EL CAMINO COLLEGE
COURSE OUTLINE OF RECORD – Approved

I. Course Information

Subject:	**ETEC**
Course Number:	**15A**
Descriptive Title:	**Aerospace Engineering I**
Division:	**Industry and Technology**
Department:	**Engineering Technology**
Course Disciplines:	**Engineering Technology**

Catalog Description:
This is the first of two courses that introduces the various aspects of aerospace engineering. Through hands-on projects and problems, topics will include aerodynamics and astronautics.

Note: The two-course sequence Engineering Technology 15A and 15B is the same as Engineering Technology 15.

Conditions of Enrollment:
None

Course Length: Full Term

Hours Lecture (per week):	1
Hours Laboratory (per week):	2
Outside Study Hours:	2
Total 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:**

II. Outcomes and Objectives

A. Student Learning Outcomes (SLOs) (The course student learning outcomes are listed below.)

SLO #1 Scale Model Aircraft Wing
Students will design, build and test a scale model aircraft wing.

SLO #2 Propulsion Systems Analysis
Students will conduct propulsion systems analysis based on data obtained through calculations and computer simulations.

B. Course Objectives (The major learning objective for in this course are listed below)

1. Answer objective questions about aerospace laboratory and experiment safety with 100% accuracy.
2. Compare and contrast the various flight vehicles.
3. Design, simulate and test aircraft wing aerodynamics and physics.
4. Analyze flight testing data to evaluate an aircraft design.
5. Predict the flight performance of an aircraft through computer simulation.
6. Compare and contrast the differences between rockets and aircraft in relation to forces of weight, thrust, drag and lift.
7. Calculate maximum velocity and acceleration of a rocket in flight given model rocket and engine performance data.

III. Outline of Subject Matter

(Topics should be detailed enough to enable an instructor to determine the major areas that should be covered to ensure consistency from instructor to instructor and semester to semester.)

Major Topics

I. AEROSPACE ENGINEERING OVERVIEW (2 hours, lecture)
1. Career research
2. Aerospace engineering and science differences

II. CAREERS (4 hours, lab)
1. Career research
2. Aerospace engineering and science differences
3. Safety procedures

III. AEROSPACE ENGINEERING (3 hours, lecture)
1. History of flight
2. Types of vehicles

IV. AERODYNAMICS (3 hours, lecture)
1. Forces in flight
2. Propulsion basics
3. Aerodynamics and physics
4. Airfoil physics

V. AERODYNAMICS (12 hours, lab)
1. Airfoil design
2. Airfoil testing
3. Model construction and testing

VI. FLIGHT SYSTEMS (4 hours, lecture)
1. Flight safety
2. Software systems
3. Global Positioning System (GPS) and spatial awareness

VII. FLIGHT SYSTEM (8 hours, lab)

1. Flight testing
2. Multi-component device construction

VIII. ASTRONAUTICS (6 hours, lecture)

1. Rocket engines
2. Rocket trajectory
3. Orbital mechanics

IX. ASTRONAUTICS (12 hours, lab)

1. Measuring rocket thrust
2. Model rocket trajectory
3. Aerial photography

Total Lecture Hours:	18
Total Laboratory Hours:	36
Total Hours:	54

IV. Primary Method of Evaluation and Sample Assignments

A. Primary Method of Evaluation

2) Problem solving demonstrations (computational or non-computational)

B. Typical Assignment Using Primary Method of Evaluation

Mount a rocket on a rocket test stand. Safely deploy the rocket and calibrate the thrust measurement device to agree with the specifications for the rocket motor in order to provide accurate data. Repeat the test to verify accuracy is within specified limits. Document your findings on a one-page lab report and submit to the instructor.

C. College-level Critical Thinking Assignments

Critical Thinking Assignment 1:

Using Three Dimensional (3D) Computer Aided Design (CADD) software, design a 3D model of a wing capable of lifting a specified payload with a 50% safety margin. Use the computer simulation tool to evaluate the wing's performance. Submit 3D model of wing design electronically to your instructor.

Critical Thinking Assignment 2:

Using Three Dimensional (3D) Computer Aided Design (CADD) software design and construct two 3D models of wings with radically different configurations and obtain lift and drag data from a wind tunnel test. Prepare a brief one-page narrative comparing the performance of the two designs and present to the instructor.

D. Other Typical Assessment and Evaluation Methods

Class Performance, Homework Problems, Laboratory Reports, Matching Items, Multiple Choice, Objective Exam, Performance Exams, Quizzes, True/False, Written Homework

V. Instructional Methods

Demonstration, Discussion, Group Activities, Lab, Lecture, Multimedia presentations, Other (specify), Role play/simulation

If other:
Internet Presentation/Resources

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. Work Outside of Class

Problem solving activity, Required reading, Study

If Other:

VII. Texts and Materials

A. Up-to-date Representative Textbooks: (Please use the following format: Author, Title, Edition, Publisher, Year. If you wish to list a text that is more than 5 years old, please annotate it as a "discipline standard".)
Project Lead the Way, Aerospace Engineering, 3rd ed, Project Lead the Way, 2016.
INDUSTRY STANDARD

B. Alternative Textbooks: (Please use the following format: Author, Title, Edition, Publisher, Year. If you wish to list a text that is more than 5 years old, please annotate it as a "discipline standard".)

C. Required Supplementary Readings

D. Other Required Materials

VIII. Conditions of Enrollment

A. Requisites (Course Prerequisites and Corequisites) Skills needed without which a student would be highly unlikely to succeed.

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).

B. Requisite Skills: (Non-Course Prerequisite and Corequisites) Skills needed without which a student would be highly unlikely to succeed.

Requisite:

Requisite and Matching Skill(s): Bold the requisite skill(s). If applicable

C. Recommended Preparations (Course) (Skills with which a student's ability to succeed will be strongly enhanced.)

Requisite course:

Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).

D. Recommended Preparation (Non-Course) (Skills with which a student's ability to succeed will be strongly enhanced.)

Requisite:

Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable

E. Enrollment Limitations
Enrollment Limitations and Category:
Enrollment Limitations Impact:

Course Created by: Ron Way on 06/15/2015

Original Board Approval Date:
06/15/2015

06/15/2015

Last Reviewed and/or Revised by: Eric Carlson Date: 03/20/2021

Last Board Approval Date: 05/11/2021