



CREDIT COURSE OUTLINE

I. COVER PAGE

(1) AERO 3	(2) Aviation Maintenance Technology	(3) 17.5
Number	Title	Units

(4) Lecture / Lab Hours:	(8) Classification:	
Course Hours		
Weekly Lec hours: 15.00	Degree applicable:	X
Weekly Lab hours: 15.00	Non-degree applicable:	
Total Contact hours: 540.00	Basic skills:	
Lec will generate __ hour(s) outside work.	(9) RC	Fulfills AS/AA degree requirement: (area)
Lab will generate __ hour(s) outside work.	General education category:	
(5) Grading Basis:	Grading Scale Only	X
Pass/No Pass option	Major:	Aviation Maintenance Technology
Pass/No Pass only	Certificate of:	Aviation Maintenance Technology Powerplant
(6) Advisories:	Certificate in:	
• Aero 1 and Aero 2	(10) CSU	Baccalaureate: X
(7) Pre-requisites (requires C grade or better):	(11) Repeatable: (A course may be repeated three times)	0
• Eligibility for English 125, 126 and Mathematics 201.	(12) C-ID:	
Corequisites:	Proposed Start Date:	Fall 2012
•		

(12) Catalog Description:
 Aero 3 meets the FAA Powerplant subjects requirement which includes: Reciprocating Engines, Turbine Engines, Engine Inspection, Lubrication Systems, Ignition and Starting Systems, Induction Systems, Engine Cooling Systems, Engine Exhaust and Reverser Systems, Propellers, Auxiliary Power Units. Successful completion of Aero 1, 2, 3, and 4 qualifies students to take the licensing exams required for Airframe and Powerplant certification.

II. COURSE OUTCOMES:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

- I. demonstrate a basic knowledge of aircraft powerplants, including their purpose, functionality, operation and major components.
- II. examine an aircraft powerplant in order to determine if the powerplant or any of its components are defective.
- III. perform regularly scheduled tasks in order to assure continued operation of an aircraft powerplant and its components.
- IV. verify the proper operation of an aircraft powerplant.
- V. re-establish the integrity of a complete aircraft powerplant.
- VI. remove and replace specific components within an aircraft powerplant.
- VII. identify and analyze malfunctions within an aircraft powerplant.
- VIII. completely disassemble, inspect, and repair an entire aircraft powerplant.

III. COURSE OBJECTIVES:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

- I. Identify and select lubricants (level 2)
- II. Repair engine lubrication systems components (level 2)
- III. Inspect, check, service, troubleshoot, and repair engine lubrication systems (Level 3)
- IV. Inspect, check, service and repair propeller synchronizing and ice control systems (level 1)
- V. Identify and select propeller lubricants (Level 3)
- VI. Balance propellers (level 1)
- VII. Repair propeller control system components (level 2)
- VIII. Inspect, check, service and repair fixed-pitch propellers, constant speed propellers, feathering propellers, and propeller governing systems (Level 3)
- IX. Install, troubleshoot, and remove propellers (Level 3)
- X. Repair aluminum alloy propeller blades (Level 3)

- XI. Inspect and repair a radial engine (level 1)
- XII. Overhaul reciprocating engine (level 2)
- XIII. Inspect, check, service, and repair reciprocating engines and engine installations (Level 3)
- XIV. Install, troubleshoot, and remove reciprocating engines (Level 3)
- XV. Overhaul turbine engine (level 2)
- XVI. Inspect, check, service, and repair turbine engines and turbine engine installations (Level 3)
- XVII. Install, troubleshoot, and remove turbine engines (Level 3)
- XVIII. Repair engine cooling system components (level 2)
- XIX. Inspect, check, troubleshoot, service, and repair engine cooling systems (Level 3)
- XX. Inspect, check, service, and repair heat exchangers and superchargers (level 1)
- XXI. Inspect, check, service, and repair carburetor air intake and induction manifolds (Level 3)
- XXII. Repair engine exhaust system components (level 2)
- XXIII. Inspect, check, troubleshoot, service, and repair engine exhaust systems (Level 3)
- XXIV. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components (level 2)
- XXV. Inspect, check, service, and repair turbine pneumatic starting systems (level 1)
- XXVI. *Skill Levels (Federal Aviation Administration Format):
 - Knowledge/Skill Level 1 C requires comprehension of general principle, but no manipulative skill application.
 - Knowledge/Skill Level 2 C requires comprehension of general principles, limited practical application and development of limited manipulative skills to perform basic operations.
 - Knowledge/Skill Level 3 C requires comprehension of general principles, performance of practical application and development of manipulative skills to minimum airworthiness standards.

IV. COURSE OUTLINE:

Lecture Content:

- A. Reciprocating Engines
- B. Turbine Engines
- C. Engine Inspection
- D. Lubrication Systems
- E. Ignition and Starting Systems
- F. Induction Systems
- G. Engine Cooling Systems
- H. Engine Exhaust and Reverser Systems
- I. Propellers
- J. Auxiliary Power Units

Lab Content:

Lab will give students the opportunity to apply concepts to practical applications

- A. Reciprocating Engines
- B. Turbine Engines
- C. Engine Inspection
- D. Lubrication Systems
- E. Ignition and Starting Systems
- F. Induction Systems
- G. Engine Cooling Systems
- H. Engine Exhaust and Reverser Systems
- I. Propellers
- J. Auxiliary Power Units

Note: The Aero program courses are regulated by the Federal Aviation Administration to include approximately 50% lecture and 50% lab in all of the subjects.

V. APPROPRIATE READINGS

Reading assignments may include but are not limited to the following:

I. Sample Text Title:

1. Recommended - Jeppesen *Federal Aviation Regulations, Aviation Maintenance Technician*, -, -, 2012,
2. Recommended - Jeppesen *A&P Technician General Textbook*, -, -, 2011,
3. Recommended - Jeppesen *A&P Technician Powerplant Textbook*, -, -, 2009,
4. Recommended - Jeppesen *Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair (AC-43.13-1B & 2B)*, -FAA, -, 2008,
5. Recommended - Crane *Dictionary of Aeronautical Terms*, -, -, 2008,
6. Recommended - Crane *Aviation Mechanic Handbook*, -, -, 2006,
7. Recommended - Jeppesen *Aircraft Gas Turbine Powerplants*, -, -, 2002,

II. Other Readings

1. Recommended - *Computer-Based-Training hardware and software Aircraft and aircraft mock-up components CD library, various Hard-copy Service Manuals, Maintenance Manuals, Parts Manuals; various*

- Global or international materials or concepts are appropriately included in this course
 Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing			
Check either 1 or 2 below			
X	1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.		
	2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.		
	a) essay exam(s)		d) written homework
	b) term or other paper(s)		e) reading reports
X	c) laboratory report(s)		f) other (specify)

Required assignments may include but are not limited to the following:

- Discrepancy reports
- Laboratory reports
- Log Book entries

B. Problem Solving			
Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)	X	d) laboratory reports
X	b) quizzes		e) field work
X	c) homework problems		f) other (specify):

Required assignments may include but are not limited to the following:

- Quizzes- What parts are typically replaced during a magneto overhaul?
- Lab reports- Describe how to locate appropriate Manufacturers Service Manuals and instructions for the servicing of an air intake filter.
- Lab projects- Inspect, service, and repair a magneto.

C. Skill demonstrations, including:			
X	a) class performance(s)	X	c) performance exams(s)
	b) field work	X	d) other (specify)

Required assignments may include but are not limited to the following:

- Lab project
- Research project
- Exam

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false	X	e) other (specify):
X	c) matching items		

COURSE GRADE DETERMINATION:

Description/explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.

50% Written (3/4 objective test, 1/4 short answer) 50% Lab Applications

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met	
	YES	NO
Textbook	<u> X </u>	<u> </u>
Reference materials	<u> X </u>	<u> </u>
Instructor-prepared materials	<u> X </u>	<u> </u>
Audio-visual materials	<u> X </u>	<u> </u>

Indicate Method of evaluation:

- Used readability formulae (grade level 10 or higher)
- Text is used in a college-level course X
- Used grading provided by publisher
- Other: (please explain; relate to Skills Levels) -

<i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)	<u> X </u>	<u> </u>
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	<u> X </u>	<u> </u>
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	<u> X </u>	<u> </u>
Requires independent thought and study	<u> X </u>	<u> </u>
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	<u> X </u>	<u> </u>
List of Reading/Educational Materials		
Recommended - Jeppesen <i>Federal Aviation Regulations, Aviation Maintenance Technician</i> , -, -, 2012,		
Recommended - Jeppesen <i>A&P Technician General Textbook</i> , -, -, 2011,		
Recommended - Jeppesen <i>A&P Technician Powerplant Textbook</i> , -, -, 2009,		
Recommended - Jeppesen <i>Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair (AC-43.13-1B & 2B)</i> , -FAA, -, 2008,		
Recommended - Crane <i>Dictionary of Aeronautical Terms</i> , -, -, 2008,		
Recommended - Crane <i>Aviation Mechanic Handbook</i> , -, -, 2006,		
Recommended - Jeppesen <i>Aircraft Gas Turbine Powerplants</i> , -, -, 2002,		

Comments:

- This course requires special or additional library materials (list attached).
- X This course requires special facilities:
Aero Lab

Attached Files:

- [Advisory Justification Forms](#)
- [FAA Written report requirements](#)
- [Reading example. Airworthiness Directive](#)
- [Math example. torque formula](#)

BASIC SKILLS ADVISORIES PAGE The skills listed are those needed for eligibility for English 125, 126, and Math 201. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least three major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.

Check the appropriate spaces.

- Eligibility for Math 201 is advisory for the target course.
- Eligibility for English 126 is advisory for the target course.

_____ Eligibility for English 125 is advisory for the target course.

If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

REQUISITES

Prerequisite -- ENGL 125 WRITING SKILLS FOR COLLEGE

D. Writing sentences: 1. sentence variety a. simple sentences b. compound sentences c. complex sentences d. compound complex sentences 2. crafting sentences a. using parallelism b. eliminating wordiness 3. avoiding and correcting sentence errors a. fragments b. run-ons (comma splices and sentence fuses) 4. punctuation

- Inspect, check, service and repair fixed-pitch propellers, constant speed propellers, feathering propellers, and propeller governing systems (Level 3)
- Install, troubleshoot, and remove propellers (Level 3)
- Overhaul reciprocating engine (level 2)
- Inspect, check, service, and repair reciprocating engines and engine installations (Level 3)
- Overhaul turbine engine (level 2)
- Inspect, check, service, and repair turbine engines and turbine engine installations (Level 3)

ESTABLISHING PREREQUISITES OR COREQUISITES

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course.

Justification: Indicate how this is so.

_____ The health or safety of the students in this course requires the prerequisite.

Justification: Indicate how this is so.

_____ The prerequisite course is part of a sequence of courses within or across a discipline.

_____ The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.

Justification: Indicate how this is so.

_____ The prerequisite/corequisite is required by law or government regulations.

Explain or cite regulation numbers:

_____ The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.

Justification: Indicate how this is so.

_____ The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.

Justification: Indicate how this is so.

_____ Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:

Justification:

Prerequisite -- ENGL 126 Reading Skills for College

Recognize the major details presented in college-level, academic reading materials to develop and support the main ideas. Distinguish among statements of fact, personal opinion, and reasoned opinion in college-level, academic reading materials. Make inferences that are logical, reasonable, and probable and are based on accurate literal comprehension of what is read in college-level, academic reading materials. Understand college-level, academic reading materials. Demonstrate confidence in gaining important information from reading independently.

- Inspect, check, service and repair fixed-pitch propellers, constant speed propellers, feathering propellers, and propeller governing systems (Level 3)
- Overhaul reciprocating engine (level 2)
- Inspect, check, service, and repair reciprocating engines and engine installations (Level 3)
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Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:

Justification:

Prerequisite -- MATH 201 ELEMENTARY ALGEBRA

A. Number Systems and Operations 1. The set of real numbers and its subsets 2. Addition, subtraction, multiplication and division of real numbers B. Linear Equations and Inequalities 1. Simplifying expressions 2. Solving equations using the addition and multiplication properties of equality 3. Applying the addition and multiplication properties to solve formulas 4. Applying the addition and multiplication properties to solve inequalities 5. Applications

- Balance propellers (level 1)
- Overhaul reciprocating engine (level 2)
- Overhaul turbine engine (level 2)
- Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components (level 2)

ESTABLISHING PREREQUISITES OR COREQUISITES

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Justification:

JUSTIFICATION OF LIMITATION ON ENROLLMENT

Enrollment in courses or blocks of courses may be limited based on performance, honors, or other performance based criteria. Be mindful of the disproportionate impact the limitation will have on specific groups of students. It is important to determine if the limitation will disproportionately keep under-represented students from enrolling in the course or block of courses.

Describe the reasons for limiting the enrollment.

Course Designator: AERO 3
Course Title(s): Aviation Maintenance Technology
Rationale for Limiting Enrollment: 0