

CONTENTS

Chapter 1—Introduction to Flight Training

Purpose of Flight Training.....	1-1
Role of the FAA	1-1
Role of the Pilot Examiner	1-2
Role of the Flight Instructor	1-3
Sources of Flight Training.....	1-3
Practical Test Standards.....	1-4
Flight Safety Practices.....	1-4
Collision Avoidance.....	1-4
Runway Incursion Avoidance.....	1-5
Stall Awareness.....	1-6
Use of Checklists.....	1-6
Positive Transfer of Controls.....	1-6

Chapter 2—Ground Operations

Visual Inspection	2-1
Inside the Cockpit.....	2-2
Outer Wing Surfaces and Tail Section	2-4
Fuel and Oil	2-5
Landing Gear, Tires, and Brakes	2-6
Engine and Propeller	2-6
Cockpit Management.....	2-7
Ground Operations	2-7
Engine Starting	2-7
Hand Propping.....	2-8
Taxiing	2-9
Before Takeoff Check.....	2-11
After Landing	2-11
Clear of Runway	2-11
Parking.....	2-11
Engine Shutdown.....	2-12
Postflight.....	2-12
Securing and Servicing.....	2-12

Chapter 3—Basic Flight Maneuvers

The Four Fundamentals.....	3-1
Effects and Use of the Controls	3-1
Feel of the Airplane	3-2
Attitude Flying.....	3-2
Integrated Flight Instruction.....	3-3
Straight-and-Level Flight	3-4
Trim Control.....	3-6
Level Turns.....	3-7
Climbs and Climbing Turns	3-13
Normal Climb.....	3-13
Best Rate of Climb	3-13
Best Angle of Climb.....	3-13
Descents and Descending Turns.....	3-15
Partial Power Descent	3-16
Descent at Minimum Safe Airspeed.....	3-16

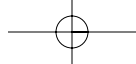
Glides.....	3-16
Pitch and Power.....	3-19

Chapter 4—Slow Flight, Stalls, and Spins

Introduction	4-1
Slow Flight	4-1
Flight at Less than Cruise Airspeeds.....	4-1
Flight at Minimum Controllable Airspeed.....	4-1
Stalls	4-3
Recognition of Stalls	4-3
Fundamentals of Stall Recovery	4-4
Use of Ailerons/Rudder in Stall Recovery	4-5
Stall Characteristics	4-6
Approaches to Stalls (Imminent Stalls) —Power-On or Power-Off	4-6
Full Stalls Power-Off.....	4-7
Full Stalls Power-On	4-8
Secondary Stall.....	4-9
Accelerated Stalls	4-9
Cross-Control Stall	4-10
Elevator Trim Stall	4-11
Spins	4-12
Spin Procedures	4-13
Entry Phase.....	4-13
Incipient Phase.....	4-13
Developed Phase	4-14
Recovery Phase	4-14
Intentional Spins.....	4-15
Weight and Balance Requirements.....	4-16

Chapter 5—Takeoff and Departure Climbs

General.....	5-1
Terms and Definitions	5-1
Prior to Takeoff.....	5-2
Normal Takeoff.....	5-2
Takeoff Roll.....	5-2
Lift-Off	5-3
Initial Climb.....	5-4
Crosswind Takeoff.....	5-5
Takeoff Roll.....	5-5
Lift-Off	5-6
Initial Climb.....	5-6
Ground Effect on Takeoff.....	5-7
Short-Field Takeoff and Maximum Performance Climb.....	5-8
Takeoff Roll.....	5-9
Lift-Off	5-9
Initial Climb.....	5-9
Soft/Rough-Field Takeoff and Climb.....	5-10



Takeoff Roll.....5-10
 Lift-Off5-10
 Initial Climb.....5-10
 Rejected Takeoff/Engine Failure5-11
 Noise Abatement.....5-11

Chapter 6—Ground Reference Maneuvers

Purpose and Scope.....6-1
 Maneuvering By Reference
 to Ground Objects6-1
 Drift and Ground Track Control.....6-2
 Rectangular Course6-4
 S-Turns Across a Road6-6
 Turns Around a Point6-7
 Elementary Eights6-9
 Eights Along a Road.....6-9
 Eights Across a Road.....6-11
 Eights Around Pylons6-11
 Eights-On-Pylons (Pylon Eights)6-12

Chapter 7—Airport Traffic Patterns

Airport Traffic Patterns and Operations7-1
 Standard Airport Traffic Patterns7-1

Chapter 8—Approaches and Landings

Normal Approach and Landing8-1
 Base Leg8-1
 Final Approach8-2
 Use of Flaps.....8-3
 Estimating Height and Movement.....8-4
 Roundout (Flare)8-5
 Touchdown8-6
 After-Landing Roll8-7
 Stabilized Approach Concept8-7
 Intentional Slips.....8-10
 Go-Arounds (Rejected Landings).....8-11
 Power8-11
 Attitude8-12
 Configuration.....8-12
 Ground Effect8-13
 Crosswind Approach and Landing8-13
 Crosswind Final Approach8-13
 Crosswind Roundout (Flare)8-15
 Crosswind Touchdown8-15
 Crosswind After-Landing Roll8-15
 Maximum Safe
 Crosswind Velocities8-16
 Turbulent Air Approach and Landing8-17
 Short-Field Approach and Landing8-17
 Soft-Field Approach and Landing8-19
 Power-Off Accuracy Approaches8-21
 90° Power-Off Approach.....8-21
 180° Power-Off Approach.....8-23

360° Power-Off Approach.....8-24
 Emergency Approaches and
 Landings (Simulated)8-25
 Faulty Approaches and Landings8-27
 Low Final Approach.....8-27
 High Final Approach8-27
 Slow Final Approach8-28
 Use of Power8-28
 High Roundout8-28
 Late or Rapid Roundout8-29
 Floating During Roundout.....8-29
 Ballooning During Roundout8-30
 Bouncing During Touchdown8-30
 Porpoising.....8-31
 Wheelbarrowing8-32
 Hard Landing8-32
 Touchdown in a Drift or Crab8-32
 Ground Loop8-33
 Wing Rising After Touchdown.....8-33
 Hydroplaning8-34
 Dynamic Hydroplaning8-34
 Reverted Rubber Hydroplaning.....8-34
 Viscous Hydroplaning8-34

Chapter 9—Performance Maneuvers

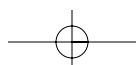
Performance Maneuvers9-1
 Steep Turns9-1
 Steep Spiral.....9-3
 Chandelle9-4
 Lazy Eight9-6

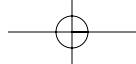
Chapter 10—Night Operations

Night Vision.....10-1
 Night Illusions10-2
 Pilot Equipment10-3
 Airplane Equipment and Lighting10-3
 Airport and Navigation Lighting Aids10-4
 Preparation and Preflight.....10-4
 Starting, Taxiing, and Runup.....10-5
 Takeoff and Climb10-5
 Orientation and Navigation10-6
 Approaches and Landings10-6
 Night Emergencies10-8

Chapter 11—Transition to Complex Airplanes

High Performance
 and Complex Airplanes11-1
 Wing Flaps.....11-1
 Function of Flaps11-1
 Flap Effectiveness.....11-2
 Operational Procedures.....11-2
 Controllable-Pitch Propeller11-3
 Constant-Speed Propeller11-4





Takeoff, Climb, and Cruise11-4
 Blade Angle Control 11-5
 Governing Range11-5
 Constant-Speed Propeller Operation11-5
 Turbocharging11-7
 Ground Boosting vs.
 Altitude Turbocharging11-7
 Operating Characteristics11-8
 Heat Management11-8
 Turbocharger Failure11-9
 Overboost Condition11-9
 Low Manifold Pressure11-9
 Retractable Landing Gear11-9
 Landing Gear Systems11-9
 Controls and Position Indicators11-10
 Landing Gear Safety Devices11-10
 Emergency Gear
 Extension Systems11-10
 Operational Procedures11-12
 Preflight11-12
 Takeoff and Climb11-13
 Approach and Landing11-13
 Transition Training11-14

Chapter 12—Transition to Multiengine Airplanes

Multiengine Flight12-1
 General12-1
 Terms and Definitions12-1
 Operation of Systems12-3
 Propellers12-3
 Propeller Synchronization12-5
 Fuel Crossfeed12-5
 Combustion Heater12-6
 Flight Director / Autopilot12-6
 Yaw Damper12-6
 Alternator / Generator12-7
 Nose Baggage Compartment12-7
 Anti-Icing / Deicing12-7
 Performance and Limitations12-8
 Weight and Balance12-10
 Ground Operation12-12
 Normal and Crosswind
 Takeoff and Climb12-12
 Level Off and Cruise12-14
 Normal Approach and Landing12-14
 Crosswind Approach and Landing12-16
 Short-Field Takeoff and Climb12-16
 Short-Field Approach
 and Landing12-17
 Go-Around12-17
 Rejected Takeoff12-18
 Engine Failure After Lift-Off12-18
 Engine Failure During Flight12-21

Engine Inoperative Approach
 and Landing12-22
 Engine Inoperative Flight Principles12-23
 Slow Flight12-25
 Stalls12-25
 Power-Off Stalls
 (Approach and Landing)12-26
 Power-On Stalls
 (Takeoff and Departure)12-26
 Spin Awareness12-26
 Engine Inoperative—Loss of
 Directional Control Demonstration12-27
 Multiengine Training Considerations12-31

Chapter 13—Transition to Tailwheel Airplanes

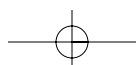
Tailwheel Airplanes13-1
 Landing Gear13-1
 Taxiing13-1
 Normal Takeoff Roll13-2
 Takeoff13-3
 Crosswind Takeoff13-3
 Short-Field Takeoff13-3
 Soft-Field Takeoff13-4
 Touchdown13-4
 After-Landing Roll13-4
 Crosswind Landing13-5
 Crosswind After-Landing Roll13-5
 Wheel Landing13-6
 Short-Field Landing13-6
 Soft-Field Landing13-6
 Ground Loop13-6

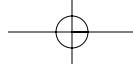
Chapter 14—Transition to Turbopropeller Powered Airplanes

General14-1
 The Gas Turbine Engine14-1
 Turboprop Engines14-2
 Turboprop Engine Types14-3
 Fixed Shaft14-3
 Split-Shaft / Free Turbine Engine14-5
 Reverse Thrust and
 Beta Range Operations14-7
 Turboprop Airplane
 Electrical Systems14-8
 Operational Considerations14-10
 Training Considerations14-12

Chapter 15—Transition to Jet Powered Airplanes

General15-1
 Jet Engine Basics15-1
 Operating the Jet Engine15-2
 Jet Engine Ignition15-3
 Continuous Ignition15-3





Fuel Heaters.....	15-3	General.....	16-2
Setting Power.....	15-4	Attitude and Sink Rate Control	16-3
Thrust to Thrust Lever Relationship	15-4	Terrain Selection.....	16-3
Variation of Thrust with RPM.....	15-4	Airplane Configuration.....	16-3
Slow Acceleration of the Jet Engine	15-4	Approach	16-4
Jet Engine Efficiency.....	15-5	Terrain Types	16-4
Absence of Propeller Effect	15-5	Confined Areas	16-4
Absence of Propeller Slipstream	15-5	Trees (Forest).....	16-4
Absence of Propeller Drag	15-6	Water (Ditching) and Snow	16-4
Speed Margins.....	15-6	Engine Failure After Takeoff (Single-Engine).....	16-5
Recovery from Overspeed Conditions	15-8	Emergency Descents	16-6
Mach Buffet Boundaries.....	15-8	In-Flight Fire	16-7
Low Speed Flight	15-10	Engine Fire	16-7
Stalls	15-10	Electrical Fires.....	16-7
Drag Devices	15-13	Cabin Fire	16-8
Thrust Reversers.....	15-14	Flight Control Malfunction / Failure.....	16-8
Pilot Sensations in Jet Flying	15-15	Total Flap Failure	16-8
Jet Airplane Takeoff and Climb.....	15-16	Asymmetric (Split) Flap.....	16-8
V-Speeds.....	15-16	Loss of Elevator Control	16-9
Pre-Takeoff Procedures	15-16	Landing Gear Malfunction	16-9
Takeoff Roll.....	15-17	Systems Malfunctions	16-10
Rotation and Lift-Off.....	15-18	Electrical System.....	16-10
Initial Climb.....	15-18	Pitot-Static System	16-11
Jet Airplane Approach and Landing.....	15-19	Abnormal Engine	
Landing Requirements.....	15-19	Instrument Indications	16-11
Landing Speeds	15-19	Door Opening In Flight.....	16-12
Significant Differences.....	15-20	Inadvertent VFR Flight Into IMC	16-12
The Stabilized Approach	15-21	General.....	16-12
Approach Speed.....	15-21	Recognition.....	16-14
Glidepath Control	15-22	Maintaining Airplane Control	16-14
The Flare.....	15-22	Attitude Control.....	16-14
Touchdown and Rollout	15-24	Turns	16-15
		Climbs.....	16-15
		Descents.....	16-16
		Combined Maneuvers.....	16-16
		Transition to Visual Flight.....	16-16
Chapter 16—Emergency Procedures		Glossary	G-1
Emergency Situations.....	16-1	Index	I-1
Emergency Landings	16-1		
Types of Emergency Landings	16-1		
Psychological Hazards.....	16-1		
Basic Safety Concepts.....	16-2		

