

**Engineering Technologies/Technicians – Four (4) Year Program – 25 Credits for Graduation  
CIP # 15.9999**

<b>Period</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
1	English I	English II	English III	English IV
2	Math	Math	Math	Civics
3	Geo-Environmental	Biology I	World History I	Chemistry or Physics
4	PE/Health I	PE/Safety Education	PE Health II (11 <sup>th</sup> or 12 <sup>th</sup> )	PE Health II (11 <sup>th</sup> or 12 <sup>th</sup> )
5	US History I	<b>Honors Civil Engineering and Architecture</b>	<b>Honors Principles of Engineering</b>	<b>Honors Digital Electronics (Offered 2020) or Cooperative Education Experience in Engineering</b>
6	<b>Honors Intro to Engineering or Foundations of Technology</b>	<b>Honors Intro to Engineering or Foundations of Technology or Aerospace Engineering</b>	<b>Honors Principles of Engineering</b>	<b>Honors Engineering Design and Development</b>
7	<b>E-CAD or Architectural Engineering and Design</b>	<b>E-CAD or Architectural Engineering and Design</b>	<b>Honors Computer Integrated Manufacturing or Honors Civil Engineering and Architecture</b>	<b>Honors Engineering Design and Development</b>
<b>CTE/CATS Total Hours: 1,320 Carlisle: 1,701</b>	<b>305 hours</b>	<b>457.5 hours</b>	<b>469.7 hours</b>	<b>469.7 hours</b>

- Students need a minimum of ten credits in the combined social studies, science and mathematics areas.
- Students must make-up all failed classes in summer school to complete this program of study.
- Students must pass all required Keystone Exams and/or complete remediation courses.

**Aerospace Engineering (PLTW)**

See the course description in the Science section of this book (page 79)  
Satisfies Engineering Hours and qualifies as a Science Credit

**Architectural Engineering and Design- Course #612**

No prerequisite  
Grades 9-12

1 credit  
5 pds/wk

Architectural Engineering and Design includes the study and design of residential structures. Students explore various types of home designs and construction methods. AutoCAD and Revit drafting and design software is used by students to develop three-dimensional computer models to create physical models, plans, and virtual walk-throughs of their designed structures. Students will experience the

architectural and engineering design process from conception to finished product using 3D modeling and prototyping technologies.

**Foundations of Technology - Course #601**

No prerequisite  
Grades 9-12

1 credit  
4 pds/wk

Foundations of Engineering Technology is an introductory course for students who have an interest in engaging in problem solving and engineering activities using tools, materials and equipment. Students work with wood, metal, plastic composites, and other materials while learning to use various woodworking and metal working tools such as table saws, lathes and welders. Equipment and materials are used, along with mathematical and scientific concepts, to solve technological problems. Students complete projects in the area of manufacturing, fabrication, robotics and electronics. We recommend *this introductory course to students planning to enter the Engineering or Automotive Technology or Carpentry programs.*

**Honors Introduction to Engineering (PLTW) – Course #146**

Pre-requisite: Successful completion of Algebra I  
Grades 9-12

1 credit  
5 pds/wk

Are you naturally curious? Do you enjoy math and science? Are you interested in pursuing a career in an engineering related occupation? If so, the Project Lead the Way-Pathway (PLTW) to Engineering Program can help you meet your goals. The PLTW Pathway to Engineering Program is a sequence of courses, which follows a proven hands-on, real world, problem-solving approach to learning. Students learn and apply the design process, acquire strong teamwork and communication skills, and develop critical thinking and problem solving skills. Students explore various career opportunities, learn the steps and principles of the design process and use computers to design and analyze products, systems and structures. In addition, students build and test models and prototypes, experiment with 3D technologies, and earn college credits while attending high school.

**E-CAD (Engineering-CAD-Design) - Course #607**

No prerequisite  
Grades 9-12

1 credit  
4 pds/wk

We recommend that students who **have not taken** Algebra I to take this course in place of Honors Introduction to Engineering Design (PLTW). Students who complete this course will take Honors Principles of Engineering as the next step in the Engineering course sequence. This course is taught at a slower pace than Honors Introduction to Engineering because students will first need to learn some of the math concepts taught in Algebra I for use in Engineering.

This course provides students with a broad view of the product development process, including basic skills in sketch techniques and understanding the importance of design as well as study of STEM principles. They will learn CADD practices including 3D modeling and will participate in design and problem solving in the construction and testing of several project based activities. Students will learn and be able to describe the product development process and account for its conditions and terms. Students will learn and be able to use basic sketching techniques to communicate ideas, plan, implement and present design projects. Students will use Autodesk Inventor to design products with moving parts, create solid models, produce realistic rendering, working drawings and simple animations of a product. *We recommend this course for students planning to enter the Engineering and Carpentry programs in tenth grade.*

**Honors Principles of Engineering (PLTW) – Course #147**

Prerequisite: Successful completion of Either 146 or 607 or teacher recommendation 2 credits  
Grades 11-12 10 pds/wk

Students will explore a wide range of engineering topics including mechanisms, the strength of structures and materials, and automation. A focus will be on developing skills in problem solving, research, and design, while learning strategies for design process documentation, collaboration, and presentation. Students, with teacher recommendation, will work in the Carlisle Engineering Learning Lab (CELL), to design and develop products for students and teachers. Working in CELL can also be set up as a work base learning experience separate from this or other engineering courses. Note this course is two periods so students have time to complete projects.

**Honors Civil Engineering and Architecture (PLTW) - Course #148**

Prerequisite: None 1 credit  
Grades 10-12 5 pds/wk

Students will learn important aspects of building and site design and development. Students will apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3-D architectural design software. Students will also develop essential skills such as collaboration, problem solving, creative and critical thinking, communication, and perseverance.

**Honors Engineering Design and Development (PLTW) – Course #149**

Prerequisite: Successful completion of at least 2 Engineering courses 2 credits  
Required: Instructor approval 10 pds/wk  
Grade 12

The knowledge and skills students acquire throughout PLTW Engineering come together in Engineering Design and Development capstone course as students identify an issue and then research, design, and test a solution, ultimately presenting their solution to a panel of engineers. Students apply the professional skills they have developed to document a design process to standards. Completing Engineering Design and Development to prepare students to take on any post-secondary program or career. Students, with teacher recommendation, will work in the Carlisle Engineering Learning Lab (CELL), to design and develop products for students and teachers. Working in CELL can also be set up as a work base learning experience separate from this or other engineering courses. Note this course is two periods so students have time to complete projects.

**Honors Digital Electronics (PLTW) Course #144**

Prerequisite: Principles of Engineering, Algebra 2 or higher recommended but not necessary. 1 credit  
Grades 11-12 5 pds/wk

This course examines the fundamentals of electronic circuits and devices used to detect, process, and control electrical signals. The course continues the study and application of semiconductors and linear electronic circuits introduced in Electrical Technology. It also introduces students to digital concepts and circuitry used in automation, mechatronics, robotics, computers and telecommunication systems. Students will work individually and collaboratively on project based labs, computer simulations, and hands on robotic activities.

**Honors Computer Integrated Manufacturing (PLTW) – Course #145**

Pre-requisite: Honors Introduction of Engineering 1 credit  
Grades 11-12 5 pds/wk

In this course, students will work in small groups in order to complete a product utilizing the manufacturing process. Students will utilize jigs/fixtures to speed up the production process. Students will use Mass production techniques in the manufacturing of the product. Students will apply engineering principles during all phases of production. Students will use problem-solving techniques

and work in a team process in all phases of production. This course will have students learn industry safety standards upon passing an OSHA certification test. Students will use the safety information during the course while utilizing the hand tools, power hand tools, and machines in the manufacturing lab.