

Course Name: Aerospace Engineering	
Department: STEM	Grade Level(s): 10-12
Duration/Credits: 1 year/1.0 credits Weighted 0.75	Prerequisites: Introduction to Engineering Design (IED)
BOE Approval Date:	Course Code: HSTEM15
Course Description:	
<p>Aerospace Engineering is one of the specialization courses in the PLTW Engineering program. The course deepens the skills and knowledge of an engineering student within the context of atmospheric and space flight. The student will explore the fundamentals of flight in air and space as they bring the concepts to life by designing and testing components related to flight such as an airfoil, propulsion system, and a rocket. They learn orbital mechanics concepts and apply these by creating models using industry-standard software. They also apply aerospace concepts to alternative applications such as a wind turbine and parachute. The student will simulate a progression of operations to explore a planet, including creating a map of the terrain with a model satellite and using the map to execute a mission using an autonomous robot.</p>	
Course Rationale:	
<p>STEM courses provide opportunities for the student to develop the skill set needed to be adaptive to the changing field of tomorrow's workforce. This course provides the student the opportunity to explore the field of aerospace engineering and plan for a career in that field. The student will develop knowledge and skills through the use of software design, simulation tools, and hands-on construction of composites as well as critical thinking, communication, creativity, and collaboration.</p>	
Course Objectives:	
<ol style="list-style-type: none"> 1. The student will read about and analyze the history of aerospace achievement. (A+ Reading) 2. The student will study the physics of flight and the four forces of flight within our atmosphere. 3. The student will research and study the systems that allow for safe coordination of aircraft. (A+ Research) 4. The student will design, revise, build, and test a competitive glider, model rocket, and a space junk mitigation system. 5. The student will use simulation software to design an airfoil, fly an aircraft, design an aircraft component, make decisions for flight scenarios in a simulated environment, and create a model of the International Space Station using Systems Tool Kit (STK). 	

6. The student will research and verbally present aircraft accident investigations and share how the human body is affected by flight conditions and its impact on aircraft design. (A+ Speaking and Listening)
7. The student will investigate orbital mechanics and model orbiting systems using software.
8. The student will explore career opportunities in the field of aerospace engineering.
9. The student will build and operate a remote sensing model to measure physical terrain and transform the data into a topographical map.
10. The student will write a plan for an autonomous planetary rover mission. (A+ Writing)
11. The student will integrate mechanical, electrical, and software systems to accomplish a sequence of objectives while exploring a new planet.