Glider Training Syllabus

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Note: This private pilot glider training syllabus is intended for the instructors, students, and members of the Kansas Soaring Association located at Sunflower, KS. This syllabus was compiled in part by using the Skyline Soaring Club syllabus and other references. This training syllabus is a living document. Feedback or corrections can be sent to:

Ed Grabman
nm25co@gmail.com

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Lesson 1a – Preflight Planning/Overview

Lesson Objective
The student will become familiar with the preparation required before going to the flight line. This includes understanding weather sources, weather judgement, go/no go decision, club rules, required documents in pilot's possession.

Prerequisite Study
Glider Flying Handbook Pages 9-21 through 9-25

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.3(a)(b)(c), §61.87(i)(1), §91.103
Private Pilot Candidate: PTS Area of Operation IA, IB

Preflight Briefing

- Weather information
  - AC 00-6B Aviation Weather
  - AC 00-45H Aviation Weather Services
- Weather sources and interpretation
  - www.aviationweather.gov
  - www.weather.gov
  - www.wunderground.com/dashboard/pws/KKSHUTCH58
  - 1-800-WX-BRIEF
- Club weather limits
- Required pilot documents
  - Verification of US citizenship or TSA approval (before training)
  - Pilot certificate if one is held
  - Medical certificate if one is held (not required for glider)
  - Photo identification
  - Logbook (does not need to be with pilot)
- Study References
  - Glider Flying Handbook
  - Private Pilot Practical Test Standards for Glider
  - 14 CFR Part 61
  - 14 CFR Part 91
  - Airman's Information Manual
  - Pilot's Handbook of Aeronautical Knowledge
- Apply for student pilot certificate
  - IACRA
    - New User Guide – Student Pilot

Inflight Training
N/A

Completion Standards

The student should be able to determine actual and forecast weather and be able to make a go/no go decision based on weather briefing information. The student will be able to exhibit knowledge pertaining to required documents.

Assignment

- At next lesson, brief the weather conditions
- Download to your personal library (computer)
    - Glider Flying Handbook,
    - Private Pilot Practical Test Standards for Glider,
    - Airman's Information Manual,
    - Pilot's Handbook of Aeronautical Knowledge.
- Familiarize yourself with how to look up FAA regulations.
- Purchase a logbook.
- Sign up for Coudbase email group
    - On www.soarkansas.org on left column, select Newsletters, then follow instructions to sign up for cloudbase email group. This is how the club communicates.
- Look at calendar.
    - On www.soarkansas.org on left column, select KSA, then at end of second paragraph click on http://www.my.calendars.net/KSA This is the club calendar and where scheduling is accomplished.

Lesson 1b – Glider Daily Inspection/Use of Controls/Cockpit Familiarization

Lesson Objective
The student will learn the correct procedure and habits of a good preflight, the effect and use of the controls, and the instruments and components of the cockpit. The student will learn the correct use of the controls and instruments.

Prerequisite Study
Glider Flying Handbook Pages 6-6 and 6-7, Glider Preflight Inspection
Glider Flying Handbook Pages 2-1 through 2-9, Components and Systems
Glider Flying Handbook Pages 4-1 through 4-18, Flight Instruments
14 CFR §91.3 Responsibility and authority of the pilot in command
14 CFR §91.7 Civil aircraft airworthiness
14 CFR §91.107 Use of safety belts
Pilot Operating Handbook for the 2-22
Pilot Operating Handbook for the 2-33

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(1)(13)
Private Pilot Candidate: PTS Area of Operation I, II(C)
Private Pilot Candidate: PTS Page 8, "Positive Exchange of Controls"
Private Pilot Candidate: PTS Area of Operation IV-A, Before Takeoff Check

Preflight Briefing
- Purpose and procedures of preflight
- Use of preflight checklists
- Required aircraft documents (AROW)
- Critical assembly checklist
- Weight and Balance
- Positive exchange of controls
- Elevators/ailerons/rudder
- Spoilers/dive brakes/flaps/trim/wheelbrakes
- Towhook release
    - Schweizer towhook
    - Tost towhook
    - Hazards of hooking Tost rings to Schweizer hooks
- Seating position/seatbelts/rudder adjustment
- Pretakeoff checklist

Inflight Training
N/A

Completion Standards

Know how to conduct a glider preflight. Use loading chart to determine weight and balance. Know what documents are required in the aircraft for legal flight. Use the “Positive Exchange of Controls” procedure whenever control of the aircraft changes. Describe how the control surfaces react to the stick or rudder pedal movement and how that affects the aircraft motion. Explain how to interpret the instruments

Lesson 1c – Ground Handling

Lesson Objective
The student will learn the proper procedures to move the glider between the hangar and the flightline.

Prerequisite Study
Glider Flying Handbook Pages 6-4 through 6-5, Ground Handling
Soaring Safety Foundation Wingrunner Course

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(2)
Private Pilot Candidate: PTS Area of Operation II(B)

Preflight Briefing

- Hangar operations
- Appropriate number of ground personnel
- How to maneuver glider
- Ramp tiedowns
- Wind considerations
- Canopy closed when not at cockpit
- Runway operations

Inflight Training
N/A

Completion Standards
The student must be able to safely extract the glider from the hangar, maneuver it to the flightline, and return.

Lesson 1d – Collision Avoidance, Windshear Avoidance, and Wake Turbulence Avoidance

Lesson Objective
The student will learn the proper procedures for collision, windshear, and wake turbulence avoidance.

Prerequisite Study
Collision Avoidance, a Different Perspective, SSF
Cause and Effect, SSF

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(6)
Private Pilot Candidate: PTS Area of Operation III(B)

Preflight Briefing

- Windshear explanation and impact on aircraft performance (especially on final)
- Collision avoidance
- Scanning techniques
- Wake turbulence strength, behavior, and avoidance

Inflight Training

- Appropriate scanning techniques
- Appropriate situational awareness of windshear and wake turbulence

Completion Standards
The student must be able to explain risk factors in midair collisions (especially as related to gliders), collision avoidance technology, the factors that create wake turbulence, what windshear is and how it relates to aircraft performance.

Lesson 2a – Attitude Flying/Airspeed Control

Lesson Objective
The student will learn to control the glider by attitude reference and adjust the pitch to capture and maintain the desired airspeed.

Prerequisite Study
Glider Flying Handbook Pages 7-27 to 7-28, Straight Glides

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(4)(7)(8)(15)
Private Pilot Candidate: PTS Area of Operation VII(A)

Preflight Briefing
- Pitch attitude references
- Roll attitude references
- Relationship of attitude to airspeed
- Effect of spoilers or dive brakes

Inflight Training
- Use of elevator to establish and hold a pitch attitude
- Establish and maintain a specified airspeed
- Change airspeed as specified
- Extend spoilers and maintain airspeed

Completion Standards
The student will exhibit knowledge of the relationship of pitch attitude to airspeed, maintain the specified airspeed ±10 mph, and demonstrate smooth, coordinated control.

Lesson 2b – Turns to Headings

Lesson Objective
The student will learn the elements related to turns, specifically the proper aileron, rudder, and elevator to perform coordinated turns while maintaining airspeed.

Prerequisite Study
Glider Flying Handbook Pages 7-28 to 7-31, Turns

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(4)(7)(15)
Private Pilot Candidate: PTS Area of Operation VII(B)

Preflight Briefing

- Adverse yaw
- The appropriate application of aileron, rudder, and elevator to perform coordinated turns and maintain the desired airspeed
- Control inputs during roll in and roll out versus in a stabilized turn
- Attitude references
- Use of yaw string for coordination awareness
- The importance of visually clearing the area before every turn

Inflight Training

- Visually clear before every turn
- Coordinated turns to headings (align parallel to roads)

Completion Standards
The student will be able to enter, maintain, and roll out from turns with smooth and coordinated control applications, maintain the specified airspeed ±10 mph, and roll out within ±10 degrees of desired heading .

Lesson 3a – Stalls and Minimum Control Airspeed

Lesson Objective
The student will learn what causes a stall, how to perform a stall, how to recover from a stall, and how to avoid an unintentional stall. The student will learn how to fly the glider on the edge of the stall without allowing the glider to actually stall.

Prerequisite Study
Glider Flying Handbook Page 7-31, Maneuvering at Minimum Controllable Airspeed
Glider Flying Handbook Page 3-17, Stalls
Glider Flying Handbook Pages 7-32 through 7-36, Stall Recognition and Recovery to Crossed Control Stalls

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(8)(14)
Private Pilot Candidate: PTS Area of Operation IX(A)(B)

Preflight Briefing
- Critical angle of attack
- Airspeed, pitch, G loading effects on stalls
- Stall indications
- Effect of spoilers on stalls
- Hazards at low altitudes
- Recovery from stalls
- Spin avoidance
- Minimum controllable airspeed

Inflight Training
- Straight stalls with and without spoilers
- Turning stalls with and without spoilers
- Minimum controllable airspeed in straight and turning flight

Completion Standards
The student must be able to perform and safely recover from straight and turning stalls with and without spoilers. The student must be able to explain the hazards of a stall and how to avoid unintentional stalls.

Lesson 3b – Steep Turns

Lesson Objective
The student will understand the aerodynamics of steep turns and become proficient in conducting turns at medium and steep bank angles.

Prerequisite Study
Glider Flying Handbook Pages 7-28 to 7-31, Turns through Steep Turns

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(4)(15)
Private Pilot Candidate: PTS Area of Operation VII(C)

Preflight Briefing

- Dihedral effect
- Overbanking tendency
- Tendency for nose to drop requiring increased back stick pressure
- Attitude cues
- The appropriate application of aileron, elevator, and rudder to perform coordinated turns
- The relationship of bank angle on load factor and resulting stall speed

Inflight Training

- Steep turns

Completion Standards
The student will exhibit knowledge of the elements related to steep turns, including required control inputs, load factor, effect on stall speed, and overbanking tendency. The student will be able to perform steep turns maintaining 45° bank ±5°, airspeed ±10 knots, recover within 10° of desired heading, and conduct the turns in a smooth and coordinated manner.

Lesson 3c – Slips

Lesson Objective
The student will learn and demonstrate slips. The student will learn when the use of a slip is appropriate.

Prerequisite Study
Glider Flying Handbook Pages 3-15 to 3-17, Slips through Sideslip
Glider Flying Handbook Pages 7-25 to 7-27, Slips
Soaring Safety Foundation video: PTS Slips to Landing

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(7)(17)
Private Pilot Candidate: PTS Area of Operation IV(R)

Preflight Briefing
- Purpose of a slip
  - Increase descent rate
  - Maintain ground track on runway extended centerline in a crosswind
- Aileron, rudder, and elevator control input during a slip
- Forward slip vs side slip
- Hazards of a slip
- Turning slips
- Slipping vs skidding turn
- Slips with and without dive brakes

Inflight Training
- Forward slips
- Side slips
- Turning slips
- Slips with dive brakes
- Slips to landing

Completion Standards
The student will be able to perform slips as needed to increase descent rate or control ground track during a crosswind landing.

Lesson 4a – Landings

Lesson Objective
The student will learn to execute a normal landing, including under light crosswind conditions.

Prerequisite Study
Glider Flying Handbook Pages 7-22 to 7-25, Normal Approach and Landing to Crosswind Landing
SSA video Pattern & Landing
Slips to Landing, SSF Video

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(5)(10)(16)
Private Pilot Candidate: PTS Area of Operation III, IV(Q)

Preflight Briefing
- Before landing checklist (FUSTALL)
    - Flaps
    - Undercarraige
    - Speed
    - Trim
    - Air brakes
    - Look
    - Landing
- Traffic pattern & desired altitudes
- Flexibility in pattern size, altitudes and TLAR
- Approach speed
- Runway alignment
- Descent control
- Crosswind control
    - Crab
    - Slip
- Flare
- Groundroll
- Slips to landing

Inflight Training
- Landings
- Slips to landing without dive brakes

Completion Standards
The student will be able to execute a normal landing without coaching and which the successful outcome is never in doubt.

Lesson 4b – Aerotow

Lesson Objective
The student will learn the correct procedures for normal aerotow.

Prerequisite Study
Glider Flying Handbook Pages 7-6 to 7-9, Aerotow Climb-out through Aerotow Release

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(11)(12)
Private Pilot Candidate: PTS Area of Operation II€, IV(C)(F)

Preflight Briefing
- High and Low tow positions
- Sight picture references
- Position and corrections during turns
- Visual signals
- Release procedures
    - Normal tension from high tow position
    - Check for runway and clear area
    - Release and confirm visually
    - Level turn

Inflight Training
- Normal aerotow
- High tow to Low tow transition & return
- Release

Completion Standards
The student will be able to maintain proper aerotow position.

Lesson 4c – Takeoff

Lesson Objective
The student will learn the proper procedures and skills to conduct an aerotow takeoff, including under crosswind conditions.

Prerequisite Study
Glider Flying Handbook Pages 5-2 to 5-7, Factors Affecting Performance
Glider Flying Handbook Pages 7-3 to 7-6, Takeoff Procedures and Techniques

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(3)
Private Pilot Candidate: PTS Area of Operation IV(B)

Preflight Briefing
- Controls and glider positioning during glider groundroll
- Controls and glider positioning after glider takeoff before towplane takeoff
- Controls and glider positioning after towplane takeoff
- Calculating crosswind component
- Crosswind control

Inflight Training
- Takeoff

Completion Standards
The student will
- Avoid dragging a wingtip
- Maintain directional control and proper wind-drift correction throughout takeoff
- Allow glider to liftoff when appropriate
- Prevent glider from ballooning on takeoff
- Maintain proper ground track by crabbing
- Maintain appropriate position above ground while towplane is still on ground
- Establish high tow position after towplane is airborne

Lesson 5a – Boxing the Wake

Lesson Objective
The student will demonstrate precise maneuvering behind the tow plane.

Prerequisite Study
Glider Flying Handbook Pages 7-10 to 7-11, Boxing the Wake
Soaring Safety Foundation video: PTS Boxing the Wake

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(3)(12)
Private Pilot Candidate: PTS Area of Operation IV(E)

Preflight Briefing

- Purpose of boxing the wake
- Coordination with tow pilot
- Minimum safe altitude and position with respect to airport to start
- Positions
- Control input throughout the maneuver
- Maneuvering through the wake
- Sight picture of towplane at each position

Inflight Training

- Boxing the wake

Completion Standards
The student will be able to maeuver the glider slightly outside the towplane's wake in a rectangular, box-like pattern.

Lesson 5b – Slack Line

Lesson Objective
The student will demonstrate safe and effective recovery from a slack line.

Prerequisite Study
Glider Flying Handbook Page 8-13, Slack Line
Soaring Safety Foundation video: PTS Slack Line

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(3)(12)
Private Pilot Candidate: PTS Area of Operation IV(D)

Preflight Briefing

- Purpose of practicing slack line
- Coordination with tow pilot
- Minimum safe altitude and position with respect to airport to start
- CFI-G to initiate and then transfer of control to student
- Possible recovery methods:
    - Do nothing (only suitable for momentary slack situation)
    - Yaw away from the slack
    - Extend dive brakes
    - Release
- Failure to recover from significant slack correctly can cause the rope to break

Inflight Training

- Slack line

Completion Standards
The student will be able to explain the hazards of slack line and demonstrate effective recovery.

Lesson 5c – Aerotow Emergencies

Lesson Objective
Aerotow emergencies include rope break, towplane power failure, glider can not release, and towplane can not release. The student will learn how to safely recover from these situations.

Prerequisite Study
Glider Flying Handbook Page 8-8 to 8-13, Aerotow Abnormal and Emergency Procedures

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(9)(19)
Private Pilot Candidate: PTS Area of Operation IV(D)

Preflight Briefing

- Tow failure with runway to land and stop
  - Pull release
  - Maneuver to right side of runway
  - Spoilers and brakes as necessary
- Tow failure without runway to land and below return altitude (200')
  - Pull release
  - Land generally ahead in best area available
- Tow failure above return to runway alatitude but below pattern altitude
  - Pull release
  - Maintain approach airspeed (pitch down as needed)
  - Turn into the wind for downwind landing (45° bank)
  - Downwind landing considerations
- Tow failure above approximately 800'
  - Pull release
  - Assess best course of action. It may be possible to land on departure runway
- Glider release failure
- Glider and towplane release failure

Inflight Training

- Premature termination of tow

Completion Standards
The student will be able to explain the proper procedures for various premature termination of tow scenarios and demonstrate proper procedures to include a downwind landing.

Lesson 6a – Thermal

Lesson Objective
The student will learn the basic thermal soaring techniques.

Prerequisite Study
Glider Flying Handbook Page 9-6 to 9-14, Thermal Soaring Weather and Air masses Conducive to Thermal Soaring
Glider Flying Handbook Page 10-1 to 10-10, Thermal Soaring

Regulatory Requirement
Pre-solo pilot (student pilot and transition pilots): §61.87(i)(8)(18)
Private Pilot Candidate: PTS Area of Operation V(A)(B), VI(A)

Preflight Briefing
- Minimum sink speed and when to use it
    - Effect of bank angle on minimum sink speed
- Best L/D speed and when to use it
- Polars
- How to find thermals
- How to center in a thermal
- Hazards of thermaling in gaggles

Inflight Training
- Thermalling

Completion Standards
The student will be able to explain the proper use of minimum sink speed vs. best L/D speed. The student will be able to locate and exploit thermal lift.