Course Acronym:	ETEC
Course Number:	15B
Descriptive Title:	Aerospace Engineering II
Division:	Industry and Technology
Department:	Engineering Technology
Course Disciplines:	Engineering Technology
Catalog Description:	This is the second of two courses that introduces the various aspects of aerospace engineering. Through hands-on projects and problems, topics will include astronautics, space-life sciences and systems engineering. *Note: The two-course sequence Engineering Technology 15A and 15B is the same as Engineering Technology 15.*
Prerequisite:	
Co-requisite:	
Recommended Preparation:	Engineering Technology 15A
Enrollment Limitation:	
Hours Lecture (per week):	1
Hours Laboratory (per week):	2
Outside Study Hours:	2
Total Course Hours:	54
Course Units:	1.5
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	06/15/2015
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	

Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Aerospace Construction Materials** Students will perform destructive tests on aerospace construction materials. **SLO #2 Intelligent Robotic Vehicles** Students will construct and demonstrate intelligent robotic vehicles incorporating mechanical, electronic and computer based systems. **SLO #3 Positive and Negative Gravity Forces** Students will conduct, measure and evaluate positive and negative gravity forces.
Course Objectives:	1. Answer objective questions about aerospace laboratory and experiment safety with 100% accuracy. 2. Compare and contrast the orbital mechanics involved in predicting a satellite's path and precise location at a given time. 3. Compare and contrast the basic physiological needs of the human body when living safely outside of the earth's atmosphere. 4. Explain and demonstrate the effect of gravitational forces (G-forces) that astronauts, pilots and race car drivers experience. 5. Simulate reduced gravity in an earth-normal environment. 6. Demonstrate the influence of gravity on physical processes through microgravity experiments. 7. Evaluate the properties, characteristics and application of materials used in the construction of aerospace vehicles. 8. Demonstrate the importance and incentive for the use of intelligent vehicles such as robots in complicated science exploration environments.
Major Topics:	**I. AEROSPACE ENGINEERING (1 hour, lecture)** A. Aerospace engineering review B. Safety procedures **II. ASTRONAUTICS (2 hours, lecture)** A. Rocket engines B. Rocket trajectory C. Orbital mechanics **III. ASTRONAUTICS (4 hours, lab)** A. Measuring rocket thrust B. Model rocket trajectory C. Aerial photography

	IV. SPACE LIFE SCIENCES (6 hours, lecture) A. Life support and environmental systems B. Effects of gravity **V. SPACE LIFE SCIENCE (12 hours, lab)** A. Spinning experiments B. Microgravity drop test **VI. AEROSPACE MATERIALS (6 hours, lecture)** A. Metallic materials B. Composite materials C. Heat transfer D. Thermal protection systems **VII. AEROSPACE MATERIALS (12 hours, lab)** A. Composite material manufacturing processes B. Composite layups C. Deflection testing D. Heat transfer experiments **VIII. SYSTEM ENGINEERING (3 hours, lecture)** A. Interactive systems B. Data communication C. Robotic devices **IX. SYSTEMS ENGINEERING (8 hours, lab)** A. Interactive systems B. Data communication C. Robotic devices
Total Lecture Hours:	18
Total Laboratory Hours:	36
Total Hours:	54
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	Construct a styrofoam mold of your best scale model wing design and layup a two-layer resin composite structure for wind tunnel testing. Submit model wing to the instructor.
Critical Thinking Assignment 1:	Given model rocket engine performance data, calculate the maximum velocity and acceleration during flight. Document calculations on a one-page lab report and submit to the instructor.

Critical Thinking Assignment 2:	Cut out two tensile strength samples, one from aluminum alloy 6061 T6 .062" thick and one from carbon fiber .062" thick. Perform a tensile strength test on each sample and record your findings on a one-page lab report. Present an oral report of your findings to your group.
Other Evaluation Methods:	Performance Exams Objective Exams Quizzes Written Homework Laboratory Reports Class Performance Homework Problems Multiple Choice Completion Matching Items True/False
Instructional Methods:	Demonstration Discussion Group Activities Laboratory Lecture Multimedia Presentations Simulation
If other:	Internet Presentation/Resources
Work Outside of Class:	Study Required reading Problem solving activities
If Other:	
Up-To-Date Representative Textbooks:	Project Lead the Way, Aerospace Engineering, 3rd ed., Project Lead the Way, 2016. (Discipline Standard)
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	Project Lead the Way handouts https://www.pltw.org/
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding	

course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	.
Requisite course:	Engineering Technology 15A
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	**Fundamental understanding of aerodynamics and the physics of flight** ETEC 15A - Design, simulate and test aircraft wing aerodynamics and physics. ETEC 15A - Predict the flight performance of an aircraft through computer simulation. **Familiarity with computer software used to simulate flight and propulsion performance.** ETEC 15A - Predict the flight performance of an aircraft through computer simulation. ETEC 15A - Calculate maximum velocity and acceleration of a rocket in flight given model rocket and engine performance data. **Explain terminology commonly used in the aerospace industry.** ETEC 15A - Answer objective questions about aerospace laboratory and experiment safety with 100% accuracy. ETEC 15A - Compare and contrast the various flight vehicles. ETEC 15A - Design, simulate and test aircraft wing aerodynamics and physics
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Ron Way
Date:	10/21/2014
Original Board Approval Date:	06/15/2015
Last Reviewed and/or Revised by:	Ahmed Al Sheyab

Date:	03/30/2023
Last Board Approval Date:	07/17/2023 effective FALL 2024