Discipline: Engineering Technology / Applied Technology

Date Submitted: July 2015

ARTICULATION TEMPLATE

General Course Title:
ENGT 104: Principles of Aerospace Design Technology (4 units)
Cerritos College
11110 Alondra Blvd.
Norwalk, CA 90650

Downey High School Course:
Aerospace Engineering (Project Lead the Way)
Downey High School
11040 Brookshire Ave
Downey, CA 90241

General Course Description:
In this class, students will explore the world of aeronautics, astronautics, flight and aerospace engineering design technology. The class explores the evolution of flight, flight fundamentals, navigation, control, aerospace materials, propulsion, space travel, orbital mechanics, ergonomics, remotely operated systems, and related subjects. Students will use 3D design software to help design related solutions of typical aerospace technology problems.

College Prerequisite(s): None	**HS/ROCP Prerequisite(s):** None

Advisories/Recommendations: This is a course designed for 10th and 11th graders. It is expected that most students will be taking a comprehensive college prep curriculum. Students should have taken either the Project Lead the Way's Principles of Engineering or Introduction to Engineering Design as a prerequisite.

Course Content:

- Aerospace Engineering Career Awareness
- Social responsibility and ethics
- Safety practices and standards in the aerospace engineering environment
- Communication, presentation skills and teamwork
- Visualization and sketching techniques of vector force diagrams
- History of Flight
- Aerodynamics and Aerodynamics Testing
  (Physics, Geometry, Airfoils, Scale Models, Wind Tunnels, Data Collection and presentation, Testing and data analysis to determine performance)
- Aerodynamic Flight Systems
  (Flight Theory, Aircraft Design, Mathematics of flight theory, Gliders, GPS and ILS, Flight Safety)
- Astronautics, Introduction to Rocketry
  (Mathematics of model rocket and engine performance, Predict, Measure and Control Rocket

Thrust)
- Rocket performance (Thrust, Weight, Drag, Lift, Velocity, Acceleration, Altitude, Launch Angle)
- Instruments, tools and techniques used for direct and indirect measurements.
- Aerial Photography
- Orbital Mechanics (Conic Sections, Orbital Calculations)
- Space Life Sciences
- Life Support and Environmental Systems
- Aerospace Materials (Multiple layers, Composites, Heat Transfer)
- Aerospace Systems Engineering (Mechanical electrical and Interactive Computer Based Systems)Social and economic impacts of the aerospace industry and government programs

Competencies and Skill Requirements (Use additional pages as necessary.) Where appropriate, please incorporate standards being used (e.g. CTE standards).

At the conclusion of this course, the student should be able to:

- Define various careers available and terminology used in the fields of aerospace engineering and aerospace engineering technology
- Demonstrate understanding of the social, economical, environmental and ethical impacts of aerospace engineering
- Demonstrate safety practices and standards in the aerospace engineering environment
- Demonstrate ability to effectively communicate verbally, visually and in written format
- Collaborate in a diverse environment
- Apply visualization and sketching techniques in solving aerospace engineering problems
- Create basic aerospace engineering drawings and force diagrams utilizing industry standards
- Create and analyze basic aerospace systems that incorporate mechanical, thermal, fluid and electrical components to create simple electromechanical mechanisms, control devices and robotic systems.
- Use programmable systems and manual techniques to acquire data.
- Use a spreadsheet to analyze and interpret data
- Demonstrate proper use of various engineering instruments and tools (such as scales, calipers, micrometers, multimeters, thermometers.) that may be used in the aerospace industry.
- Design and analyze basic static systems to measure lift drag and thrust
- Demonstrate the use and operation of a wind tunnel to analyze the performance of airfoils and the aerodynamics of other structures.
- Collect and interpret thrust versus time data.
- Demonstrate the ability to work as a team member and collaborate in a diverse environment.

Measurement Methods (include any industry certification or licensure):

- Written tests
- Essay Exam
- Objective Exam
- Project(s)
- Portfolio
- Classroom Discussion
- Reports
- Problem Solving Exam
- Skill demonstration
- Technical Presentations

***Sample* Textbooks or Other Support Materials (including Software): Textbooks:** The entire curriculum is supplied in electronic format by Project Lead the Way along with all required support and evaluation materials.

- Autodesk Inventor
- FoilSim II (NASA)
- RocketModeler (NASA)
- National Instruments LabView
- Microsoft Office
- USB Flash Drive

Procedures for Course Articulation:
Cerritos College credit for the articulated course listed above may be received when the following criteria are met:

1. The student has completed the articulated course listed above with a "B" grade or higher in *Principles of Aerospace Design Technology*
2. The student must enroll at Cerritos College within two (2) years from the semester date in which the course was completed.
3. The student will present verification of successful completion of the articulated course by presenting a *Cerritos College Articulation Card* to a Cerritos College Counselor. The *Cerritos College Articulation Card* should be completed and signed by the student's high school counselor or teacher.
4. No more than 12 units of credit may be accepted for credit by examination.

This Agreement will be reviewed annually and will remain in effect until cancelled by either party giving 30 days written notice.

High School/ROP District Signatures		**Cerritos College Signatures**	
9/9/2015		7/24/15	
Faculty/Department Chair	Date	Instructor/Division Chair	Date
7-21-15		Real 7/21/15	
Principal	Date	Dean of Instruction	Date
		7/22/15	
Superintendent	Date	Vice President	Date
J. a. H, Jr.		Debra Schilling 7/27/15	

[*Office use only.*] **TOPs Code:**	[*Office use only.*] **Internal Tracking Number:**
Date Accepted by Steering Committee:	

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Date Accepted by Steering Committee:	