



AOPA AIR SAFETY  
INSTITUTE

Safety Syllabus



# VFR INTO IMC

**A syllabus designed to help protect pilots against GA's most fatal type of weather-related accident: VFR into IMC. Recommended for use by flight instructors and schools.**

AIR SAFETY INSTITUTE

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## AVOIDING IMC

**The best defense against flying under visual flight rules (VFR) into instrument meteorological conditions (IMC) is to avoid entering them in the first place.** Keeping the big weather picture in mind before a trip, and then frequently checking weather observations during a flight, can support a safe outcome. After all, weather is what you find, not necessarily what's being forecast. If conditions worsen after takeoff, diverting early or getting the airplane on the ground before nearing IMC is the safest choice.

## USING THIS SYLLABUS

**This syllabus is designed to help recognize the dangers of inadvertent VFR flight into IMC and to recommend safe exit practices.** It is not intended for training toward an instrument rating, and should be used by flight schools and instructors as an integral part of existing lesson plans, syllabi, or curricula for both ground and flight. Some lessons may be divided up at the instructor's discretion to match each pilot's learning pace. Proficiency can be maintained by using this syllabus during flight reviews, checkouts, and flights with a qualified safety pilot.

# Lesson 1

## Ground

Weather theory, information, and services.

### **Lesson Objectives**

- Learn what IMC is, how it develops, how to recognize it, and how to avoid it
- Review the spatial disorientation risks that can occur even in visual meteorological conditions (VMC) (e.g., moonless nights over water, haze, flying on top of an overcast layer)
- Cover the essential weather knowledge you need to avoid IMC, gain a better understanding of the hazards associated with flying VFR into IMC, and learn more about the consequences of making poor decisions by viewing the free safety programs in ASI's **VFR into IMC Safety Spotlight** ([www.airsafetyinstitute.org/spotlight/vfrintoimc](http://www.airsafetyinstitute.org/spotlight/vfrintoimc))

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# Lesson 1

## Ground

### Discussion

- Weather patterns and trends that develop into IMC
- What constitutes marginal VFR (MVFR) conditions
- How moisture affects ceiling and visibility (including significance of temperature/dewpoint and development of fog)
- Weather products that indicate deteriorating weather, IMC, and associated risks
- Getting the "Big Picture" of weather 3-5 days in advance
- Diverting to an alternate due to adverse weather (including communications with air traffic control and use of GPS)
- Weather information and services provided by Flight Service
- Weather information and advisories provided by ATC
- How Flight Service and ATC can help you find VMC
- How to get an updated in-flight weather briefing
- Psychological pressures that lure pilots to press on into IMC
- Use of autopilot if IMC is encountered

### Completion Standards

Completion of all lesson objectives, the ability to explain all discussion points including psychological pressures that influence decision making, and what appropriate actions pilots should take to avoid IMC encounters.

# Lesson 1

## Flight/Simulator

Basic instrument flying, maneuvers, and emergency situations.

### **Lesson Objectives**

- Perform full-panel, instrument flying and scanning basics in a simulator or actual IMC
- Perform slow flight and unusual attitude recovery (optional: full-panel stall recovery)
- Practice 180-degree turns in simulated or actual conditions with and without the autopilot

### **Maximizing the Learning Experience**

Flying in actual IMC can be one of the best learning environments for new and experienced instrument and VFR-only pilots, whereas flight simulators and flight training devices (FTDs) offer the benefit of added safety, lower costs, and the ability to stop at any point for further instruction and critique. More often than not, a combination of flight simulation and actual flight can maximize the learning experience.

If using this lesson in flight, coordinate with ATC beforehand to find out whether they can assist with practice VFR into IMC encounters, simulated emergencies, weather diversions (radar vectors), and instrument approach procedures to an airport when the pilot doesn't have approach charts.

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# Lesson 1

## Flight/Simulator

### In Flight

- Straight and level
- Constant airspeed climbs and descents
- Maneuvering during slow flight (optional: stalls)
- Unusual attitude recovery during a turn
- Standard-rate turns
- 180-degree turn out of simulated or actual IMC with emphasis on maintaining altitude

### Completion Standards

Completion of all lesson objectives and flight maneuvers, the ability to recognize the onset of unusual attitudes and perform safe recoveries, maintaining at least private pilot test standards where appropriate.

## Lesson 2

### Ground

Decision making, instrument flying, using the autopilot, and IMC exit strategies.

#### **Lesson Objectives**

- View **Mistakes We Make** safety video ([bit.ly/weathermistakes](http://bit.ly/weathermistakes))
- Complete the Air Safety Institute's **Do the Right Thing: Decision Making for Pilots** online course ([airsafetyinstitute.org/dtrt](http://airsafetyinstitute.org/dtrt))
- Learn how aeronautical decision making and personal minimums can be used to avoid and safely escape an inadvertent encounter into IMC
- View the Ask ATC videos, specifically **Weather Deviating**, **Precipitation Intensity**, **Flight Following**, **When to Ask for Flight Following**, and **VFR on Top** ([airsafetyinstitute.org/askatc](http://airsafetyinstitute.org/askatc))
- Understand the risks associated with your next flight by using the **ASI Flight Risk Evaluator** during your preflight planning and discussing the results with your instructor ([airsafetyinstitute.org/flightrisk](http://airsafetyinstitute.org/flightrisk))
- Proficient use of GPS (or PFD/MFD) to help find nearest airport or VMC
- Knowledge of aircraft information manual/POH supplement for instructions on how to use the autopilot. Sample steps:
  - > Turn autopilot ON
  - > Set heading (HDG) bug to current heading
  - > Select HDG mode
  - > Select attitude (ALT) mode or maintain altitude
  - > Rotate heading bug to turn aircraft toward nearest VMC

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## Lesson 2

### Ground

#### Discussion

- How to develop personal minimums
- Developing a “Plan B” on the ground or in flight
- Ensuring enough fuel to land with at least one hour of fuel reserves upon landing
- Declaring an emergency to ATC and dispelling myths about paperwork ([bit.ly/sayitright-paperwork](http://bit.ly/sayitright-paperwork))
- Performing a 180-degree turn out of IMC
- Use of autopilot after encountering IMC
- ATC radar services and limitations
- GPS (or PFD/MFD) basics to help navigate to nearest airport or VMC
- Instrument approach basics (e.g., inbound course, frequencies, minimum altitudes)
- The importance of listening on frequency
- Landing off-airport if there’s no other alternative
- Taking a tour of the nearest ATC facility

#### Completion Standards

Completion of all lesson objectives, the ability to explain all discussion points, development of personal minimums, knowing how to safely escape IMC (including use of the autopilot and GPS, if equipped), and understanding ATC radar services and limitations.

## Lesson 2

### Flight Simulator

Flight into simulated or actual IMC and use of ATC services.

#### ***Lesson Objectives***

- Review 180-degree turns in simulated or actual conditions with and without the autopilot
- Declare an emergency to ATC and solicit their aid in escaping IMC, divert to nearest visual conditions, and land safely at an airport (or, if necessary, make a safe landing off-airport)
- Use of GPS, PFD, or MFD to find nearest airport or VMC

#### **Using Scenarios**

Instructors may want to use the following common VFR into IMC scenarios during this lesson:

- Marginal VFR encounter as visibility and ground reference slowly deteriorate
- Partly cloudy skies slowly turn into lowered ceilings with overcast conditions as terrain below rises
- Heavy precipitation reduces visibility to zero
- A routine VFR night flight is met with unexpected cloud conditions invisible to the naked eye
- Flight over large unlit areas such as lakes, oceans, forests, or unpopulated areas

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## Lesson 2

### Flight Simulator

#### In Flight

- Reviewing 180-degree turn out of simulated or actual IMC
- Declaring an emergency to ATC (simulated with instructor acting as ATC)
- Receiving radar vectors to nearest VFR conditions and/or airport (simulated or actual)
- Using GPS, PFD, or MFD to find nearest airport or VMC
- Diverting to an alternate airport
- Intercepting and tracking courses
- Optional: Receiving ATC vectors to fly an instrument approach without IFR charts (simulated or actual)

#### Completion Standards

Completion of all lesson objectives and flight maneuvers while demonstrating proficiency in safely performing 180-degree turns with and without the autopilot, clear communications with ATC (actual or simulated) when declaring an emergency, compliance with ATC radar vectors, and landing safely at an airport.

# IMC Escape Procedures

## AVIATE

**CONTROL THE AIRCRAFT** by maintaining trim for level flight, power setting, and airplane configuration.

**ENGAGE AUTOPILOT** if one is available. Use the Altitude Hold (ALT) and Heading Hold (HDG) modes.

## NAVIGATE

**EXIT** IMC by performing a 180-degree, standard-rate turn until visual references are regained.

## COMMUNICATE

**TALK** to ATC immediately and declare an emergency. State that you have entered IMC. If you haven't already made a 180-degree turn, consider asking for vectors to the nearest visual conditions. Although ATC can only see precipitation on their scopes, they can quickly scan weather conditions for nearby airports.

## CHECK

**OBSERVE** the situation. Check to see if conditions are getting better or worse. Is there VMC close by? Do you need more help from ATC? Will you have enough fuel remaining after escaping IMC? Will you need to make an off-airport landing?

## COMPOSE

**RELAX** Don't succumb to spatial disorientation or hyperventilation. Keep cool and scan your instruments. Make minor adjustments and ensure you are not departing controlled flight.