

Weight Shift Control Training Syllabus
Copyright ©2008 Moore Airtime

Revision Date 7/8/2010

Introduction

This syllabus is designed to meet the training requirements of a typical student who is new to aviation. Your instructor might modify the content and/or order of lessons in order to tailor your instruction for your individual needs and prior experience. In order to successfully meet the requirements for Sport Pilot, and to obtain your Sport Pilot Certificate, you should be proficient in all of the flight and ground topics contained in this syllabus.

This syllabus is a work-in-progress! If you have suggestions, comments, or complaints, please let your instructor know.

References

Most lessons include “Study Preparation.” In order to get the most from each lesson, you should make an effort to review these materials prior to arriving for your lesson. This will result in the best use of your time and financial investment. For some lessons, there are multiple reading assignments as well as online courses that are recommended. In these cases, you should try to read enough to get a feel for the topic before your lesson, and review the online and additional materials after the lesson until you are comfortable that you have a thorough understanding of the topic. When a topic is confusing or unclear then get help from your instructor until you have a thorough understanding. That's what we're here for!

There are basically three resources that are used in the Study Preparation sections.

The primary handbook referred to is FAA document FAA-H-8083-5 titled “Weight-Shift Control Aircraft Flying Handbook.” When this syllabus refers to a chapter with no other reference then it is this document that is being referenced. You can download this document for free at www.faa.gov.

PHAK refers to the “Pilot's Handbook of Aeronautical Knowledge,” which is FAA document FAA-H-8083-25. This book can also be downloaded for free at www.faa.gov, and it can be purchased from various aviation supply companies. This handbook presumes that the student is flying a traditional airplane, not a trike. However, it contains extremely useful information that is helpful for all pilots, and much of the information it contains will apply to your training, and will show up during testing for your Sport Pilot Certificate. When reading material in this handbook, try to analyze how each concept would be the same for a trike pilot, different, or irrelevant.

Several valuable online courses are offered by aopa.org. You will need to create a user account in order to take these courses, but access is free. We recommend membership in AOPA, the Aircraft Owners and Pilots Association, because of the commitment that they have made to ongoing pilot training.

Ground Lesson 1: Program Overview

Objective:

Study Preparation:

None

Discussion:

- ❑ Review of course and objectives
- ❑ School requirements, procedures, regulations
- ❑ Grading criteria, expectations of student
- ❑ Training task log use
- ❑ Review objective of Stage 1
- ❑ Review training materials
- ❑ Discuss best training schedule

Handbooks and Manuals:

- ❑ Weight-Shift Control Aircraft Flying Handbook
- ❑ Pilot's Handbook of Aeronautical Knowledge
- ❑ FAA Weight Shift Control Practical Test Standards

Online Resources:

- ❑ www.mooreairtime.com
General information about your training with Moore Airtime. Click on “FTG-Area Weather Links” for several useful weather forecast sites.
- ❑ www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs600/afs610/
FAA Sport Pilot Website. Lists of instructors, test requirements, and other official information.
- ❑ www.faasafety.gov
FAA Safety Website. Click on “Learning Center” and then “Online Courses.” You will be required to create a username and password, but registration is free.
- ❑ www.duat.com
Official FAA-recognized source for pre-flight briefings. This site is an alternative to calling Flight Service at 1-800-WX-BRIEF. Access is free, but a pilot certificate is required in order to register as a new user. A Student Pilot Certificate is acceptable.
- ❑ www.aopa.org
Aircraft Owners and Pilots Association. Click on “Training and Safety” and then “ASF Interactive Courses.” You will be required to create a username and password, but registration is free.
- ❑ www.eaa.org
Experimental Aircraft Association.

Ground Lesson 2: Regulations, Documents, Publications

Objective:

- ❑ To understand the content and purpose of the Federal Aviation Regulations (FARs), Aeronautical Information Manual (AIM), and other aviation publications.

Study Preparation:

Chapter 1 “Light Sport Aircraft”
Chapter 1 “Flight Operations and Pilot Certificates”
Chapter 1 “Flight Safety Practices”
PHAK Chapter 7

Discussion:

- ❑ FAR
 - Part 1 – Definitions and Abbreviations
 - Part 61 – Certification
 - Part 91 – General Operating and Flight Rules
 - NTSB Part 830
- ❑ Aeronautical Information Manual
- ❑ Certificates and Documents
 - Onboard Aircraft – AROW
 - ✓ Airworthiness Certificate
 - ✓ Registration
 - ✓ Operating Limitations
 - ✓ Weight and Loading
 - With Pilot
 - ✓ Pilot Certificate
 - ✓ Medical Certificate of Driver’s License
 - ✓ Logbook
- ❑ Airworthiness Requirements
 - S-LSA vs. E-LSA
 - Required Instruments
 - Maintenance
 - Inspections
 - Inoperative Equipment
 - Record Keeping
 - Special Flight Permit
 - Airworthiness Directives
- ❑ Pilot Currency
 - Flight Review
 - WINGS Program
 - Carrying Passengers
- ❑ Advisory Circulars
 - 20 – Aircraft
 - 60 – Pilots
 - 70 – Aircraft

- 90 – Air Traffic and Operating Rules
- NOTAM's
 - NOTAM L
 - NOTAM D
 - FDC NOTAM

Completion Standards: at the end of this lesson, the student should:

- Understand the content and purpose of the FAR/AIM book, and be able to locate relevant topics.
- Understand the content and purpose of other publications such as Advisory Circulars, NOTAM's, and Airworthiness Directives.

Ground Lesson 3: Principles of Flight

Objective:

- To gain an understanding of basic aerodynamics and the forces acting on the wing and trike.

Study Preparation:

Chapter 2
PHAK Chapter 2
PHAK Chapter 3

Discussion:

- The three axes of motion
 - Roll
 - Pitch
 - Yaw
- The four dynamic forces acting on an airplane during all maneuvers
 - Gravity
 - Always points straight down
 - Lift
 - Bernoulli's principle
 - Airfoil shape
 - Angle of Attack
 - Relative Wind – Chord Line
 - Newton's Third Law
 - Dynamic / static pressure
 - Streamlined / turbulent flow
 - Airspeed
 - Aerodynamic force
 - Pressure distribution / center of pressure movement (CP)
 - Wing shape / aspect ratio
 - Wing Loading
 - Thrust
 - Propeller motion
 - Forces on a propeller blade
 - Propeller efficiency
 - Propeller pitch – geometric and effective – propeller slip
 - Propeller torque effect
 - Gyroscopic effect
 - P-factor
 - Takeoff effects of propellers
 - Drag
 - Parasitic drag
 - Form drag
 - Interference drag

- Skin friction drag (Profile drag)
 - Induced drag
 - Angle of attack
 - Wing design
 - Wing twist
 - Cross bar
 - Fairings, wheel pants, etc.
- Lift / drag ratio (L/D)
- What condition results when all are equal, unequal
- Accelerated Flight
- Stability and control
 - Static
 - Dynamic
 - PIO
 - Maneuverability
 - Controllability
 - Aircraft equilibrium
 - Pitching moments
 - Longitudinal / directional / lateral stability
- Forces
 - Straight and level
 - Climbing and descending
 - Turning and load factor
 - Forces in a turn
 - Thrust in a turn
 - Steep turns
- Stalls
 - Definition
 - When stalls occur
 - Symptoms
 - Awareness
 - Avoidance
 - Recovery
 - Stalling in a turn
 - 18 – 20 Degrees
 - Stall speed defined
 - Stall speed as a function of wing loading

Completion Standards: at the end of this lesson, the student should:

- Understand and be able to explain the concepts listed above.

Ground Lesson 4: Airport Operations

Objective:

- Understand airport procedures, markings, lighting, and radio procedures.

Study Preparation:

Chapter 10

PHAK Chapter 12

Take online course and pass quiz: AOPA.org "Runway Safety"

Discussion:

- Airport Markings
 - Taxiway Markings
 - Yellow Lines
 - Movement Areas
 - Hold Line
 - Blue Lights – Taxiway Edge
 - Green Lights – Taxiway Centerline
 - Runway Markings
 - White Lines
 - Hold Short Line
 - Runway Numbers
 - Threshold
 - Landing Aiming Point
 - VASI / PAPI
 - LIRL, MIRL, HIRL
 - White / Red Centerline Lights
 - Rotating Beacon
 - Signage
 - Wind and Landing Direction Indicators
 - Segmented Circle
- Airport Operations
 - Definition of Pattern
 - Standard Traffic Pattern
 - Legs of Traffic Pattern
 - Entering the Pattern
 - Departing the Pattern
 - Closed Pattern
 - Wake Turbulence
 - Collision Avoidance
 - Tower Hours of Operation
- Radio Aids
 - ATIS

- CTAF
- Unicom
- Multicom
- AWOS / ASOS
- 121.5
- 122.2

- Minimum Equipment Requirements
 - Class B: Two-Way Radio and Mode C Transponder
 - Class C: Two-Way Radio and Mode C Transponder
 - Class D: Two-Way Radio

- Airport Communications: Non-Towered Airport
 - Phraseology
 - Taxi
 - Takeoff
 - Exiting Pattern
 - Closed Pattern Operations
 - Approaching Airport
 - Entering Pattern
 - Clearing Runway

- Airport Communications: Towered Airport
 - Initial Call – On the ground to Ground Control
 - Initial Call – On the ground to Tower Control
 - Exiting Pattern
 - Closed Pattern Operations
 - Initial Call – Inbound
 - Class B: Must receive clearance from ATC to enter
 - Class C: Must establish communications with ATC
 - Class D: Must establish communications with ATC
 - Clearing Runway
 - ATC Services – Class B, C, D
 - Responsibilities of Pilot
 - Deviating From ATC Instructions
 - Radio Failure
 - Light Gun Signals
 - Radio failure in pattern
 - Radio failure outside pattern – transmitter failure
 - Radio failure outside pattern – receiver failure
 - Requirements – VFR, Tower In Sight, Clearance to Land

Completion Standards: at the end of this lesson, the student should:

- Understand airport procedures for operations both on the ground and in the air.
- Understand airport signage, pavement markings, and lighting.
- Understand the fundamentals of radio usage at towered and non-towered airports.

Ground Lesson 5: National Airspace System

Objective:

- ❑ Understand the national airspace system, and how to read sectional charts.

Study Preparation:

Chapter 8

PHAK Chapter 13

Take online course and pass quiz: AOPA.org “Know Before You Go: Navigating Today's Airspace”

Take online course and pass quiz: AOPA.org “Mission: Possible – Navigating Today's Special-Use Airspace”

Discussion:

- ❑ Airspace – Definition & Dimensions
 - Controlled vs. Uncontrolled
 - Class A
 - Class B
 - Class C
 - Class D
 - Class E
 - Class G
- ❑ Special Use Airspace
 - MOA
 - Alert Area
 - Restricted Area
 - Prohibited Area
 - Warning Area
 - CFA
- ❑ Other Airspace
 - TFR
 - MTR
 - ADIZ
 - Parachute Jump Operations
 - VFR Flyways
 - VFR Corridors
 - VFR Transition Routes
 - National Security Area
 - National Parks
- ❑ Charts
 - Sectional Charts
 - VFR Terminal Area Charts
 - World Aeronautical Charts

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand and be able to describe the national airspace system.
- ❑ Know how to read sectional charts.

Ground Lesson 6: Operation of Systems

Objective:

- Understand the proper and safe usage of all aircraft systems.

Study Preparation:

Chapter 3, 4

Discussion:

- Wing
 - Pitch, roll, yaw control
 - Pitch trim adjustment
 - Roll trim adjustment
 - Stability in a positive angle of attack
 - Luff lines / sprogs
 - Washout tubes
- Trike
 - Throttle operation
 - Brake operation
 - Steering
 - Suspension
- Electrical
 - Master power switch
 - 12 volt system, rectifier, charging
 - Voltage regulator
 - Ammeter
 - Breakers / fuses
 - Fail-safe relation to engine
- Instruments
 - Altimeter
 - VSI
 - Airspeed indicator
 - Compass
 - GPS
 - Headsets / ANR
 - Intercom
 - Radio
 - Transponder
 - ELT
 - Engine instruments (see below)
- BRS
- Engine
 - Principles of two-stroke
 - Exhaust system
 - Oil and oil mixing / oil injection
 - Fuel system

- Fuel tank, vent, sump
- Fuel pump
- Primer bulb
- Fuel filter
- Fuel grade
- Fuel contamination – sources and prevention
- Fuel gauges
- Air induction system
- Cooling (air & fuel)
- Starter
- Magneto switches
- Carburetor
 - Theory and operation
 - Jetting
 - Icing
 - Carburetor heat
- Fuel injection
- Instruments
 - Tachometer
 - EGT
 - CHT
 - Coolant temperature
- Abnormal combustion
 - Pre-ignition
 - Detonation
 - Missing
- ❑ Engine starting
 - Cold vs. warm engine
 - Safety
 - Use checklist
- ❑ Reduction drive
 - Lubrication
 - Gear ratio
- ❑ Propeller
 - Number of blades vs. blade length
 - Pitch (angle of attack)
 - Cruise vs. climb performance
- ❑ Cockpit Management

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand the proper and safe usage of all aircraft systems, including some common problem areas.

Ground Lesson 7: Weather

Objective:

- ❑ Understand basic weather principles.
- ❑ Learn the various types of weather services available to pilots, and how to access them.
- ❑ Learn to make valid go / no-go decisions based on weather conditions and forecasts.

Study Preparation:

Chapter 5 “Weather”

PHAK Chapter 10

PHAK Chapter 11

Take online course and pass quiz: AOPA.org “Weather Wise: Air Masses and Fronts”

Discussion:

- ❑ Troposphere
- ❑ Atmospheric Pressure
 - Standard Atmosphere 29.92 at 59°F
 - Pressure Altitude
 - Density Altitude
 - Effect of Altitude on Flight
 - Pressure systems, fronts
 - Coriolis & Circulation
 - Flow
 - Characteristics of Warm and Cold fronts
 - Low-level wind shear
- ❑ Wind
 - Ocean of air in motion
 - Cause – uneven heating
 - Equatorial – Polar Circulation
 - Jet Stream
 - Mechanical Turbulence
 - Wind Gradient
- ❑ Temperature & Dewpoint
 - Relative Humidity
 - DALR = 5.4°F = 3°C
 - Dewpoint Drop = 1°F = .5°C
 - Cloudbase
 - Dew & Frost
 - Fog
 - Carburetor Ice
 - Inversions & Wind Gradient
- ❑ Cloud Types
 - Stratus
 - Cumulous
 - Ceiling
 - ❑ Overcast (100% Coverage)

- ❑ Broken (5/8 Coverage)
 - ❑ Vertical Visibility Into An Obscuration (Such as Haze)
- ❑ Convection
 - Thunderstorms
 - Gust Fronts
 - Low-level wind shear
- ❑ Stability
 - SALR = 3.6°F = 2°C
- ❑ Turbulence
- ❑ Reporting Systems and Services
 - AWOS / ASOS
 - METAR
 - PIREP
 - Radar
 - Airmet
 - Sigmet
 - Convective Sigmet
- ❑ Forecasting Systems
 - Terminal Aerodrome Forecasts (TAF)
 - Area Forecasts (FA)
 - Winds Aloft (FD)
- ❑ Sources
 - FSS – 1-800-WXBRIEF
 - TIBS
 - DUATS
 - EFAS (Flight Watch – 122.0)
 - HIWAS
 - TWEB
 - Adds.aviationweather.gov
 - Other reliable internet sites
- ❑ Weather Charts
 - Surface Analysis Chart
 - Weather Depiction Chart
 - Radar Summary Chart
 - Significant Weather Prognostic Chart
- ❑ To Go or Not To Go?
 - Wind forecast – direction, velocity, and predicted change during flight
 - Convection forecast - time of day for flight and overall stability
 - Cloud cover
 - Temperature / dew point
 - Visibility
 - Aircraft limitations
 - Pilot limitations

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand basic weather concepts.

- Be able to make a go / no-go decision based on current and forecasted conditions.

Ground Lesson 8: Visual Navigation

Objective:

- ❑ Understand the principles of visual navigation.

Study Preparation:

PHAK Chapter 14

Take online course and pass quiz: AOPA.org "GPS For VFR Operations"

Discussion:

- ❑ Definition of VFR
- ❑ Pilotage, Dead Reckoning, GPS
- ❑ Longitude / Latitude
- ❑ Nautical vs. Statute
- ❑ True Airspeed
- ❑ Course, True Heading, Magnetic Heading
- ❑ Wind Drift, Wind Correction Angle
- ❑ Ground Track, Ground Speed
- ❑ Wind Triangle
- ❑ Altitude
 - Minimum Safe Altitude
 - VFR Cruise Altitude
- ❑ Weather Forecasts
 - TAF
 - AF
 - Winds Aloft
 - Other Resources
- ❑ Time
 - Local vs. UTC / Zulu
 - Standard vs. Daylight
- ❑ Diversion
- ❑ Lost Procedures
- ❑ Accidental Entry Into IMC
- ❑ Precautionary Landing vs. Emergency Landing
- ❑ Fuel Requirements

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand the definition of VFR and VFR minimums.
- ❑ Understand the difference between pilotage, dead reckoning, and GPS navigation.
- ❑ Understand the relationship between course, heading, wind, airspeed, ground speed.
- ❑ Know how to access various weather resources.
- ❑ Be able to plan for unexpected flight conditions.

Ground Lesson 9: Cross Country Flight Planning

Objective:

- ❑ To plan a cross country flight using the principles of visual navigation.

Study Preparation:

Chapter ?

Take online course and pass quiz: AOPA.org "A Pilot's Guide to Flight Service"

Discussion:

- ❑ Equipment
 - Sectional
 - AFD
 - Planning Sheets
 - Plotter
 - CX2
- ❑ Plan Route
 - Plan route to avoid controlled and restricted airspace
 - Plan route over acceptable terrain, at acceptable altitudes
 - Draw route, and mark in 10 mile increments
 - Identify enough landmarks to keep 2 to 3 in sight at all times during the flight
 - Locate and mark checkpoints
 - Locate and mark alternate landing sites
 - Critical point and point of no return
- ❑ Research planned and alternate landing sites
 - Trike friendly?
 - Runway directions, patterns, etc.
 - Radio frequencies
 - Special rules / requirements
 - Aircraft storage in case of being stranded
 - Fuel availability
 - Contact phone numbers
- ❑ Complete flight planner sheet
 - Need to know:
 - ✓ Takeoff time
 - ✓ Indicated airspeed
 - ✓ Fuel consumption rate
 - ✓ Fuel capacity
 - ✓ Altimeter setting
 - ✓ Temperature
 - ✓ Wind
- ❑ Complete flight plan
- ❑ Set GPS Coordinates
- ❑ Check NOTAM's
- ❑ Check weather at the takeoff area, destination, enroute
- ❑ Things to have on hand

- 2-stroke oil
- Appropriate clothing including possible temperature extremes
- Cash
- Cell phone
- Emergency phone numbers
- Tools
- Knife
- Spark plugs
- Tie downs
- Wing straps
- Sunblock lotion
- Water
- Insect Repellent
- First aid supplies
- Space blanket
- Signal Mirror
- Batteries for radio
- Flares

Completion Standards: at the end of this lesson, the student should:

- Be able to plan a cross country flight using the principles of visual navigation.

Ground Lesson 10: Performance and Limitations

Objective:

- Understand the elements of aircraft performance.

Study Preparation:

PHAK Chapter 9

Discussion:

- Trike & wing limitations
 - Minimum, maximum weight ratings
 - Balance limitations (“hang point”)
 - Minimum, maximum airspeed
 - V_S Stall speed / minimum controllable airspeed
 - V_{NE} Speed not to exceed
 - V_{NO} Maximum structural cruising speed
 - V_A Maneuvering speed
 - V_X Best angle of climb speed
 - V_Y Best rate of climb speed
 - V_H Maximum speed in level flight at full throttle
 - V_C Cruise speed
- Performance characteristics to be considered
 - Takeoff speed
 - Takeoff roll
 - Rate of climb
 - Angle of climb
 - Maximum altitude (ceiling)
 - Range
 - Cruising speed
 - Maneuverability
 - Stall speed
 - Landing speed
 - Landing rollout
 - Stress on landing gear
- Factors affecting performance
 - Weight
 - Air density
 - Surface wind
 - Runway surface
 - Runway upslope / down slope
- Weight
 - Gross weight
 - Empty weight
 - Useful load
 - Maximum passenger / baggage weight

- Air density
 - Factors affecting air density: Pressure, Temperature, Humidity
 - Pressure altitude
 - Definition – standard atmosphere
 - Used to calculate other performance values
 - How to calculate
 - ✓ Charts
 - ✓ CX2
 - ✓ Set altimeter to 29.92”
 - Density altitude
 - Definition – pressure altitude adjusted for temperature
 - Used to evaluate engine, wing performance
 - How to calculate
 - ✓ Charts
 - ✓ CX2
 - ✓ AWOS
 - Humidity
 - Affect on air density
 - How to calculate
 - Airspeed
 - Affect of air density on airspeed
 - Calculating true airspeed from indicated airspeed
 - ✓ CX2
- Wind
 - Headwind / crosswind component
 - Effect on takeoff / landing
 - How to calculate
 - ✓ Chart
 - ✓ CX2
 - Cruise flight
 - Ground speed
 - Fuel requirement
- Runway surface
- Runway upslope / down slope

Completion Standards: at the end of this lesson, the student should:

- Understand the elements of aircraft performance, and how to estimate performance under various conditions.

Ground Lesson 11: Emergency Procedures

Objective:

- ❑ Understand the cause, dangers, and procedures for handling emergency situations.

Study Preparation:

Chapter 13

Discussion:

- ❑ Engine rough – malfunction or propeller imbalance
- ❑ Engine overheat
- ❑ Loss of power (icing?)
- ❑ Engine out during cruising flight
 - Causes
 - Bar in
 - Fly the airplane
 - Collision avoidance
 - Wind indicators
 - Choosing an emergency landing field
 - Settings up an approach
 - When to try to re-start the engine
- ❑ Engine out during takeoff
 - Radical pitch change
 - Bar in
 - Land straight ahead unless high enough to turn
 - Aggressive flair
- ❑ How and when to use BRS
- ❑ Electrical out
- ❑ Radio out
- ❑ Hypothermia
- ❑ In-flight fire or smoke – Emergency Descent
- ❑ Hang bolt failure
- ❑ Structural failure
- ❑ Mid-air collision
- ❑ Medical emergency
- ❑ Prop strike on ground
- ❑ Prop strike in the air
- ❑ Unexpected entry into IMC
- ❑ Lost procedures
- ❑ Radio usage
- ❑ Intercept procedures

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand the cause, dangers, and procedures for handling emergency situations.

Ground Lesson 12: Aeromedical Factors

Objective:

- ❑ Understand the affects of flight on the human body.

Study Preparation:

Chapter 1 “Medical Factors”

PHAK Chapter 15

Discussion:

- ❑ Fitness For Flight - IMSAFE
 - Self-Certification
- ❑ Factors Affecting Pilot Performance
 - Alcohol
 - Hypoxia
 - Hypoxic Hypoxia
 - Anemic Hypoxia
 - Stagnant Hypoxia
 - Histotoxic Hypoxia
 - Hyperventilation
 - Motion Sickness
 - Dehydration
 - Fatigue
 - Stress
 - Sinus and Ear Block
 - Spatial Disorientation
 - Diving / Decompression
- ❑ Factors Affecting Vision
 - Environmental Conditions (Smoke, haze, dust, rain, sunlight)
 - Windshield Conditions
 - Bright Illumination
 - Dim Illumination
 - Dark Adaptation
- ❑ Illusions
 - The Leans
 - Runway Width
 - Runway / Terrain Slope
 - Featureless Terrain

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand the affects of flight on the human body, and how to avoid or overcome these affects when they are encountered.

Ground Lesson 13: Aeronautical Decision Making

Objective:

- ❑ Understand Aeronautical Decision Making, and a positive approach to risk management.
- ❑ Understand common hazardous attitudes and their antidotes.

Study Preparation:

Chapter 1 “Aeronautical Decision Making”
PHAK Chapter 16

Discussion:

- ❑ Risk Factors
 - Pilot
 - Airplane
 - Environment
 - Operation
- ❑ Situational Awareness
- ❑ Managing Risk
 - Pilot Self-Assessment
 - Stress Management
 - Use of Resources
 - Situational Awareness
 - Operational Pitfalls
 - Peer Pressure
 - Mind-Set
 - Get-There-It is
 - Scud Running
 - Flying Into IMC
 - Loss of Situational Awareness
 - Inadequate Fuel Reserves
 - Flying Outside the Envelope
 - Inadequate Flight Planning
- ❑ DECIDE Model
 - Detect that a change has occurred
 - Estimate the need to respond to the change
 - Choose a desired outcome
 - Identify actions that will lead to the desired outcome
 - Do the necessary action
 - Evaluate the effect of the action

□ Hazardous Attitudes

Attitude	Antidote
Anti-Authority	Follow the rules – they’re usually right
Impulsivity	Not so fast - think first
Invulnerability	It could happen to me
Macho	Taking chances is foolish
Resignation	I’m not helpless – I can make a difference

Completion Standards: at the end of this lesson, the student should:

- Understand Aeronautical Decision Making and risk managements.
- Understand common hazardous attitudes and their antidotes.

Ground Lesson 14: Controlled Airspace Endorsement

Objective:

- ❑ Understand procedures and radio use in ATC controlled airspace.

Study Preparation:

Say Again Please

Discussion:

- ❑ Minimum Equipment Requirements
 - Class B: Two-Way Radio and Mode C Transponder
 - Class C: Two-Way Radio and Mode C Transponder
 - Class D: Two-Way Radio
- ❑ Entry Into Controlled Airspace
 - Class B: Permission From Tower
 - Class C: Establish Communication With Tower
 - Class D: Establish Communication With Tower
- ❑ Airport Surface Movement
 - Movement vs. non-movement areas
 - Ground controlled areas
 - Tower controlled areas
- ❑ Tower Communications:
 - ATIS
 - Clearance Delivery
 - Initial Call – On the ground to Ground Control
 - Initial Call – On the ground to Tower Control
 - Exiting Pattern
 - Closed Pattern Operations
 - Initial Call – Inbound
 - Clearing Runway
 - LAHSO
- ❑ Misc
 - ATC Services – Class B, C, D
 - Responsibilities of Pilot
 - Deviating From ATC Instructions
 - Radio Failure
 - Light Gun Signals
 - Radio failure in pattern
 - Radio failure outside pattern – transmitter failure
 - Radio failure outside pattern – receiver failure
 - Requirements – VFR, Tower In Sight, Clearance to Land

Completion Standards: at the end of this lesson, the student should:

- ❑ Understand airport procedures for operations both on the ground and in the air.
- ❑ Understand the fundamentals of radio usage at towered airports.

Introductory Flight

Objective:

This flight will introduce you to basic ground operations and flight procedures. Your instructor will demonstrate some basic control techniques, and you might even be able to take the controls for a portion of the flight. You should come away from this flight with a general idea of the way the trike works, and how it can all “come together” to make flying a truly enjoyable and safe activity.

Study Preparation:

None.

Ground Discussion:

- Checklists used by trike pilots
- Cockpit entry
- Four basics of flight: straight & level, turns, climbs, descents
- Collision avoidance
- Positive exchange of controls
- Passenger Briefing

Flight Plan:

- Brief Preflight
- Fly away from the airport and get comfortable in this new environment
- Demonstration of bar control to bank the wings and turn the trike
- Transfer control of the bar to the student and practice shallow turns
- Enjoy the flight, get used to the feel of the control bar
- Post flight

Completion Standards:

The student should be able to control the direction of flight by making shallow turns. The student should understand the importance of collision avoidance and the positive exchange of controls. The student should end the lesson with a positive impression of trike flying and general aviation, and want to move on to additional lessons.

Notes:

Everyone reacts a little differently the first time their feet leave the ground while seated on a trike. Even experienced pilots may experience a sense of unease, or nervousness, due to the strange new sensations on the trike. This is normal and you should not be embarrassed if your nervousness shows. So be honest with your instructor! You should communicate to your instructor immediately if you are feeling more nervous than you're comfortable with, or if you are getting chilled, or if you are feeling airsick. Your instructor is used to taking first-time trike flyers, and will not be critical of you in any way. He or she may even be able to offer some suggestions to increase your comfort level.

Tasks Covered:

_____ Checklist introduction and use

- _____ Introduction to preflight of the aircraft
- _____ Cockpit entry
- _____ Positive exchange of controls
- _____ Collision avoidance
- _____ Introduction to post flight procedures
- _____ Four basics: straight & level, climbs, descents, turns
- _____ Right of way rules
- _____ Straight and level flight
- _____ Shallow banked turns
- _____ Airspeed control

Flight Lesson 1: Shallow Turns and Airspeed Control

Objectives:

- ❑ To gain proficiency using the control bar to maintain straight flight, make shallow turns, and control airspeed.
- ❑ To begin developing good habits for collision avoidance.
- ❑ To use procedures for positive exchange of controls.
- ❑ To begin using checklists where appropriate.
- ❑ To become familiar with preflight preparation and procedures.

Study Preparation:

Chapters 3, 5

Chapter 6 up to and including “Coordinating the Controls”

Ground Discussion:

- ❑ Four basics of flight: straight & level, turns, climbs, descents
- ❑ Cockpit entry
- ❑ Cockpit controls and instruments
 - Switches
 - Engine gauges
 - Intercom
 - Radio
 - Altimeter
 - Airspeed
 - GPS
 - BRS
- ❑ Flight controls
 - Up / down control
 - Speed control
 - Roll control
 - Yaw control
- ❑ Checklists
 - Preflight
 - Engine starting
 - Pre-taxi
 - Pre-takeoff
 - Post-flight
- ❑ Positive exchange of controls
- ❑ Collision avoidance techniques
 - Division of attention
 - Visual scanning technique
 - Clearing all maneuvers
 - Using clearing turns
- ❑ Right of way rules
- ❑ Passenger briefing

Flight Plan:

- ❑ Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- ❑ Straight and level flight
- ❑ Shallow turns
- ❑ Smooth transitions from trim speed to fast speed (slow speed will be covered in a later lesson)
- ❑ Demonstration of altitude control
- ❑ Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- ❑ Demonstrate a growing habit of scanning for traffic, clearing maneuvers.
- ❑ Use procedures for positive exchange of controls.
- ❑ Use checklists
- ❑ Smoothly control wing in straight flight.
- ❑ Be able to perform shallow and medium banked turns of 90, 180, 360 degrees.
- ❑ Control airspeed between trim and fast flight.

Notes:

The ground portion of this lesson is likely to be one of the longer lessons of your training. Before beginning significant flight instruction, it's important for you to gain an understanding of the trike, wing, engine, instruments, and systems. Don't worry about remembering everything. The important thing is to get exposure to the hardware, to take the mystery out of it, and to start getting familiar with the vocabulary, layout, and use of the various components of the trike.

Tasks Covered:

- _____ Use of checklists
- _____ Preflight elements and considerations
- _____ Cockpit entry
- _____ Positive exchange of controls
- _____ Collision avoidance
- _____ Post flight
- _____ Four basics: straight & level, climbs, descents, turns
- _____ Right of way rules
- _____ Straight and level flight
- _____ Shallow banked turns
- _____ Airspeed control

Flight Lesson 2: Taxi, Altitude Control

Objectives:

- ❑ To taxi safely in the airport environment, in various wind conditions.
- ❑ To control altitude during straight and level flight, during maneuvers, and at various airspeeds.
- ❑ To properly secure the trike after the flight

Study Preparation:

Chapter 5 “Taxiing”

Chapter 6

Ground Discussion:

- ❑ Taxi technique
 - Throttle use
 - Clear all motion
 - Avoiding obstacles
 - Yield to all traffic
 - Speed to taxi
 - Care for clutch
 - Wind considerations
 - Headwind
 - Tailwind
 - Crosswind
 - Mechanical turbulence
 - Propeller blast
- ❑ Collision avoidance and clearing turns
- ❑ Airspeed vs. altitude
- ❑ Energy Management
- ❑ Smooth throttle use
- ❑ Securing the trike in the parking area
- ❑ Introduction to stall – definition

Flight Plan:

- ❑ Thorough preflight
- ❑ Taxi to runway
- ❑ Maintain altitude using throttle
- ❑ Maintain altitude while performing shallow turns
- ❑ Normal climbs and descents
- ❑ Glides
- ❑ Airspeed transitions while maintaining level flight
- ❑ Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- ❑ Taxi safely with proper consideration to wind, mechanical turbulence, traffic, and propeller blast.

- ❑ Control altitude during maneuvers and at various airspeeds.
- ❑ Shut down the engine and instruments after the flight, and secure the trike in a hangar or other parking area.

Tasks Covered:

- _____ Use of throttle on the ground
- _____ Taxiing around obstacles
- _____ Taxiing near other aircraft
- _____ Taxi wind effects on the wing
- _____ Mechanical turbulence
- _____ Speed to taxi
- _____ Care for the clutch
- _____ Smooth use of throttle
- _____ Maintaining altitude
- _____ Normal climbs and descents
- _____ Level flight at varying airspeeds
- _____ Level flight during turning maneuvers

Flight Lesson 3: Turns: Coordinated, Slipping, Steep, Climbing, Descending

Objectives:

- To make coordinated turns
- To make slipping turns
- To make turns up to 45 degree bank angle
- To make climbing turns
- To make descending turns

Study Preparation:

Chapter 6

Ground Discussion:

- Collision avoidance and clearing turns
- G-force and wing loading
- Coordinated turn
- Slipping turn
- Steep turn
- Climbing turn
- Descending turn
- Disorientation

Flight Plan:

- Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- Coordinated turns at 45° bank
- Maintain altitude while performing steep turns
- 90° turns, 180° turns, 360° turns, turns to a heading
- Slipping turns
- Climbing turns
- Descending turns
- Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- Define and perform coordinated turns, slipping turns, climbing turns, descending turns.
- Make steep turns without significant altitude change, leveling out at various headings.

Tasks Covered:

- _____ Clearing ground maneuvers
- _____ G-force and wing loading
- _____ Medium and steep banked turns
- _____ Coordinated turns

- _____ Slipping turns
- _____ 90°, 180°, 360° turns
- _____ Turns to a heading

Flight Lesson 4: Engine Start, Wind Effects, Ground Reference Maneuvers

Objectives:

- ❑ To safely start the engine using the appropriate checklist.
- ❑ To gain an understanding of the way the wind affects an aircraft in flight.
- ❑ To gain proficiency flying various shaped maneuvers with respect to the ground, accounting for the effect of wind.

Study Preparation:

Chapter 5 “Engine Start”

Chapter 9

Ground Discussion:

- ❑ Engine starting procedure
- ❑ Wind effects - lift, weather vaning, etc.
- ❑ Airspeed vs. ground speed
- ❑ Crabbing
- ❑ “The Downwind Demon”

Flight Plan:

- ❑ Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- ❑ Ground reference maneuvers
 - Tracking a straight Line – upwind vs. downwind vs. crosswind
 - Rectangular course
 - Turns around a point
 - S-Turns
 - Figure 8’s
- ❑ Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- ❑ Start the engine use the appropriate checklist.
- ❑ Describe the effect of wind on flight control and performance.
- ❑ Perform various ground reference maneuvers.

Notes:

Tasks Covered:

- _____ Engine starting
- _____ Wind effects in flight
- _____ Airspeed vs. ground speed
- _____ Crabbing
- _____ Rectangular course

- _____ Turns around a point
- _____ S-Turns
- _____ Figure 8's

Flight Lesson 5: Radio, Normal Takeoffs, Approaches, Traffic Pattern

Objectives:

- ❑ To learn proper radio usage for your airport, and to begin monitoring radio communications.
- ❑ To become proficient in normal takeoff technique in light wind conditions.
- ❑ To establish an appropriate initial climb on an appropriate heading
- ❑ To fly a proper traffic pattern and set up an approach to land.

Study Preparation:

Chapter 10, 11

Ground Discussion:

- ❑ Radio communications
 - When necessary
 - What to say
- ❑ Traffic pattern
- ❑ Wind considerations
 - Assessing wind velocity
 - Choosing a runway, pattern direction
 - Assessing crosswind
 - Mechanical turbulence
- ❑ Wake turbulence
- ❑ Takeoff Technique
 - Eyes-Up Technique
 - Ground Roll
 - Rotate
 - Initial Climb
- ❑ Aborted Takeoff
- ❑ Traffic awareness, especially when turning onto final
- ❑ Approach to land

Flight Plan:

- ❑ Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- ❑ Pre-takeoff
 - Check Wind
 - Check Obstructions
 - Plan For Aborted Takeoff
 - Check For Other Traffic
 - Check ATIS
 - Contact Ground Control
 - Taxi to instructed runway
 - Contact Tower when ready

- Take runway when cleared – don't rush but don't delay
- ❑ Multiple touch and go's
- ❑ Aborted takeoff
- ❑ Post flight

At the end of this lesson, the student should be able to:

- ❑ Describe proper radio procedures.
- ❑ Demonstrate competency in normal takeoffs and rectangular patterns.
- ❑ Recognize conditions requiring aborted takeoff, and take prompt action.
- ❑ Watch for traffic in pattern, especially turning onto final.
- ❑ Set up an approach to land lined up with the runway, at the proper altitude.

Notes:

Most students are initially reluctant to talk over the radio. There's no rush for you to take over responsibility of the radio. The purpose of discussing the radio in this lesson is just to get you familiar with the terminology and procedures for using the radio. You should start to listen to the announcements made by your instructor, the other traffic in the pattern, and the tower. You should start to anticipate what radio call will be made by your instructor. Your instructor will probably give you responsibility for the radio in a later lesson. For now, your main concentration should be on performing the flight maneuvers involved in each lesson.

Tasks Covered:

- _____ Radio usage
- _____ Normal takeoff
- _____ Climb-out
- _____ Departure
- _____ Wake turbulence
- _____ Approach to land

Flight Lesson 6: Stalls, Minimum Controllable Airspeed

Objectives:

- To learn the definition, signs, and recovery techniques of stalls.
- To build an awareness of the nature and danger of whip stalls, tucks, and tumbles.
- To gain proficiency in flight at minimum controllable airspeed.

Study Preparation:

Chapter 6 “Slow Flight and Stalls”

Chapter 6 “Whip Stall and Tumble Awareness”

Ground Discussion:

- Definition of stall
- Signs of impending stall
- Stall recovery
- Whip stall, tuck and tumble awareness
- Power-on stall
- Slow flight techniques and characteristics

Flight Plan:

- Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- Power-off stall
- Accelerated stall
- Flight at minimum controllable airspeed
- Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- Define a stall, describe the signs of an impending stall, and describe the technique to recover from a stall.
- Define whip stalls, tucks, and tumbles, the dangers of each, and how to avoid them.
- Fly straight and level at minimum controllable airspeed, and make shallow left and right turns.
- Perform power-off stalls and accelerated stalls with minimum altitude loss.

Notes:

Tasks Covered:

- _____ Power-off stall
- _____ Accelerated stall
- _____ Whipstall awareness
- _____ Tuck & tumble awareness

_____ Power-on stall awareness
_____ Minimum controllable airspeed

Flight Lesson 7: Approaches / Landings

Objectives:

- ❑ To gain proficiency in power-off approaches, power-on approaches, and normal landings.
- ❑ Learn when and how to go around instead of trying to continue with a bad approach.

Study Preparation:

Chapter 11

Ground Discussion:

- ❑ Eyes-up technique
- ❑ Traffic awareness, especially turning onto final
- ❑ Wake turbulence
- ❑ Clear runway
- ❑ Approach speed
- ❑ Throttle setting
- ❑ Two-step flare

Flight Plan:

- ❑ Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- ❑ Low approach
- ❑ Power-off landings
- ❑ Power-on landings
- ❑ Aborted landing – go-around
- ❑ Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- ❑ Land the trike safely in a variety of conditions, including light winds, stronger winds, crosswinds, and turbulent conditions.
- ❑ Use the proper procedure to abort a landing and go around.

Notes:

It's very likely that you will spend multiple hours learning the contents of this lesson. Learning to land is a skill that is difficult for most people to learn. This is not because landing an aircraft is especially complicated or difficult in itself, but because the skill is so different from anything else in our ground-based experience. The way you will learn to land is through practice, practice, practice! Don't be discouraged if it seems to take you a long time to get the hang of it. This is normal. After multiple landings, multiple mistakes, and wrestling with the problem mentally, you will suddenly find that the whole process of landing "makes sense."

Your instructor may also insist that you practice landings even after you think you have the hang of it. This is because of the great importance of being proficient in your landing technique. Taking off is always optional, flying away from the airport is always optional. But once you are

in the air, making a safe landing is a requirement. You need to know how to make a safe landing even if the wind suddenly becomes stronger, changes direction, or becomes turbulent. You will need to hone your landing technique to cover a variety of situations before your instructor will consider you a safe pilot for flying solo.

Tasks Covered:

- _____ Low approach
- _____ Power-off approach
- _____ Power-on approach
- _____ Normal landing
- _____ Aborted landing – go-around

Flight Lesson 8: Emergency Procedures

Objectives:

- ❑ To practice handling a variety of in-flight emergencies.

Study Preparation:

Chapter 13

Chapter 7 “Rejected Takeoff/Engine Failure”

Ground Discussion:

- ❑ Engine out during cruising flight
 - Causes
 - Bar in
 - Fly the airplane
 - Collision avoidance
 - Wind indicators
 - Choosing an emergency landing field
 - Settings up an approach
 - When to try to re-start the engine
- ❑ Engine out during takeoff
 - Radical pitch change
 - Bar in
 - Land straight ahead unless high enough to turn
 - Aggressive flair
- ❑ How and when to use BRS

Flight Plan:

- ❑ Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- ❑ Simulated engine-out during cruising flight
- ❑ Simulated engine-out during takeoff
- ❑ Simulated use of BRS
- ❑ Emergency Descent
- ❑ Post flight

Completion Standards: at the end of this lesson, the student should be able to:

- ❑ Describe the procedure for handling various in-flight emergencies.
- ❑ Land safely during simulated engine failure during takeoff.
- ❑ Pick out appropriate emergency landing fields based on wind and terrain.
- ❑ Set up an approach to land during simulated engine failure.
- ❑ Make an emergency descent.

Notes:

Tasks Covered:

- _____ Simulated engine-out during cruising flight
- _____ Simulated engine-out during takeoff
- _____ Simulated use of BRS

Flight Lesson 9: Performance Techniques

Objectives:

-

Study Preparation:

- Chapter 7 “Crosswind Takeoff”
- Chapter 7 “Short Field Takeoff and Steepest Angle Climb”
- Chapter 7 “Soft/Rough Field Takeoff and Climb”
- Chapter 11 “Short and Soft Field Landing Techniques”
- Chapter 11 “Power-On Approach and Landing for Turbulent Air”
- Chapter 11 “Crosswind Approaches and Landings”

Ground Discussion:

- Performance factors
 - Density altitude
 - Wind
 - Weight
 - Runway surface
 - Runway upslope or downslope
- Other takeoff and landing factors
 - Obstacles
 - Mechanical turbulence
- Rough field takeoff technique
- Short field takeoff technique
- Short field landing technique
- Crosswind takeoff technique
- Crosswind landing technique

Flight Plan:

- Thorough preflight
 - Wing
 - Trike
 - Pilot
 - Documents on board
- Rough field takeoffs
- Short field takeoffs
- Short field landings
- Crosswind takeoffs
- Crosswind landings
- Spot landings
- Post flight

Notes:

Tasks Covered:

- _____ Rough field takeoff
- _____ Short field takeoff
- _____ Short field landing
- _____ Spot landing
- _____ Crosswind takeoff
- _____ Crosswind landing

Flight Lesson 10: Solo Flight

Now that you've flown solo you're done, right? Wrong!
Your ticket to fly solo = your ticket to learn on your own
"Hang 2" Syndrome
Value of 99.999% judgement