



## Mountain Flying Syllabus

### Stage 1 – Self Study

#### Stage Objectives

Develop the student's mountain flying knowledge base and identify areas for improvement leading up to ground instruction. Lay the foundation for planning and safely executing a cross country flight in the Rocky Mountains.

Acquire the minimum documents required to understand applicable Aspen Flying Club policies and to safely plan and execute a mountain cross country flight.

#### Instructor Note

- This stage may include 1 to 2 hours with an instructor to establish a plan for Stage 2.
- Experienced pilots, such as those who have developed a thorough understanding of mountain flying through self-study or have completed the Aspen Flying Club Mountain Flying Ground School (or equivalent) may require little ground instruction beyond this self-study lesson.

#### Stage Completion Standards

- Student will complete the Aspen Flying Club Mountain Checkout – Self-Study Worksheet.
- Student will make arrangements with a mountain flight instructor to complete Stages 2 and 3.

#### Recommended Aids

- Mountain Checkout – Self-Study Worksheet
- Mountain Flying Bible, Revised – Sparky Imeson
- Aircraft POH
- FAR/AIM
- Current Section Charts including Denver and Cheyenne; Albuquerque, Salt Lake City, Billings, Great Falls or Phoenix as applicable to planned flight.
- Aspen Flying Club Policies

#### Review

- Appropriate information sources with an instructor for further training, as necessary

#### Introduce

- The intent of the Aspen Flying Club checkout and instructor expectations. Student obtains appropriate planning documents and completes the Worksheet prior to Stage #2.



## **Stage 2 – Ground Instruction**

### **Stage Objectives**

The student will understand the rules, procedures, and aircraft capabilities and limitations necessary for safe operations in the mountain and will demonstrate the ability to apply them by planning a multi-leg flight in mountainous terrain. With an instructor, the student will resolve any questions that came up during Stage 1.

### **Instructor Note**

- This stage may require two to six or more hours of ground instruction, depending on how well the student absorbed the self-study materials.
- Some students may best solidify their understanding the material during the flight activity of Stage 3. Other students may require a more extensive ground review before moving forward.
- Lessons in Stage 2 are suggested in an order that should be effective for most students. Instructors are encouraged to re-order and/or combine the lessons in this stage to most effectively and efficiently meet the needs of the individual student.

### **Stage Completion Standards**

- The student will satisfactorily plan a multi-leg flight to mountain airports utilizing appropriate information gathering techniques.
- Student will demonstrate a sound understanding of mountain weather, navigation and flight maneuvers, aircraft performance, communications, aeromedical factors, and risk management.

## **Stage 2, Lesson #1 – Introduction to Mountain Flying**

### **Objectives**

- Ensure student understands unique rules and procedures applicable to mountain flying.

### **Recommended Aids**

- Mountain Checkout – Self-Study Worksheet, questions 15 & 23
- AC 61-91H; Pilot Proficiency Award Program
- FAA-P-8740-60, AFS-803; Tips on Mountain Flying
- FAA-P-8740-61, AFS-803; Mountain Flying Checklist (1999) – Available at the AFC front desk
- Aspen Flying Club policies
- FAR/AIM

### **Review:**

- Applicable Aspen Flying Club flight policies and Self-Study Worksheet answers with student.
- FAR 91.119 (minimum safe altitudes), 91.121 (altimeter settings), 91.137 (temporary flight restrictions), 91.151 (VFR fuel requirements), 91.211 (supplemental oxygen), Part 830 (NTSB), AIM 3-1-4 (VFR weather minimums)



## Introduce

- FAA "Wings" program
- Mountain Flying "Rules of Thumb" - [http://www.mountainflying.com/pages/mountain-flying/rule\\_of\\_thumb.html](http://www.mountainflying.com/pages/mountain-flying/rule_of_thumb.html)

## Lesson 1 Completion Standards

- Student demonstrates knowledge of applicable FARs and other rules and policies applicable to safe mountain flying in Aspen Flying Club aircraft.

## Stage 2, Lesson #2 – Mountain Weather

### Lesson Objectives

- Ensure that the student understands sources of mountain weather information and how to interpret and apply the information to flight planning and enroute operations.

### Recommended Aids

- Self-Study Worksheet questions 6,8,11,18,19
- FAA-P-8470-30, AFS-820; How to Obtain a Good Weather Briefing
- Weather & Flight Information Telephone Numbers
- AOPA – Flight Training; Turbulence 101
- FAA-P-8470-40, AFO-800-0582; Wind Shear
- ATA-10; NOTAM & Weather Contractions Translator (available online)
- Colorado AWOS Stations
- AOPA Safety Advisor; Weather #1, Aircraft Icing
- AOPA/ASF; Weather Tactics
- AOPA/ASF; Weather Strategies
- AOPA Safety Advisor; Technology #2, ASOS

### Review

- METARS
- Thunderstorms, windshear & turbulence
- Flight Watch
- Sources of local mountain weather
- Fog
- Diurnal and terrain effects on mountain weather
- Icing

### Introduce

- Colorado AWOS system
- Rules of thumb for winds aloft



### **Completion Standards**

- Student will obtain a complete weather briefing for a mountain flight, correctly decode and interpret data obtained, and use the weather information to make a go/no-go decision, discuss where to fly through passes, near rapidly rising or falling terrain and discuss weather effects on the planned flight.

## **Stage 2, Lesson #3 – Aircraft Performance**

### **Lesson Objectives**

- Student will demonstrate familiarity with various tables required to predict aircraft performance.
- Students will understand proper operation and troubleshooting of major aircraft systems.
- Student will understand limitations of light aircraft in mountainous terrain.

### **Instructor note**

- If the student utilizes electronic devices for calculations, ensure that the student is capable of reasonable levels of manual calculation in case of electronics failure.

### **Recommended Aids**

- Self-Study Worksheet questions 4, 7, 11, 12, 14, 17, 19, 21, 22, 23, 24, 25
- Aircraft POH
- FAA-P-8740-5, AFS-800; Weight & Balance
- FAA-P-8740-2, AFS-803; Density Altitude
- Aspen Flying Club (specific) Aircraft Checkout Quiz
- AIM Chapter 7-2-3, Altimeter Errors

### **Review**

- E6B operation
- Aircraft performance tables including takeoff, climb-out and cruise climb
- Take off and landing distances
- Rate of climb
- Fuel consumption
- Crosswind component
- Weight and balance calculations
- Leaning techniques
- Manual density altitude calculation
- Aircraft systems and troubleshooting
- Short field technique
- Go-arounds
- Aborted takeoffs
- $V_a$



## **Introduce**

- Koch Chart
- Operation and maintenance of portable and installed oxygen systems
- Weight “download” concept
- Rules of thumb for takeoff performance
  - Mountainflying.com, Rules of Thumb

## **Completion Standards**

- Student understands all aircraft performance calculations required for safe mountain flight and is able to calculate all aircraft performance requirements to Private Pilot PTS accuracy.
- Student has working knowledge (Private Pilot PTS) of major aircraft systems and can successfully resolve system scenarios presented by instructor.

## **Stage 2, Lesson #4 – Communications**

**Lesson Objectives:** Ensure student understands communications sources in the mountains and operational limitations.

### **Recommended Aids**

- Self-Study Worksheet, questions 2, 13, 15

### **Review**

- FSS frequencies
- Flight Watch
- Unicom operation
- ASOS/AWOS operation
- Pilot controlled lighting
- Flight following

## **Introduce**

- IFR charts and Center frequencies

## **Completion Standards**

- Student flight plan shows recognition of available communication sources and their limitations, and includes a backup plan in case of failed communications.
- Student obtains correct frequencies for all legs of a selected mountain flight.

## **Stage 2, Lesson #5 – Mountain Flight Operations and Maneuvers**

### **Lesson Objectives**

- Prepare student for maneuvers and techniques required for safe mountain flying.



### **Instructor Note**

- Less experienced students may be asked to demonstrate some or all of these maneuvers in the practice area prior to the Stage 3 flight into mountainous terrain.

### **Recommended Aids**

- Aspen Flying Club Mountain Checkout Preparation Self Study Worksheet questions 1, 8, 9, 11
- AOPA Safety Advisor – Operations & Proficiency #3 Operations at Non-towered Airports
- FAA-P-8740-44, AFO-800; Impossible Turn
- Mountain Flying Bible – Sparky Imeson

### **Review**

- Operations at non-towered airports
- Emergency procedures
- IAS versus TAS at altitude
- Carburetor heat
- Vapor lock
- Stall recognition & recovery
- Use of checklists
- Mixture control and leaning at high altitudes

### **Introduce**

- Flying canyons
- Advanced course reversal techniques (ie; Chandelle, wing over, use of flaps, etc.) and their limited effectiveness in rising terrain and canyons
- High altitude take off and landing technique
- Approach & crossing a mountain pass

### **Completion Standards**

- Student demonstrates understanding of elements of critical mountain flying operations and maneuvers and the conditions requiring their use.

## **Stage 2, Lesson #6: Aeromedical Factors**

### **Lesson Objectives**

- Ensure student understands aeromedical factors affecting mountain flight with special emphasis on hypoxia and optical illusion.

### **Recommended Aids**

- Self-Study Worksheet, questions 15, 23



- AIM Chapter 8, Medical Facts for Pilots
- FAA-H-8083-25; Pilot's Handbook of Aeronautical Knowledge
- AM-400-91/1, AAM-900; Hypoxia (FAA Pilot Safety brochure)
- Altitude Decompression Sickness (FAA Pilot Safety brochure)
- The Air Up There; AOPA – The Weather Never Sleeps
- Fighting Fatigue; AOPA/ASF – Safety Brief, Fatigue in Aviation
- 14 CFR 91.211

### **Review**

- AIM Chapter 8, Medical Facts for Pilots
- Pilot's Handbook of Aeronautical Knowledge, Chapter 15

### **Introduce**

- Oxygen requirements
- Decompression sickness

### **Completion Standards**

- Student can recognize personal aeromedical related symptoms and understands effective countermeasures.

## **Stage 2, Lesson #7 – Risk Management**

### **Lesson Objectives**

- Ensure student understands risks inherent in mountain flying and is capable of applying sound judgment to real or simulated mountain flying scenarios.

### **Recommended Aids**

- Aspen Flying Club Mountain Checkout – Self Study Worksheet, questions 3, 8, 9, 10, 12, 14, 17, 24
- AIM 7-5-13
- Back to Basics - Flying in Flat Light & White Out Conditions; FAA YouTube video
- FAA AirCrew Survival, Series of 8 videos. Note: the FAA does not supply GA pilots with survival kits
- FAAviation News, April 2001
- FAA-H-8083-25; Pilot's Handbook of Aeronautical Knowledge

### **Review**

- Pilot's Handbook of Aeronautical Knowledge, chapter 16, Decision Making
- PAVE model

### **Introduce**

- Scenario(s) designed to test student's knowledge of mountain flying factors and decision making abilities
- Survival kit



- Night and IFR at night is not recommended in Aspen aircraft

### **Completion Standards**

- Student is able to recommend safe courses of action to resolve Aspen Flying Club Mountain Checkout Preparation Self Study Worksheet questions 3, 8, 9, 10, 12, 14, 17, 24 and any additional scenarios as presented by instructor. Student solutions should always reflect a conservative approach.

## **Stage 2, Lesson #8 – Mountain Flight Planning**

### **Lesson Objectives**

- Ensure student is capable of accurately planning a safe VFR flight into the mountains.

### **Recommended Aids**

- Self-Study Worksheet questions 2, 5, 7, 16, 20, 22, 24, 25
- Aspen Flying Club flight plan
- Commonly Flown Mountain Passes (Colorado Aviation map)
- AC 91-36D; VFR Flight Near Noise Sensitive Areas
- AC00-57; Hazardous Mountain Winds and Their Visual Indicators
- AOPA – Mountain Flying
- Denver and Cheyenne Sectional, others as required
- E6B & plotter
- Aspen Flying Club flight policies

### **Review**

- Aspen Flying Club flight planning and cross country policies
- Sectional chart symbol interpretation
- E6B operation
- Preferred mountain routes & passes

### **Introduce**

- Need for planning alternatives
- Increased fuel reserves
- Colorado mountain passes

### **Completion Standards**

- Student will accurately plan a multi-leg, VFR flight as agreed to by the instructor.





## Stage 3 – Mountain Flight Practical Exercise

### Stage Objectives

- Student will plan and safely execute a multi-leg, daytime, VFR flight over mountainous terrain.
- This stage will require 4-8 hours for completion.

### Instructor Note

- Student must have 100 hours total time before attempting this stage.
- Flights must be in a 180hp C172 or more powerful aircraft.
- Instructors are encouraged to also expose student to common mountain situations such as short runways, narrow runways, difficult surrounding terrain, or one-way in-one way out, etc. in selecting airports.
- Airports in other Rocky Mountain states may be utilized at the instructor's discretion as long as the above three-airport/two mountain pass standard is complied with.

### Recommended Aids

- Aircraft POH
- Appropriate sectional charts for the planned flight
- Checklists
- Aspen Flying Club Aircraft Checkout Quiz
- Colorado Airport Directory

### Review

- Flight planning procedures as necessary
- Operational and emergency procedures (while enroute), as necessary for student to demonstrate adequate knowledge of mountain flying techniques

### Completion Standards

- Student will successfully plan and safely complete a day VFR mountain cross-country flight with take offs and landings at a minimum of three different mountain airports, although more are recommended.
- Student will correctly interpret enroute weather conditions and adjust flight accordingly.
- Depending upon student interest and weather conditions any of a number of airports can be selected but at least two of the airport runway elevations must be above 7000' MSL and at least one of the airports must be above 8000' MSL.
- The route must include at least two different mountain passes.



**Qualifying Colorado airports are listed below**

<u>Airport</u>	<u>Designator</u>	<u>Elevation</u>	<u>TPA</u>	<u>Longest Runway</u>	<u>Airport Name</u>
Alamosa	ALS	7,539'	8335'	8,519'	San Luis Regional/Bergman Field
Aspen	ASE	7,838'	9,005'	8,006'	Aspen-Pitkin County/Sardy Field
Blanca #	05V	7,720'	8,800'	6160'	Blanca
Buena Vista	AEJ	7,950'	9,000'	8,303'	Central Colorado Regional
Center	1V8	7,598'	8,400'	7,000'	Leach
Craig-Moffat	CAG	6,198'	7,000'	5,606'	Craig-Moffat
Creede	C24	8,680'	9,700'	6,880'	Mineral County Memorial
Del Norte	RCV	7,955'	9,000'	6,051'	Astronaut Kent Rominger
Eagle	EGE	6,547'	7,535'	9,000'	Eagle County Regional
Glenwood Springs	GWS	5,916'	7,000'	3,305'	Glenwood Springs Municipal
Granby	GNB	8,207'	9,003'	5,000'	Granby-Grand County
Gunnison	GUC	7,680'	8,468'	9,400'	Gunnison-Crested Butte Regional
Hayden	HDN	6,606'	7,597'	10,000'	Yampa Valley
Kremmling	20V	7,411'	8,400'	5,536'	Mc Elroy Airfield
La Veta	07V	7,153'	8,153'	5,798'	Cuchara Valley at La Veta
Leadville	LXV	9,934'	10,727'	6,400'	Lake County
Meeker	EEO	6,426'	7,420'	6,503'	Meeker Coulter Field
Monte Vista	MVI	7,611'	8,408'	5,901'	Monte Vista Municipal
Pagosa Springs	PSO	7,664'	8,650'	8,100'	Stevens Field
Rifle	RIL	5,537'	6,600'	7,000'	Garfield Regional
Saguache #	04V	7,850'	8,900'	7,957'	Saguache Municipal
Salida	ANK	7,523'	8,300'	7,348'	Harriet Alexander Field
Steamboat Springs	SBS	6,882'	7,878'	4,452'	Steamboat Springs/Bob Adams Field
Telluride	TEX	9,070'	10,492'	7,111'	Telluride Regional
Walden	33V	8,154'	8,949'	5,900'	Walden-Jackson County
Wescliffe	C08	8,290'	9,000'	6,954'	Silver West

# Unpaved runway. Requires special permission to land, per AFC policy 3.7.