COURSE SYLLABUS

MULTI-ENGINE RATING

KING SCHOOLS

eLearning
Web Based Instructional Programs

Commercial Pilot Multi-Engine Additional Class Rating Training Course

SYLLABUS

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Cleared for Multi-Engines—Commercial Pilot Multi-Engine Additional Class Rating Syllabus
Your Path to Becoming a Multi-Engine Pilot

TABLE OF CONTENTS

INTRODUCTION

Purpose....i
Steps for Becoming a Multi-Engine Pilot....i
Course Elements....ii
Course Structure....ii
Progressing Through the Syllabus....iv
Overall System Use....v
FAA Industry Training Standards (FITS)....v
Scenario Based Training....vi
Single-Pilot Resource Management (SRM)....vii
Learner-Centered Grading....viii
Everyday Use of FITS Concepts....x
Knowledge Content....xi
Required Aeronautical Knowledge Areas....xi
Flight Scenarios....xiv

KNOWLEDGE AND FLIGHT ELEMENTS

STAGE 1: Essential Multi-Engine Skills....1
Phase 1: Welcome to the Multi-Engine Airplane....2
Phase 2: Mastering Single-Engine Operations....7
Phase 3: Multi-Engine Instrument Flying....15
STAGE 2: Cross-Country Flying and the Practical Test....23
Phase 4: Multi-Engine Cross-Country Flying....24
Phase 5: Preparing for Your Practical Test....29

APPENDIX A (MULTI-ENGINE ADD-ON COURSE TRAINING REQUIREMENTS)

Cleared for Multi-Engines Course Training Requirements....A1
Minimum Course Hours and Chronological Log....A2

APPENDIX B (RISK MANAGEMENT CHECKLISTS)

PAVE....B1
CARE....B2

Cleared for Multi-Engines—Commercial Pilot Multi-Engine Additional Class Rating Syllabus

REVISION RECORD

Revision Number	*Revision Date*	*Online Date*	*Change Description*
Ver. 1.00	06-12-15	ORIGINAL	ORIGINAL
Ver. 1.01	02-01-16	02-01-16	Pg 6 Add asterisk: may use FS & FTD on Climbs & Descents
Ver. 1.01	02-01-16	02-01-16	Pg 16 Add Partial Panel & Unusual Attitudes
Ver. 1.01	02-01-16	02-01-16	Pg 18 Add Partial Panel & Unusual Attitudes
Ver. 1.01	02-01-16	02-01-16	Pg 18 & 19 Add asterisk: may use FS & FTD
Ver. 1.01	02-01-16	02-01-16	Pg 19 Slow Flight & Engine Failure rippled from previous pg
Ver. 1.01	02-01-16	02-01-16	Pg 19 Deleted Landing from approach 1 engine inop
Ver. 1.01	02-01-16	02-01-16	Pg 20 Add Basic Attitude Instrument Flight, Partial Panel & Unusual Attitude Recovery
Ver. 1.01	02-01-16	02-01-16	Pg 21 Add Partial Panel & Unusual Attitude Recovery
Ver. 1.01	02-01-16	02-01-16	Pg 22 Landing from S-I & Circle approaches 1 engine inop rippled from previous page; deleted redundant task
Ver. 1.02	05-11-17	05-15-17	Pg ii, iii, xi,& 1 Corrected Phase 3 title to Multi-Engine Instrument Flying for consistency.
Ver. 1.03	05-31-19	05-31-19	Pg 6, 11, 13, 14, 18, 19, 21, 27, 28, 29, 31 & 32 Changed reference to ACS from PTS.
Ver. 1.04	06-24-24	06-28-24	Pg 26 revised total time to three hours and Pg A3 Revised Phase 4 Flight Scenario 2 total & night times, Phase 4 totals and corresponding course totals and corrected the Minimums Required for Private Pilot Part 141

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REVISION RECORD

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Cleared for Multi-Engines—Commercial Pilot Multi-Engine Additional Class Rating Syllabus
Your Path to Becoming a Multi-Engine Pilot

Purpose

Congratulations! Your decision to add a Multi-Engine rating to you Pilot Certificate will take your flying to a challenging and exciting new level you will find both rewarding and fun.

The curriculum in this syllabus is designed to be documented in the *Course Tracking Application (CTA)* of the Cessna Flight Training System. Each ground element of the *Cleared for Multi-Engines* course is presented through online home-study lessons that are integrated with structured, individual training scenarios for the flight portion.

With this syllabus in hand, you will know the objective of every flight scenario and where it fits into the overall program. You'll also see how each ground lesson and scenario are building blocks that work with and build upon the others to move you toward your goal of becoming a safe and proficient multi-engine pilot.

The *Cleared for Multi-Engines* syllabus is divided into two stages and five “phases”, each containing multiple knowledge lessons and flight scenarios. Progress checks in *Cleared for Multi-Engines* are located in phases at key points in the course including those marking the end of a stage.

Your *Cleared for Multi-Engines* syllabus and accompanying curriculum will provide you with the knowledge, procedures, experience, skills, and risk management tools required by 14 CFR 141 regulations and the standards for a Commercial Pilot airplane Multi-Engine Land (AMEL) additional class rating practical test.

Although this course is designed to conform to the requirements for the commercial pilot certificate, it can be adapted to training for the private pilot certificate level by applying the Private Pilot standards. No FAA knowledge test is required for an additional class rating, but the course does utilize periodic knowledge evaluations to assess your knowledge of multi-engine airplanes, systems, and procedures in preparation for the FAA practical test. Your knowledge will be evaluated during the oral and flight portion of the practical test.

You will use this syllabus as your day-to-day guide for training since it provides all the details for applying the curriculum elements. You will also find useful information regarding the use and application of the FAA Industry Training Standards (FITS) concepts.

Cleared for Multi-Engines may also be used with a 14 CFR part 61 pilot training curriculum when adjusted for the part 61 requirements.

STEPS FOR BECOMING A MULTI-ENGINE PILOT

Earning a multi-engine rating is an important step in your flying career. Multi-Engine aircraft offer new challenges and opportunities that will be important for the rest of your individual or commercial flying. Your Cessna Pilot Center will explain in detail the course enrollment and completion requirements shown below:

- Hold at least a private pilot certificate with airplane single engine land rating.
- Hold a current third class medical certificate.
- Complete the required flight training for the course (see Appendix A).
- Pass the FAA practical test or approved 141 End-Of-Course test.

COURSE ELEMENTS

The Cessna online pilot training

- Provides innovative and interactive learning exercises.
- Is accessible anywhere you have an Internet connection.

The unique design of the training program

- Integrates web-based knowledge sessions with flight scenarios.
- Ensures that before every flight you will have the required knowledge to succeed.

You and your instructor will discuss the schedule for your training and you will know

- When to complete the appropriate web-based knowledge instruction
- What to prepare for each flight scenario.

Upon completion of each flight scenario you and your instructor will

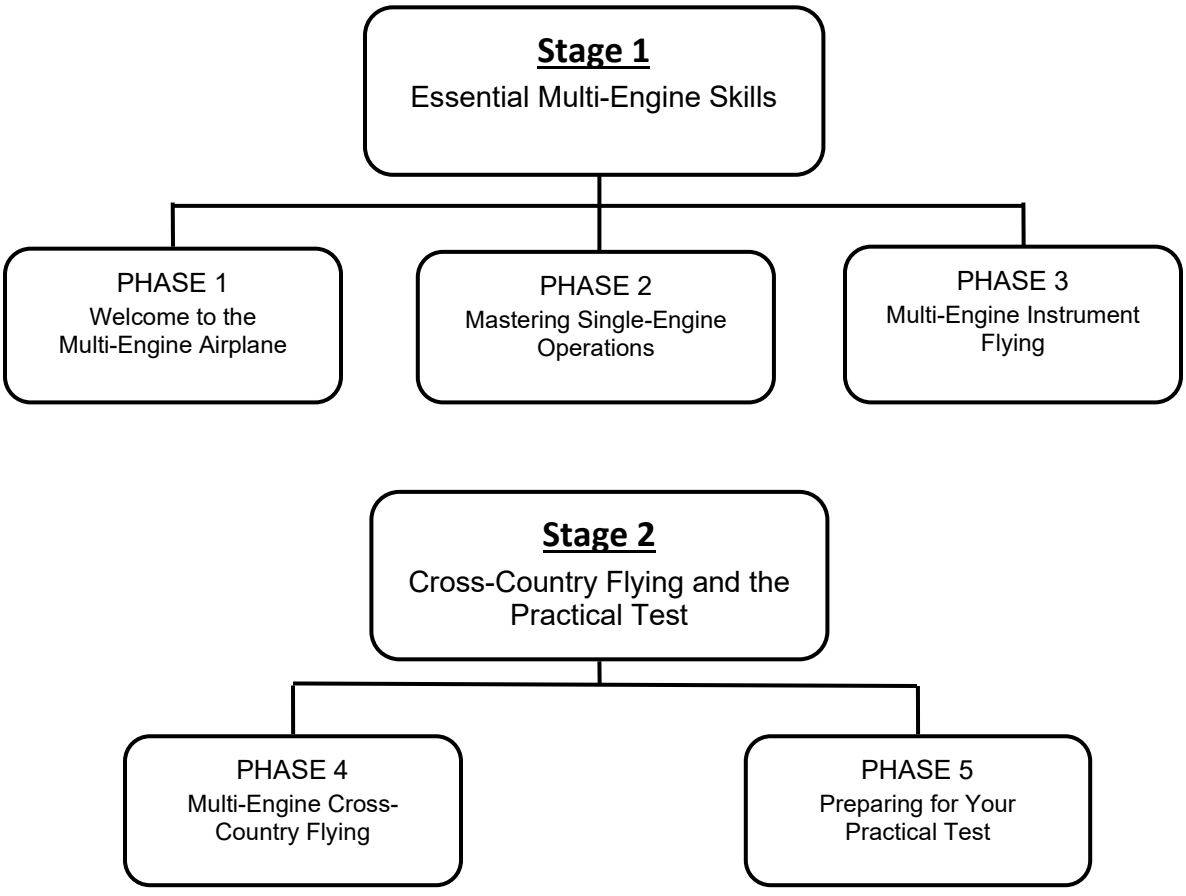
- Review the elements of the flight scenario and the scenario outcome.
- Compare your performance to the completion standards.
- Independently evaluate the tasks in the flight scenario.
- Discuss and compare the results.
- Discuss the next flight scenario.

Please note that it may take you more than one flight to complete a flight scenario to the established standards.

COURSE STRUCTURE

STAGES

The course is divided into two stages consisting of 5 phases:



PHASE SEQUENCE

The five phases are:

- 1. WELCOME TO THE MULTI-ENGINE AIRPLANE – In this phase, you will gain an understanding of the aerodynamics, performance and special considerations involved with multiengine airplanes. You will start by learning to taxi an airplane where the thrust is not attached to the airplane centerline.
- 2. MASTERING SINGLE-ENGINE OPERATIONS – In this Phase you will learn to manage engine failures under various phases of flight and learn the very important balance between performance and control of a multi-engine aircraft experiencing and engine failure.
- 3. MULTI-ENGINE INSTRUMENT FLYING – This phase addresses unique considerations of multi-engine instrument flight including single-engine instrument approaches and performance planning.
- 4. MULTI-ENGINE CROSS-COUNTRY FLYING – You will build skills and experience in flight planning, navigation, and decision making.
- 5. PREPARING FOR YOUR PRACTICAL TEST – Completes the course of training with review and preparation for the FAA Practical Test or 141 End-of-Course exam as appropriate.

SCENARIOS

There are multiple flight scenarios within each phase. The completion standards for the scenario tasks in each phase are found in that phase's Phase Proficiency Checklist.

Once all items on the phase proficiency checklist are completed to the level of performance required for that phase, you can then move on to the next phase of training.

You are not required to complete every flight scenario within a phase, but it is highly recommended that you do so, as the scenarios progress in complexity to give you maximum efficiency in your training. Progress Checks are required scenarios.

PROGRESS CHECKS

There are three Progress Checks in the *Cleared for Multi-Engines* syllabus. The progress checks are found:

- Phase 2, Flight Scenario 2
- Phase 3, Flight Scenario 3
- Phase 5, Flight Scenario 1

<u>IMPORTANT</u>: The syllabus does not address your local Cessna Pilot Center's safety practices and procedures; review these key items before or after the first flight with your instructor.

PHASES

There are 5 phases of training. Each phase has

- *Required* **Web-based Knowledge Instruction (except Phase 5)**
- *Required* **Expanded Briefings**
- *Suggested* **Flight Scenarios**
- *Required* **Phase Ground Training Checklists**
- *Required* **Phase Proficiency Checklists**

Web-based Knowledge Instruction

- Forms the customer's knowledge foundation to be used for the flight scenarios
- Is directly correlated to the phase
- Is to be completed before the corresponding phase can be considered complete

Flight Scenarios

- Are placed in a suggested order of completion
- Can be flown
    - Once
    - More than once
    - Not at all
- Can be customized to for your local training environment
- Can be completed out of phase or stage if approved by the Chief or Assistant Chief Instructor

Phase Ground Training Checklists

- Can be prepared for through study of the web-based curriculum and course library materials
    - Including FAA publications such as the Pilot's Handbook of Aeronautical Knowledge and Airplane Flying Handbook
    - Recorded as 'Instruction Given', 'Describe' or 'Explain'
        - 'Instruction Given' indicates that your instructor briefed you on the subject
        - 'Describe' indicates that you are able to describe the physical characteristics of the maneuver or knowledge area
        - 'Explain' indicates that you are able to describe the task or knowledge area and understand the underlying concepts, principles and procedures
    - Must be demonstrated to the 'Explain' level to complete the phase

Phase Proficiency Checklists

- Contain tasks that are to be completed in order to the 'Perform' level in order to complete the phase
- Contain single-pilot resource management that is to be completed to the 'Manage/Decide' level
    - Grading criteria is discussed in detail later in this document
- Contain completion standards for the phase

PROGRESSING THROUGH THE SYLLABUS

A phase is considered complete when all the tasks are completed to the 'Perform' or 'Manage/Decide' level as appropriate for the completions standards given on the Phase Proficiency Checklist.

It is recommended that the order of the suggested scenarios be followed.

- However, with the approval of your Chief or Assistant Chief Instructor you can complete scenarios that are out of the current phase
- This flexibility allows greater efficiency in course of flight training

You do not need to complete all scenarios in a phase in order to complete that particular phase. The scenarios are simply suggested flights to get you to the 'Perform' and 'Manage/Decide' level for the tasks and standards for that phase.

It is more common to repeat the scenarios in order to obtain the desired level of proficiency and safety than to skip them.

If you are able meet all of the phase standards and skip a scenario, you and your instructor must make sure that you meet the hourly training requirements if they are applicable to your approved training course. It is possible that you could finish up the course and have to make up time at the end.

OVERALL SYSTEM USE

The Cleared for Multi-Engines course is designed to provide the most benefit when

- The instructor assigns preparation for the next scenario
  - Web-based study
  - Suggested study materials
  - Scenario planning

- Prior to the next scenario, you
  - Study the assigned materials
  - Perform the necessary scenario planning

- Prior to the flight, the instructor
  - Prints your training package including the
    - Phase Ground Training Checklist
    - Phase Proficiency Checklist
    - Scenario

- During the preflight briefing
  - Your instructor provides training on the expanded Briefing items and evaluates the applicable items on the Phase Ground Training Checklist
  - You ask any questions you may have and clarify your understanding of the knowledge areas and the upcoming scenario you will fly and brief the instructor on the scenario planning

- During the postflight briefing
  - You independently grade the applicable tasks on the Phase Proficiency Checklist
  - Your instructor independently grades the tasks on the Phase Proficiency Checklist
  - You then discuss the scenario outcome and compare grading
  - The instructor logs the scenario into the Course Tracking Application on the computer at your Cessna Pilot Center

FAA INDUSTRY TRAINING STANDARDS (FITS)

This flight training syllabus uses the concepts developed under the FAA Industry Training Standards (FITS) program. FITS incorporates three tenets

- Scenario-based training (SBT)
- Single-pilot resource management (SRM)
- Learner-centered grading (LCG)

Scenario-Based Training (SBT) uses real-world scenarios as the foundation of training. Flight maneuvers are still a vital part of flight training, but the use of real-world scenarios help to develop a pilot's decision making skills. The training presents situations and circumstances that pilots face every day as learning experiences.

Single-Pilot Resource Management (SRM) includes the concepts of aeronautical decision making (ADM), risk management (RM), task management (TM), automation management (AM), controlled flight into terrain (CFIT) awareness, and situational awareness (SA). SRM training helps the pilot to accurately assess and manage risk, thereby making logical and timely decisions.

Learner-Centered Grading (LCG) includes two parts: learner self assessment and a detailed debrief by the instructor. The purpose of the self assessment is to stimulate growth in the learner's thought processes and, in turn, behaviors. The self assessment is followed by an in-depth discussion between the instructor and the customer that compares the instructor's assessment to the customer's self assessment.

SCENARIO-BASED TRAINING

The scenario-based approach to training pilots emphasizes the development of critical thinking and flight management skills, rather than focusing solely on traditional maneuver-based skills. The goal of this training philosophy is the accelerated acquisition of higher-level decision making skills. Such skills are necessary to prevent pilot-induced accidents.

Scenario-based training goals include the development of

- Critical thinking skills
- Aeronautical decision making skills
- Situational awareness
- Pattern recognition (emergency procedures) and judgment skills
- Automation competence
- Planning and execution skills
- Procedural knowledge
- Psychomotor (hand-eye coordination) skills
- Risk management skills
- Task management skills
- Automation management skills
- Controlled flight into terrain (CFIT) awareness

For scenario-based training to be effective there must be a purpose for the flight and consequences if the flight is not completed as planned.

It is vital that you, the pilot in training, and the instructor communicate the following information well in advance of every training flight:

- Purpose of the flight
- Pressures to complete the flight (real or simulated)
- Risks/hazards associated with the scenario (real or simulated)
- Scenario destination(s)
- Desired outcomes
- Possible in-flight scenario changes or deviations (during later stages of the program)

With the guidance of your instructor, you should plan and fly the scenario as realistic as possible. This means that you will know where you are going and what will transpire during the flight. While the actual flight may deviate from the original plan, this method allows you to be placed in a realistic scenario.

SCENARIO PLANNING

Prior to the flight, you will be briefed on the scenario to be planned. You will plan the scenario; your instructor will help you the first few times. The flight scenario should include

- Simulated real-world reason to go flying
- Route
    - Destination(s)
    - Weather
    - NOTAMs
- Pressures to complete the flight (real or simulated)
- Risks associated with the scenario (real or simulated)
- Possible deviations

Reality is the ultimate learning situation, and scenario-based training attempts to get as close as possible to this ideal. The more realistic the training scenario, the better we learn

- Core safety habits, and
- Decision-making skills that can be applied in the real-world

SINGLE-PILOT RESOURCE MANAGEMENT (SRM)

Single-pilot resource management is defined as the art and science of managing all the resources (both onboard the aircraft and from outside sources) available to a pilot flying in a single-pilot operation (prior to and during flight) to ensure that the successful outcome of the flight is never in doubt.

SRM includes the concepts of

- Task management (TM)
- Automation management (AM)
- Risk management (RM)
- Aeronautical decision making (ADM)
- Situational awareness (SA)
- Controlled flight into terrain (CFIT) awareness

SRM training helps a pilot maintain situational awareness by

- Managing the technology in the aircraft as well as aircraft control and navigation tasks
- Enabling the pilot to accurately assess and manage risk while making accurate and timely decisions
- Helping pilots learn how to gather information, analyze it and make decisions

In most flight scenarios, there is no one correct answer. Pilots are expected to analyze each situation in light of their

- Experience level
- Personal minimums
- Current physical and mental condition
- Ability to make their own decisions as best as possible

Below are standards for each training concept of SRM:

Performance The training task is:	**Standards** You will:
Task management (TM)	Prioritize and select the most appropriate tasks (or series of tasks) to ensure successful completion of the training scenario.
Automation management (AM)	Program and utilize the most appropriate and useful modes of cockpit automation to ensure successful completion of the training scenario.
Risk management (RM)	Utilize risk management tools to assess and mitigate risk associated with the planned flight both during the preflight planning and in flight.
Aeronautical decision-making (ADM)	Consistently make informed decisions in a timely manner based on the task at hand and a thorough knowledge and use of all available resources.
Situational Awareness (SA)	Be aware of all factors such as traffic, weather, fuel state, aircraft mechanical condition, and pilot fatigue level that may have an impact on the successful completion of the training scenario.
Controlled Flight Into Terrain (CFIT) Awareness	Understand, describe, and apply techniques to avoid CFIT during inadvertent encounters with IMC during VFR flight, periods of reduced visibility, or at night.

LEARNER-CENTERED GRADING

Learner-centered grading includes two parts

- Learner self-assessment
- A detailed debrief by the instructor

The purpose of the self-assessment is to stimulate growth in the learner's thought processes and, in turn, behaviors. The self-assessment is followed by an in-depth discussion between you and your flight instructor that compares your self-assessment to the instructor's assessment.

Pre- and postflight briefings are essential for setting goals. During events and tasks that require high levels of attention, there may be little time for learning as the bulk of your cognitive resources are given to performing the actual task.

INDEPENDENTLY GRADING THE SCENARIO

After the scenario is complete, you and your instructor should independently grade your performance for maneuvers and single-pilot resource management (SRM). Note that any grade that would not apply to the task has been grayed out in this syllabus.

It is very important that enough time is allowed. Simply assigning grades and signing logbooks within a limited period of time will not work with this grading system.

After independently evaluating the *actual scenario outcomes* compared to the *desired outcomes*

- You and your instructor come together to compare and discuss your individual evaluations during the postflight discussion

You and your instructor may disagree on the evaluations.

- This should be used as an opportunity to discuss the scenario further
- The instructor has the final authority in assigning the final grade for the desired outcomes

MANEUVER (TASK) GRADES

- **Describe** – At the completion of the ground training session, the pilot in training will be able to describe the physical characteristics of the task at a rote level.
- **Explain** – At the completion of the ground training session, the pilot in training will be able to describe the task and display an understanding of the underlying concepts, principles, and procedures.
- **Practice** – At the completion of the scenario, the pilot in training will be able to plan and execute the scenario. *Coaching, instruction, and/or assistance from the instructor will correct deviations and errors identified by the instructor.*
- **Perform** – At the completion of the scenario, the pilot in training will be able to perform the activity without assistance from the instructor. *Errors and deviations will be identified and corrected by the customer in an expeditious manner.* At no time will the successful completion of the activity be in doubt. ('Perform' will be used to signify that the pilot is satisfactorily demonstrating proficiency in traditional piloting and systems operation skills.)
- **Not Observed** – Any event not accomplished or required in the scenario.

Example:

- Once the pilot in training can explain the effect of crosswind and speed reduction on rudder effectiveness, they have achieved a level of learning that will allow for meaningful "Practice."
- The "Perform" level is met when the completion standards for the particular scenario or phase are met.

SINGLE-PILOT RESOURCE MANAGEMENT (SRM) GRADES

- **Explain** – At the completion of the ground training session, the pilot in training can verbally identify the risks inherent in the flight scenario.
- **Practice** – The pilot in training can identify, describe, and understand the risks inherent in the scenario. The customer may need to be prompted to identify risks and make decisions.
- **Manage/Decide** - The pilot in training can correctly gather the most important data available both within and outside the cockpit, identify possible courses of action, evaluate the risk inherent in each course of action, and make the appropriate decision. *Instructor intervention is not required for the safe completion of the flight.*
- **Not Observed** – Any event not accomplished or required in the scenario.

  Example:
  - A pilot who is becoming proficient at aeronautical decision making (ADM) and risk management (RM) would be graded first at the "Practice" level.
  - The "Manage/Decide" level is met once a pilot makes decisions on their own, for instance, the decision to go-around without being prompted.

EVERYDAY USE OF FITS CONCEPTS

The PAVE Checklist
Use the PAVE Checklist as an easy way to implement the FITS concepts.

The PAVE checklist is
- A simple way to remember and examine the risk factors before you fly, and
- Can also help you manage the specific risks associated with taking off and landing

The PAVE checklist puts risk factors into four categories:
Pilot
Aircraft
en**V**ironment
External pressures

The pilot. Are you fatigued? When was the last time you were flying in the weather conditions that you will encounter? What are your personal minimums?

The aircraft. Are you familiar with the aircraft? Its avionics? Is it airworthy? What is the density altitude? How does that affect your climb rate? What is your maximum crosswind component?

The environment. Are the temperature and dew point close? Are you familiar with the area and its topography? Are there any NOTAMs?

External pressures. Are others influencing the flight? Do you have people waiting for you at the airport?

KNOWLEDGE CONTENT

WEB-BASED KNOWLEDGE INSTRUCTION

The web-based knowledge instruction should be completed before beginning the flight scenarios in each corresponding phase; you can work ahead as far in the course as you like at your discretion. However, the course is designed so that the web-based knowledge instruction corresponds to the flight scenarios within a phase.

If you have an extended time lapse between studying the web-based knowledge instruction and flying the companion scenario, you will find it very helpful to take some time to review your last knowledge sessions just before you fly the associated scenario.

You complete the web-based knowledge instruction satisfactorily by answering all the questions correctly. Your instructor will

- Review your results before you fly
- Answer any questions you may have

EXPANDED BRIEFINGS

Before the following events in your flight training, you will receive expanded one-on-one briefing scheduled by your instructor. They will take place prior to the following points in this curriculum:

- Phase 1 Scenario 1 (Multi-Engine Operations)
- Phase 2 Scenario 1 (Single-Engine Operations)
- Phase 3 Scenario 1 (Multi-Engine Instrument Flying)
- Phase 4 Scenario 1 (Multi-Engine Cross-Country Operations)
- Phase 5 Final Progress Check (Practical Test)

During an expanded briefing, your instructor will ask you questions about your airplane and the local flight environment as well as questions specific to this phase of training.

REQUIRED AERONAUTICAL KNOWLEDGE AREAS

The Federal Aviation Regulations, 14 CFR Part 141, lists aeronautical knowledge areas that must be included in the ground training for a Commercial Pilot Additional Multiengine Class Rating Course. All required areas are covered in this course, but they are distributed throughout the curriculum for subject continuity and logical development. You will find these required topics included in lessons, briefings, and ground training checklists listed as follows:

(1) Applicable regulations issued by the Federal Aviation Administration for commercial pilot privileges, limitations, and flight operations

Phase 1; Multi-Engine Operations briefing

Phase 4; Multi-Engine Cross-Country Operations briefing

(2) Basic aerodynamics and the principles of flight

Phase 1; 1.3 If You Lose One
- Maintaining Control and Maximizing Performance After an Engine Fails
- Getting the Best Rate of Climb

Phase 2; 2.1 Climb Performance on One Engine
- Why Single-Engine Climb Rate is Less Than Half
- Why and How Much Do You “Raise the Dead”
- What it Takes to Climb

Phase 2; Single-Engine Operations briefing

Phase 2; Ground Training Checklist

Phase 5; Practical Test briefing

(3) Safe and efficient operation of aircraft;

Phase 1; 1.2 Normal Operations
- Engine Start and Taxi
- Engine Runup
- Pre-takeoff Considerations
- Accelerate-Stop Distance
- Accelerate-Go Distance
- Normal Takeoff
- Being Prepared for Abnormalities Every Takeoff
- Propeller Synchronization

Phase 1; Multi-Engine Operations briefing

Phase 1; Ground Training Checklist

Phase 3; Multi-Engine Instrument Operations briefing

Phase 4; 4.1 Special Considerations
- IFR Departures in a Twin

(4) Weight and balance computations;

Phase 1; Multi-Engine Operations briefing

Phase 5; Practical Test briefing

(5) Use of performance charts;

Phase 1; 1.2 Normal Operations
- Accelerate-Stop Distance
- Accelerate-Go Distance

Phase 1; Multi-Engine Operations briefing

Phase 1; Ground Training Checklist

(6) Significance and effects of exceeding aircraft performance limitations

Phase 2; 2.2 Keeping It Under Control
- V_{MC} - Keeping it Going Straight on One Engine
- What Happens When You Get Too Slow on One Engine
- What V_{MC} Means to You
- How V_{MC} Is Determined
- Demonstrating V_{MC}

Phase 2; Single-Engine Operations briefing

Phase 2; Ground Training Checklist

(7) Principles and functions of aircraft systems

Phase 1; Multi-Engine Operations briefing

Phase 4; 4.1 Special Considerations
- Lack of Redundant Systems in Some Twins
- Managing Fuel Systems and Heaters on Twins

Phase 4; Ground Training Checklist

(8) Maneuvers, procedures, and emergency operations appropriate to the aircraft

Phase 1; 1.1 Expectations
- What's Different with Light Twins

Phase 1; 1.3 If You Lose One
- Single-Engine Performance in Light Twins

Phase 2; 2.1 Climb Performance On One Engine
Why Single-Engine Climb Rate is Less Than Half
Why and How Much Do You “Raise the Dead”
What it Takes to Climb
Phase 2; 2.3 Engine Failure on Takeoff
Engine Failure on Takeoff Roll
Engine Failure just After Liftoff
Maintaining a Deliberate, Methodical Pace
If You Cannot Climb on One Engine
How to Make a Bad Situation Worse
Phase 2; 2.4 Managing Engine Failure Aloft
It Depends on Where You Are
When You Have Time to Troubleshoot
Deciding When to Shut Down an Engine
Feathering and Securing an Engine
Restarting an Engine with a Feathered Prop
Restarting an Engine in Flight
Phase 2; 2.5 Nursing A Sick Engine
When you Suspect an Engine Problem
Dealing with a Surging Engine
If You Lose Oil Pressure or Your Engine Overheats
When You Lose Control of a Propeller
Phase 2; 2.6 Getting Home On One Engine
Landing with an Engine Shutdown
What’s Different When You’re Landing with One Engine
The Difficulty of Taxiing on One Engine
One Engine Go-Arounds and Single-Engine Climb Rates
Phase 2; Single-Engine Operations briefing
Phase 2; Ground Training Checklist
Phase 3; 3.1 Single-Engine Instrument Approach
If You Have to Fly an Instrument Approach on One Engine
Making an Instrument Approach on One Engine
Phase 3; Multi-Engine Instrument Operations briefing
Phase 4; 4.1 Special Considerations
The Temptation to Fly with One Engine Less Than Perfect
Prop Blade Failure
Emergencies Caused by Baggage and Cabin Doors
Phase 4; Ground Training Checklist

(9) Nighttime and high-altitude operations

Phase 2; Single-Engine Operations briefing
Phase 2; Ground Training Checklist
Phase 2; 2.5 Nursing a Sick Engine
If You Lose a Turbocharger at High Altitude
Phase 4; 4.1 Special Considerations
Flying into and out of High Altitude Airports
Phase 4; Multi-Engine Cross-Country Operations briefing
Phase 4; Ground Training Checklist

FLIGHT SCENARIOS

PREFLIGHT BRIEFING

Before each flight scenario you and your instructor will review the scenario objectives to make sure you both understand what you will be doing during the lesson.

- Use this opportunity to ask any questions.
- Make sure you understand what is expected of you

DUAL FLIGHTS

All scenarios in this syllabus are dual flights performed with your instructor. As such, scenarios will usually begin with a review of tasks from previous flights, and then new tasks will be introduced. This will help you to see the relationships between what you have previously learned and the new tasks to be performed on the flight.

When indicated (IR) means “instrument reference,” or reference to the flight display or instruments only.

- You will need a view-limiting device such as a hood or view-restricting glasses for a scenario having (IR) associated with any task

POSTFLIGHT DISCUSSION AND EVALUATION

After each flight, you and your instructor will

- Review your flight and evaluate your performance independently
- Compare and discuss your self-evaluation with his or her evaluation

Your instructor will make recommendations to help you in your learning. Make sure you ask questions about any area that is not clear.

You will then complete your flight training record based on the completion standards for the phase. Any tasks requiring additional practice to meet the phase completion standards will be carried over to the next flight scenario.

You may expect at least one-half hour for preflight and postflight briefings for each scenario.

PROGRESS CHECKS

Progress checks are designed to ensure that you progress at the appropriate level of proficiency and are safe to move on to the next level. Normally, the Chief Instructor, Assistant Chief Instructor or an assigned instructor will fly with you.

Progress checks are nothing to get nervous about; they are to ensure the completeness of your training. You will find that flying with another instructor often provides fresh insight and new techniques.

CREDIT FOR PREVIOUS TRAINING (WHEN ENROLLING INTO PART 141 CURRICULUM)

According to FAR 141.77(c), when you transfer from one FAA-approved school to another approved school, course credits you earned in your previous course of training may be credited for part of your training by your new school.

- Your new school may determine the amount of credit you are allowed by a knowledge test and a flight proficiency test
- Credit for aeronautical knowledge instruction may be determined by a knowledge test alone
- Maximum credit allowed is 50% of the curriculum requirements of your new school

If you transfer from other than an FAA-approved school, you may receive credit for the knowledge and flight experience. Up to a maximum of 25% of the curriculum requirements of the course to which you are transferring to may be credited.

CREDIT FOR PREVIOUS TRAINING (WHEN ENROLLING INTO PART 61 CURRICULUM)

If you are enrolling into a Part 61 course, all flight training logged, from an authorized instructor, applies to the minimum required flight time under Part 61. Your new flight school

- Will evaluate your flight proficiency and knowledge in all required areas of operation and aeronautical knowledge
- Determine the appropriate starting point in the syllabus to continue your training

GUARANTEE OF QUALITY

This multimedia online pilot training system is available through Cessna Pilot Centers. It is structured so that you receive the highest quality pilot training at any Cessna Pilot Center located around the world.

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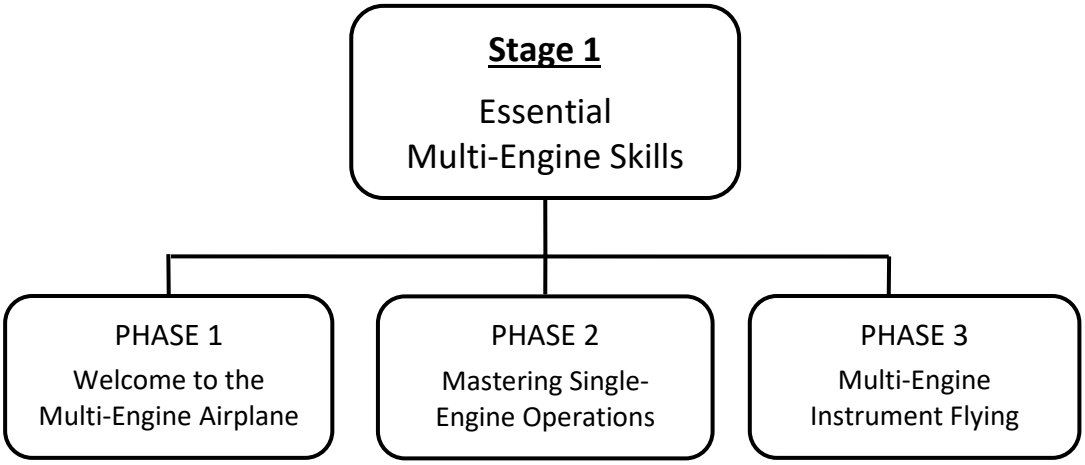


Stage 1 consists of three Phases

- Welcome to the Multi-Engine Airplane
- Mastering Single-Engine Operations
- Multi-Engine Instrument Flying

Stage Objective: During this stage you will

- Learn the key concepts of operating Multi-Engine Aircraft
- Learn fundamental skills for managing engine failures and other emergencies
- Gain experience in flying the multi-engine airplane in normal and single-engine operations
- Gain experience operating IFR normally, and single-engine
- Fly with a check instructor to evaluate your progress and instructor pairing

Each phase contains **Web-based Knowledge Instruction**

- The web-based knowledge instruction for the phase should be completed prior to starting the flight scenarios to ensure fundamental knowledge before the flight.

Each phase contains multiple **Flight Scenarios** that can be

- Customized for your local training environment
- Repeated, or
- Omitted if all items in the Phase Proficiency Checklist are completed to standard.

At the end of each Phase are the **Ground Training Checklist** and **Phase Proficiency Checklist**

- All items in the checklist must be completed to the appropriate standard listed before the Phase is considered complete.

Phase 1: Welcome to the Multi-Engine Airplane

Phase Objective: During this Phase you will learn, demonstrate, and review:
- Normal Operations in Multi-Engine Aircraft
- The problems associated with engine failures

Web-based KNOWLEDGE

EXPECTATIONS
NORMAL OPERATIONS
IF YOU LOSE ONE

1.1 EXPECTATIONS
Objective: You will learn the reason a light twin airplane requires as much or more attention and exacting procedures with an engine failure than a transport category jet.

1.1.1 What's Different with Light Twins

1.2 NORMAL OPERATIONS
Objective: You will learn the fundamentals of multi-engine aircraft ground and flight operations.

1.2.1 Engine Start and Taxi
1.2.2 Engine Runup
1.2.3 Pre-takeoff Considerations
1.2.4 Accelerate-Stop Distance
1.2.5 Accelerate-Go Distance
1.2.6 Normal Takeoff
1.2.7 Being Prepared for Abnormalities Every Takeoff
1.2 8 Propeller Synchronization

1.3 IF YOU LOSE ONE
Objective: You will be introduced to the consequences of an engine failure and be shown the basic procedures for managing one.

1.3.1 Single-Engine Performance in Light Twins
1.3.2 Maintaining Control and Maximizing Performance After an Engine Fails
1.3.3 Getting the Best Rate of Climb

GROUND INSTRUCTION

BRIEFING: MULTI-ENGINE OPERATIONS

BRIEFING: MULTI-ENGINE OPERATIONS

Objective: You and your instructor will discuss the procedures and systems of your training aircraft. You will also review safety practices and procedures for operating in your training environment.

- Aircraft Performance and Limitations
- Operation of Systems
- V Speeds for Your Airplane
- Weight & Balance, Zero Fuel Weight
- Preflight Inspection
- Cockpit Management
- Engine Starting
- Taxiing
- Before Takeoff Checks
- Normal and Crosswind Takeoff and Climb
- Noise Abatement Procedures
- Use of Checklists
- Positive Aircraft Control
- Positive Exchange of the Flight Controls
- Spin Awareness
- Collision Avoidance
- Visual Scanning
- Wake Turbulence Avoidance
- LAHSO Operations
- CFIT Avoidance
- Aeronautical Decision Making
- Commercial pilot privileges, limitations, and flight operations

FLIGHT SCENARIOS

MULTI-ENGINE BASICS

Scenario 1: Multi-Engine Basics

Objective:
You will learn how to use the systems and employ normal flight procedures in the multi-engine airplane you are flying. You will also learn the techniques for starting, taxiing, and running up an airplane with two engines.

Purpose/pressures (real or simulated):
To become familiar with the training aircraft and operation of its systems.

Where to go:
A suitable practice area.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
None.

Risks (real or simulated):
First flight in the training aircraft, unfamiliar with location of instruments, etc.

Preflight Discussion

New This Scenario
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Aircraft Performance and Limitations
Operation of Systems
Preflight Inspection
Cockpit Management
Engine Starting
Taxiing
Airport, Runway, and Taxiway Signs, Markings, and Lighting
Before Takeoff Checks
Runway Incursion Avoidance
Normal and Crosswind Takeoff and Climb
Noise Abatement Procedures
Use of Checklists
Positive Aircraft Control
Straight and Level (VR-IR)*
Turns (VR-IR)*
Climbs and Descents (VR-IR)*
Climbing and Descending Turns (VR-IR)*
Traffic Patterns
Normal and Crosswind Approach and Landing
Collision Avoidance
Wake Turbulence Avoidance
After Landing, Parking and Securing

***A Flight Simulator or approved FTD may be used for these maneuvers.**

Postflight Discussion

Phase 1 Ground Training Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Explain"*	Instruction Given	Describe	Explain
Engine start and taxi			
Engine runup			
Pre takeoff considerations			
Accelerate-stop distance			
Accelerate-go distance			
Normal takeoff			
Being prepared for abnormalities every takeoff			
Propeller synchronization			
Single-engine performance of light twin-engine aircraft			
Recognizing engine failure			
Maintaining aircraft control			
Maximizing performance			
Minimizing drag			
Troubleshooting and feathering			

Phase 1 Proficiency Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *Uses sound decision-making process, recognizes hazardous attitudes, appropriate response to changes*			
Risk management *Identifies risks both preflight and in-flight, evaluates options and chooses actions to mitigate the risks*			
Situational awareness Identifies potential ground and airborne SA risks; understands and uses tools available to enhance SA			
Task management *Prioritizes tasks, completes in timely manner without distractions to flying, uses checklists*			
Preflight procedures			
Aircraft performance and limitations *Aware of aircraft limitations, calculates performance, determines W&B, describes effects of different conditions*			
Operation of systems *Operates aircraft's systems within limitations and procedures of POH, understands impact of systems becoming inoperative*			

Phase 1 Proficiency Checklist *continued*

Preflight inspection *Performs preflight inspection using the checklist, understands the unique items for landing gear and propeller*			
Cockpit management *Organizes cockpit to have necessary resources available without impeding access to controls, instruments, or restricting egress from the aircraft*			
Engine starting *Correctly positions engine controls, checks landing gear switch down prior to applying electrical power*			
Taxiing *Safe Taxi speed, proper use of differential power, nose wheel steering, and braking*			
Airport, runway, and taxiways signs, markings, and lighting *Identifies signs and markings to assist in maintaining orientation during taxi, avoiding runway incursions, and proper reference on approach and landing*			
Before takeoff check *Positions aircraft, uses checklist, engine instruments ready for runup, follows manufacturer's procedures*			
Runway incursion avoidance *Uses all available resources to include ATC, taxi diagrams, and airport signs and markings to taxi as assigned with proper awareness to location on the airport surface.*			
In-flight			
Normal and crosswind takeoff and climb *ACS standards*			
Noise abatement procedures *Utilizes published noise abatement procedures consistent with safety and limitations*			
Use of checklists *Appropriate use of checklists for the given operation or phase of flight. Can be used during or after depending on the situation*			
Positive aircraft control *Maintains positive control of the aircraft throughout all phases of flight*			
Straight and level (VR-IR)* *ACS Standards*			
Turns (VR-IR)* *ACS Standards*			
Climbs and descents (VR-IR)* *Smoothly sets climb/descent power settings, establishes climb/descent attitudes, divides attention in and out*			
Climbing and descending turns (VR-IR)* *Maintains assigned headings/altitudes while smoothly transitioning from maneuvering to cruise flight*			
Use of constant speed propeller *Understands correct operation, response to failure, role in operational efficiency and performance*			
Traffic patterns *ACS standards*			
Normal and crosswind approach and landing *ACS standards*			
Collision avoidance *Uses proper scanning and procedures to minimize collision risk*			
Wake turbulence avoidance *Demonstrates proper awareness and avoidance of wake turbulence*			
Postflight procedures			
After landing, parking and securing *Runway incursion avoidance procedures, completes appropriate checklists and postflight inspection*			

Phase 2: Mastering Single-Engine Operations

Phase Objective: During this Phase you will learn, demonstrate, and review:

- The realities of engine-out performance
- The nature of V_{MC} and aircraft controllability
- Engine failures under specific conditions
- Operating on a single-engine
- Evaluate your progress with a designated Check Instructor

Web-based KNOWLEDGE

CLIMB PERFORMANCE ON ONE ENGINE
KEEPING IT UNDER CONTROL
ENGINE FAILURE ON TAKEOFF
MANAGING ENGINE FAILURE ALOFT
NURSING A SICK ENGINE
GETTING HOME ON ONE ENGINE

2.1 CLIMB PERFORMANCE ON ONE ENGINE

Objective: You will learn why a light twin loses 80-90% of its climb performance when an engine fails. You will also learn the importance behind establishing a bank towards the operating engine, and managing engine failure in the worst case scenario.

2.1.1 Why Single-Engine Climb Rate is Less Than Half
2.1.2 Why and How Much Do You "Raise the Dead"
2.1.3 What it Takes to Climb

2.2 KEEPING IT UNDER CONTROL

Objective: You will learn how it is possible to lose directional control of a twin flying on one engine. You will learn how V_{MC} is determined, its relationship to stall speed, and precautions for demonstrating V_{MC}.

2.2.1 V_{MC} - Keeping it Going Straight on One Engine
2.2.2 What Happens When You Get Too Slow on One Engine
2.2.3 What V_{MC} Means to You
2.2.4 How V_{MC} Is Determined
2.2.5 Demonstrating V_{MC}

2.3 ENGINE FAILURE ON TAKEOFF

Objective: You will learn how to be prepared for an engine failure during takeoff and initial climb. You will learn what to check if you are not climbing, and how rushing an engine-out procedure can be dangerous.

2.3.1 Engine Failure on Takeoff Roll
2.3.2 Engine Failure just After Liftoff
2.3.3 Maintaining a Deliberate, Methodical Pace
2.3.4 If You Cannot Climb on One Engine
2.3.5 How to Make a Bad Situation Worse

2.4 MANAGING ENGINE FAILURE ALOFT

Objective: You will learn that you don't always want to immediately shut down and engine. You will also learn how to properly secure a failed engine, and how to restart an engine in-flight.

- 2.4.1 It Depends on Where You Are
- 2.4.2 When You Have Time to Troubleshoot
- 2.4.3 Deciding When to Shut Down an Engine
- 2.4.4 Feathering and Securing an Engine
- 2.4.5 Restarting an Engine with a Feathered Prop
- 2.4.6 Restarting an Engine in Flight

2.5 NURSING A SICK ENGINE

Objective: You will learn about several possible engine and propeller problems you might experience and how to manage them.

- 2.5.1 When you Suspect an Engine Problem
- 2.5.2 Dealing with a Surging Engine
- 2.5.3 If You Lose Oil Pressure or Your Engine Overheats
- 2.5.4 If You Lose a Turbocharger at High Altitude
- 2.5.5 When You Lose Control of a Propeller

2.6 GETTING HOME ON ONE ENGINE

Objective: You will see how to land a twin on a single-engine, taxiing on a single-engine, and the hazards of a single-engine go-around.

- 2.6.1 Landing with an Engine Shutdown
- 2.6.2 What's Different When You're Landing with One Engine
- 2.6.3 The Difficulty of Taxiing on One Engine
- 2.6.4 One Engine Go-Arounds and Single-Engine Climb Rates

GROUND INSTRUCTION

BRIEFING: SINGLE-ENGINE OPERATIONS

BRIEFING: SINGLE-ENGINE OPERATIONS

Objective: The purpose of this briefing is to review procedures specific to your training aircraft, training environment, and safety procedures for your training.

- Engine Inoperative Aerodynamics
- Principles of Flight- Engine Inoperative
- Spin Awareness
- Systems and Equipment Malfunctions
- Emergency Equipment and Survival Gear
- Emergency Operations
- Limitations on Altitudes and Airspeed for Single-Engine Operations
- Training Aircraft Limitations and Single-Engine Procedures

FLIGHT SCENARIOS

LEARNING TO FLY SINGLE-ENGINE
ENGINE FAILURES DURING CRITICAL PHASES OF FLIGHT

Flight scenarios will be repeated as necessary to reach the desired proficiency

Scenario 1: Learning to Fly Single-Engine

Objective:
You will gain experience using the systems and normal flight procedures in your multi-engine airplane. In addition, you will learn how to control and maneuver your airplane in the event of an engine failure, and you'll work through the engine failure procedures. You'll explore the short-field takeoff and landing techniques and fly steep turns.

Purpose/pressures (real or simulated):
You are operating out of a small unimproved field that requires maximum performance takeoffs and landings.

Where to go:
A practice area that allows adequate terrain clearance and a safe diversion airport for single engine operations.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None

Planned malfunctions:
Simulated Engine Failures

Risks (real or simulated):
Loss of Control during single-engine flight, inability to restart and engine, single-engine go-around.

Preflight Discussion

New This Flight
Short-Field Takeoff and Maximum Performance Climb
Maneuvering During Slow Flight (VR-IR)*
Maneuvering with One Engine Inoperative (Simulated)
Engine Failure Procedure (Simulated)
Systems and Equipment Malfunctions*
Steep Turns (VR-IR)*
Emergency Descent*
Short-Field Approach and Landing
Go-Around/Rejected Landing

Improving your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Normal and Crosswind Takeoff and Climb
Normal and Crosswind Approach and Landing
Traffic Patterns
After Landing, Parking and Securing

***A flight simulator or approved FTD may be used for these maneuvers**

Postflight Discussion

Phase 2 Ground Training Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Explain"*	Instruction Given	Describe	Explain
V_{MC} - Keeping it going straight on one engine			
What happens when you get too slow on one engine			
What V_{MC} means to you			
How V_{MC} is defined			
Demonstrating V_{MC}			
Engine failure on takeoff roll			
Engine failure just after liftoff			
Maintaining a deliberate, methodical pace			
If you cannot climb on one engine			
How to make a bad situation worse			
Modifying engine out procedures for the situation			
When you have time to troubleshoot			
Deciding when to shut down an engine			
Feathering and securing an engine			
Restarting an engine			
Unfeathering an engine			
When you suspect an engine problem			
Dealing with a surging engine			
If you lose oil pressure or your engine overheats			
If you lose a turbocharger at high altitude			
When you lose control of a propeller			
Landing with an engine shutdown			
What's different when you're landing with one engine			
The difficulty of taxiing on one engine			
One engine go-around and single engine climb rates			

Phase 2 Proficiency Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *Uses sound decision-making process, recognizes hazardous attitudes, appropriate response to changes*			
Risk management *Identifies risks both preflight and in-flight, evaluates options and chooses actions to mitigate the risks*			

Phase 2 Proficiency Checklist *continued*

Situational awareness *Identifies potential ground and airborne SA risks; understands and uses tools available to enhance SA*			
Task management *Prioritizes tasks, completes in timely manner without distractions to flying, uses checklists*			
In-flight			
Normal and crosswind takeoff and climb *ACS standards*			
Normal and crosswind approach and landing *ACS standards*			
Traffic patterns *ACS standards*			
Short-field takeoff and maximum performance climb *ACS standards*			
Maneuvering during slow flight (VR-IR) *ACS standards*			
Maneuvering with one engine inoperative (Simulated) *ACS standards*			
Engine failure procedure (Simulated) *ACS standards*			
Systems and equipment malfunctions *ACS standards*			
Steep turns (VR-IR) *ACS standards*			
Emergency descent *ACS standards*			
Short-field approach and landing *ACS standards*			
Go-around/ rejected landing *ACS standards*			
Engine failure during takeoff before V_{MC} (Simulated) *ACS standards*			
Engine failure after liftoff (Simulated) *ACS standards*			
Approach and landing with one engine inoperative (Simulated) *ACS standards*			
Go-around with one engine inoperative (Simulated) *ACS standards*			
Power-off stall with and without turns *ACS standards*			
Power-on stall with and without turns *ACS standards*			
Procedures for feathering, shut down and restart *ACS standards*			
V_{MC} demonstration *ACS standards*			
Postflight procedures			
After landing, parking and securing *ACS standards*			

Scenario 2: Engine Failures During Critical Phases of Flight (Prog Check)

Objective:
You'll learn how to react to an engine failure on takeoff, feather and unfeather a propeller, and land with one simulated inoperative engine. You will also explore slowing your aircraft to V_{MC} and taking the proper actions as you begin to lose control. Additionally, you will fly power-off and power-on stalls with both engines operating. For the progress check you will have a chance to demonstrate the previously learned maneuvers according to the completion standards for this flight. You may expect the Chief or Assistant Chief Flight Instructor to give you this lesson.

Purpose/pressures (real or simulated):
None.

Where to go:
A practice area that allows adequate terrain clearance and a safe diversion airport for single-engine operations.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures, engine shutdown and feather, restarting an engine in flight.

Risks (real or simulated):
Loss of Control during single-engine flight, inability to restart an engine, single-engine go-around.

Preflight Discussion

New This Flight
Engine Failure During Takeoff before V_{MC} (Simulated)
Engine Failure After Liftoff (Simulated)
Approach and Landing with One Engine Inoperative (Simulated)
Go-Around with One Engine Inoperative (Simulated)
Power-Off Stall With and Without Turns
Power-On Stall With and Without Turns
Procedures for Feathering, Shut Down and Restart
V_{MC} Demonstration

Testing your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Short-Field Takeoff and Maximum Performance Climb
Maneuvering During Slow Flight (VR-IR)
Maneuvering with One Engine Inoperative (VR-IR)
Systems and Equipment Malfunctions*
Steep Turns (VR-IR)
Emergency Descent
Short-Field Approach and Landing
After Landing, Parking and Securing

***A flight simulator or approved FTD may be used for these maneuvers**

Postflight Discussion

Phase 2 Progress Check Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *ACS standards*			
Risk management *ACS standards*			
Situational awareness *ACS standards*			
Task management *ACS standards*			
In-flight			
Normal and crosswind takeoff and climb *ACS standards*			
Normal and crosswind approach and landing *ACS standards*			
Traffic Patterns *ACS standards*			
Short-field takeoff and maximum performance climb *ACS standards*			
Maneuvering during slow flight (VR-IR) *ACS standards*			
Maneuvering with one engine inoperative (Simulated) *ACS standards*			
Engine failure procedure (Simulated) *ACS standards*			
Systems and equipment malfunctions *ACS standards*			
Steep turns (VR-IR) *ACS standards*			
Emergency descent *ACS standards*			
Short-field approach and landing *ACS standards*			
Go-around/ rejected landing *ACS standards*			
Engine failure during takeoff before v_{MC} (Simulated) *ACS standards*			
Engine failure after liftoff (Simulated) *ACS standards*			
Approach and landing with one engine inoperative (Simulated) *ACS standards*			
Go-around with one engine inoperative (Simulated) *ACS standards*			
Power-off stall with and without turns *ACS standards*			

Phase 2 Progress Check Checklist *continued*

Power-on stall with and without turns *ACS standards*			
Procedures for feathering, shut down and restart *ACS standards*			
V_{MC} demonstration *ACS standards*			
Postflight procedures			
After landing, parking and securing *ACS standards*			

Phase 3: Multi-Engine Instrument Flying

Phase Objective: During this Phase you will learn, demonstrate, and review:

- IFR operations in Multi-Engine aircraft
- Planning considerations for IFR flight
- Managing engine failures while in IMC conditions

Web-based KNOWLEDGE

SINGLE-ENGINE INSTRUMENT APPROACH

3.1 SINGLE-ENGINE INSTRUMENT APPROACH

Objective: You will learn about managing an engine failure in instrument conditions and how to safely complete the flight with an instrument approach.

3.1.1 If You Have to Fly an Instrument Approach on One Engine
3.1.2 Making an Instrument Approach on One Engine

GROUND INSTRUCTION

BRIEFING: MULTI-ENGINE INSTRUMENT OPERATIONS

BRIEFING: MULTI-ENGINE INSTRUMENT OPERATIONS

Objective: During this briefing you will review instrument flight in a multi-engine airplane and explore the techniques and procedures of flying an instrument approach with one engine inoperative.

Approach and Enroute Chart Review
ATC Clearance for an Instrument Approach
Straight in and Circling to Land Instrument Approaches
Missed Approach Procedures
Systems Management During Instrument Approaches
Use of Checklists
Engine Failure Procedures During Instrument Flight
Instrument Approach with One Engine Inoperative

FLIGHT SCENARIOS

SINGLE-ENGINE FLIGHT ON THE GAUGES
SINGLE-ENGINE INSTRUMENT APPROACHES
SINGLE-ENGINE APPROACH AND LANDING

Scenario 1: Single-Engine Flight on the Gauges

Objective:
You'll become familiar with flying a multi-engine airplane through instrument maneuvers with both engines operating. You will then learn how to fly maneuvers using instrument reference single-engine.

Purpose/pressures (real or simulated):
You are practicing skills necessary to safely operate in IMC during normal and emergency situations.

Where to go:
A practice area that allows adequate terrain clearance and a safe diversion airport for single engine operations.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures.

Risks (real or simulated):
Loss of Control during single-engine flight, inability to restart and engine, single-engine go-around.

Preflight Discussion

New This Flight
Standard Rate Level Altitude Turns (IR)*
Climbs and Descents (IR)*
Steep Turns (IR)*
Intercepting and Tracking Courses Using Navigation Systems (IR)*
Partial Panel Control and Using Navigation Systems (IR)*
Recovery from Unusual Flight Attitudes (IR)*
Maneuvering During Slow Flight (IR)*
Engine Failure During Flight (Simulated) (IR)*
Maneuvering with One Engine Inoperative (Simulated) (IR)*
Precision Instrument Approach – Both Engines Operative (IR)*
Non-Precision Instrument Approach – Both Engines Operative (IR)*
Landing from a Straight-In or Circling Approach – Both Engines Operative (IR)*
Missed Approach (IR)*

Improving your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
After Landing, Parking and Securing

***A flight simulator or approved FTD may be used for these maneuvers.**

Postflight Discussion

Scenario 2: Single-Engine Instrument Approaches

Objective:
You'll improve your instrument skills, including maneuvering with one engine inoperative. You'll also learn how to fly a precision approach and non-precision instrument approaches with an engine inoperative.

Purpose/pressures (real or simulated):
You are practicing skills critical to handling emergencies in IMC.

Where to go:
A practice area that allows adequate terrain clearance and a safe diversion airport for single-engine operations, and has operative precision and or non-precision approaches.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures.

Risks (real or simulated):
Loss of Control during single-engine flight, inability to restart and engine, single-engine go-around.

Preflight Discussion

New This Flight
Precision Instrument Approach – One Engine Inoperative (Simulated) (IR)*
Non-Precision Instrument Approach – One Engine Inoperative (Simulated) (IR)*
Holding Pattern (IR)*

Improving your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Engine Failure During Flight (Simulated) (IR)*
Maneuvering with One Engine Inoperative (Simulated) (IR)*
Landing from a Straight-In or Circling Approach – Both Engines Operative (IR)*
Steep Turns (IR)*
Missed Approach (IR)*
After Landing, Parking and Securing

***A flight simulator or approved FTD may be used for these maneuvers**

Postflight Discussion

Phase 3 Ground Training Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Explain"*	Instruction Given	Describe	Explain
If you have to fly an instrument approach on one engine			
Making an instrument approach on one engine			
Approach and enroute chart review			
ATC clearance for an instrument approach			
Straight in and circling to land instrument approaches			
Missed approach procedures			
Systems management during instrument approaches			
Use of checklists			
Engine failure procedures during instrument flight			
Instrument approach with one engine inoperative			

Phase 3 Proficiency Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *ACS standards*			
Risk management *ACS standards*			
Situational awareness *ACS standards*			
Task management *ACS standards*			
In-flight			
Standard rate level altitude turns (IR)* *ACS standards*			
Climbs and descents (IR)* *ACS standards*			
Steep turns (IR)* *ACS standards*			
Intercepting and tracking courses using navigation systems (IR)* *ACS standards*			
Partial panel control and using navigation systems (IR)* *ACS standards*			
Recovery from unusual flight attitudes (IR)* *ACS standards*			

Phase 3 Proficiency Checklist *continued*

Maneuvering during slow flight (IR)* *ACS standards*			
Engine failure during flight (Simulated) (IR)* *ACS standards*			
Maneuvering with one engine inoperative (Simulated) (IR)* *ACS standards*			
Precision instrument approach - both engines operative (IR)* *ACS standards*			
Non-precision instrument approach - both engines operative (IR)* *ACS standards*			
Landing from a straight-in or circling approach - both engines operative (IR)* *ACS standards*			
Missed approach (IR)* *ACS standards*			
Precision instrument approach - one engine inoperative (Simulated) (IR)* *ACS standards*			
Non-precision instrument approach - one engine inoperative (Simulated) (IR)* *ACS standards*			
Holding pattern (IR)* *ACS standards*			
Postflight procedures			
After landing, parking and securing *ACS standards*			

Scenario 3: Single-Engine Approach and Landing (Prog Check)

Objective:
You will learn how to land from straight in and circling approaches with one engine simulated inoperative. In the progress check you will have a chance to demonstrate your ability to handle an engine failure while in instrument flight and complete a precision and non-precision approach with a simulated inoperative engine. You may expect the Chief or Assistant Chief Flight Instructor to give this progress check.

Purpose/pressures (real or simulated):
You will be evaluated by the Chief or Assistant Chief Instructor.

Where to go:
A practice area that allows adequate terrain clearance and a safe diversion airport for single engine operations, and has operative precision and or non-precision approaches.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures.

Risks (real or simulated):
Loss of Control during single-engine flight, inability to restart and engine, single-engine go-around.

Preflight Discussion

New This Flight
Landing from a Straight-In Instrument Approach – One Engine Inoperative (Simulated)
Landing from a Circling Instrument Approach – One Engine Inoperative (Simulated)

Testing your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Basic Attitude Instrument Flying (Straight & Level, Climbs/Descents, Turns) (IR)*
Partial Panel Control and Using Navigation Systems (IR)*
Recovery from Unusual Flight Attitudes (IR)*
Task Management
Engine Failure During Flight (Simulated) (IR)*
Precision Instrument Approach – One Engine Inoperative (Simulated) (IR)*
Non-Precision Instrument Approach – One Engine Inoperative (Simulated) (IR)*
After Landing, Parking and Securing

***A flight simulator or approved FTD may be used for these maneuvers**

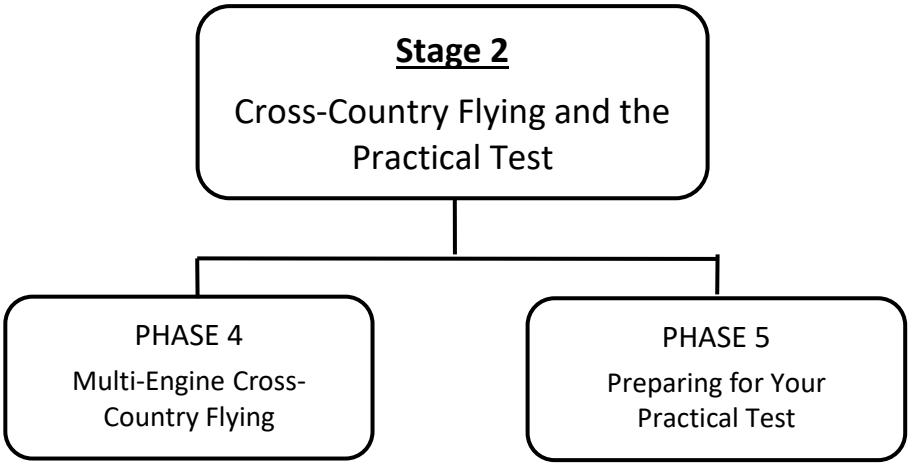
Postflight Discussion

Phase 3 Progress Check Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *ACS standards*			
Risk management *ACS standards*			
Situational awareness *ACS standards*			
Task management *ACS standards*			
In-flight			
Standard rate level altitude turns (IR)* *ACS standards*			
Climbs and descents (IR)* *ACS standards*			
Steep turns (IR)* *ACS standards*			
Intercepting and tracking courses using navigation systems (IR)* *ACS standards*			
Partial panel control and using navigation systems (IR)* *ACS standards*			
Recovery from unusual flight attitudes (IR)* *ACS standards*			
Engine failure during flight (Simulated) (IR)* *ACS standards*			
Maneuvering with one engine inoperative (Simulated) (IR)* *ACS standards*			
Precision instrument approach - both engines operative (IR)* *ACS standards*			
Non-precision instrument approach - both engines operative (IR)* *ACS standards*			
Landing from a straight-in or circling approach - both engines operative (IR)* *ACS standards*			
Missed approach (IR)* *ACS standards*			
Precision instrument approach - one engine inoperative (Simulated) (IR)* *ACS standards*			
Non-precision instrument approach - one engine inoperative (Simulated) (IR)* *ACS standards*			
Holding pattern (IR)* *ACS standards*			

Phase 3 Progress Check Checklist *continued*

Landing from straight-in approach - one engine Inoperative (Simulated) *ACS standards*			
Landing from a circling approach - one engine inoperative (Simulated) *ACS standards*			
Postflight procedures			
After landing, parking and securing *ACS standards*			



Stage 2 consists of two Phases

- Multi-Engine Cross-Country Flying
- Preparing for Your Practical Test

Stage Objective: During this stage you will

- Gain experience in cross-country operations
- Refine your skills in managing emergencies daytime, nighttime, VMC and IMC
- Review key course elements in preparation for your Practical Test
- Be evaluated by a designated Check Instructor to determine your preparedness for the Practical Test

Phase 4: Multi-Engine Cross-Country Flying

Phase Objective: During this Phase you will learn, demonstrate, and review:

- Cross-Country planning considerations
- Cross-Country operations
- Single-Engine operations

Web-based KNOWLEDGE

SPECIAL CONSIDERATIONS

4.1 SPECIAL CONSIDERATIONS

Objective: In this lab you will learn about the limitations and unique systems you may encounter operating twins that you didn't have to consider while flying single engine aircraft.

4.1.1 Flying into and out of High Altitude Airports
4.1.2 IFR Departures in a Twin
4.1.3 The Temptation to Fly with One Engine Less Than Perfect
4.1.4 Lack of Redundant Systems in Some Twins
4.1.5 Prop Blade Failure
4.1.6 Emergencies Caused by Baggage and Cabin Doors
4.1.7 Managing Fuel Systems and Heaters on Twins

GROUND INSTRUCTION

BRIEFING: MULTI-ENGINE CROSS-COUNTRY OPERATIONS

BRIEFING: MULTI-ENGINE CROSS-COUNTRY OPERATIONS

Objective: This briefing is an opportunity for you and your instructor to review cross-country flight procedures and unique factors to consider when planning a flight in a multi-engine airplane.

Obtaining and Interpreting Weather Information
Cross-Country Flight Planning
Single-Engine Instrument Approach Procedures
The National Airspace System
Navigation Systems and Radar Services
Basic VFR Weather Minimums
NOTAMs
Takeoff and Landing Performance Considerations
V Speed for your Airplane
Special Considerations for Night Cross-Country Flight
High altitude operations

FLIGHT SCENARIOS

DAYTIME CROSS-COUNTRY
NIGHTTIME CROSS-COUNTRY

Scenario 1: Daytime Cross-Country

Objective:
You'll apply your multi-engine airplane skills to a day cross-country flight. You'll also improve your skills using instrument reference with one engine inoperative during the enroute and approach phases, and you'll make a single-engine landing at your cross-country destination.

Purpose/pressures (real or simulated):
You have been chartered to take a group of passengers to an event located in another city.

Where to go:
A suitable airport more than 100 nm straight-line distance from the departure airport and allows for a total night flight training time of three hours.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures.

Risks (real or simulated):
Single-engine service ceiling, single-engine approach and landing.

Preflight Discussion

New This Flight
Cross-Country Navigation – Day VFR or IFR Flight Plan
At Least One Instrument Approach at an Airport More Than 100 nm from Departure Airport – One Engine Inoperative (Simulated) (IR)
At Least One Landing at an Airport More Than 100 nm from Departure Airport – One Engine Inoperative (Simulated)

Improving your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Normal and Crosswind Takeoff and Climb
Maneuvering with One Engine Inoperative (Simulated)
Systems and Equipment Malfunctions
Engine Failure During Flight (Simulated) (IR)*
Normal and Crosswind Approach and Landing
After Landing, Parking and Securing

Postflight Discussion

Scenario 2: Nighttime Cross-Country

Objective:
You'll apply your multi-engine airplane skills to a night cross-country flight. You'll also improve your skills using instrument reference at night with one engine inoperative during the enroute and approach phases, and you'll make a night single engine landing at your cross-country destination.

Purpose/pressures (real or simulated):
Working for a medivac company you have been called in to transport a critically injured patient to a nearby city for life-saving treatment.

Where to go:
A suitable airport more than 100 nm straight-line distance from the departure airport and allows for a total night flight training time of three hours.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures.

Risks (real or simulated):
CFIT, Single-Engine service ceiling, single-engine approach and landing.

Preflight Discussion

New This Flight
Cross-Country Navigation – Night VFR or IFR Flight Plan
At Least One Instrument Approach at Night at an Airport More Than 100 nm from Departure Airport – One Engine Inoperative (Simulated) (IR)
At Least One Landing at Night at an Airport More Than 100 nm from Departure Airport – One Engine Inoperative (Simulated)

Improving your Skills
Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Normal and Crosswind Takeoff and Climb
Maneuvering with One Engine Inoperative (Simulated)
Systems and Equipment Malfunctions
Engine Failure During Flight (Simulated) (IR)*
Normal and Crosswind Approach and Landing
After Landing, Parking and Securing

Postflight Discussion

Phase 4 Ground Training Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Explain"*	Instruction Given	Describe	Explain
Flying into and out of high altitude airports			
IFR departures in a twin			
The temptation to fly with one engine less than perfect			
Lack of redundant systems in some twins			
Prop blade failure			
Emergencies caused by baggage and cabin doors			
Managing fuel systems and heaters on twins			

Phase 4 Proficiency Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *ACS standards*			
Risk management *ACS standards*			
Situational awareness *ACS standards*			
Task management *ACS standards*			
In-flight			
Normal and crosswind takeoff and climb *ACS standards*			
Normal and crosswind approach and landing *ACS standards*			
Systems and equipment malfunctions *ACS standards*			
Cross-country navigation - day VFR or IFR flight plan *ACS standards*			
Cross-country navigation - night VFR or IFR flight plan *ACS standards*			
Maneuvering with one engine inoperative (Simulated) *ACS standards*			
Engine failure during flight (Simulated) (IR) *ACS standards*			
At least one instrument approach at an airport more than 100 nm from departure airport - one engine inoperative (Simulated) (IR) *ACS standards*			

Phase 4 Proficiency Checklist *continued*

At least one instrument approach at night at an airport more than 100 nm from departure airport - one engine inoperative (Simulated) (IR) *ACS standards*			
At least one landing at an airport more than 100 nm from departure airport – one engine inoperative (Simulated) (IR) *ACS standards*			
At least one landing at night at an airport more than 100 nm from departure airport – one engine inoperative (Simulated) (IR) *ACS standards*			
Postflight procedures			
After landing, parking and securing *ACS standards*			

Phase 5: Preparing for your Practical Test

Phase Objective: During this Phase you will learn, demonstrate, and review:

- Multi-Engine theory
- Performance of ACS tasks for the Practical Test
- Demonstrate satisfactory knowledge and maneuvers performance in preparation for your practical test

GROUND INSTRUCTION

BRIEFING: PRACTICAL TEST

BRIEFING: PRACTICAL TEST

Objective: During this briefing you will demonstrate your readiness for the oral portion of the Practical Test. You will use this time to resolve any unanswered questions.

Performance Charts
Limitations of Light Multi-Engine Airplanes
Single-Engine Climb Performance Limitations
Multi-Engine Aerodynamics
Engine Inoperative Aerodynamics
Principles of Flight- Engine Inoperative
V Speed for Your Plane
Spin Awareness
Systems and Equipment Malfunctions
Weight & Balance
Zero Fuel Weight
Emergency Equipment and Survival Gear
Review of applicable ACS Appendices
Review of ACS Maneuvers

FLIGHT SCENARIOS

FINAL PROGRESS CHECK

Scenario 1: Final Prog Check

Objective:
This is your final progress check. During this flight you will demonstrate proficiency to meet or exceed current Practical Test Standards appropriate to the rating sought. You will exhibit sound judgment when making flight related decisions. You may expect the Chief or Assistant Chief Flight Instructor to conduct this progress check.

Purpose/pressures (real or simulated):
You will be evaluated in preparation for your Practical Test.

Where to go:
A practice area that allows adequate terrain clearance and a safe diversion airport for single engine operations, and has operative precision and or non-precision approaches.

How to get there:
Any combination of pilotage, dead reckoning, or navigation systems as appropriate.

Planned deviations:
None.

Planned malfunctions:
Simulated engine failures in all phases of flight, engine shutdown and feather, engine restart in flight.

Risks (real or simulated):
Loss of Control during single-engine flight, inability to restart and engine, single-engine go-around.

Preflight Discussion

Demonstrating your Skills

Aeronautical Decision Making
Risk Management
Situational Awareness
Task Management
Preflight Inspection
Cockpit Management
Passenger Briefing
Instrument Cockpit Check
Before Takeoff Check
Normal and Crosswind Takeoff and Climb
Short-Field Takeoff and Maximum Performance Climb
Engine Failure During Takeoff Before V_{MC} (Simulated)
Engine Failure After Lift-Off (simulated)
Steep Turns
Maneuvering During Slow Flight
Power-Off Stalls With and Without Turns
Power-On Stalls With and Without Turns
V_{MC} Demonstration
Emergency Descent
Procedures for Shutdown, Feathering, and Restart
Maneuvering with One Engine Inoperative
Engine Failure During Flight (Simulated) (IR)*
Systems and Equipment Malfunctions (Simulated)
Approach and Landing with One Engine Inoperative (Simulated)
Go-Around with One Engine Inoperative (Simulated)
Normal and Crosswind Approach and Landing
Go-Around/Rejected Landing
Short-Field Approach and Landing
Wake Turbulence Avoidance
Collision Avoidance
After Landing, Parking and Securing

Postflight Discussion

Phase 5 Progress Check Checklist

*All items to be graded independently by the instructor and customer, then discussed and a final grade assessed. *Desired outcome for all tasks by the end of the phase is "Perform" or "Manage/Decide"*	Practice	Perform	Manage/Decide
Single-pilot resource management			
Aeronautical decision making *ACS standards*			
Risk management *ACS standards*			
Situational awareness *ACS standards*			
Task management *ACS standards*			
Preflight procedures			
Preflight inspection *ACS standards*			
Passenger briefing *ACS standards*			
Instrument cockpit check *ACS standards*			
Cockpit management *ACS standards*			
Before takeoff check *ACS standards*			
In-flight			
Normal and crosswind takeoff and climb *ACS standards*			
Short-field takeoff and maximum performance climb *ACS standards*			
Engine failure during takeoff before V_{MC} (Simulated) *ACS standards*			
Engine failure after lift-off (Simulated) *ACS standards*			
Steep turns *ACS standards*			
Maneuvering during slow flight *ACS standards*			
Power-off stalls with and without turns *ACS standards*			
Power-on stalls with and without turns *ACS standards*			
V_{MC} demonstration *ACS standards*			
Emergency descent *ACS standards*			
Procedures for shutdown, feathering, and restart *ACS standards*			

Phase 5 Progress Check Checklist *continued*

Maneuvering with one engine inoperative *ACS standards*			
Engine failure during flight (Simulated) (IR) *ACS standards*			
Systems and equipment malfunctions (Simulated) *ACS standards*			
Approach and landing with one engine inoperative (Simulated) *ACS standards*			
Go-Around with one engine inoperative (Simulated) *ACS standards*			
Normal and crosswind approach and landing *ACS standards*			
Go-around/rejected landing *ACS standards*			
Short-field approach and landing *ACS standards*			
Wake turbulence avoidance *ACS standards*			
Collision avoidance *ACS standards*			
Postflight procedures			
After landing, parking and securing *ACS standards*			

Cleared for Multi-Engines—Course Training Requirements

Requirements for enrollment

Prior to enrolling in the flight portion of the Multi-Engine course, the customer must

- Hold a pilot certificate with an airplane category, single engine land class rating.

Ground training requirements

The customer must successfully complete

- All web-based knowledge instruction
- All Ground Training Checklists
- All Expanded Briefings

Flight training requirements

Prior to completing the Cleared for Multi-Engines Course

- The applicable minimum hourly requirements must be met
- As well as the successful completion of all Phase Proficiency Checklists and Progress Checks

Requirements for graduation

To obtain a graduation certificate for the Multi-Engine course, the applicant must:

- Complete all ground training requirements
- Complete all flight training requirements

Minimum flight time requirements

The course is designed to meet the minimum hour requirements of

- 14 CFR Part 141, Appendix I Additional Aircraft Category and/or Class Rating Course
- 14 CFR Part 61 Subpart B Aircraft Ratings and Pilot Authorizations

The minimum FAA hour requirements

- Vary depending upon your course of enrollment
- Are to be thought of as minimums only
    - The goal is to prepare you to be a competent, proficient multi-engine pilot

What you get at an FAA certificated flight school (under 14 CFR Part 141)

If you take a course with this syllabus under Part 141 of the Federal Aviation Regulations, you are assured that flight school has been approved by the FAA and is required to demonstrate and maintain

- Standardized flight operations, including *Safety Procedures and Practices*
- A structured training environment
- Detailed training records available for regular and unannounced FAA checks and inspection
- At least an 80% first attempt pass rate for certificate or rating applicants training under Part 141

Appendix A

MULTI-ENGINE COURSE

MINIMUM COURSE HOURS AND CHRONOLOGICAL LOG

For Part 141, Appendix I Compliance

These times are for customer/instructor guidance only. They are a suggested time schedule which will ensure compliance with the minimum flight and ground training required under FAR Part 141. Preflight and postflight briefings are required under FAR Part 141 for each flight training flight. It is suggested that you allow a minimum of .5 hour per flight for these briefings. The pre and postflight times may be credited toward the required ground training, and the check flights may be credited toward the required flight training.

Date	Lesson	Total Flight Training	IR Flight Training	Complex ME	Night Flight Training	X-C Day	X-C Night	Ground Training
	Stage One **Phase 1: Welcome to the Multi-Engine Airplane**							
	EXPECTATIONS							0.1
	NORMAL OPERATIONS							0.6
	IF YOU LOSE ONE							0.3
	MULTI-ENGINE OPERATIONS BRIEFING							1.0
	FLIGHT SCENARIO 1	1.5		1.5				1.1
	PHASE 1 TOTALS	1.5		1.5				3.1
	Phase 2: Mastering Single-Engine Operations							
	CLIMB PERFORMANCE ON ONE ENGINE							0.3
	KEEPING IT UNDER CONTROL							0.5
	ENGINE FAILURE ON TAKEOFF							0.3
	MANAGING ENGINE FAILURE ALOFT							0.3
	NURSING A SICK ENGINE							0.2
	GETTING HOME ON ONE ENGINE							0.3
	SINGLE-ENGINE OPERATIONS BRIEFING							1.0
	FLIGHT SCENARIO 1	1.5		1.5				1.0
	FLIGHT SCENARIO 2 AND PROGRESS CHECK	1.5		1.5				0.7
	PHASE 2 TOTALS	3.0		3.0				4.6
	Phase 3: Multi-Engine Instrument Flying							
	SINGLE ENGINE INSTRUMENT APPROACH							0.7
	MULTI-ENGINE INSTRUMENT OPS BRIEF							1.0
	FLIGHT SCENARIO 1	1.5	1.3	1.5				0.5
	FLIGHT SCENARIO 2	1.5	1.3	1.5				0.5
	FLIGHT SCENARIO 3 AND PROGRESS CHECK	1.5	1.3	1.5				0.7
	PHASE 3 TOTALS	4.5	3.9	4.5				3.4
	STAGE 1 TOTALS	9.0	3.9	9.0				11.1
	TOTAL RECEIVED STAGE 1							

Date	Lesson	Total Flight Training	IR Flight Training	Complex ME	Night Flight Training	X-C Day	X-C Night	Ground Training
	Stage Two **Phase 4: Multi-Engine Cross-Country Flying**							
	SPECIAL CONSIDERATIONS							0.7
	MULTI-ENGINE CROSS-COUNTRY OPS BRIEFING							1.0
	FLIGHT SCENARIO 1	2.0	0.4	2.0		2.0		0.7
	FLIGHT SCENARIO 2	3.0	0.4	2.0	3.0		2.0	0.7
	PHASE 4 TOTALS	5.0	0.8	4.0	3.0	2.0	2.0	3.1
	Phase 5: Preparing for Your Practical Test							
	PRACTICAL TEST BRIEFING							2.0
	FLIGHT SCENARIO 1 AND PROGRESS CHECK	2.0	0.3	2.0				1.5
	PHASE 5 TOTALS	2.0	0.3	2.0				3.5
	STAGE 2 TOTALS	7.0	1.1	6.0	3.0			6.6
	TOTAL RECEIVED STAGE 2							
	COURSE TOTALS	16.0	5.0	15.0	3.0	2.0	2.0	17.7
	MINIMUMS REQUIRED FOR COMMERCIAL PART 141	10	5	10	2	2	2	15
	TOTAL RECEIVED IN COURSE							

For Private Pilot Level Certification

This syllabus can be adapted to an additional Multi-Engine Land class rating for applicants holding a private pilot certificate with an Airplane Single-Engine rating. The contents of this course conform to all the necessary areas of training; however, the course total requirements are different.

	MINIMUMS REQUIRED FOR PRIVATE PILOT PART 141	3	3		3 (AND 10 LDGS)**	3*	10

**Part 141, Appendix I paragraph 4(k)(1)(i) states that 3 hours of cross country training in a multiengine airplane is required.*

***Part 141, Appendix I paragraphs 4(k)(1)(ii) states that 3 hours of nighttime flight training is required in a multiengine airplane that includes one cross country flight of more than 100 nautical miles total distance in a multiengine airplane, and 10 takeoffs and 10 landings to a full stop (with each landing involving a flight in the traffic pattern) at an airport.*

Applicants Not Seeking Instrument Privileges

The Private Pilot applicant who does not hold, or does not want instrument privileges in a multi-engine aircraft does not need to complete Phase 3. They must still comply with course training totals in order to graduate.

Adapting the Syllabus to Part 61 training requirements

Applicants for an additional airplane multi-engine land rating who train under part 61 of 14 CFR do not need to comply with the time-tables above, they must comply with 61.39 which only requires 3 hours of training within the two calendar months preceding the practical test. While the course totals are not mandatory it is recommended that the applicant complete the entire course to be properly prepared for the practical test.

PAVE Checklist

PAVE your way to a safe instrument flight. Before you fly, examine your risk factors.

Remember the cumulative effect. Change your plan whenever more than one risk factor is marginal.

Pilot
Aircraft
en**V**ironment
External Pressures

PILOT

Make a frank assessment of your own skills.

- ❑ Am I proficient (not just current) for flying in today's weather?
- ❑ Do I have recent experience in actual instrument conditions?
- ❑ Am I proficient with the avionics and the navigation systems for this flight?
- ❑ Am I rested and have I checked the IMSAFE elements?

AIRCRAFT

Evaluate the capability of the aircraft.

- ❑ Does this airplane have enough redundancy of communication radios, navigation equipment, and flight instruments or display?
- ❑ Is the lighting working and good enough for night instrument flying?
- ❑ Does this airplane have sufficient performance reserve for this flight?
- ❑ Is there enough range reserve to reach a legal and safe alternate?

ENVIRONMENT

Evaluate the environmental factors at the airport and on the runway.

- ❑ Are conditions at my destination forecast for marginal IFR?
- ❑ Are there areas for a good weather alternate within my fuel range?
- ❑ What is the crosswind component on the active runway?
- ❑ Is the runway slick from water, snow, or slush?
- ❑ Are braking action reports available?

External Pressures

Evaluate pressures that influence you to make or complete the flight.

- ❑ Do someone else's plans depend on you completing this flight?
- ❑ Are peers encouraging you to take off or land despite the conditions?
- ❑ What are your strategies for managing the external pressures specific to this flight?

CARE Checklist

Use the CARE attention scan to recognize and manage the changing risk factors in flight and for landing.

Manage your workload so that you have time to use the CARE checklist to deal with changes.

Consequences
Alternatives
Reality
External Pressures

Consequences

- ❑ Am I thinking: What is changing at my destination and alternate?
- ❑ Am I evaluating the consequences of changes I am seeing?
- ❑ Am I prepared for a later arrival, lower ceilings and visibility, gusts, or crosswind component more than I anticipated?
- ❑ Is moisture on the runway, and will temperature be a factor?

Alternatives

- ❑ Do I have more than one alternate course of action?
- ❑ Are conditions changing at my destination?
- ❑ Should I land now to expand my circle of alternatives and remove pressure to land in adverse conditions?

Reality

- ❑ Have I accepted the fact that the weather at my destination airport has changed?
- ❑ Has the goal to land at my destination put me in denial?
- ❑ Am I dealing with things as they really are enroute and at my destination, or just as I planned them?

External Pressures

- ❑ Am I ignoring risk factors in order to land at my destination?
- ❑ Am I managing my own goal-oriented behavior?
- ❑ Are pressures influencing me to continue under unsuitable conditions?