



## Pinch Hitter Instructor Syllabus

This syllabus is designed to help non-pilot flying companions learn how to safely land an aircraft in the unlikely event of pilot incapacitation. It includes outlines for ground and flight lessons to introduce a new student to the basics of GA flying, as well as how to land.

Participants are encouraged to first review the free Pinch Hitter Safety Spotlight from the AOPA Air Safety Institute (ASI), and then use this training syllabus to further guide instruction. ASI recommends using a certificated flight instructor (CFI) for the ground and flight instruction portions of the syllabus.

While pilot incapacitation is extremely rare in general aviation (GA), completing this syllabus will help non-pilots be more knowledgeable and better prepared in the event of an actual emergency— they may even decide to pursue additional flight training.

### Part 1: Ground School

#### Lesson 1: Introduction and aircraft control

Each lesson is designed to be approximately one hour

1. Describe the course objectives
  - a. Learning how to be more than just a participant when flying as a passenger in light aircraft
    - i. Helping the pilot with basic in-flight tasks as needed
      1. Navigation
      2. Traffic scanning
      3. Radio communications
      4. Possibly some flying
    - ii. Using knowledge to assist with pilot decision making
  - b. Learning how to find an airport and land safely in the unlikely event of pilot incapacitation
2. Overview of Federal Aviation Regulations
  - a. FAR Part 61—pilot certification
    - i. Discuss Part 61 briefly
      1. Certification levels (i.e., student, sport, private, etc.)
      2. Certificate duration (valid until suspended or revoked)
      3. Ratings (instrument, multiengine, etc.)
      4. Pilot currency and medical requirements
  - b. FAR Part 67—medical standards for pilots
    - i. Discuss briefly medical certification classes and duration
    - ii. BasicMed
  - c. FAR Part 91—flight rules (“Rules of the Road”)
    - i. The concept of “pilot in command”
    - ii. Emergency authority of the pilot

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- iii. Right-of-way rules
  - iv. See-and-avoid concept
  - v. VFR and IFR altitude rules
3. Meteorology
- a. Weather theory
    - i. Importance of weather to pilots
    - ii. Basic weather theory—air masses, highs and lows, wind flow, direction of movement, and associated weather
    - iii. Sources of weather information
      - 1. Internet, news, TV
      - 2. Official weather briefings
      - 3. Reports and forecasts
    - iv. Understanding the weather map
4. Flying the aircraft
- a. Aviate, navigate, communicate
  - b. Simple explanation of controls
    - i. Fore/aft yoke movement and its connection to pitch, airspeed and altitude
    - ii. Side-to-side yoke movement and control of bank and turns
    - iii. Rudder pedals and their use for ground steering and turn coordination
    - iv. Elevator trim and its use in relieving control pressure
    - v. Throttle movement and control of engine power and aircraft speed
  - c. Instruments
    - i. Explain the magnetic compass and the heading indicator with emphasis on the heading indicator
      - 1. Show cardinal headings and numbers
      - 2. Explain turns to specific headings
      - 3. Relate headings to directions (e.g., NE, SW, W)
    - ii. Describe function of the airspeed indicator and its color code
    - iii. Explain what the altimeter does and how to read it
    - iv. Relate the tachometer and manifold pressure gauges to the throttle and desired power settings
  - d. Flight
    - i. Discuss straight and level flight emphasizing aircraft attitude with respect to the horizon
    - ii. Describe shallow turns and the change in attitude when viewed from the right seat
    - iii. Simple explanation of climbs and descents
    - iv. Attitude changes with increased power producing a climb and decreased power causing a descent

## Lesson 2: Navigation

1. Chart reading
  - a. Sectional charts
    - i. If using paper charts, the chart should be folded showing only the portion to be used
    - ii. If using electronic charts, show how to zoom in/out and refocus on current location
    - iii. Explain clear directions on the chart, emphasizing north (top of the chart) and other cardinal directions
    - iv. Describe terrain features
      1. Large cities/towns
      2. Airport symbols
      3. Prominent lakes and rivers
      4. Roads and railroads
    - v. Airport legends
      1. Airport name
      2. Elevation and length of runways
  - b. Pilotage
    - i. Explain how to locate position with the aid of terrain features
    - ii. Demonstrate how to draw a course line/create a course line in an EFB (if used)
    - iii. Show how to use checkpoints relative to the course line to fly a straight path

**Lesson 3: Electronic Navigation**—tailor this to your student’s airplane and expand/modify as needed

1. VOR stations on the chart
  - a. Show where frequencies can be found on the chart and mention the compass rose around the station
  - b. Explain station identification code
  - c. Briefly explain:
    - i. How the station transmits
    - ii. Radials as “lines” radiating outward from the station
    - iii. How these radials give course guidance in the aircraft
2. Tuning the radio
  - a. Frequency selection
  - b. Station identification
3. Omni-bearing selector and to-from indicator
  - a. Rotating OBS to center the needle
  - b. Reading magnetic headings from the OBS
  - c. Making sure directional gyro/HSI and OBS show roughly the same heading when navigating toward the station
  - d. Station passage—needle fluctuation and the to-from indicator
4. Flying to the VOR

- a. Course needle function and how to keep it centered
  - b. Station passage—needle fluctuation and the to-from indicator
  - c. Flying away from the station:
    - i. Setting the course selector and needle
    - ii. Keeping the needle centered
5. GPS navigation
- a. Basic introduction to GPS and how it works
  - b. Similarities with non-aviation GPS receivers
  - c. Using the GPS for direct navigation
    - i. The “Direct To” button
    - ii. Finding an airport identifier and adding it as the destination
  - d. Using GPS to find nearby airports
    - i. Nearest airport button
    - ii. Using the nearest function in conjunction with “Direct to”
  - e. The importance of learning the particular receiver in the airplane the student normally flies/discussion of differences among GPS units
    - i. Consider using ground power for more complex GPS/glass cockpits, but remember this course is about the basics

#### Lesson 4: Emergency Communications and Airport Arrival

- 1. Emergency communications
  - a. Transmitting and receiving on 121.5
    - i. The purpose of 121.5
    - ii. How to select frequencies
  - b. Communication
    - i. Using the push-to-talk
      - 1. Transmit/receive indicators
    - ii. Identifying your aircraft
    - iii. The need to speak clearly and distinctly in a normal tone of voice
    - iv. The importance of releasing the push-to-talk at the end of each transmission
    - v. How to describe the emergency at hand
    - vi. Following instructions from the ground
- 2. Transponder
  - a. What it does
    - i. OFF, STBY, ON and ALT switch positions
  - b. Normal operations—1200 code
  - c. Emergency operations—7700 code
- 3. Airport arrival
  - a. Circling the field overhead
  - b. Determining desired altitude and traffic pattern

- c. Runway determination
    - i. Communication
    - ii. Other traffic
    - iii. Windssock/other indicators
    - iv. Numbers on the runway and corresponding heading
  - d. Controlling the airplane
    - i. Trim
    - ii. Landing gear
    - iii. Flaps if appropriate
    - iv. Use of power
4. Traffic pattern and landing
- a. Downwind leg
    - i. Distance from airport
    - ii. Direction in relation to runway
    - iii. Procedures to accomplish—gear, throttle, etc.
    - iv. Reducing power opposite point of intended landing
    - v. Trimming to predetermined mark to maintain proper glide speed
  - b. Turn to base leg
    - i. Shallow turns—15 to 20-degrees bank
    - ii. Starting turn when runway is 45 degrees behind left shoulder and the airplane is the proper distance from the field
    - iii. Maintaining power with a low rate of descent
  - c. Turn to final
    - i. Shallow bank
    - ii. Altitude about 500' agl
    - iii. Maintaining power
    - iv. Effect of crosswinds
    - v. Alignment with runway and constant descent attitude
  - d. Touchdown
    - i. Leveling off close to runway
    - ii. Looking well ahead of airplane
    - iii. Closing throttle by pulling back
    - iv. Allowing airplane to roll to stop using rudder to guide it

## Part 2: Flight Lessons

### Lesson 1: Aircraft Control

Each lesson is designed to be approximately one hour

1. Acquaint student with aircraft during ground operations
  - a. During preflight emphasize the special precautions taken for safety
    - i. Discuss movement and function of flight and power controls
    - ii. Assure student that you will always be near the controls
      1. Reassure student that you won't let them get into a dangerous situation
      2. Emphasize that this flight is for experience—not pass or fail
  - b. Be sure the student is seated properly to reach all flight controls (and see out) from the right side
  - c. Describe the starting procedures while performing them, building the student's confidence through involvement
    - i. Don't go into unnecessary detail
    - ii. Answer all questions
  - d. Demonstrate taxiing
    - i. Point out that the yoke doesn't control direction on the ground
    - ii. Explain and demonstrate use of brakes and throttle
    - iii. Give student opportunity to try taxiing, including coming to a stop
  - e. Locate radio and explain operation
  - f. Encourage the student to ask questions during the flight as needed
2. Demonstrate takeoff with student following on the controls
  - a. Allow student to "feel" controls during climb out
    - i. Point out relationship between nose and horizon, wings and horizon
    - ii. Encourage student to use one hand on the yoke and the other on the throttle
  - b. Set power for a gentle climb and point out power setting to student for future use
3. Introduce attitude and power setting for level cruise
  - a. Emphasize the need to put the airplane in the desired "attitude"
  - b. Point out the relationship between attitude indicator and visual attitude cues
  - c. Point out that frequent small corrections are part of flying
4. Show student that when one wing is down slightly it can result in an unwanted turn
  - a. Putting a wing down intentionally (banking) results in a turn
  - b. All turns should be gentle (10 to 15 degrees of bank)
    - i. Do not demand unnecessary precision
    - ii. Encourage student to relate headings and attitude to directions and the natural horizon
  - c. Explain the function of the heading indicator and magnetic compass
    - i. Relate headings to directions outside the airplane
    - ii. Point out the advantages of the heading indicator and encourage its use

- iii. Demonstrate why the attitude indicator can be valuable for pitch reference but can be confusing if used for turns
    - d. Don't let students fixate on the instrument panel
5. Introduce the attitude and power setting for a gentle descent (300 to 400 fpm): 5 minutes
  - a. Suggest that student remember this power setting
  - b. Encourage student to make a mental note of pitch attitude
  - c. Encourage use of trim to ease pressure on controls
  - d. Practice holding heading using terrain features in addition to the heading indicator
6. Practice straight and level cruise, turns, and descents
7. Introduce approach and landing procedures
  - a. Approach the airport at 1,000' agl
    - i. Identify runway for landing
    - ii. Circle over airport until ready to turn downwind
    - iii. Use predetermined power setting for a 300 to 400 fpm descent
    - iv. Begin turn onto base leg
    - v. Emphasize importance of keeping the runway in sight at all times
      1. Maintain sufficient distance from runway so that all turns are gentle
      2. Plan final turn 400 to 500' agl
      3. Descend with or without flaps, depending on aircraft
  - b. Demonstrate how to "aim" aircraft at the landing area
    - i. Use power in all approaches
    - ii. As a demonstration, fly low above the runway without letting the aircraft touch down
    - iii. When height above ground is correct, ask student to pull throttle back
    - iv. Have student allow aircraft to settle to runway
  - c. Allow student to practice directional control by taxiing to parking area
  - d. Emphasize the successful aspects of the flight during postflight briefing

## Lesson 2: Fundamentals of Flight

1. Describe all planned flight activities during preflight
  - a. Reassure student as necessary
  - b. Review basic aircraft control and power settings
  - c. Review procedures for climbs, turns, and descents
  - d. Emphasize the importance of establishing proper attitude and power settings to obtain desired results
  - e. Describe starting procedures
  - f. Allow student to practice directional control and use throttle while taxiing to run up area
    - i. Practice coming to a complete stop
    - ii. Emphasize need to use equal pressure on brakes

- g. Describe pre-takeoff procedures
- 2. Follow through on controls while student performs takeoff: 5 minutes
  - a. Assist as necessary
  - b. Establish predetermined climb attitude and power when clear of airport
    - i. Reemphasize relationship between attitude indicator and natural horizon
    - ii. Stress importance of setting and continually correcting to desired attitude
    - iii. Encourage the student
- 3. Practice straight and level cruise at desired altitude
  - a. Encourage student to hold a constant heading and altitude
  - b. Reemphasize that making corrections is part of flying; the student isn't doing anything wrong
- 4. Review turns and turns to headings
  - a. Encourage student to think of numbers on heading indicator in relation to the terrain
  - b. Introduce steeper banks (15 to 20 degrees)
    - i. These are necessary while maneuvering for landing
- 5. Describe a hypothetical navigation problem using visual references or known landmarks and radio navigation or GPS (modify as needed for student's airplane)
  - a. Have student tune in nearest VOR station
    - i. Explain each procedure, while student performs each task
    - ii. Tune station and assure positive identification
    - iii. Explain function of OBS, left-right needle, and To-From indicator. Work only "To" station orientation procedures
    - iv. Explain relationship between bearing To and From station to the heading of the aircraft
    - v. Assist student to visualize direction of aircraft with the terrain
    - vi. Encourage student to try talking on the radio
  - b. Assist student in tracking to VOR station while practicing heading and altitude control in level cruise
  - c. Correlate position with chart
- 6. Demonstrate basic GPS functions (if equipped)
  - a. Correlate aircraft position on moving map with position on chart
  - b. Have student find and navigate to the nearest airport using the GPS
    - i. Explain how to use the "Nearest airport" function
    - ii. Select an airport from the list that appears
    - iii. Find that airport on the chart
    - iv. Use the "Direct" button to set a course to that airport
  - c. Demonstrate using the GPS to navigate
    - i. Show how to follow the course line on the moving map
    - ii. Note that GPS can also display course guidance like a VOR, either on the screen or on the VOR display itself



7. Practice powered descents while tracking to the airport
  - a. Practice trim use and power adjustments to control rate of descent
    - i. Describe function and control of flaps if appropriate
  - b. Encourage the student!
8. Identify the appropriate runway for landing and enter the traffic pattern: 5 minutes
  - a. Explain a controlled descent: Aim aircraft at point of intended landing, control airspeed with power
  - b. Practice approach and landing procedure, using recommended approach speed
  - c. Allow student to practice directional control when taxiing to parking area
  - d. Encourage student during postflight briefing

### Lesson 3: Navigation

1. Review basic aircraft control, approach, and landing procedures during preflight
  - a. Allow student to practice directional control while taxiing to run up area
  - b. Review power and trim setting for best approach speed
2. Follow through on the controls as the student executes the takeoff
  - a. Remain in the traffic pattern, practice approaches and landings
  - b. Don't allow the student to struggle too much—apply subtle and timely corrections to keep the situation well under control
3. Practice using GPS nearest and tuning in a VOR station
  - a. Review procedures in using the GPS nearest and direct functions, and in tuning in a VOR, bearing selection, tracking, and station passage
  - b. Correlate with chart
  - c. Point out easily identifiable landmarks
  - d. Request student locate position visually and return to airport by pilotage
    - i. Relate heading to geography of the land
    - ii. Point out prominent landmarks
  - e. Practice a trimmed 300 to 400 fpm rate of descent
4. Practice approaches and landings
  - a. Emphasize aiming the airplane at the touchdown point, controlling airspeed with power
  - b. Work on the landing flare and judging aircraft height
    - i. Remind student of the proper use of power
    - ii. Emphasize directional control after touchdown
  - c. Allow student to taxi to parking area with help as necessary

### Lesson 4: Graduation Exercise

1. Review basic aircraft control during preflight
  - a. Review electronic navigation procedures
  - b. Review the use of charts for landmark identification and other information
  - c. Have student practice directional control while taxiing



2. Follow through on the controls as the student executes the takeoff
3. Let the student practice basic aircraft control while maneuvering to a point from which a simulated emergency situation can be started. On the way:
  - a. Encourage student to hold heading accurately
  - b. Review power settings for various conditions
  - c. Have student mentally review Pinch Hitter procedures
4. Have student perform a simulated emergency procedure
  - a. Tune radio to 121.5—instructor can serve as ground advisor while simulating conditions
  - b. Navigate to nearest navaid or airport
  - c. Simulate a pilotage navigation problem if time permits
  - d. Practice descents while returning to airport
5. Review approach and landing procedures
  - a. Do everything possible to help student make a successful approach and landing
  - b. After landing, allow student to taxi to parking
6. Review all the procedures and congratulate the student!
  - a. Make a plan for continuing flight lessons or a plan for a Pinch Hitter refresher course in the future