



Outcome-based 18/SU Course Syllabus

Course Rubric Number Section: AERM 2341 2001
Lecture-Lab-Credit: 2-2-3
CIP Code: 47.0608
Course Title: Powerplant and Auxiliary Power Units
Course Description: Advanced concepts of auxiliary power unit (APU) and powerplant systems and components. Safety procedures will also be addressed.
Prerequisites:
Co-requisites:
Course Meets: 200T 121 LEC M 10:10AM 12:10PM 200T 121 LAB W 10:10AM 12:10PM

Instructor: Thomas Cross
Office Phone Number: 956-364-4787
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Office Fax Number: 956-364-5157
Building & Office Room Number: Aviation Bldg. "T" 101
Office Hours: 1:30 - 3:30 Tues. Thur.

Approved by:	Angel Newhart	Date:	2018-05-09
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Course Outcomes

- CO1:** Operate auxiliary power unit (APU) systems
- CO2:** Distinguish functions of auxiliary power unit (APU) components
- CO3:** Operate powerplant systems
- CO4:** Troubleshoot powerplant systems
- CO5:** Demonstrate safety techniques

Added Outcomes

- CO6:** The student will identify the operation, construction, maintenance, and troubleshooting procedures for temperature gauges, pressure gauges, tachometers, and other miscellaneous engine instruments.
- CO7:** The student will identify, inspect, maintain, and repair the cooling and exhaust systems of aircraft.
- CO8:** The student will identify, inspect, maintain, and repair induction systems and engine ice and rain control systems.
- CO9:** The student will identify, inspect, maintain and repair powerplant fire detection and suppression systems.
- CO10:** The student will identify, inspect, maintain, repair, and operate auxiliary power units.
- CO11:** The student will identify, inspect, maintain, and repair engine instrument systems.
- CO12:** The student will identify, inspect and maintain engine cooling systems.
- CO13:** The student will identify, inspect, and maintain engine induction and ice and rain control systems.
- CO14:** The student will identify, inspect, maintain and operate an APU system.

TSTC Grading Policy

(Grades for courses must be C or better)

Grade	Percent	Description	Grade Points
A	90-100	Excellent/Superior Performance Level	4
B	80-89	Above Required Performance Level	3
C	70-79	Minimum Required Performance Level	2
D	60-69	Below Required Performance Level	1

		Performance Level	
F	Below 60	Failure to meet Performance Requirements	0
IP	--	In Progress	
W	--	Withdrawal	0
CR	--	Credit	0
AUD	--	Audit of Course	0

See College Catalog for complete descriptions.

Competencies Rating Scale

Rating Scale Key			
6	90+	Proficient	Student consistently performs the task accurately to industry standards without supervision.
5	80-89	Proficient	Student performs the task to industry standards with no supervision.
4	70-79	Proficient	Student performs the task to industry standards with little supervision. This is the minimum performance rating for STAR skill completion.
3	60-69	Exposed/Not Proficient	Student has been introduced to the task and can perform some of the tasks to industry standards.
2	50-59	Exposed/Not Proficient	Student has been introduced to the task, but cannot perform the task to industry standards.
1	0-49		Student was absent or did not complete assignment.

Campus Standard Policies

The [Student Handbook](#) contains valuable information on campus policies and procedures.

- Student Code of Conduct
- Student Drug and Alcohol Testing Policy
- Plagiarism
- Student Grievances and Complaints

Disability Services

Any student who, because of a disability, may require special accommodations in order to meet the course requirements, should contact the Disability Services office, as soon as possible, to make necessary arrangements. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Disability Services office has been provided.

Abilene Campus

Susan Hash
Testing and Support Services
Abilene Main Campus Bldg. Rm. 112
325-734-3641

Fort Bend Campus

Schauna Boynton
Brazos Center Rm. 113
346-239-3394

Sweetwater Campus

Misty Walden
Disability Services
Student Support Services
Lance Sears Building Rm. 140
325-236-8292

Breckenridge Campus

Lisa Langford
Testing and Advisement located in
The Main Building Rm. 106
254-559-7731

Harlingen Campus

Corina De La Rosa
Disabilities Services
Student Support Services
Student Services Bldg. Rm. 216
956-364-4521

North Texas Campus

Amanda Warren
Student Services, Room 227
972-617-4724

Brownwood Campus

Nicole Whitley
Testing and Advisement
Building 2 Rm. 120
325-641-5955

Marshall Campus

Annette Ellis
Administration and Admissions Rm. 150
909-923-3313

Waco Campus

Marilyn Harren
Disabilities Services Office
Student Services Center Rm. 198
254-867-3600

Williamson County

Chemese Armstrong
Enrollment Services Rm. B113C
512-759-5907

Tutoring Statement

The Supplemental Instruction & Tutoring Program at TSTC offers free tutoring and academic support services to help you achieve your academic and career goals. You can access the Tutoring Schedule, as well as *MyTSTC Video Tutor Library*, by visiting: <https://portal.tstc.edu/student/Learning/Pages/Tutoring.aspx> (shortened link: goo.gl/Z9vJvY). For more information, please contact Norma A. Salazar@ [956-364-4557](tel:956-364-4557).

Learning Resource Center

The purpose of the TSTC Learning Resource Center is to serve the TSTC Community and support academic, advanced, specialized and emerging programs, contributing to the educational and economic development of the State of Texas. You can access the Learning Resource Center page at <https://portal.tstc.edu/employee/Departments/operations/Pages/Learning%20Resource%20Center.aspx>

Aerospace Grading Policy:

Passing any course will require a minimum overall course grade of 70%.The student cannot fail more than one test per course. More than one test score below 60 is a failure of the entire course with a final grade of "D" or "F". The grade difference between "D" and "F" will be based on each individual program policy.

Aerospace Students reference HB 1508:

For students in this course who may have a criminal background, please be advised that the background could keep you from being licensed by the State of Texas and certifying agency. If you have a question about your background and licensure, please speak with your faculty member or the department chair. You also have the right to request a criminal history evaluation letter from the applicable licensing agency.

Aerospace Student Dress Code:

The student dress requirements mirror standards seen in our profession and will identify you as an Aviation Program Student. Your image reflects your professional attitude and conduct. How you present yourself is important to companies, airlines, FAA and hopefully to yourself. We expect you to look like a professional in your dress as well as in your conduct.

All APT, AER, AVI, ADT and ATC students are expected to be clean and well groomed. The TSTC aviation blue, steel grey, Baylor aviation shirt, or approved substitute, must be worn when in the classroom. Pants should reflect a professional image and worn at waist level. Ripped or baggy clothing is not acceptable; nor is overly tight or revealing clothing; yoga pants are not acceptable. NO short shorts! Shorts must be no more than 5" above the knee. Jeans that don't detract from a professional image may be worn. Close toed shoes, tennis shoes, or boots are acceptable. Open toed shoes, sandals, and flip flops are not permitted due to safety issues. If heels are worn they must be two inches or less for safety. Hair should be clean and neat.

Jewelry will be kept to a minimum to prevent loss and /or injury. Earrings are acceptable, but should be conservative and not extend beyond the ear. Tattoos covering large parts of the body or reflecting crude taste will limit your chances of being hired, are not recommended, and will be covered to promote an aviation professional image.

The purpose of these appearance standards is to promote a safe and comfortable work environment that is free of unnecessary distraction. The aviation industry as a whole is conservative in dress and appearance, and we hold you to these standards. Crude, provocative, or radical clothing will not be permitted. Students who arrive for class or for a flight inappropriately groomed or attired may be asked to leave and/or make changes. If you have opposition to conforming to conservative dress standards, you should probably consider other career options. Unless a notification is sent out Fridays are considered Relaxed Dress Code days.

Only the Department Chair or Lead instructor can issue waivers to this policy.

By attending our programs, you agree to the standards so described.

Represent TSTC and the Aerospace Department with pride.

Resources

Textbooks & Publications:

Item	Title	Author	Publisher	Edition	ISBN
1	Aviation Maintenance Technician Series	Dale Crane	ASA		Latest
2	FAA-H-8083-32 Aviation Maintenance Technician Handbook-Powerplant V1, V2	FAA	U.S. Department of Transportation	Latest	978-1-56027-954-9
3	AC 43.13-1B & 2B Acceptable Methods Techniques, and Practices	FAA	U.S. Department of Transportation	Latest	0-88487-504-0

Course Schedule

Unit/Week	Unit Description/Objectives	Assessment Label:Description	Due Date
1	Week 1 Powerplant Instruments		
	• 1. Overview of course	Lab 1: Research questions concerning powerplant	

	<ul style="list-style-type: none"> 1. Overview of course 1. Describe the different instruments used for powerplant. 	Lab 1: Research questions concerning powerplant instruments.
2	Week 2 Powerplant Instruments	
	<ul style="list-style-type: none"> 1. Describe electrically operated instruments including wheatstone bridge circuit, ratiometer circuit, and thermocouple circuit. 	Lab 2: 1. Inspect tachometer system. 2. Inspect oil temperature system. 3. Inspect EGT system. 4. Inspect CHT system. 5. Inspect oil pressure indicating system.
3	Week 3 Powerplant Fire Detection and Suppression	
	<ul style="list-style-type: none"> 1. Discuss types of aircraft powerplant fire detection systems. 	Lab 3: 1. Answer questions concerning construction and components of fire detection systems. 2. Inspect, test an aircraft powerplant fire detection system.
4	Week 4 Powerplant Fire Detection and Suppression	
	<ul style="list-style-type: none"> 1. Discuss aircraft powerplant fire extinguishing system. 2. Discuss inspection, troubleshooting and repair of fire detection and extinguishing systems. 	Lab 4: 1. Answer questions concerning construction and components of fire suppression systems. 2. Inspect fire extinguishing system according to manufacture's manual.
5	Week 5 Engine Cooling Systems	
	<ul style="list-style-type: none"> 1. Discuss need for powerplant cooling. 2. Discuss reciprocating engine cooling construction, inspection, and repair Test 1 	Test 1: 1. Test 1 over engine instrumentation and fire detection and suppression. Lab 5: 1. Answer questions concerning construction and components of engine cooling system.
6	Week 6 Engine Cooling System	
	<ul style="list-style-type: none"> 1. Discuss turbine engine cooling systems. 	Lab 6: 1. Inspect engine cooling system according to manufactures's manual.
7	Week 7 Engine Exhaust Systems	
	<ul style="list-style-type: none"> 1. Discuss the need for an exhaust system. 2. Discuss materials and construction of exhaust systems, 3. Discuss reciprocating engine exhaust system. 	Lab 7 : 1. Answer questions concerning construction and components of an engine exhaust system.
8	Week 8 Engine exhaust Systems	
	<ul style="list-style-type: none"> 1. Discuss turbine engine exhaust systems. 2. Discuss turbine engine thrust reverser system. 	Lab 8: 1. Inspect engine exhaust system according to manufacturer's manual.
9	Week 9 Heat Exchangers	
	<ul style="list-style-type: none"> 1. Discuss heat exchanger principles 	Lab 9: 1. Inspect engine heat exchanger system according to manufacturer's manual.
10	Week 10 Engine Ice and Rain Control	
	<ul style="list-style-type: none"> 1. Discuss the need for ice and rain control. 2. Discuss ice and rain control for reciprocating engines. 	Test 2: 1. Test 2 over Engine cooling, exhaust systems and heat exchangers. Lab 10: 1. Answer questions concerning construction and components on engine ice and rain control for reciprocating engine.
11	Week 11 Engine Ice and Rain Control	
	<ul style="list-style-type: none"> 1. Discuss the need for ice and rain control for turbine engines. 2. Discuss ice and rain control inspection and maintenance. 	Lab 11: 1. Inspect engine ice and rain control system according to manufacturer's manual.
12	Week 12 Auxiliary Power Units	
	<ul style="list-style-type: none"> 1. Discuss purpose of an auxiliary power units. 2. Discuss components, systems, and construction of auxiliary power units. 	Test 3 : 1. Test 3 on Ice and Rain Control. Lab 12: 1. Answer questions concerning construction and components of an auxiliary power unit.

13	Week 13 Auxiliary Power Units	
	<ul style="list-style-type: none"> 1. Discuss location of auxiliary power units. 2. Discuss running, testing, and maintenance of Auxiliary Power Units. 	Lab 13: Answer questions on Auxiliary Power Unit starting and operation.
14	Week 14 Auxiliary Power Units	
	<ul style="list-style-type: none"> 1. Discuss maintenance on Auxiliary Power Units. 	Lab 14: 1. Start, run, and shutdown Auxiliary Power Unit.
15	Week 15 Final	
		Test 4: Test 4 on APU Systems (Part of final) Final Exam: Final Exam (Test 4 on APU systems will be part of the final.)

Grade Scheme		
Category Description		Category Value
Theory Test		33.3%
Assessment Label:	Assessment Description	Assessment Value
Test 1:	1. Test 1 over engine instrumentation and fire detection and suppression.	8.33%
Test 2:	1. Test 2 over Engine cooling, exhaust systems and heat exchangers.	8.33%
Test 3:	1. Test 3 on Ice and Rain Control.	8.33%
Test 4:	Test 4 on APU Systems (Part of final)	8.33%
Category Description		Category Value
Labs (All labs must be completed to satisfactory condition, pass this category)		33.3%
Assessment Label:	Assessment Description	Assessment Value
Lab 1:	Research questions concerning powerplant instruments.	33.30%
Lab 2:	1. Inspect tachometer system. 2. Inspect oil temperature system. 3. Inspect EGT system. 4. Inspect CHT system. 5. Inspect oil pressure indicating system.	0.00%
Lab 3:	1. Answer questions concerning construction and components of fire detection systems. 2. Inspect, test an aircraft powerplant fire detection system.	0.00%
Lab 4:	1. Answer questions concerning construction and components of fire suppression systems. 2. Inspect fire extinguishing system according to manufacturer's manual.	0.00%
Lab 5:	1. Answer questions concerning construction and components of engine cooling system.	0.00%
Lab 6:	1. Inspect engine cooling system according to manufacturer's manual.	0.00%
Lab 7:	1. Answer questions concerning construction and components of an engine exhaust system.	0.00%
Lab 8:	1. Inspect engine exhaust system according to manufacturer's manual.	0.00%
Lab 9:	1. Inspect engine heat exchanger system according to manufacturer's manual.	0.00%
Lab 10:	1. Answer questions concerning construction and components on engine ice and rain control for reciprocating engine.	0.00%
Lab 11:	1. Inspect engine ice and rain control system according to manufacturer's manual.	0.00%
Lab 12:	1. Answer questions concerning construction and components of an auxiliary power unit.	0.00%
Lab 13:	Answer questions on Auxiliary Power Unit starting and operation.	0.00%
Lab 14:	1. Start, run, and shutdown Auxiliary Power Unit.	0.00%
Category Description		Category Value
Final Exam		33.4%
Assessment Label:	Assessment Description	Assessment Value
Final Exam:	Final Exam (Test 4 on APU systems will be part of the final.)	33.40%
Total Assessment Percent		100.00%
Total Category Percent		100.00%
A = 100-90	B = 89-80	C = 79-70
		D = 69-60
		F = 59-0

Description of Graded Elements of the Course			
Assessment Label	Assessment Description/Course outcomes met	Assessment Value in Percent	% of Final Grade
Lab 1	Research questions concerning powerplant instruments. Course outcomes met: CO3, CO4	33.30	33.30%
Lab 2	1. Inspect tachometer system. 2. Inspect oil temperature system. 3. Inspect EGT system. 4. Inspect CHT system. 5. Inspect oil pressure indicating system. Course outcomes met: CO3, CO4	0.00	0.00%
Lab 3	1. Answer questions concerning construction and components of fire detection systems. 2. Inspect, test an aircraft powerplant fire detection system. Course outcomes met: CO4, CO3	0.00	0.00%
Lab 4	1. Answer questions concerning construction and components of fire suppression systems. 2. Inspect fire extinguishing system according to manufacture's manual. Course outcomes met: CO3, CO4	0.00	0.00%
Test 1	1. Test 1 over engine instrumentation and fire detection and suppression. Course outcomes met: CO3, CO4, CO6, CO11, CO9, CO5	8.33	8.33%
Lab 5	1. Answer questions concerning construction and components of engine cooling system. Course outcomes met: CO4, CO3	0.00	0.00%
Lab 6	1. Inspect engine cooling system according to manufactures's manual. Course outcomes met: CO3, CO4	0.00	0.00%
Lab 7	1. Answer questions concerning construction and components of an engine exhaust system. Course outcomes met: CO4, CO3	0.00	0.00%
Lab 8	1. Inspect engine exhaust system according to manufacturer's manual. Course outcomes met: CO3, CO4	0.00	0.00%
Lab 9	1. Inspect engine heat exchanger system according to manufacturer's manual. Course outcomes met: CO4, CO3	0.00	0.00%
Test 2	1. Test 2 over Engine cooling, exhaust systems and heat exchangers. Course outcomes met: CO5, CO12, CO7, CO4, CO3	8.33	8.33%
Lab 10	1. Answer questions concerning construction and components on engine ice and rain control for reciprocating engine. Course outcomes met: CO4, CO3	0.00	0.00%
Lab 11	1. Inspect engine ice and rain control system according to manufacturer's manual. Course outcomes met: CO3, CO4	0.00	0.00%
Test 3	1. Test 3 on Ice and Rain Control. Course outcomes met: CO3, CO4, CO8, CO5, CO13	8.33	8.33%
Lab 12	1. Answer questions concerning construction and components of an auxiliary power unit. Course outcomes met: CO5, CO1	0.00	0.00%
Lab 13	Answer questions on Auxiliary Power Unit starting and operation. Course outcomes met: CO1, CO5	0.00	0.00%
Lab 14	1. Start, run, and shutdown Auxiliary Power Unit. Course outcomes met: CO5, CO1	0.00	0.00%
Test 4	Test 4 on APU Systems (Part of final) Course outcomes met: CO14, CO5, CO10, CO1, CO2, CO4, CO3	8.33	8.33%
Final Exam	Final Exam (Test 4 on APU systems will be part of the final.) Course outcomes met: CO3, CO4, CO2, CO12, CO11, CO10, CO1, CO6, CO7, CO8, CO9, CO5, CO14, CO13	33.40	33.40%
		100.00	100.00%