UNIVERSITY *of*
DUBUQUE

MULTI-ENGINE AIRPLANE LAND CLASS

TRAINING COURSE OUTLINE

UNIVERSITY *of*
DUBUQUE

MULTI-ENGINE AIRPLANE LAND CLASS
TRAINING COURSE OUTLINE

UNIVERSITY *of* DUBUQUE

This is to certify that

_____

is enrolled in the FAA approved

MULTI-ENGINE RATING COURSE

conducted at the University of Dubuque

School #GV8S178Q

_____

Enrollment Date

_____ _____

Primary Flight Instructor Chief Flight Instructor

AIRPLANE MULTI-ENGINE LAND CLASS

CERTIFICATION COURSE

STUDENT FLIGHT RECORD

University of Dubuque / 2000 University Ave / Dubuque, IA 52001

AIR AGENCY CERTIFICATE NO. GV8S178Q

FTN #

PILOT'S LEGAL NAME _____ SODA ☐

PILOT'S LEGAL SIGNATURE _____

SSN _____ Date of Birth _____

CITIZENSHIP

I certify that _____ has presented to me a _____ (Certified Birth Certificate or U.S. Passport), establishing that _____ (He or She) is a U.S. citizen or national in accordance with 49 CFR 1552.3(h).

Instructor _____ Date _____

Certificate No. _____ Expires _____

PERMANENT ADDRESS

Street _____

City _____ State_____ Zip_____

Phone: Home _____ Cell _____

Date of Enrollment _____ Date Completed _____

Medical Certificate: Class _____ Date Issued _____ Expires _____

Pilot Certificate No. _____ Date Issued _____

GRADUATION RECORD

END-OF-COURSE GRADUATION: DATE _____ RESULT _____

END-OF-COURSE EXAMINER _____

RECORDS CERTIFIED COMPLETE AND ACCURATE: DATE _____

NAME _____ TITLE _____

PREVIOUS EXPERIENCE

DUAL _____ NIGHT SOLO _____

SOLO _____ NIGHT LANDINGS _____

X-C DUAL _____ HOOD _____

X-C SOLO _____ ACTUAL IFR _____

NIGHT DUAL _____ FLIGHT TRAINING DEVICE _____

EVALUATION

FLIGHT / ORAL BY _____ DATE _____

TITLE _____

CHIEF OR ASSISTANT CHIEF INSTRUCTOR

CREDIT GIVEN

GROUND HOURS: Part 141 _____ Part 61 _____ HOURS AWARDED _____

FLIGHT HOURS: Part 141 _____ Part 61 _____ HOURS AWARDED _____

TERMINATION OF TRAINING

DATE _____

CERTIFIED BY _____ _____

CHIEF OR ASSISTANT CHIEF INSTRUCTOR CERTIFICATE NO.

TRANSFERRED

SCHOOL _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TRANSFER DATE _____

AIR AGENCY NO. _____

COPY ISSUED TO STUDENT: DATE _____ BY _____

List of Effective Pages

This list of effective pages shows the standing of all pages in this syllabus with regard to their revision status. The list shows the page number, the revision number and the date of the revision.
Revised pages in this syllabus will include a change bar ( ]) on the side of the page where changes have been made.

The Revision Process

1. Revise the pages in question.
2. Make two copies of the revised pages.
3. Correct this "List of Effective Pages" to reflect the revised pages.
4. Make two copies of this corrected "List of Effective Pages".
5. Send all four copies to the local Flight Standards District Office for approval.
6. Insert corrected pages in all syllabus copies when approval is granted.

Page	Revision	Revision Date
1	Original	11-02-2004
2	Original	11-02-2004
3	Revision 13	10-15-2019
4	Original	11-02-2004
5	Revision 13	10-15-2019
6	Revision 12	06-01-2019
7	Revision 13	10-15-2019
7a	Revision 13	10-15-2019
8	Original	11-02-2004
9	Revision 13	10-15-2019
10	Original	11-02-2004
11	Revision 9	06-01-2017
12	Revision 1	11-23-2009
13	Revision 11	09-15-2018
14	Revision 11	09-15-2018
15	Revision 13	10-15-2019
16	Revision 11	09-15-2018
17	Revision 13	10-15-2019
18	Revision 2	11-23-2009
19	Revision 13	10-15-2019
20	Revision 11	09-15-2018
21	Revision 2	11-23-2009
22	Revision 13	10-15-2019
23	Revision 11	09-15-2018
24	Revision 13	10-15-2019
25	Revision 13	10-15-2019
26	Revision 3	06-05-2012
27	Revision 11	09-15-2018
28	Revision 3	01-09-2014
29	Revision 11	09-15-2018
30	Revision 11	09-15-2018
31	Revision 13	10-15-2019
32	Revision 11	09-15-2018
33	Revision 11	09-15-2018
34	Revision 13	10-15-2019
35	Revision 13	10-15-2019
36	Revision 13	10-15-2019
37	Revision 9	06-01-2017
38	Revision 13	10-15-2019
39	Revision 9	06-01-2017
39a	Revision 9	06-01-2017
40	Revision 2	05-07-2012
41	Revision 1	11-23-2009
42	Revision 1	11-23-2009
43	Revision 8	03-23-2015
44	Revision 1	11-23-2009
45	Revision 1	11-23-2009
46	Revision 1	11-23-2009
47	Revision 1	11-23-2009
48	Revision 1	11-23-2009
49	Revision 1	11-23-2009
50	Revision 1	11-23-2009
51	Revision 1	11-23-2009

APPROVED 1/16/2020 . DSM - FSDO
BY

TRAINING COURSE OUTLINE

LOCATION

The University of Dubuque, located at 2000 University Avenue, Dubuque, Iowa, 52001, holds Air Agency Certificate No. GV8S178Q. The University of Dubuque operates its pilot training school at the Dubuque Regional Airport, Dubuque, Iowa.

COURSE TITLE

Airplane Multi-Engine Land Class Rating Certification Course

This Training Course Outline meets all the curriculum requirements for the Airplane Multi-Engine Land Class Rating Certification Course contained in Appendix I to Title 14 Code of Federal Regulation Part 141 (14 CFR Part 141). This syllabus contains separate flight training and ground training sections, which may be taught concurrently or separately.

COURSE OBJECTIVE

Students will gain the knowledge, skill and aeronautical experience necessary to meet the requirements for the addition of a Multi-Engine Land Class Rating to a Commercial Pilot Certificate.

COURSE COMPLETION STANDARDS

To meet the course completion standards, students must demonstrate through knowledge, oral, flight tests, and appropriate records, that they meet the knowledge, skill and experience requirements necessary to acquire a Multi-Engine Land Class Rating.

MAIN OPERATIONS BASE

The Dubuque Regional Airport is the main operations base for training in this course. The airport has hard-surface runways and meets the requirements of 14 CFR 141.38 for day and night operations. Fuel services and maintenance services are available weekdays during normal working hours. Weekend and after hours fuel and maintenance are available on request.

MAIN OPERATIONS FACILITY

The school's primary flight facility is the Babka Flight Center, 10656 Airport Road, located at the Dubuque Regional Airport, Dubuque, Iowa 52003. This building conforms to the requirements of 14 CFR 141.43 for briefing areas and 14 CFR 141.45 for ground training facilities. This permanent structure has 10 briefing areas of at least 6' by 7' and 14 additional office/training rooms with a maximum number of two students per area. Each briefing/training room will have communications capabilities for contacting a Flight Service Station. The building has Wi Fi capabilities for students and instructors to access weather and flight planning applications online.

GROUND INSTRUCTIONAL FACILITIES

The primary ground instructional facilities are in the Babka Flight Center, located at the Dubuque Regional Airport, Dubuque, Iowa 52003. This facility has three classrooms with a capacity of 24 students in each. The building and rooms are heated, lighted, and ventilated to conform to local building, sanitation, and health codes.
Based on enrollment and class formats, ground schools may also be conducted on the main campus of the University of Dubuque located at 2000 University Avenue, Dubuque, Iowa 52001. The University of Dubuque is accredited by the North Central Association of the Council for Higher Education. The University's classrooms meet the requirements of the Association and conform to local building, sanitation and health codes. Campus classrooms and computer labs are available in the Myers Library, Blades Hall, Alumni Hall, Dunlap Technology Center, MTAC, Mercer-Birmingham, and the University Science Center. Classrooms range in size from 142 seats in the Dunlap Technology Center to 6 seats in the Myers library.

GROUND INSTRUCTIONAL EQUIPMENT / TRAINING AIDS

Training aids and equipment used may include the following: Whiteboards, televisions, podium, LCD/Overhead projector with screen, laptop and/or desktop and/or tablet computers, computer/video interface units for TV/LCD projector. Other aids may include airplane models, airplane parts, instrument panel posters, aviation software, multiple aviation websites, E6B flight computer, plotter, navigation charts, Instrument Terminal Procedures, and EFB's. These aids and equipment will be kept accurate and current for the relevant course of training.
An Advanced Aviation Training device (AATD) may be used in this course as outlined in 14 CFR 141 and AC 61-136. An aircraft may be used to fulfill the instrument training requirement of those lessons if the training devices are not available or desired.

TRAINING DEVICES

The FRASCA RTD and ALSIM 250 are approved Advanced Aviation Training Devices that are available for training in accordance with their respective FAA Letter of Authorization.

AIRCRAFT

Piper Seminole PA-44-180s are available for flight training.
For day, VFR, local area flight within 25 nautical miles of Dubuque Regional Airport or an approved satellite base, an airplane can be dispatched when it meets the requirements of 14 CFR 91.205 (a)(b), and has a serviceable communications radio.
For night, VFR, local area flight within 25 nautical miles of Dubuque Regional Airport or an approved satellite base, an airplane can be dispatched when it meets the requirements of 14 CFR 91.205 (a)(b)(c), and has a serviceable communications radio, and a serviceable landing light.
For flight outside the local area, the airplane must meet the above requirements and also be equipped with at least one serviceable VOR navigational receiver, or one panel mounted GPS receiver.

PERSONNEL

The Chief Instructor for the Airplane Multi-Engine Land Class Certification Course meets the requirements for Chief Instructor as listed in the 14 CFR 141.35 and has been approved by the local FAA Flight Standards District Office. When course enrollments and individual availabilities warrant such appointments, the University of Dubuque will request the appointment of other key personnel such as; Assistant Chief Instructors, Check Instructors and Chief Ground Instructors. All requested appointees will meet the requirements of the appropriate sections of 14 CFR 141.35, Subpart B.
Flight instructors will have a Certified Flight Instructor, Airplane Multi-Engine Land rating, will have received standardization, and will receive recurrent training annually.

CHIEF AND ASSISTANT CHIEF INSTRUCTORS

The Chief Flight Instructor for the Multi-engine Airplane Land Class Rating is Ms. Suzanne Peterson certificate #2801778.

The Chief Ground Instructor for the Multi-engine Airplane Land Class Rating is Ms. Polly Kadolph certificate #3689827.

The following persons have been authorized as Assistant Chief Flight Instructors for the Multi-engine Airplane Land Class Rating: Mr. Michael J. Glynn certificate #2883378 and Mr. Robert Anthony (Tony) Foster certificate #3213651.

ENROLLMENT PREREQUISITES

Students must be able to write, read, speak, and understand the English language and possess a Commercial Pilot Certificate with an instrument rating prior to enrolling in the flight portion of the Airplane Multi-engine Land Class Course.

ENROLLMENT PROCEDURE

Upon enrollment in the flight portion of the training syllabus students will be issued a Certificate of Enrollment showing the date of enrollment and the course entered. Students will also receive a copy of the approved training syllabus. Students may enter the ground portion of the syllabus prior to or during the flight portion. Enrollment certificates and syllabi will be retained at UD Flight Operations at all times unless otherwise directed by the Chief Instructor. Students will have access to a copy of the University of Dubuque Student Flight Operations Manual which outlines the school's operational and safety procedures.

CREDIT FOR PREVIOUS 14 CFR PART 141 PILOT TRAINING

Flight credit may be transferred from other certificated schools to the University of Dubuque's flight program based on an oral test, flight check, written test, or any combination thereof. Students must arrange for the transmittal of flight records from the previous school to the University of Dubuque. The University will determine the amount of credit to be transferred. Credit will be entered in the student's training record along with the documents and tests on which the acceptance is based. The maximum credit given may be up to 50% of the University's approved curriculum requirements.

CREDIT FOR PREVIOUS 14 CFR PART 61 PILOT TRAINING

Flight credit may be transferred from 14 CFR Part 61 schools to the University of Dubuque's flight program based on an oral test, flight check, written test or any combination thereof. Students should submit a record of previous training from the school where it was received. The University will determine the amount of credit to be transferred. Credit will be entered in the student's training record along with the documents and tests on which the acceptance is based. The maximum credit given may be up to 25% of the University's approved curriculum requirements.

GRADING SYSTEM FOR FLIGHT TRAINING

GRADE STANDARD

3……...Meets Practical Test Standards
2……...Meets Lesson Standards
1……...Needs Additional Training
D……...Demonstration

The above grading standard will be used to evaluate student performance. Grades will be entered on each lesson page. At the completion of each stage of training the students will be examined orally and by flight evaluation. Upon successful completion of the evaluation the student will proceed to the next stage of flight training.

AIRPORTS USED

The airports listed below are approved for use by the University of Dubuque, 14 CFR Part 141 Airplane Multi-Engine Land Class student to satisfy the requirements of the school's Multi-Engine Land Class Certification Course syllabus. Mileage to these airports is indicated.

IOWA	ILLINOIS	MISSOURI	MINNESOTA
Mason City (MCW) - 124	Midway (MDW) - 137	Kansas City (MKC) - 265	Rochester (RST) - 120
Des Moines (DSM) - 142	Chicago Executive (PWK) - 125	St. Louis (STL) - 220	St. Paul (STP) - 183

Other airports may be selected by a student, but those airports must be approved by a university multi-engine flight instructor, considering the following: (1) 3000' recommended minimum runway length (2) availability of 100LL aviation gasoline. Instructors must ensure that all airports used meet the requirements of Title 14 CFR Part 141.38 (b) (c) (d) (e) and (f).

REVIEW LESSON PROCEDURE

During training, students may need to do additional work on lessons, or review past lessons. If an instructor needs additional lesson pages the instructor will:

- Copy a blank lesson page for the lesson concerned;
- Use the copied page to record the review or additional work;
- Write the word "Review" in a prominent place on the copied lesson page;
- Place the added lesson page(s) sequentially behind the original lesson page.

	Dual Local Flight	Dual X-Country Day	Dual X-Country Night	Dual Instrument or AATD*
STAGE 1	5			
STAGE 2	1	2	2	5
TOTALS	6	2	2	5*
	Total minimum Multi-Engine flight training time is 10 hours to include 5 hours of instrument training.			

* A maximum of 2 hours may be flown in an approved AATD.

HOW TO USE THIS SYLLABUS

1. This syllabus was designed to be a reasonable complete list of the tasks required for the completion of each lesson. The list of tasks relieves the instructor of having to remember all of the things that should be covered and rated in each lesson. At first, the number of tasks may seem daunting; however, they flow in a natural progression from start to finish and should cause little additional load on the instructor. Some tasks may be accompanied by italicized notes. These notes are additional memory helps for the instructor, student and check pilot.
2. At the top left of each lesson page is a block labeled “HOURS”. There are three white blocks inside the black “HOURS” block. Each lesson allows for three flights or briefings. You should put the time for each flight or briefing in one of the white boxes. When a lesson is completed, that is, when every task in the lesson has a grade of “2” or better, the instructor should total up the time for the lesson and enter it at the bottom of the page in the cumulative times area.
3. Each task in a lesson has three blank lines to the left. These lines are for recording the rating of each task. Every task in a lesson must receive a rating of ”2” or better before the lesson can be considered complete. If a lesson requires more than three flights or briefings to complete the lesson, the instructor will insert and use blank copies of the original lesson to record further flights or briefings, until the lesson is satisfactorily completed.
4. Lessons may require the instructor’s and the student’s signature, along with the date, airplane type, and airplane “N” number at the completion of each flight or briefing.
5. The cumulative times area at the bottom of each lesson is self-explanatory. It is the instructor’s and the student's combined responsibility to make sure this area is accurately filled out, not at the conclusion of each flight or briefing, but at the conclusion of each lesson. Be sure to carry the “TOTAL” time for a finished lesson to the “PREVIOUS” time on the next lesson.
6. The “TIME” requirement at the top of each lesson is the time required for the student to stay “on track”, time wise, throughout the syllabus. A lesson may be completed with somewhat less than the approximate time noted, but this time must then be made up in later lessons if the student is to finish the syllabus with the required amount of time. Having more hours than required is not a problem. Having fewer hours than suggested is cause for the instructor to be aware of the situation and work to ensure that the student finishes the stage and syllabus with the required number of hours. We will use the command and response method of checklist usage. That is, the pilot not flying will read the item while the pilot flying will perform the task with the appropriate verbal response. The PNF will visually confirm that the task has been properly performed.
7. All flight training should contain elements of crew resource management (CRM) and cockpit resource management training. The flight instructor should observe, evaluate and train the student on performing the duties of Pilot In Command and should act like a Second In Command and provide the student with training in crew concept setting during cross-country flights.

ABBREVIATIONS

a/c	aircraft
ACS	Airman Certification Standards
a/s	airspeed
ADF	Automatic Direction Finder
alt	altitude
approx	approximately
ARROW	Airworthiness, registration, radio license (international), operator's manual, weight and balance
ATC	Air Traffic Control
BC	Back Course
calcs	calculations
CG	center of gravity
comm	communication
Cs	constant speed
cx	correction
dist	distance
DME	Distance Measuring Equipment
EGT	Exhaust Gas Temperature
equip	equipment
ETA	estimated time of arrival
FAA	Federal Aviation Association
FAR	Federal Aviation Regulation
freq	frequency / frequencies
FSS	Flight Service Station
FTD	Flight Training Device
GPS	Global Positioning System
hdg	heading
hr	hour
HSI	Horizontal Situation Indicator
IAS	Indicated Airspeed
ID	identify
IFR	Instrument Flight Rules
ILS	Instrument Landing System
inop	inoperative
inst	flight solely by reference to instruments while using a view limiting device
LOC	Localizer
MRA	Manufacturer's recommended airspeed
nav	navigation
NDB	Non Directional Base
OBS	Omni Bearing Selector
ops	operations
PMC	pre-maneuver checklist
PNF	Pilot not flying
pre	before
prep	preparation
pwr	power
req	required
RNAV	Area Navigation
sim	simulated
TACs	Terminal Area Charts
TC	true course
TCO	Training Course Outline
VHF	very high frequency
Vmc	Visual Meteorological Conditions
VR-IR	Integrated flight training using visual and instrument reference
vol	volume
VOR	very high freq, omni directional, radio range
Vx	best angle of climb
Vy	best rate of climb
WACs	World Aeronautical Charts
X-country	cross country
xmitter	transmitter
X-wind	crosswind
√	The aircraft checklist will be used

MULTI-ENGINE AIRPLANE LAND CLASS RATING CERTIFICATION
Training Course Outline

STAGE ONE

Lessons 1—6

During this stage the student will learn the flight procedures and maneuvers necessary to competently and safely operate a twin-engine airplane with both engines operating normally. In addition, the student will learn the techniques and procedures used to meet engine-out emergencies. This includes engine shutdown, engine-out maneuvering, and Vmc recoveries.

The student must successfully complete each of the flight lessons. Additionally, at the completion of this stage the student must be able to perform all normal and emergency operating procedures and maneuvers applicable to a multi-engine rating. The student will also be able to accurately and smoothly maneuver the airplane with one engine inoperative with tolerances stated in the completions standards.

The student should be using CRM techniques in the operation of the aircraft in coordination with the instructor when appropriate.

This stage has a minimum of 5 hours of instruction.

Hours		

MULTI-ENGINE LESSON 1— (BRIEFING) AIRCRAFT SYSTEMS AND AIRCRAFT FAMILIARIZATION

OBJECTIVE: To review multi-engine aircraft systems - general and aircraft specific.

TIME: As required

PREFLIGHT PREPARATION

____ ____ ____ Pilot's Operating Handbook

____ ____ ____ Aircraft log books

____ ____ ____ Certificates and documents

____ ____ ____ Vmc factors

PERFORMANCE AND LIMITATIONS

____ ____ ____ Weight and balance

____ ____ ____ Takeoff calculations

____ ____ ____ Takeoff ground roll

____ ____ ____ Takeoff over obstacle

____ ____ ____ Accelerate / stop calculations

____ ____ ____ Climb performance—all engines operating, gear up and down

____ ____ ____ SE climb performance

____ ____ ____ Time, fuel, distance to climb

____ ____ ____ Cruise performance charts

____ ____ ____ Time, fuel, distance to descend

____ ____ ____ Landing calculations

____ ____ ____ Over 50' obstacle

____ ____ ____ Landing ground roll

____ ____ ____ V Speeds

AIRCRAFT SYSTEMS

____ ____ ____ Fuel, oil, hydraulic systems - general

____ ____ ____ Fuel, oil, hydraulic systems - A/C specific

____ ____ ____ Electrical systems - general

____ ____ ____ Electrical systems - A/C specific

____ ____ ____ Avionics—A/C specific

____ ____ ____ Landing gear systems - general

____ ____ ____ Landing gear systems - A/C specific

____ ____ ____ Propeller systems - general

AIRCRAFT SYSTEMS cont.

____ ____ ____ Propeller synchronizing systems - general

____ ____ ____ Propeller systems - A/C specific

____ ____ ____ Propeller synchronizing systems - A/C specific

____ ____ ____ A/C powerplant

____ ____ ____ Turbo charging & supercharging systems - general

____ ____ ____ Pitot static and associated instruments

____ ____ ____ De-ice and anti-ice systems - general

____ ____ ____ De-ice and anti-ice systems - A/C specific

____ ____ ____ Environmental and pressurization systems

COMPLETION STANDARDS

This lesson will be complete when the student's knowledge of all items rates a grade of 2 or better.

Instructor	Student	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

NOTES

Hours		

MULTI-ENGINE LESSON 2 AIRCRAFT—(DUAL) AIRCRAFT FAMILIARIZATION

OBJECTIVE: The student will be familiarized with the operations of the aircraft systems, power settings and airspeeds for normal operations.

TIME: Approximately 1.0 hour.

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson

____ ____ ____ Wake turbulence and wind shear avoidance

____ ____ ____ Collision avoidance

____ ____ ____ RUNWAY INCURSION avoidance

EMERGENCY PROCEDURES— REVIEW

____ ____ ____ Positive exchange of control

____ ____ ____ Pre take off briefing

____ ____ ____ Precautions and actions in case of real emergency

PREFLIGHT PROCEDURES

____ ____ ____ Weight and balance calculations

____ ____ ____ Obtain and brief weather

____ ____ ____ Performance charts

____ ____ ____ Take off calculations

____ ____ ____ Accelerate / stop calculation

____ ____ ____ Multiengine climb performance, gear down and up

____ ____ ____ Single engine climb performance

____ ____ ____ Time, fuel, distance to climb

____ ____ ____ Cruise calculations

____ ____ ____ Time, fuel, distance to descend

____ ____ ____ Landing calculations

PREFLIGHT

____ ____ ____ Cockpit √

____ ____ ____ Certificates & documents—*ARROW*

____ ____ ____ Preflight inspection √

____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √

____ ____ ____ Comm radio setup—*freq, vol, xmitter*

____ ____ ____ GPS / RNAV, NAV radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √

____ ____ ____ Taxi clearance—*copy, confirm, comply*

____ ____ ____ Begin taxi—*brake check, steering check*

____ ____ ____ Taxiing—*wind, speed, braking, hazards*

____ ____ ____ Traffic watch / Call HOLD SHORT lines

____ ____ ____ Runup √

____ ____ ____ Radio communications

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √

____ ____ ____ Take off briefing

____ ____ ____ Takeoff clearance—*copy, confirm, comply*

____ ____ ____ Take off—normal, crosswind

____ ____ ____ Traffic pattern departure

____ ____ ____ Climb

____ ____ ____ Cruise climb

____ ____ ____ Level-off from climb

____ ____ ____ Cruise √

____ ____ ____ Leaning procedures (EGT)

____ ____ ____ Cruise power settings for various attitudes

____ ____ ____ Turns, climbs, various a/s and configurations

MULTI-ENGINE LESSON 2 AIRCRAFT—(DUAL) AIRCRAFT FAMILIARIZATION
(Continued)

DESCENTS

____ ____ ____ Planning

____ ____ ____ Descent √

____ ____ ____ Descents, various a/s and config

____ ____ ____ Descent at cruise airspeed

____ ____ ____ Level off from descent

____ ____ ____ Descents at approach airspeed and landing config with turns

APPROACH AND LANDING

____ ____ ____ Landing √

____ ____ ____ Radio communications

____ ____ ____ Traffic pattern entry

____ ____ ____ Traffic pattern

____ ____ ____ Normal, x-wind landing

____ ____ ____ Engine shut down

____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft

____ ____ ____ Debrief

____ ____ ____ Complete TCO and logbook

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 2 or better.

Straight and level flight	+/- 200 feet
Heading	+/- 15 degrees
Airspeed	+/- 15 KIAS

Instructor	Student	Date	A/C Type	N#

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

Hours		

MULTI-ENGINE LESSON 3 AIRCRAFT (DUAL)—STEEP TURNS, SLOW FLIGHT, STALLS
OBJECTIVE: The student will become familiar with the aircraft handling in slow flight, stalls, steep turns and short field take offs and landings.
TIME: Approx 1 hour.

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson

____ ____ ____ Wake turbulence and wind shear avoidance

____ ____ ____ Collision avoidance

____ ____ ____ RUNWAY INCURSION avoidance

EMERGENCY PROCEDURES—REVIEW

____ ____ ____ Positive exchange of control

____ ____ ____ Pre take off briefing

____ ____ ____ Precautions and actions in case of emergency

PREFLIGHT PROCEDURES

____ ____ ____ Weight and balance calculations

____ ____ ____ Obtain and brief weather

____ ____ ____ Performance charts

____ ____ ____ Take off calculations

____ ____ ____ Accelerate / stop calculations

____ ____ ____ Multiengine climb performance, gear up and down

____ ____ ____ Single engine climb performance

____ ____ ____ Time, fuel, distance to climb

____ ____ ____ Cruise calculations

____ ____ ____ Time, fuel, distance to descend

____ ____ ____ Landing calculations

PREFLIGHT

____ ____ ____ Cockpit √

____ ____ ____ Certificates & documents—*ARROW*

____ ____ ____ Preflight inspection √

____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √

____ ____ ____ Comm radio setup—*freq, vol, xmitter*

____ ____ ____ GPS / RNAV, Nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √

____ ____ ____ Taxi clearance—*copy, confirm, comply*

____ ____ ____ Begin taxi—*brake check, steering check*

____ ____ ____ Taxiing—*wind, speed, braking, hazards*

____ ____ ____ Traffic watch / Call HOLD SHORT lines

____ ____ ____ Run-up √

Radio communications

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √

____ ____ ____ Take off briefing

____ ____ ____ Takeoff clearance—*copy, confirm, comply*

____ ____ ____ Take off—short, 0° flaps

____ ____ ____ Traffic pattern departure

____ ____ ____ Level-off from climb

____ ____ ____ Cruise √

____ ____ ____ Leaning procedures (EGT)

____ ____ ____ Cruise power settings

PERFORMANCE MANUEVER

____ ____ ____ Steep turns

SLOW FLIGHT

____ ____ ____ Various configurations
____ ____ ____ Climbs / descents
____ ____ ____ Turns

STALLS

____ ____ ____ Power off
____ ____ ____ Power on
____ ____ ____ Accelerated

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 2 or better.

APPROACH AND LANDING

____ ____ ____ Landing √
____ ____ ____ Radio communications
____ ____ ____ Traffic pattern entry
____ ____ ____ Traffic pattern
____ ____ ____ Short field obstacle landing
____ ____ ____ Zero flap landing
____ ____ ____ Engine shut down
____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft
____ ____ ____ Debrief
____ ____ ____ Complete TCO and logbook

Standards are as follows:

1. Altitude ±100 feet
2. Headings ±10°
3. Airspeed ±10 knots
4. Bank ±5°

Instructor	Student	Date	A/C Type	N#

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

Hours		

MULTI-ENGINE LESSON 4—BRIEFING—CROSS-COUNTRY PLANNING AND ENGINE-OUT PROCEDURES

OBJECTIVE: Review certification and cross-country procedures for normal category multi-engine airplane and introduce engine-out and emergency procedures.

TIME: As required.

MULTI-ENGINE AIRPLANE CERTIFICATION REQUIREMENTS

____ ____ ____ FAR 23 / Vmc factors

V SPEEDS

____ ____ ____ Definitions and POH values

WEATHER INFORMATION

____ ____ ____ Weather charts

____ ____ ____ METARs, TAFs, FDs,

____ ____ ____ PIREPS, SIGMETS, AIRMETS

____ ____ ____ Go, no-go decisions

FLIGHT PLANNING

____ ____ ____ Aeronautical charts

____ ____ ____ Airport/Facility Directories

____ ____ ____ NOTAMS

____ ____ ____ Flight log preparation

____ ____ ____ Taxi chart review

____ ____ ____ Weight and balance

____ ____ ____ Performance charts

____ ____ ____ Fuel planning

____ ____ ____ Filing flight plans

AERODYNAMICS—ENGINE-OUT

____ ____ ____ Induced airflow

____ ____ ____ Factors causing yaw and turning tendency

____ ____ ____ Definition of Vmc

____ ____ ____ Factors affecting Vmc

____ ____ ____ Definition of critical engine

____ ____ ____ Feathering

____ ____ ____ Zero sideslip

EMERGENCY PROCEDURES

____ ____ ____ Positive exchange of control

____ ____ ____ Pre take off briefing

____ ____ ____ Engine failure, take off below Vmc

____ ____ ____ Engine failure, take off after rotation

____ ____ ____ Engine failure, take off after rotation, insufficient runway

____ ____ ____ Engine failure in traffic pattern

____ ____ ____ Engine failure in cruise

EMERGENCY PROCEDURES continued

____ ____ ____ Precautions and actions in case of real emergency

____ ____ ____ Approach & landing single-engine

____ ____ ____ Engine roughness or overheat

____ ____ ____ Carburetor or induction icing

____ ____ ____ Loss of oil pressure

____ ____ ____ Fuel starvation

____ ____ ____ Electrical malfunctions

____ ____ ____ Vacuum pressure malfunction

____ ____ ____ Pitot/Static malfunction

____ ____ ____ Landing gear or flap malfunction

____ ____ ____ Inop/Runaway trim

____ ____ ____ Inadvertent door or window opening

____ ____ ____ Structural icing

____ ____ ____ Smoke/Fire/Engine compartment fire

____ ____ ____ Emergency descent

PREFLIGHT PROCEDURES

____ ____ ____ Accelerate / stop calculation

____ ____ ____ Single engine climb performance

ENGINE-OUT EMERGENCY PROCEDURES

____ ____ ____ Identifying inop engine (before shut down)

____ ____ ____ Control inputs required (before shut down)

____ ____ ____ Proper flap and gear retraction

____ ____ ____ Engine shutdown and feather (use fuel shut off valve)

____ ____ ____ X-feed operations

____ ____ ____ Use of Checklist

ENGINE-OUT MANEUVERING

____ ____ ____ Use of trim

____ ____ ____ Engine-out cruise with turns

____ ____ ____ Engine-out climbs and descents with turns

____ ____ ____ In-flight restart of shut-down engine

____ ____ ____ Engine-out missed approach

MANEUVER

____ ____ ____ Vmc demonstration

NOTE

Single engine go-around to be initiated at least 400' AGL or higher.

COMPLETION STANDARDS

This lesson will be complete when the student's knowledge of all items rates a grade of 2 or better.

Instructor	Student	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

Hours		

MULTI-ENGINE LESSON 5 (DUAL)—ENGINE OUT AND EMERGENCY PROCEDURES
OBJECTIVE: To introduce single engine and emergency procedures in the aircraft.
TIME: Approximately 1.5 hours.

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson
____ ____ ____ Wake turbulence and wind shear avoidance
____ ____ ____ Collision avoidance
____ ____ ____ RUNWAY INCURSION avoidance
____ ____ ____ Emergency checklists
____ ____ ____ Memory items

EMERGENCY PROCEDURES—BRIEFING

____ ____ ____ Positive exchange of control
____ ____ ____ Pre take off briefing
____ ____ ____ Engine failure, take off below Vmc
____ ____ ____ Engine failure, take off after rotation
____ ____ ____ Engine failure, take off after rotation, insufficient runway
____ ____ ____ Engine failure in traffic pattern
____ ____ ____ Engine failure in cruise
____ ____ ____ Precautions and actions in case of real emergency

PREFLIGHT PROCEDURES

____ ____ ____ Weight and balance calculations
____ ____ ____ Obtain and brief weather
____ ____ ____ Performance charts
____ ____ ____ Short and obstacle clearance take off calculations
____ ____ ____ Accelerate / stop calculation
____ ____ ____ Multiengine climb performance gear up and down
____ ____ ____ Single engine climb performance
____ ____ ____ Short and obstacle clearance landing calculations

PREFLIGHT

____ ____ ____ Cockpit √
____ ____ ____ Certificates & documents—*ARROW*
____ ____ ____ Preflight inspection √
____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √
____ ____ ____ Comm radio setup—*freq, vol, xmitter*
____ ____ ____ GPS / RNAV, nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √
____ ____ ____ Taxi clearance—*copy, confirm, comply*
____ ____ ____ Begin taxi—*brake check, steering check*
____ ____ ____ Taxiing—*wind, speed, braking, hazards*
____ ____ ____ Traffic watch / Call HOLD SHORT lines
____ ____ ____ Run-up √
____ ____ ____ Radio communications

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √
____ ____ ____ Take off briefing
____ ____ ____ Takeoff clearance—*copy, confirm, comply*
____ ____ ____ Simulated engine failure on take off ground roll
____ ____ ____ Take off—crosswind
____ ____ ____ Take off—short obstacle 0° flaps
____ ____ ____ Simulated engine failure on climb-out
____ ____ ____ Traffic pattern departure
____ ____ ____ Level-off from climb
____ ____ ____ Cruise √
____ ____ ____ Leaning procedures (EGT)
____ ____ ____ Cruise power settings

ENGINE-OUT EMERGENCY PROCEDURES

____ ____ ____ Identifying inop engine (before shut down)

____ ____ ____ Control inputs required (before shut down)

____ ____ ____ Proper flap and gear retraction

____ ____ ____ Engine shutdown and feather (use fuel shut off valve)

____ ____ ____ Use of checklist

ENGINE-OUT MANEUVERING

____ ____ ____ X-feed operation

____ ____ ____ Use of trim

____ ____ ____ Engine-out cruise with turns

____ ____ ____ Engine-out climbs and descents with turns

____ ____ ____ In-flight restart of shut-down engine

SIMULATED MANEUVERS

____ ____ ____ Vmc demonstration

DESCENTS

____ ____ ____ Descent checklist

____ ____ ____ Descent at cruise airspeed

____ ____ ____ Level off from descent

____ ____ ____ Descents at approach airspeed and landing configurations with turns

____ ____ ____ Emergency descent

APPROACH AND LANDING

____ ____ ____ Landing √

____ ____ ____ Radio communications

____ ____ ____ Traffic pattern entry

____ ____ ____ Go around procedure (2 engines)

____ ____ ____ Single engine traffic pattern

____ ____ ____ Single engine go around

____ ____ ____ Single engine landing

____ ____ ____ Engine shut down

____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft

____ ____ ____ Debrief

____ ____ ____ Complete TCO and logbook

NOTE

Single engine go-around to be initiated at least 400’ AGL or higher.

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 2 or better.

Standards are as follows:

1. Altitude ±100 feet
2. Headings ±10°
3. Airspeed ±10 knots
4. Vmc demo: ±20°, ±5 knots

Instructor	Student	Date	A/C Type	N#
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

NOTES

Hours		

MULTI-ENGINE LESSON 6 — STAGE CHECK
AIRCRAFT HANDLING AND SINGLE ENGINE OPERATIONS
OBJECTIVE: To review single engine and emergency procedures in the aircraft.
TIME: Approximately 1.5 hours.

____ ____ ____ **Vmc Factors**

AIRCRAFT SYSTEMS—*ORAL*

____ ____ ____ Electrical

____ ____ ____ Landing gear / hydraulic

____ ____ ____ Engine and propeller

____ ____ ____ Fuel / oil

____ ____ ____ Air frame and flight controls

____ ____ ____ Environmental

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson

____ ____ ____ V Speeds

____ ____ ____ Wake turbulence / wind shear

____ ____ ____ Weight and balance

____ ____ ____ Take off and landing calcs

____ ____ ____ Accelerate / stop calcs

____ ____ ____ Climb performance:

____ ____ ____ All engines operating, gear up and down

____ ____ ____ One engine inoperative

ENGINE-OUT EMERGENCY PROCEDURES—BRIEFING

____ ____ ____ Engine failure below Vmc

____ ____ ____ Engine failure during climb-out

____ ____ ____ Memory items

____ ____ ____ Emergency checklists

____ ____ ____ Identifying inop engine

____ ____ ____ Control inputs required

____ ____ ____ Proper flap and gear retraction

____ ____ ____ Procedure for engine shutdown

PREFLIGHT

____ ____ ____ Cockpit √

____ ____ ____ Certificates and documents—ARROW

____ ____ ____ Preflight inspection √

____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √

____ ____ ____ Comm radio setup—*freq, vol, xmitter*

____ ____ ____ GPS / RNAV, Nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √

____ ____ ____ Taxi clearance—*copy, confirm, comply*

____ ____ ____ Begin taxi—*brake check, steering check*

____ ____ ____ Taxiing—*wind, speed, braking, hazards*

____ ____ ____ Traffic watch / Call HOLD SHORT lines

____ ____ ____ Run-up √

____ ____ ____ Radio communications

MULTI-ENGINE LESSON 6 — STAGE CHECK

AIRCRAFT HANDLING AND SINGLE ENGINE OPERATIONS

(Continued)

TAKEOFF / CLIMB / CLIMB / CRUISE

____ ____ ____ Takeoff √

____ ____ ____ Take off briefing

____ ____ ____ Takeoff clearance—*copy, confirm, comply*

____ ____ ____ Simulated engine failure on take off ground roll

____ ____ ____ Take off—short obstacle 0° flaps

____ ____ ____ Simulated engine failure on climb-out

____ ____ ____ Traffic pattern departure

____ ____ ____ Level-off from climb—*VR-IR*

____ ____ ____ Cruise √

____ ____ ____ Leaning procedures (EGT)

____ ____ ____ Cruise power settings

SIMULATED SINGLE ENGINE OPERATION

____ ____ ____ Vmc demonstration

ENGINE-OUT EMERGENCY PROCEDURES

____ ____ ____ Use of checklist

____ ____ ____ Identifying inop engine

____ ____ ____ Control inputs required

____ ____ ____ Proper flap and gear retraction

____ ____ ____ Engine shutdown and feather

____ ____ ____ Emergency descent

ENGINE-OUT MANEUVERING

____ ____ ____ Use of trim

____ ____ ____ Engine-out cruise with turns

____ ____ ____ Engine-out climbs and descents with turns

____ ____ ____ In-flight restart of shut-down engine

SLOW FLIGHT, VARIOUS CONFIGURATIONS

____ ____ ____ Entry

____ ____ ____ Recovery

STALLS

____ ____ ____ Power off

____ ____ ____ Power on

____ ____ ____ Accelerated

PERFORMANCE MANEUVERS

____ ____ ____ Steep turns

SYSTEMS & EQUIPMENT MALFUNCTIONS

Select at least (5) of the following:

____ ____ ____ Engine roughness or overheat

____ ____ ____ Carburetor or induction icing

____ ____ ____ Loss of oil pressure

____ ____ ____ Fuel starvation

____ ____ ____ Electrical malfunction

____ ____ ____ Vacuum/Pressure malfunction

____ ____ ____ Pitot/Static

____ ____ ____ Landing gear or flap malfunction

____ ____ ____ Inop or runaway trim

____ ____ ____ Inadvertent door or window opening

____ ____ ____ Structural icing

____ ____ ____ Smoke/Fire/Engine compartment fire

DESCENTS

____ ____ ____ Descent checklist

____ ____ ____ Descent at cruise airspeed

____ ____ ____ Level off from descent

APPROACH AND LANDING

____ ____ ____ Landing check list

____ ____ ____ Traffic patterns

____ ____ ____ Short field

____ ____ ____ Zero flap landing

____ ____ ____ Normal/crosswind

____ ____ ____ Engine-out

MULTI-ENGINE LESSON 6 — STAGE CHECK

AIRCRAFT HANDLING AND SINGLE ENGINE OPERATIONS

(Continued)

SINGLE ENGINE GO AROUND AND LANDING— SIMULATED

____ ____ ____ Go around (Initiate >400 ft AGL)

____ ____ ____ Traffic pattern

____ ____ ____ Landing

____ ____ ____ Engine shut down

____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft

____ ____ ____ Debrief

____ ____ ____ Complete TCO and logbook

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 2 or better.

Standards are as follows:

1. Altitude ±100 feet
2. Headings ±10°
3. Airspeed ±10 knots
4. Vmc demo: ±20°, ±5 knots

Instructor	Student	Date	A/C Type	N#

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

MULTI-ENGINE RATING STAGE CHECK EVALUATION
(CONTINUED)

CRITIQUE

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

RECOMMENDATION

1 _____ This stage check performance indicates that additional review is necessary.

A. Do Review Lessons on all items marked “1” until your Instructor indicates a satisfactory “2”.

B. Insert the Review Lesson sheets following this page.

C. Return to the Chief / Assistant Chief Instructor for reevaluation.

Check Instructor	Student	Date
_____	_____	_____

2 _____ This stage check was performed in a satisfactory manner.

Check Instructor	Student	Date
_____	_____	_____

MULTI-ENGINE AIRPLANE LAND CLASS RATING CERTIFICATION
Training Course Outline

STAGE TWO

Lessons 7—11

During this stage of training, the student will integrate lessons learned in VFR multi-engine operations to instrument flying. This stage will consist of a minimum of 5 hours of flying including the day and night cross-country flights as required by FAR Part 141, Appendix I 4 (k)(2)(i) through (v).

Three (3) hours of flight training in preparation for the practical test within 2 calendar months preceding the date of the test.

The student must demonstrate instrument competency in multi-engine operations both in normal operation and with an engine-out and meet performance levels outlined in the FAA multi-engine ACS.

Note: Any revisions to the FAA multi-engine ACS will take precedence over lesson.

Hours		

MULTI-ENGINE LESSON 7— EXPANDED IFR BRIEFING

OBJECTIVE: Review IFR operations, regulations and single engine operations in IMC conditions.

TIME: As required.

____ ____ ____ **REVIEW TITLE 14 CFR, INSTRUMENT FLIGHT RULES**

____ ____ ____ **AIRSPACE CLASSIFICATIONS AND REQUIREMENTS**

____ ____ ____ **AIRWAYS**

____ ____ ____ **RADAR SERVICES AND ATC COMM**

RADIO NAVIGATION

____ ____ ____ VOR

____ ____ ____ GPS / RNAV

INSTRUMENT APPROACHES—TWO ENGINES

____ ____ ____ VOR

____ ____ ____ ILS / LOC

____ ____ ____ Back course

____ ____ ____ GPS / RNAV

INSTRUMENT LANDINGS—TWO ENGINES

____ ____ ____ From straight in approach

____ ____ ____ From circling approach

INSTRUMENT APPROACHES—ONE ENGINE INOP

____ ____ ____ VOR

____ ____ ____ ILS / LOC

____ ____ ____ Back course

____ ____ ____ GPS / RNAV

INSTRUMENT LANDINGS—ONE ENGINE INOP

____ ____ ____ From straight in approach

____ ____ ____ From circling approach

HOLDS

____ ____ ____ VOR

____ ____ ____ GPS / RNAV

____ ____ ____ LOC

____ ____ ____ DME

Instructor	Student	Date	A/C Type	N#
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Hours		

MULTI-ENGINE LESSON 8 AIRCRAFT—(DUAL) ***100 NM DAY X-COUNTRY***
OBJECTIVE: The student will conduct a day flight with one leg of at least 100 nm.
TIME: ***Minimum 2 hours. (Approximately 1 hour instrument)***

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson
____ ____ ____ Wake turbulence and wind shear avoidance
____ ____ ____ Collision avoidance
____ ____ ____ RUNWAY INCURSION avoidance
____ ____ ____ X-country flight planning

EMERGENCY PROCEDURES—REVIEW

____ ____ ____ Positive exchange of control
____ ____ ____ Pre take off briefing
____ ____ ____ Precautions and actions in case of real emergency

PREFLIGHT PROCEDURES

____ ____ ____ Weight and balance calculations
____ ____ ____ Obtain and brief weather
____ ____ ____ Performance charts
____ ____ ____ Take off calculations
____ ____ ____ Accelerate / stop calculation
____ ____ ____ Multiengine climb performance, gear down and up
____ ____ ____ Single engine climb performance
____ ____ ____ Time, fuel, distance to climb
____ ____ ____ Cruise calculations
____ ____ ____ Time, fuel, distance to descend
____ ____ ____ Landing calculations
____ ____ ____ Flight planning form completed
____ ____ ____ Flight plan filed

PREFLIGHT

____ ____ ____ Cockpit √
____ ____ ____ Certificates & documents—*ARROW*
____ ____ ____ Preflight inspection √
____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √
____ ____ ____ Comm radio setup—*freq, vol, xmitter*
____ ____ ____ GPS / RNAV, nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √
____ ____ ____ Taxi clearance—*copy, confirm, comply*
____ ____ ____ Begin taxi—*brake check, steering check*
____ ____ ____ Taxiing—*wind, speed, braking, hazards*
____ ____ ____ Traffic watch / Call HOLD SHORT lines
____ ____ ____ Run-up √
____ ____ ____ Radio communications

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √
____ ____ ____ Take off briefing
____ ____ ____ Takeoff clearance—*copy, confirm, comply*
____ ____ ____ Take off—short field, crosswind
____ ____ ____ Traffic pattern departure
____ ____ ____ Climb √
____ ____ ____ Cruise climb
____ ____ ____ Level-off from climb
____ ____ ____ Cruise √
____ ____ ____ Leaning procedures (EGT)
____ ____ ____ Cruise power set as calculated

MULTI-ENGINE LESSON 8 AIRCRAFT—(DUAL) *100 NM DAY X-COUNTRY*

(Continued)

AT LEAST ONE LEG OF 100 NM

____ ____ ____ Pilotage / Dead reckoning

____ ____ ____ GPS/RNAV navigation

ATTITUDE INSTRUMENT FLYING

____ ____ ____ Straight and level

____ ____ ____ Standard rate turns—level, climbing, descending

____ ____ ____ Climbs / descents—constant rate and constant IAS

____ ____ ____ Unusual attitude recoveries

INSTRUMENT APPROACHES

Select 2—(1) Partial panel approaches

____ ____ ____ VOR, LOC, or BC/LOC

____ ____ ____ ILS

____ ____ ____ GPS

____ ____ ____ Straight in or circling

DESCENTS

____ ____ ____ Planning descent

____ ____ ____ Descent √

____ ____ ____ Descent at desired airspeed

____ ____ ____ Level-off from descent

APPROACHES AND LANDINGS

____ ____ ____ Landing √

____ ____ ____ Radio communications

____ ____ ____ Traffic pattern entry

____ ____ ____ Traffic patterns

____ ____ ____ Normal / crosswind landing

____ ____ ____ Engine shut-down

____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft

____ ____ ____ Debrief

____ ____ ____ Complete TCO and logbook

COMPLETION STANDARDS

The lesson will be complete when the student's knowledge of all items rates a grade of 2 or better.

Straight and level flight	+/- 100 feet
Heading	+/- 10°
Airspeed	+/- 10 knots

Cross-Country Route	Distance

Instructor	Student	Date	A/C Type	N#

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

Hours		

MULTI-ENGINE LESSON 9 AIRCRAFT (DUAL)—*100 NM NIGHT CROSS-COUNTRY*
OBJECTIVE: The student will conduct a night flight with one leg of at least 100 nm.
TIME: ***Minimum 2 hours***. *(Approximately 1 hour instrument)*

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson
____ ____ ____ Wake turbulence and wind shear avoidance
____ ____ ____ Collision avoidance
____ ____ ____ RUNWAY INCURSION avoidance
____ ____ ____ A/C lighting systems
____ ____ ____ Airport lighting systems
____ ____ ____ Night flying regulations
____ ____ ____ X-country flight planning

EMERGENCY PROCEDURES—BRIEFING

____ ____ ____ Positive exchange of control
____ ____ ____ Pre take off briefing
____ ____ ____ Precautions and actions in case of real emergency

PREFLIGHT PROCEDURES

____ ____ ____ Weight and balance calculations
____ ____ ____ Obtain and brief weather
____ ____ ____ Performance charts
____ ____ ____ Take off calcs
____ ____ ____ Accelerate / stop calculations
____ ____ ____ Multiengine climb performance, gear up and down
____ ____ ____ Single engine climb performance
____ ____ ____ Time, fuel, distance to climb
____ ____ ____ Cruise calculations
____ ____ ____ Time, fuel, distance to descend
____ ____ ____ Landing calculations
____ ____ ____ Flight planning form completed
____ ____ ____ Flight plan filed

PREFLIGHT

____ ____ ____ Cockpit √
____ ____ ____ Certificates & documents—*ARROW*
____ ____ ____ Preflight inspection √
____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √
____ ____ ____ Comm radio setup—*freq, vol, xmitter*
____ ____ ____ GPS / RNAV, Nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √
____ ____ ____ Taxi clearance—*copy, confirm, comply*
____ ____ ____ Begin taxi—*brake check, steering check*
____ ____ ____ Taxiing—*wind, speed, braking, hazards*
____ ____ ____ Traffic watch / Call HOLD SHORT lines
____ ____ ____ Run-up √
____ ____ ____ Radio communications

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √
____ ____ ____ Take off briefing
____ ____ ____ Takeoff clearance—*copy, confirm, comply*
____ ____ ____ Take off—short, 0° flaps, crosswind
____ ____ ____ Traffic pattern departure
____ ____ ____ Level-off from climb
____ ____ ____ Cruise √
____ ____ ____ Leaning procedures (EGT)
____ ____ ____ Cruise power set as calculated

AT LEAST ONE LEG OF 100 NM

____ ____ ____ Pilotage / Dead reckoning

____ ____ ____ GPS / RNAV navigation

ATTITUDE INSTRUMENT FLYING

____ ____ ____ Straight and level

____ ____ ____ Standard rate turns—level, climbing, descending

____ ____ ____ Climbs / descents—constant rate and constant IAS

____ ____ ____ Unusual attitude recoveries

INSTRUMENT APPROACHES

Select 2 approaches—at least 1 partial panel

____ ____ ____ VOR, LOC, or BC/LOC

____ ____ ____ ILS

____ ____ ____ GPS

____ ____ ____ Straight in or circling

DESCENTS

____ ____ ____ Planning descent

____ ____ ____ Descent √

____ ____ ____ Descent at desired airspeed

____ ____ ____ Level off from descent

APPROACH AND LANDING

____ ____ ____ Landing √

____ ____ ____ Radio communications

____ ____ ____ Traffic pattern entry

____ ____ ____ Traffic pattern

____ ____ ____ Normal / x-wind landing

____ ____ ____ Engine shut down

____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft

____ ____ ____ Debrief

____ ____ ____ Complete TCO and logbook

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 2 or better.

Standards are as follows:
1. Altitude ±100 feet
2. Headings ±10°
3. Airspeed ±10 knots

Cross-Country Route	Distance

Instructor _____ Student _____ Date _____ A/C Type _____ N# _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total Acft	Inst/AATD
Previous								
This Lesson								
Total								

Hours		

MULTI-ENGINE LESSON 10 (Aircraft or AATD) IFR— ENGINE-OUT IFR APPROACHES

OBJECTIVE: To review IFR approaches with one engine inoperative.

TIME: As required. **Approximately 3 hours instrument**.

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson

____ ____ ____ Review holding procedures

____ ____ ____ Review planned approaches

____ ____ ____ Wake turbulence / wind shear

____ ____ ____ Weather briefing

____ ____ ____ Normal take off and landing calculations

____ ____ ____ Accelerate stop calculations

____ ____ ____ Climb performance

____ ____ ____ All engines operating

____ ____ ____ One engine inoperative

STARTUP

____ ____ ____ Engine start √

____ ____ ____ Comm radio setup—*freq, vol, xmitter*

____ ____ ____ Nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √

____ ____ ____ IFR clearance

____ ____ ____ Taxi clearance—*copy, confirm, comply*

____ ____ ____ Begin taxi—*brake check, steering check*

____ ____ ____ Taxiing—*wind, speed, braking, hazards*

____ ____ ____ Traffic watch / Call HOLD SHORT lines

____ ____ ____ Run-up √

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √

____ ____ ____ Take off briefing

____ ____ ____ Takeoff clearance—*copy, confirm, comply*

____ ____ ____ Take off—normal, crosswind

____ ____ ____ Traffic pattern departure

____ ____ ____ Communication with ATC

____ ____ ____ Level-off from climb—*VR-IR*

____ ____ ____ Unusual attitude recovery (IR)

____ ____ ____ Cruise √

____ ____ ____ Leaning procedures (EGT)

____ ____ ____ Cruise power settings

ENGINE-OUT EMERGENCY PROCEDURES

____ ____ ____ Identifying inop engine

____ ____ ____ Control inputs required

____ ____ ____ Proper flap and gear retraction

____ ____ ____ Procedures for engine shutdown and feather

ENGINE-OUT APPROACHES

Select 2 approaches—at least 1 partial panel

____ ____ ____ VOR

____ ____ ____ ILS

____ ____ ____ BC/LOC

____ ____ ____ GPS / RNAV

____ ____ ____ Straight in

____ ____ ____ Circling

DESCENTS

____ ____ ____ Descent checklist

____ ____ ____ Descent at cruise airspeed

____ ____ ____ Level off from descent

____ ____ ____ Descents at approach airspeed and landing configurations with turns

____ ____ ____ Missed approach procedure

APPROACH AND LANDING

____ ____ ____ Landing check list

____ ____ ____ Normal, x-wind landing—single engine (straight-in)

____ ____ ____ Normal landing—single engine, from a circling approach

POSTFLIGHT

____ ____ ____ Engine shut down

____ ____ ____ Securing the aircraft

____ ____ ____ Debrief

____ ____ ____ Update syllabus and logbook

NOTES

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 2 or better.

Standards are as follows:

1. Altitude ±100 feet
2. Headings ±10°
3. Airspeed ±10 knots

Instructor	Student	Date	A/C Type	N#

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total A/C	Inst/AATD
Previous								
This Lesson								
Total								

Hours		

MULTI-ENGINE LESSON 11 (DUAL)— REVIEW FOR CHECK RIDE

OBJECTIVE: To review flight procedures in preparation for the end of course check ride.

TIME: Aircraft: As required.

PREFLIGHT BRIEFING

____ ____ ____ Discussion of this lesson

____ ____ ____ Multi-engine ACS review

____ ____ ____ Wake turbulence and wind shear avoidance

____ ____ ____ Collision avoidance

____ ____ ____ RUNWAY INCURSION avoidance

____ ____ ____ Emergency procedures

PREFLIGHT PROCEDURES

____ ____ ____ Weight and balance calculations

____ ____ ____ Obtain and brief weather

____ ____ ____ Review all performance charts

____ ____ ____ Take off calculations (various)

____ ____ ____ Landing calculations (various)

____ ____ ____ Accelerate / stop calculations

____ ____ ____ Multiengine climb performance, gear up and down

____ ____ ____ Single engine climb performance

____ ____ ____ Time, fuel, distance to climb

____ ____ ____ Cruise calculations

____ ____ ____ Time, fuel, distance to descend

____ ____ ____ Wake turbulence avoidance

PREFLIGHT

____ ____ ____ Cockpit √

____ ____ ____ Certificates & documents—*ARROW*

____ ____ ____ Preflight inspection √

____ ____ ____ Airplane servicing

STARTUP

____ ____ ____ Engine start √

____ ____ ____ Comm radio setup—*freq, vol, xmitter*

____ ____ ____ GPS / RNAV, Nav radio setup—*freq, ID, set course*

TAXI

____ ____ ____ Taxi √

____ ____ ____ Taxi clearance—*copy, confirm, comply*

____ ____ ____ Begin taxi—*brake check, steering check*

____ ____ ____ Taxiing—*wind, speed, braking, hazards*

____ ____ ____ Traffic watch / Call HOLD SHORT lines

____ ____ ____ Run-up √

TAKEOFF / CLIMB / CRUISE

____ ____ ____ Takeoff √

____ ____ ____ Take off briefing

____ ____ ____ Takeoff clearance—*copy, confirm, comply*

____ ____ ____ Take off—normal, cross-wind, short field

____ ____ ____ Traffic pattern departure

____ ____ ____ Level-off from climb—*VR-IR*

____ ____ ____ Cruise √

____ ____ ____ Leaning procedures (EGT)

____ ____ ____ Cruise power settings

PERFORMANCE MANEUVERS

____ ____ ____ Steep turns

MULTI-ENGINE LESSON 11 (DUAL)— REVIEW FOR CHECK RIDE

(Continued)

SLOW FLIGHT

____ ____ ____ Various configurations

STALLS

____ ____ ____ Power off

____ ____ ____ Power on

____ ____ ____ Accelerated

ENGINE-OUT EMERGENCY PROCEDURES

____ ____ ____ Engine failure during take off ground roll

____ ____ ____ Identifying inop engine

____ ____ ____ Control inputs required

____ ____ ____ Proper flap and gear retraction

____ ____ ____ Engine failure during climb-out

____ ____ ____ Procedures for engine shutdown and feather

ENGINE-OUT MANEUVERING

____ ____ ____ Use of trim

____ ____ ____ Engine-out cruise with turns

____ ____ ____ Engine-out climbs and descents with turns

____ ____ ____ In-flight restart of shut-down engine

____ ____ ____ Systems & equipment malfunctions

DESCENTS

____ ____ ____ Descent √

____ ____ ____ Descent at cruise airspeed

____ ____ ____ Level off from descent

____ ____ ____ Descents at approach airspeed and landing config with turns

____ ____ ____ Emergency descent

APPROACH AND LANDING

____ ____ ____ Landing check list

____ ____ ____ Traffic pattern entry

____ ____ ____ Traffic pattern

____ ____ ____ Normal, x-wind, short field

____ ____ ____ Go around

____ ____ ____ Missed approach procedure

____ ____ ____ Engine shut down

____ ____ ____ Securing the aircraft

POSTFLIGHT

____ ____ ____ Post flight inspection of aircraft

____ ____ ____ Debrief

____ ____ ____ Update syllabus and logbook

COMPLETION STANDARDS

The lesson will be complete when all areas have a grade of 3 or better and meet the FAA Multi-engine ACS.

1. Altitude ±100 feet
2. Headings ±10°
3. Airspeed ±10 knots

Instructor _____ Student _____ Date _____ A/C Type _____ N# _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

	Dual Pre/Post	Dual Day	Dual Night	Dual X-Ctry	Dual Inst	Dual AATD	Total Acft	Inst/AATD
Previous								
This Lesson								
Total								

MULTI-ENGINE END-OF-COURSE EVALUATION
OBJECTIVE: To assure that the student meets the minimum requirements of the FAA multi-engine ACS.
TIME: As required for thorough evaluation.

Student _____ Examiner _____ Date _____

NOTE:

The evaluator must assess the applicant on all skill elements for each task included in each area of operation of the ACS unless otherwise noted. The evaluator must also assess at least one knowledge element and one risk management element in each task.

EVALUATION PRELIMINARIES

____ ____ ____ Drivers license or picture ID
____ ____ ____ Pilot's Certificate—*valid*
____ ____ ____ Medical certificate—*valid*
____ ____ ____ 8710 Form—*correct, dated, signed*
____ ____ ____ Certificate of Enrollment—*current*
____ ____ ____ Training Course Outline—*completed*
____ ____ ____ Ground school completion—*verified*

I. PREFLIGHT PREPARATION

____ ____ ____ Performance and limitations

Operation of Systems:

Examiner will select at least (3) of the following:

____ ____ ____ Primary flight controls and trim
____ ____ ____ Secondary flight controls
____ ____ ____ Powerplant and propeller
____ ____ ____ Landing gear
____ ____ ____ Fuel, oil, and hydraulic
____ ____ ____ Electrical
____ ____ ____ Avionics
____ ____ ____ Pitot/Vacuum/Pressure instruments
____ ____ ____ Environmental
____ ____ ____ De-icing and anti-icing

Or

____ ____ ____ Indications of systems abnormalities or failures

II. PREFLIGHT PROCEDURES

____ ____ ____ Preflight assessment
____ ____ ____ Engine starting
____ ____ ____ Before takeoff check

III. TAKEOFFS, LANDINGS, GO-AROUNDS

____ ____ ____ Normal, takeoff and climb
____ ____ ____ Normal approach and landing
____ ____ ____ Short-field and maximum performance climb
____ ____ ____ Short-field approach and landing

IV. SLOW FLIGHT AND STALLS

Note: Establish and maintain an airspeed at which any further increase in angle of attack, increase in load factor, or reduction in power, would result in a stall warning (e.g., aircraft buffet, stall horn, etc.)

____ ____ ____ Maneuvering during slow flight—*specified configurations*

Note: Acknowledge the cues and recover promptly at the first indication of an impending stall (e.g., aircraft buffet, stall horn, etc.)

____ ____ ____ Power-off stalls—approach or landing configuration
____ ____ ____ Power-on stalls (take off or departure configuration)
____ ____ ____ Accelerated stalls
____ ____ ____ Spin awareness

V. PERFORMANCE MANEUVER

____ ____ ____ Steep turns—50° bank, opposite directions

MULTI-ENGINE END-OF-COURSE EVALUATION (CONTINUED)

V. EMERGENCY OPERATIONS

_____ _____ _____ Emergency descent

_____ _____ _____ Engine failure during takeoff before Vmc (Simulated)

_____ _____ _____ Engine failure after lift-off (Simulated)

_____ _____ _____ Approach and landing with inop engine (Simulated)

Systems and Equipment Malfunctions
Examiner will select at least (3) of the following elements or sub-elements:

_____ _____ _____ Partial or complete power loss

_____ _____ _____ (a) Engine roughness or overheat

_____ _____ _____ (b) Carburetor or induction icing

_____ _____ _____ (c) Loss of oil pressure

_____ _____ _____ (d) Fuel starvation

_____ _____ _____ Electrical malfunction

_____ _____ _____ Vacuum/Pressure malfunction

_____ _____ _____ Pitot/Static malfunction

_____ _____ _____ Landing gear or flap malfunction

_____ _____ _____ Inop trim

_____ _____ _____ Inadvertent door or window opening

_____ _____ _____ Smoke/Fire/Engine compartment fire

VI. MULTI-ENGINE OPERATIONS

_____ _____ _____ Maneuvering with one inoperative engine

_____ _____ _____ Vmc demonstration

_____ _____ _____ Engine failure during flight (by reference instruments)

_____ _____ _____ Instrument approach-one engine inoperative

VII. POSTFLIGHT PROCEDURES

_____ _____ _____ After landing, parking, securing

COMPLETION STANDARDS

The applicant must meet the FAA Commercial Pilot and Instrument Multi-engine Land Class ACS on this evaluation before being awarded a Multi-engine Rating.

MULTI-ENGINE RATING END-OF-COURSE EVALUATION (CONTINUED)

Attempt Flight 1

Examiner_____

Student _____

Date_____

Oral Time _____

Flight Time _____

Attempt Flight 2

Examiner_____

Student _____

Date_____

Oral Time _____

Flight Time _____

Attempt Flight 3

Examiner_____

Student_____

Date _____

Oral Time_____

Flight Time_____

TOTAL ORAL TEST TIME _____

TOTAL FLIGHT TEST TIME _____

AIRCRAFT N # _____

COMMENTS:

Recommendations:

1 ____ **The End-Of-Course Evaluation performance indicates the additional review is necessary.**

- Do review lessons on all items marked "1" until your instructor indicates a satisfactory "3".
- Insert the review lesson sheets following this page.
- Then return to the Chief or Assistant Chief Instructor for reevaluation.

Chief/ Assistant Chief Instructor	**Student**	**Date**
_____	_____	_____

2 ____ **This End-of–Course Evaluation was performed in a satisfactory manner.**

Chief/ Assistant Chief Instructor	**Student**	**Date**
_____	_____	_____

UNIVERSITY of DUBUQUE

AVIATION

Memo

To: Chief Flight Instructor

From:

CC: TCO and Chief Ground Instructor

Date:

RE: AVI 435 Multi-engine Ground School Completion

I certify that the student named below has received the required ground training of CFR Part 141 Appendix I and Appendix D [3] [a] [1] and [b] as appropriate for the Multi -engine Land Class Rating.

Name:

SSN:

DOB:

Instructor's Name _____

Instructor's Signature _____

MULTI-ENGINE GROUND TRAINING COURSE

15 HOURS OF GROUND TRAINING REQUIRED

STAGE 1

OBJECTIVE

The student will obtain the aeronautical knowledge necessary to competently pilot a multi-engine aircraft during normal flight operations and single-engine operations. The systems and operation of a general aviation multi-engine aircraft such as a BE1900, Piper Navajo, or King Air should be reviewed in detail and the material related to the Piper Seminole.

STAGE COMPLETION STANDARDS

The student will display an understanding of the material covered by oral and/or written quizzes. At the end of this stage, the student must successfully complete the Stage 1 exam. The instructor will review each incorrect response to insure complete understanding before the student proceeds to Stage 2.

LESSON 1
THE MULTI-ENGINE EXPERIENCE

OBJECTIVES
To introduce the student to human factors related to multi-engine flying and to review elements related to human factors, night operations, privileges, limitations and flight operations.

HUMAN FACTORS
Review the symptoms, causes, effects and corrective actions for:
- Hypoxia
- Hyperventilation
- Middle ear and sinus problems
- Spatial disorientation
- Motion sickness
- CO poisoning
- Stress and fatigue
- Dehydration

NIGHT TIME OPERATIONS
- Physiological aspects of night flying as it relates to vision.
- Lighting systems identifying airports, runways, taxiways and obstructions, and pilot controlled lighting.
- Airplane lighting systems.
- Personal equipment essential for night flight.
- Night orientation, navigation, and chart reading techniques.
- Safety precautions and emergencies unique to night flying.
- Somatogravic illusion and black hole approach illusion.

PRIVILEGES, LIMITATIONS, & FLIGHT OPERATIONS
- Commercial pilot certificate privileges, limitations, and recent flight experience requirements.
- Medical certificate class and duration.
- Pilot logbook or flight records.
- Airworthiness and registration certificates.
- Operating limitations, placards, instrument markings, and POH/AFM.
- Weight and balance data and equipment list.

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 2
AIRCRAFT SYSTEMS

OBJECTIVES
To determine that the student has knowledge of aircraft systems, and high altitude operations.

POWER PLANTS
- Piston
- Turbo
- Turbine

SYSTEMS
- Primary flight controls and trim
- Flaps, leading edge devices and spoilers
- Landing gear
- Fuel, oil and hydraulic
- Electrical
- Avionics
- Pitot-static, vacuum/pressure and associated flight instruments
- Environmental
- Deicing and anti-icing

HIGH ALTITUDE OPERATIONS
- Supplemental oxygen requirements for flight crew and passengers when operating non-pressurized airplanes.
- Identification and differences between “aviator’s breathing oxygen” and other types of oxygen.
- Operational characteristics of continuous flow, demand, and pressure-demand oxygen systems.
- Fundamental concept of cabin pressurization.
- Physiological hazards associated with high altitude flight and decompression.

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 3
PERFORMANCE AND LIMITATIONS

OBJECTIVES
To review the elements related to performance and limitations using charts, tables and data.

WEIGHT AND BALANCE CALCULATIONS

- Weight and balance calculations.
- Adverse effects of exceeding weight and balance limits.
- Different types of take-off and landing calculations under various atmospheric, runway, loading and aircraft configurations.
- Climb calculations under various atmospheric, loading, and aircraft configurations.
- Single-engine climb calculations under various atmospheric loading and aircraft configurations.
- Calculation of service ceiling and absolute ceiling all engine operating and single-engine.
- Cruise calculations under various atmospheric conditions and power settings.
- Time, fuel and distance to climb and descent.
- Accelerate—stop calculations.
- Accelerate—go calculations.
- Other performance charts related to the aircraft understudy and the Piper Seminole.

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 4
FAR 23

OBJECTIVES
To review airworthiness requirements related to multi-engine aircraft.

GENERAL

FLIGHT

SUBPART D—DESIGN AND CONSTRUCTION

SUBPART E—POWERPLANT

SUBPART F—EQUIPMENT

SUBPART G—OPERATING LIMITATIONS AND INFORMATION

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 5
MULTI-ENGINE AERODYNAMICS

OBJECTIVES
To study the elements related to multi-engine flight and single-engine operations.

- Definition of critical engine
- Definition of Vmc
- Factors affecting Vmc
- Relationship of Vmc and stall speeds
- Vmc recovery procedure
- Causes of yaw and roll
- Decision making in single-engine operations
    - in cruise
    - In the traffic pattern
    - On approaches
    - On landings

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 6
STAGE ONE EXAM

OBJECTIVES
To review the material covered in Stage 1 by a written exam.

LESSON COMPLETION STANDARDS
A minimum grade of 80% is required.

LESSON 7
REVIEW OF STAGE ONE EXAM

OBJECTIVES
To discuss the Stage 1 exam.

LESSON COMPLETION STANDARDS
The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

NOTES

MULTI-ENGINE GROUND TRAINING COURSE

STAGE 2

OBJECTIVE

The student will gain a thorough understanding and knowledge of single-engine operations and the correct single-engine flight procedures.

STAGE COMPLETION STANDARDS

The student will display an understanding of the material covered by oral and/or written quizzes.

LESSON 1
CREW RESOURCE MANAGEMENT

OBJECTIVES
To discuss the effective use of all available information.

HUMAN RESOURCES IN SINGLE PILOT AND MULTIPLE CREW OPERATIONS

- Cockpit crew
- Cabin crew
- Dispatcher
- Maintenance
- ATC
- FSS

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 2
DEFINITIONS OF V-SPEEDS FOR NORMAL AND SINGLE-ENGINE OPERATIONS

OBJECTIVES
To review all the V speeds used in multi-engine flying.

The definitions and uses of the various V speeds will be discussed and applied to a typical multi-engine general aviation aircraft and the Piper Seminole.

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 3
SINGLE-ENGINE OPERATIONS

OBJECTIVES
To review and discuss the elements related to single-engine operations.

- Single–engine performance charts
- Shut down, feather and restart procedures

SYSTEMS MANAGEMENT DURING SINGLE-ENGINE OPERATIONS
- Fuel
- Electrical
- Pneumatic
- Hydraulic

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 4
EMERGENCIES

OBJECTIVES
To discuss emergencies and troubleshooting systems.

System Diagrams and charts will be used to diagnose and trouble shoot faults in various systems including:
- Primary flight controls and trim
- Flaps, leading edge devices and spoilers
- Landing gear
- Fuel, oil and hydraulic
- Electrical
- Avionics
- Pitot-static, vacuum/pressure and associated flight instrument
- Environmental
- Deicing and anti-icing
- Fire on ground and in flight
- Fuel pump failure
- Landing gear malfunctions
- Combustion heater overheat

LESSON COMPLETION STANDARDS
The student will demonstrate understanding during oral or written quizzes by the instructor at the completion of the lesson. The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

LESSON 5
STAGE TWO EXAM

OBJECTIVES
To review that material discussed in Stage 2.

LESSON COMPLETION STANDARDS
A minimum grade of 80% is required.

LESSON 6
REVIEW OF STAGE TWO EXAM

OBJECTIVES
To discuss the Stage 2 exam.

LESSON COMPLETION STANDARDS
The instructor will review incorrect responses to ensure student understanding.

ASSIGNED READING
Reading and homework for the next lesson will be assigned as required.

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