

**Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study**

Course Title	<i>Aerospace Engineering 1AB Re-write</i>	Course Code	<i>KT362-363</i>
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Transcript Title:	<i>Aerospace Engineering 1A/1B</i>	Grades Levels:	<i>9-12 (pref 11)</i>	Board Adoption Date:	
Content Area:	<i>Interdisciplinary</i>	GPA Scale:	<i>4.0</i>	Date Course Submitted:	<i>March 2018</i>
Credential Required:	<i>Single Subject Secondary and/or CTE Credential</i>	Graduation Subject Areas:	<i>Electives</i>		
UC/CSU "A-G" Area Approvals:	<i>G</i>		School Site/person that wrote and submitted the course:	<i>Project Lead the Way wrote the course- Costa Mesa High School (Racine Cross) submitting for board approval</i>	
Recommend Skills:	<i>Introduction to Engineering Design, Principles of Engineering</i>				
Next course(s):	<i>Engineering Design and Development</i>				

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Aerospace Engineering

DATE: 03/07/18

INDUSTRY SECTOR: Engineering and Architecture

PATHWAY: Engineering Design (152)

CBEDS TITLE: Intermediate Engineering Design (Concentrator)

CBEDS Code: 7730

HOURS:

Total	Classroom	Laboratory/CC/CVE
180	62 hours	118 hours

JOB TITLE	ONET CODES	JOB TITLE	ONET CODES
Non-Destructive Testing Specialists	17-3029.01	Manufacturing Production Technicians	17-3029.09
Electronics Engineering Technologists	17-3029.04	Fuel Cell Technicians	17-3029.10
Photonics Technicians	17-3029.08	Nanotechnology Engineering Technicians	17-3029.12

COURSE DESCRIPTION: 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

PREREQUISITES:

High School Name:	Site Prerequisite:
Costa Mesa High School	IED, POE

A – G APPROVAL: Yes No Desired

ARTICULATION: N/A

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High School Name:	College Name:	College Course Title:
N/A		

LEVEL: **Introductory** **Concentrator** **Capstone**

CERTIFICATION: N/A

High School Name:	Embedded/Leads to:	Description:
N/A		

METHOD OF STUDENT EVALUATION:

- ✓ Pre and Post test
- ✓ Student Projects
- ✓ Written work
- ✓ Observation record of student performance
- ✓ Completion of assignments and worksheets

METHOD OF INSTRUCTION:

- ✓ Lecture
- ✓ Group and individual applied projects
- ✓ Demonstration
- ✓ Field Trips
- ✓ Guest Speaker

RECOMMENDED TEXTS:

Project Lead the Way curriculum

MODEL CTE PATHWAY:

Grade	Fall Semester	Spring Semester
9 th	Introduction to Engineering 1A	Introduction to Engineering 1A
10 th	Principles of Engineering 1A	Principles of Engineering 1B
11 th	Aerospace Engineering 1A	Aerospace Engineering 1B
12 th	Engineering Design and	Engineering Design and

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	Development 1A	Development 1B
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CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS

California Department of Education CTE Standards website:
<http://www.cde.ca.gov/ci/ct/sf/ctemstandards.asp>

**Advanced Manufacturing and Engineering
 KNOWLEDGE AND PERFORMANCE ANCHOR STANDARDS**

1.0 Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Engineering and Architecture academic alignment matrix for identification of standards.

2.0 Communications

Acquire and accurately use Engineering and Architecture sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)

- 2.1 Recognize the elements of communication using a sender–receiver model.
- 2.2 Identify barriers to accurate and appropriate communication.
- 2.3 Interpret verbal and nonverbal communications and respond appropriately.
- 2.4 Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.
- 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

3.0 Career Planning and Management

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)

- 3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.
- 3.2 Evaluate personal character traits, such as trust, respect, and responsibility, and understand the impact they can have on career success.
- 3.3 Explore how information and communication technologies are used in career planning and decision making.
- 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- 3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning.
- 3.6 Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.
- 3.7 Recognize the importance of small business in the California and global economies.

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3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.

3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.

4.0 Technology

Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Engineering and Architecture sector workplace environment. (Direct alignment with WS 11-12.6)

4.1 Use electronic reference materials to gather information and produce products and services.

4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.

4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.

4.4 Discern the quality and value of information collected using digital technologies, and recognize bias and intent of the associated sources.

4.5 Research past, present, and projected technological advances as they impact a particular pathway.

4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

5.0 Problem Solving and Critical Thinking

Conduct short, as well as more sustained, research projects to create alternative solutions to answer a question or solve a problem unique to the Engineering and Architecture sector using critical and creative thinking; logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

6.0 Health and Safety

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Engineering and Architecture sector workplace environment. (Direct alignment with RSTS 9-10, 11-12.4)

6.1 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions.

6.2 Interpret policies, procedures, and regulations for the workplace environment, including employer and employee responsibilities.

6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.

6.4 Practice personal safety when lifting, bending, or moving equipment and supplies.

6.5 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics.

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6.6 Maintain a safe and healthful working environment.

6.7 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA).

7.0 Responsibility and Flexibility

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Engineering and Architecture sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)

7.1 Recognize how financial management impacts the economy, workforce, and community.

7.2 Explain the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.

7.3 Understand the need to adapt to changing and varied roles and responsibilities.

7.4 Practice time management and efficiency to fulfill responsibilities.

7.5 Apply high-quality techniques to product or presentation design and development.

7.6 Demonstrate knowledge and practice of responsible financial management.

7.7 Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

7.8 Explore issues of global significance and document the impact on the Engineering and Architecture sector.

8.0 Ethics and Legal Responsibilities

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d)

8.1 Access, analyze, and implement quality assurance standards of practice.

8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Engineering and Architecture industry sector.

8.3 Demonstrate ethical and legal practices consistent with Engineering and Architecture sector workplace standards.

8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.

8.5 Analyze organizational culture and practices within the workplace environment.

8.6 Adhere to copyright and intellectual property laws and regulations, and use and appropriately cite proprietary information.

8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Engineering and Architecture sector laws and practices.

9.0 Leadership and Teamwork

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the SkillsUSA career technical student organization. (Direct alignment with SLS 11-12.1b)

9.1 Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.

9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills, as applied in groups, teams, and career technical student

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organization activities.

9.3 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.

9.4 Explain how professional associations and organizations and associated leadership development and competitive career development activities enhance academic preparation, promote career choices, and contribute to employment opportunities.

9.5 Understand that the modern world is an international community and requires an expanded global view.

9.6 Respect individual and cultural differences and recognize the importance of diversity in the workplace.

9.7 Participate in interactive teamwork to solve real Engineering and Architecture sector issues and problems.

10.0 Technical Knowledge and Skills

Apply essential technical knowledge and skills common to all pathways in the Engineering and Architecture sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11 -12)

10.1 Interpret and explain terminology and practices specific to the Engineering and Architecture sector.

10.2 Comply with the rules, regulations, and expectations of all aspects of the Engineering and Architecture sector.

10.3 Construct projects and products specific to the Engineering and Architecture sector requirements and expectations.

10.4 Collaborate with industry experts for specific technical knowledge and skills.

11.0 Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the Engineering and Architecture anchor standards, pathway standards, and performance indicators in classroom, laboratory and workplace settings, and through the SkillsUSA career technical student organization.

11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Engineering and Architecture sector program of study.

11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.

11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.

11.4 Employ entrepreneurial practices and behaviors appropriate to Engineering and Architecture sector opportunities.

11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

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CR = Classroom LAB/CC = Laboratory/Shop/Community Classroom

I.	Introduction to Aerospace	CR	LAB/ CC	STANDARDS
	<p>The goal of this unit is to excite students about aerospace engineering while providing a foundation of knowledge related to flight. In this unit, students explore the rich history of aerospace achievement that advanced the industry. Students are introduced to the physics that allow flight within the atmosphere and the systems which provide safe coordination of aircraft.</p> <p style="margin-left: 20px;">A. Evolution of Flight</p> <p style="margin-left: 40px;">1. Project- Aerospace Evolution- Students will work as a research team to gather information and create an aerospace evolution documentary, relating to the major advances within the aerospace industry.</p> <p style="margin-left: 20px;">B. Physics of Flight</p> <p style="margin-left: 40px;">1. Activity- Aircraft Control Surfaces and Components Students will identify the components of an aircraft. Students will explore aircraft control and stability about the three axes of flight</p> <p style="margin-left: 40px;">2. Problem- Aircraft Trim Design Challenge-Students will apply their knowledge of aircraft performance factors to design and test aircraft models to accurately complete flight challenges.</p> <p style="margin-left: 40px;">3. Activity- Center of Gravity – Students will calculate the location of the center of gravity for an aircraft</p> <p style="margin-left: 40px;">4. Activity- Atmosphere- Students will calculate the pressure and temperature at various altitudes using Microsoft Excel.</p> <p style="margin-left: 40px;">5. Activity-Aerodynamic Forces- Students will calculate lift and drag using Microsoft Excel.</p>	20	30	<p>Academic:</p> <p><u>ELA</u> AS.R.1, 2, 4, 6 - 10 AS.W.2 – 4, 7 – 9 AS.SL.1, 2, 5, 4 – 6 AS.L.1 – 4, 6 9-10.RL.1 9-10.W.1e, 1d, 2a, 2b, 2c, 2d, 2e, 2f, 7, 8, 9, 9b 11-12.W.1.d, e 11-12.W.2.a, b, c, d, e, f 11-12.W.3.d.e 11-12.W.4, 7 – 9 9-10.SL.2, 4 – 6 11-12.SL. 1, 2, 4 – 6 9-10.L. 1, 2, 2c, 3a 11-12.L. 1, 2, 2b 9-10.RH. 1, 7 11-12.RH. 7 9-10.RST.1, 3, 7, 10 11-12.RST. 1, 3, 7, 10 9-10.WHST.1d, 1e, 2a, 2b, 2d, 2e, 2f, 4, 7, 8, 9 11-12.WHST.1e, 2, 2b, 2e, 4, 7, 8, 9 RLST 11-12.4, 11-12.7 WS 11-12.2, 11-12.4, 11-12.5, 11-12.6, 11-12.7 WHSST 11-12.2 SEP 5, 6, 7, 8 CC 3, 6, 7 ETS 2.A</p> <p><u>Math</u> A.CED.4 A.REI.3 F.BF.1c G.MG.3 N.Q.1, 3 N.VM.3</p> <p><u>Science</u> HS.PS2.1 HS.PS3.1 HS.PS3.3</p>

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	<p>6. Activity- Airfoil Simulation- Students will determine the relationship between airfoil shape and the coefficient of lift and drag using an online simulation provided by NASA.</p> <p>7. Activity- Airfoil Construction- Students will construct a physical airfoil model using 3d CAD solid modeling software and 3d printers.</p> <p>8. Activity- Airfoil Test- Students will test airfoil models in a wind tunnel.</p> <p>9. Activity- Glider Design- Students will gain familiarity with the AERY software interface and glider-related terminology.</p> <p>10. Project- Glider Design Challenge- Students will be given design constraints and use the AERY software to create glider plans. Students will create physical models of their glider out of balsa wood. Students will fly the gliders and analyze flight data to determine the characteristics of successful glider design.</p> <p>C. Flight Planning and Navigation</p> <p>1. Activity- Introduction to Navigation- Students will use the VOR system to determine location.</p> <p>2. Activity- Flight Simulator Introduction- Students will use a flight simulator to explore and gain the basic skills required to safely and accurately pilot an aircraft during takeoff, level flight, and landing.</p> <p>3. Activity- Cross Country Solo- Students will develop planning and piloting skills as they prepare a basic flight plan and use a flight simulator to execute the plan.</p> <p>4. Activity- Air Traffic Control-Students will make decisions to coordinate aircraft to safely fly along a route.</p> <p>5. Activity- GPS Navigation and Routes-</p>			<p>HS.ETS1.2 HS.ETS.1.3 HS.ETS.1.4 DCI.PS2.A DC.PS3.A,B, D DCI.ETS1. B,C</p> <p>CTE Anchor: 2.0, 4.0, 5.0, 7.0, 9.0, 10.0</p> <p>CTE Pathway: C1.0, C2.0, C5.0, C10.0, C11.0</p>
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	Students will create a detailed navigational chart; design a route and then will navigate that route.			
II.	Aerospace Design	C	LAB/ CC	STANDARDS
	<p>The goal of this unit is for students to learn about factors which affect aircraft design. Students develop knowledge and skills in this unit through the use of software design, simulation tools, and hands-on construction of composites.</p> <p>A. Materials and Instruction</p> <ol style="list-style-type: none"> 1. Activity- Aerospace Materials Investigation- Students will investigate properties of materials in several categories. 2. Activity- Frame Generator Introduction- Students will gain understanding of the frame generator function in the Autodesk® Inventor software. 3. Activity- Frame Generator Analysis- Students will gain understanding of the frame analysis built into Autodesk® Inventor® software. 4. Project- Frame Design of Engine Mount- Students will design a frame assembly for a motor mount <i>structure</i> for a Lycoming O-300 to be installed in a light aircraft. 5. Activity- Preparing Composite Sample- Students will work with a team to experience the construction of a composite and then test and evaluate the material. 6. Activity- Composite Plastic Fabrication- Students will work with fiberglass and epoxy resin to create a plastic composite. 7. Activity- Demolding and Finishing Composite Sample- Students will remove the samples from their molds and finish the surfaces. 	2	35	<p>Academic:</p> <p><u>ELA</u> AS.R.7 AS.W.2, 4 AS.SL. 4, 5, 6 AS.L. 1, 2, 4, 6 9-10.W.1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f 11-12.W. 1d, 1e, 2, 2d, 2e, 2f, 3d, 3e, 4 9-10.SL.4, 5, 11-12.SL.4, 5 9-10.L.2, 2c 11-12.L. 1, 2, 2b 9-10.RH.7 9-10.RST.3, 7 11-12.RST.3, 10 9-10.WHST. 1d, 1e, 2, 2a, 2d, 2e, 2f, 4 11-12.WHST. 1e, 2, 2e, 4 RLST 11-12.4, 11-12.7 WS 11-12.2, 11-12.4, 11-12.5, 11-12.6, 11-12.7 WHSST 11-12.2 SEP 5, 6, 7, 8 CC 3, 6, 7 ETS 2.A</p> <p><u>Math</u> N.Q.1 N.Q.3 A.CED.3, 4 A.REI.3, 10 F.IF.6 G.SRT.8 G.MG.3 S.ID.1</p> <p><u>Science</u> HS.PS1.3 HS.PS2.1 HS.PS3.1 HS.PS3.3</p>

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	<p>8. Activity- Testing Composite Sample- Students will test your <i>composite</i> sample and determine how well it performs under certain conditions.</p> <p>B. Propulsion</p> <p>1. Activity- Action and Reaction- Students will compare the force applied by propellers with different pitch angles.</p> <p>2. Activity- Engine Simulator- Students will learn how to use a software simulator to design a turbine engine.</p> <p>3. Project- Turbine Engine Design- Students will use the software simulator learned in the previous activity to design a turbine engine to meet several design constraints.</p> <p>4. Activity- Rocket Engine Test- Students will record force information to compare to published specifications and then use this for a rocket design.</p> <p>5. Project- Rocket Design and Simulate and Build-This project simulates rocket flight, data collection, and design decision making based on this experimental data. This project is presented in two parts. In this Part A of the project, students will investigate how changes in various design characteristics of a model rocket affect the model rocket's flight performance. The second part of the project continues the design simulation with the ultimate goal of constructing a physical rocket for flight.</p> <p>6. Project- Rocket Launch- Students will launch and recover the rocket that they designed and built. The maximum height will be determined and any data recorded will be compiled into a final report.</p>			<p>HS.ETS1.2 HS.ETS1.3 HS.ETS1.4 DCI.ETS1.b,c DCI.PS2.A DCI.PS3.A. B D</p> <p>CTE Anchor: 2.0, 4.0, 5.0, 6.0, 7.0, 9.0, 10.0</p> <p>CTE Pathway: C1.0, C2.0, C3.0, C4.0, C10.0, C11.0</p>
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	<p>7. Project- Rocket Performance Analysis- Students will analyze the data collected during the rocket launch and compare it to the prediction.</p> <p>8. Project- Space Propulsion- Students will research and present to the class a spacecraft propulsion system.</p> <p>C. Flight Physiology</p> <p>1. Activity- Visual Perception-Students will perform a series of tests to explore and assess many characteristics of human visual perception, including visual acuity, <i>depth perception</i>, color vision, peripheral vision, and illusions.</p> <p>2. Activity- Reaction Time- Students will investigate reaction time based on both visual and audible cues. You will conduct individual investigations and create a classroom data set.</p> <p>3. Activity- Flight Control Design- Students will experience the increasing challenge of manipulating controls with a variety of gloves.</p> <p>4. Activity- Build a Block- Students will attempt to communicate directions to a partner. The partner will recreate a unique structure that the student created.</p> <p>5. Activity- NTSB Reports- Students will investigate aviation incidents and accidents.</p> <p>6. Activity- Mars Mission Survival- Students will research the effects of space travel on the human body.</p>			
III	Space	C	LAB/ CC	STANDARDS
	The goal of this unit is for students to focus on space related-concepts defined in aerospace engineering. Students will learn about the	1	15	Academic: <u>ELA</u> AS.R.1, 2, 4, 6, 7, 9, 10 AS.W.1, 2,3 4, 8, 9

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<p>governance of space and the impact of exploration of space. Students learn orbital mechanics and apply these concepts to modeling orbiting systems with software used by aerospace engineers.</p> <p>A. Space Travel</p> <ol style="list-style-type: none"> 1. Activity- Sizing up the Universe- The purpose of this activity is to gain an appreciation for the enormous dimensions of space. 2. Project- Space Law- Students will research and report on a space law topic. 3. Project- Space Junk Mitigation- Students will research the volume of space junk and propose a solution to cleaning up the debris. <p>B. Orbital Mechanics</p> <ol style="list-style-type: none"> 1. Activity- Historical Figures in Orbital Mechanics- Students will gain an appreciation for the early orbital mechanics pioneers. 2. Activity- Orbit Types- Students will learn about different types of orbits. 3. Activity- Orbital Mechanics Modeling- Students will apply their knowledge of orbital mechanics to describe the orbit of a satellite based on its ground trace. They will also use Analytical Graphics, Inc. (AGI) Orbit Tuner application within the Systems Tool Kit® software to adjust the orbit of a satellite to achieve a mission objective. 4. Activity- Orbital Mechanics Physics- Students will calculate the energy required for satellites to orbit Earth. 5. Activity- Systems Tool Kit- Students will learn how to model an orbiting satellite and ground-based tracking stations. 6. Activity- Where is ISS- Students will use your STK expertise to define and 	<p>AS.SL.2, 4, 5, 6 AS.L.1, 2, 3, 4, 6 9-10.W.1d 9-10.L.2.c,11-12.L.2.b 9-10.RH.7 9-10.RST.3, 7, 11-12 RST.3, 7, 10 9-10.WHST.1.d RLST 11-12.4, 11-12.7 WS 11-12.2, 11-12.4, 11-12.5, 11-12.6, 11-12.7 WHSST 11-12.2 SEP 5, 6, 7, 8 CC 3, 6, 7 ETS 2.A</p> <p><u>Math</u> N.Q.1 N.Q.3 A.CED.4 A.REI.3 G.C.2 G.MG.3</p> <p><u>Science</u> HS.PS2.1 HS.PS2.3 HS.PS2.4 HS.PS3.1 HS.PS3.2 HS.ESS1.4 HS.ESS3.4 HS.ETS1.1 HS.ETS.1.2 HS.ETS.1.3 HS.ETS.1.4 DCI.ETS.1.ABC DCI.ESS1.B DCI.ESS3.C DCI.PS2.AB DCI.PS3.ABC</p> <p>CTE Anchor: 2.0, 4.0, 5.0, 7.0, 8.0, 9.0, 10.0</p> <p>CTE Pathway: C1.0, C2.0, C4.0, C5.0, C8.0, C10.0, C11.0</p>
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	assess a complex, real-world problem, and then model and analyze that problem in STK.			
IV	Alternative Applications	C	LAB/CC	STANDARDS
	<p>The goal of this unit is for students to consider application of aerospace concepts beyond the design of aircraft and spacecraft and to explore career opportunities in the field of aerospace engineering. Students simulate a progression of operations to explore a planet. Students build and operate a remote sensing model to measure a physical terrain similar to the satellite overflight of an unexplored planet. Students transform the data into topographical map that students will use to plan an autonomous planetary rover mission.</p> <p>A. Alternative Applications</p> <ol style="list-style-type: none"> 1. Project- Wind Turbine Design- Students will research and design wind turbine blades, then they will design and build your own turbine 2. Problem- Aircraft Efficiency- Students will research several airliner fuel consumption rates and calculate the savings by improving their efficiency. Their input will be used to create a fleet of aircraft for a commercial carrier. 3. Problem- Parachute Design- Students will research effective parachute design fundamentals. They will use this information to design, build, and test a parachute to safely land a simulated human. <p>B. Remote Systems</p> <ol style="list-style-type: none"> 1. Project- Unmanned Systems Investigation- Students will work as a research team to gather information and create a timeline related to major advances within the unmanned systems industry. 2. Activity- Human Robot Exploration- Students will simulate following the 	1	35	<p>Academic:</p> <p><u>ELA</u> AS.R.1 ,2, 4, 6, 7, 8, 9, 10 AS.W.2, 3, 4, 7, 8, 9 AS.SL.1, 2, 4, 5, 6 AS.L.1, 2, 3, 4, 6 9-10.W.1d, 1e, 2a, 2b, 2c, 2d, 2e, 2f, 7, 8, 9, 9b 11-12.W.1d, 1e, 2, 2a, 2b, 2c, 2d, 2e, 2f, 3d, 3e, 4, 7, 8, 9 9-10.SL.1a, 2, 4, 5, 6 11-12.SL.1, 2, 4, 5, 6 9-10.L.1, 2, 2c, 3a 11-12.L.1, 2, 2b 9-10.RH.1, 7 11-12.RH.7 9-10.RL.1 9-10.RST.1, 3, 7, 10 11-12.RST.1 ,3, 7, 10 9-10.WHST.1d, 1e, 2, 2a, 2b, 2d, 2e, 2f, 4, 7, 8, 9 11-12.WHST.1e, 2, 2b, 2e, 4,</p> <p>RLST 11-12.4, 11-12.7 WS 11-12.2, 11-12.4, 11-12.5, 11-12.6, 11-12.7 WHSST 11-12.2 SEP 5, 6, 7, 8 CC 3, 6, 7 ETS 2.A 7, 8, 9,</p> <p><u>Math</u> N.Q.1 N.Q.3 A.CED.4 A.REI.3 A.REI.10 G.MG.3 S.ID.1</p> <p><u>Science</u> HS.PS2.1 HS.PS2.3 HS.PS3.1</p>

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	<p>commands of a remote operator. They will also simulate following the commands of a remote operator with a time delay.</p> <ol style="list-style-type: none"> 3. Activity- Inputs and Outputs- Students will use the ROBOTC® software to monitor inputs and control outputs. This will allow them to test the behavior of components before writing a program and to use it as a troubleshooting tool for analyzing program performance. 4. Activity- Basic Outputs Programming- Students will use ROBOTC to control several outputs. 5. Activity- Basic Inputs Programming- Students will use ROBOTC® and VEX® Robotics platform components to sense the environment. 6. Activity- Satellite Flight Data- Students will build and operate a simulated satellite to orbit a planet. 7. Activity- Create Topographical Map- Students use elevation data from the previous activity to produce a topographical map of the planet’s surface. 8. Project- Path Finder- Students will program the Clawbot to navigate an obstacle course. 9. Project- Rover Navigation- Students will investigate various rover navigation operations and principles related to planetary exploration. 10. Project- Fly by Wire Autopilot- Students will program a controller to use inputs from an accelerometer to simulate the response of an elevator stabilizing aircraft pitch. <p>C. Aerospace Careers</p> <ol style="list-style-type: none"> 1. Project- Future Professional- Students will imagine themselves as a professional and prepare for an interview about their life. 			<p>HS.PS3.3 HS.PS4.2 HS.ESS3.4 HS.ETS1.2 HS.ETS1.3 HS.ETS1.4 DCI.PS2.A DCI.PS3.ABD DCI.ETS1.ABC DCI.ESS2.D DCI.ESS3.C</p> <p>CTE Anchor: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 9.0, 10.0</p> <p>CTE Pathway: C1.0, C2.0, C3.0, C4.0, C10.0, C11.0</p>
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VII	EMPLOYMENT PORTFOLIO	C	LAB/ CC	STANDARDS
	<p>A. Students will prepare a professional portfolio.</p> <ol style="list-style-type: none"> 1. Portfolio showcases best professional level work 2. Portfolio is organized 3. Job application 4. Resume 5. References 	2	3	<p>Academic: <u>ELA</u> 11-12.L.1 ,2 11-12.RST.2, 4, 7 11-12.WS. 2, 4, 5, 6, 7, 8 11-12.WHST.2, 6, <u>Science</u> HS.ETS.2a, 2b</p> <p>LS 11-12.1, 11-12.2 RLST 11-12.2, 11-12.4 WS 12.2, 4, 5, 6, 7 SEP 6 ETS2.A</p> <p>CTE Anchor: 1.0, 2.0, 3.0, 11.0</p> <p>CTE Pathway: C10.0, C11.0</p>