Danville Area School District
Course Overview and Scope and Sequence

Course Title: Fundamentals of Engineering
Content Area: Science
Grade Level: 10th, 11th, and/or 12th
Date Developed: June 2023

COURSE OVERVIEW: The course is for students who may have an interest in engineering. Exploring basic computer aided design and concepts in data collection analysis and modeling, students will learn and investigate engineering and engineering concepts. This course is an interactive, hands-on, project based course and will allow students to gain exposure to multiple engineering disciplines including Civil, Mechanical, Electrical and other Engineering fields. Topics and projects to be covered in this course may include: design software, hydroponics, strengths of materials, electrical systems, and renewable energy sources. Each student will have the opportunity to explore a topic of their choice for a final project.
ANCHOR STANDARDS: 3.5 Earth Sciences
KEY COURSE TEXT AND MATERIALS: Teacher Generated
KEY ASSESSMENTS: Diagnostic: 8th Grade PSSA Science Formative: Quizzes Summative: Unit Tests

SCOPE AND SEQUENCE

Unit	PRIORITY STANDARDS	SUPPORTING STANDARDS	ASSESSMENT	MATERIALS	TIMEFRAME
1. **Fields of Engineering**	3.5.9-12.NN 3.5.9-12.JJ 3.5.9-12.G 3.5.9-12.E 3.5.9-12.Z 3.5.9-12.T	3.5.6-8.P 3.5.6-8.BB	Individual review of fields and careers in Engineering	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	5 days
2. The Engineering Process	3.5.9-12.OO 3.5.9-12.MM 3.5.9-12.I 3.5.9-12.B 3.5.9-12.F 3.5.9-12.CC 3.5.9-12.U 3.5.9-12.Q	3.5.6-8.Q 3.5.6-8.S	Reverse Engineering Project Presentation	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	6 days
3. Chemical and Environmental Engineering	3.5.9-12.QQ 3.5.9-12.C 3.5.9-12.D	3.5.6-8.FF	Hydroponic/Aquaponic Project Presentation	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	10 days
4. Engineering Design	3.5.9-12.PP 3.5.9-12.BB 3.5.9-12.X 3.5.9-12.Y 3.5.9-12.O 3.5.9-12.N	3.5.6-8.II	Demonstrate ability with Fusion360 and other design softwares, Print a simple object on the 3D Printer	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	12 days
5. Aeronautical and	3.5.9-12.J 3.5.9-12.DD	3.5.6-8.JJ	Model Rocket Improvement	Content is teacher created. In addition	12 days

Aerospace Engineering			Project	to lab/project supplies, materials are posted in Google Classroom.	
6. Mechanical and Civil Engineering	3.5.9-12.A 3.5.9-12.H 3.5.9-12.S 3.5.9-12.W	3.5.6-8.LL 3.5.6-8.KK	Egg Drop Activity, Structural Project Presentation	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	25 days
7. Electrical Engineering	3.5.9-12.KK 3.5.9-12.P	3.5.6-8.CC 3.5.6-8.DD	Circuit Activity	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	10 days
8. Independent Research	3.5.9-12.GG 3.5.9-12.II 3.5.9-12.FF 3.5.9-12.AA 3.5.6-8.W	3.5.6-8.DD	Final Presentation	Content is teacher created. In addition to lab/project supplies, materials are posted in Google Classroom.	10 days