Engineering Sciences 3 & 4
Scope & Sequence: Year 2

Semester 1		Semester 2	
Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
Technical Standards: 1.0,2.0, 3.2, 3.4, 3.5, 3.6, 4.0, 5.2, 5.6, 5.7 Professional Skills: 2.0 (C), 3.0 (D) 8.0(A, C, D, E) Unit 1 **Review of Intro to Engineering** • Compare and contrast various disciplines of engineering. • Identify the skills and education needed for engineering disciplines. • Practice safe use of tools, machines, equipment, and materials. Unit 2 **Project #1 Foundation and Start*** (Projects may vary, reflecting the diversity of needs of instructor, school, and community and availability of resources.) • Use the engineering design process to solve engineering problems. • Identify design criteria and constraints. • Use the relationships among energy, work, and power to solve problems involving mechanical, fluid, electrical, and thermal systems.	Technical Standards: 1.0, 2.0, 3.1, 3.3, 3.4, 3.6, 4.0, 5.0, 6.0, 7.0 Professional Skills: 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0 Unit 3 **Project #1 Execution** • Use mathematical software to model and display data to solve engineering problems. • Use 3D CAD software to model and analyze engineering solutions. • Fabricate models using multiple methods. • Collaborate on a team. Unit 4 **Project #1 Completion** • Demonstrate accurate documentation of data and results. • Communicate results in the form of a technical report and group presentation. * Examples of Projects: • Solar Oven Project • Threaded Plate Project • DC Motor Project	Technical Standards: 1.0, 2.0, 3.3, 3.4, 3.5, 4.1, 4.3, 4.4, 5.0, 6.0, 7.2 Professional Skills: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0 Unit 5 **Project #2 Foundation**** (Projects may vary, reflecting the diversity of needs of instructor, school, and community and availability of resources.) • Use mathematical relationships and properties to solve engineering problems. • Evaluate the validity of mathematical solutions. • Use the laws of conservation of energy, charge, and momentum to solve problems involving mechanical, fluid, electrical, and thermal systems. Unit 6 **Project #2 Start** • Identify design criteria and constraints. • Identify resources needed. • Interpret graphical data such as plans, diagrams, and working drawings. • Collaborate on a team.	Technical Standards: 1.0, 2.0, 3.1, 3.3, 3.4, 3.6, 4.0, 5.0, 6.0, 7.0 Professional Skills: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0 8.0 Unit 7 **Project #2 Execution** • Collect and analyze data to solve engineering problems. • Use 3D CAD software to model and analyze engineering solutions. • Manage time according to organizational expectations. • Assess material properties used in engineering projects. Unit 8 **Project #2 Completion** • Take actions supported by evidence to explain conclusions. • Communicate results in the form of a technical report and group presentation. **Examples of Projects: • Catapult Project • Helicopter Optimization • Pump Project • Water Rocket Project

51% of the entire program will be conducted in a lab setting. The lab consists of hand-on learning projects and experiences where student will practice the necessary skills to complete the current unit study.