Course Name	9	10	11	12	Credit	Prerequisite#
Robotics I (Dual Credit)*	X	X	X	X	1.0	None
Introduction to Engineering Design	X	X			1.0	None
Principles of Engineering	X	X			1.0	None
Engineering Design & Development			X	X	1.0	Principles of Engineering and Introduction to Engineering Design
Aerospace Engineering			X	X	1.0	Principles of Engineering and Introduction to Engineering Design
Digital Electronics			X	X	1.0	Principles of Engineering and Introduction to Engineering Design
Computer Integrated Manufacturing			X	X	1.0	Principles of Engineering and Introduction to Engineering Design
Technological Design			X	X	1.0	Technology & Society OR Departmental Recommendation

*All Dual Credit courses require students to meet qualification requirements established by Triton College.

#Prerequisite courses must be completed with a passing grade.

Course Descriptions (alphabetical order)

Aerospace Engineering
Grade: 11, 12
Length: 2 semesters
State Course Code: 21013A001
Through hands-on engineering projects developed with NASA, students learn about aerodynamics, astronautics, space-life sciences, and systems engineering (which includes the study of intelligent vehicles like the Mars rovers Spirit and Opportunity). 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.

Computer Integrated Manufacturing
Grade: 11, 12
Length: 2 semesters
State Course Code: 21010A001
This course applies principles of robotics and automation in manufacturing through computer control. The course builds on computer solid modeling skills developed in Introduction to Engineering Design. Students use CNC equipment to produce actual models of their three-dimensional designs. Fundamental concepts of robotics used in automated manufacturing and design analysis are included. Manufactured items are part of everyday life, yet most students have not been introduced to the high-tech, innovative nature of modern manufacturing. This course illuminates the opportunities related to understanding manufacturing. At the same time, it teaches students about manufacturing processes, product design, robotics, and automation. Students can earn a virtual manufacturing badge recognized by the National Manufacturing Badge system.

Digital Electronics
Grade: 11, 12
Length: 2 semesters
State Course Code: 21008A000
Digital Electronics courses teach students how to use applied logic in the development of electronic circuits and devices. Students may use computer simulation software to design and test digital circuitry prior to the actual construction of circuits and devices.

Engineering Design & Development
Grade: 11
Length: 2 semesters
State Course Code: 21007A002
This course is an advanced course in which students demonstrate mastery of knowledge and skills from previous pre-engineering courses to develop an original product or machine design. In groups using project-based learning, students research, design, and construct a solution to an engineering problem. Students apply principles developed in the preceding courses and are guided by an industry mentor. Students must present progress reports, submit a final written report, and defend their solutions to a panel of outside reviewers at the end of the course. Students are placed in management situations in production operations to develop leadership and entrepreneurship skills. Students are responsible for scheduling, pricing, procuring materials and equipment, and the maintaining of equipment. The knowledge and skills students acquire throughout PLTW Engineering come together in Engineering Design and Development as they 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 ready to take on any post-secondary program or career.

Introduction to Engineering Design
Grade: 9
Length: 2 semesters
State Course Code: 21006A001
Offered in alternate years This course teaches problem-solving skills using a design development process. Models of product solutions are created, analyzed and communicated using solid modeling computer design software. Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. They work both individually and in teams to design solutions to a variety of problems using 3D modeling software and use an engineering notebook to document their work.

Principles of Engineering
Grade: 10
Length: 2 semesters
State Course Code: 21004A001
Offered in alternate years This course helps students understand the field of engineering/engineering technology. Exploring various technology systems and manufacturing processes helps students learn how engineers and technicians use math, science, and technology in an engineering problem solving process to benefit people. The course also includes concerns about social and political consequences of technological change. Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

Robotics I (Dual Credit)
Grade: 9-12
Length: 2 semesters
State Course Code: 21009A000
Robotics course develops and expands students' skills and knowledge so that they can design and develop robotic devices. Topics covered in the course may include mechanics, electrical and motor controls, pneumatics, computer basics, and programmable logic controllers. This course will fulfill CTE requirement and will receive college credit at Triton. Course will be taught by Triton Adjunct professor and co-taught with PMSA teacher that has an Engineering background. Student will receive 2 credit hours per semester from Triton. Course will be taught after school from 3:30 to 5:00 twice a week.

Technological Design
Grade: 11-12
Length: 2 semesters
State Course Code: 21054A001
In Technological Design, engineering scope, content, and professional practices are presented through practical applications. Students in engineering teams apply technology, science, and mathematics concepts and skills to solve engineering design problems and innovate designs. Students research, develop, test, and analyze engineering designs using criteria such as design effectiveness, public safety, human factors, and ethics. This course is an essential experience for students who are interested in technology, innovation, design, and engineering.