels students' learning in the fundamentals of atmospheric and space flight. As they explore the physics of flight, students bring the concepts to life by designing an airfoil, propulsion system, and rockets. They learn basic orbital mechanics using industry-standard software. They also explore robot systems through projects such as remotely operated vehicles.

#### Digital Electronics\* (1)

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 + (1)

Engineering Design and Development is the capstone course in the 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 course since it requires application of the knowledge and skills learned in the foundation courses.



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	105

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 – August 2022