Introduction

Sponsoring Faculty:
Professor R. John Hansman (CFI/CFII)

Introductions

• MIT/Wellesley/Harvard/Other?
• Aero Background?
• Flight Experience?
• Purpose for taking this class?
  – Fly an airplane?
  – Fly a helicopter?
  – Remote Pilot certificate?
Course Objectives

- Prepare for FAA Private Pilot Knowledge Test ("Written" as opposed to "Practical" test or "checkride")
- Available in Airplane, Helicopter, Balloon, Glider, etc. variants
- We will concentrate on Airplane
- Prepare for FAA Remote Pilots UAS Test
- Help you get the most out of flight training
- Learn about the engineering

What’s Great about Aviation

- Realize the ancient human dream of flight
- Understand geology and human settlement by looking at the Earth from above
- Appreciate engineering achievements
- Use all of your capabilities: mental, physical coordination, emotional control
- Get to Martha’s Vineyard in 30 minutes! (and most places a little slower than if you’d taken a Honda Accord)
What you can do

- Nearby Airports: Norwood, Bedford, Lawrence, Beverly, Nashua, Marshfield, etc.
- All have flight schools for lessons and rentals of airplanes or helicopters
- Learn to fly in 10 hours: take off, cruise, land.
- Next 35-55 hours: learn to be safe as the only pilot in the aircraft, the FAA standard for cert.

Our local area
Flying is faster than driving

KBHB – Hiking in Acadia
48 states; 18 days; 50 hours

About $5,000 in operating cost in a Cirrus SR20; see Philip’s weblog

Why you will love it

• A lot of people who have enough time and money to do anything they want choose to fly.
• You’ll meet a lot of interesting people.
• Passion that pulls together people of all ages, education levels, nationalities, etc.
Is it safe?

- Statistically, traveling by light aircraft is less safe than being on JetBlue
- Only a tiny percentage of light aircraft accidents are related to mechanical failure
- Therefore, you can fly almost as safely as the airlines if you fly like the airlines:
  - Recurrent training
  - Develop and practice instrument flying skills
  - Two-pilot crew
  - Checklists
- All else fails? Pull the ballistic parachute!

Instructors: Philip Greenspun

- MIT Class of 1982(!)
- Pilot since 2002
- Airplane instructor at East Coast Aero Club (2005)
- Helicopter instructor at ECAC (2006)
- First Officer flying CRJ-200 for Delta Airlines
- type-rated for two jets (CRJ and Cessna Mustang)
- Usually flies the Cirrus SR20, Robinson R44, Pilatus PC-12 (sea turtles!)
Instructors: Tina Srivastava

• MIT Course 16, S.B., S.M., Ph.D
• Zero-G flight, satellite deployment testing
• Chief Engineer, Raytheon, $40M radar and electronic warfare program
• Pilot since 2012
• MIT Flying Club
• Working on IFR (completed stages 3 of 4)
• Usually flies the Cessna 172
What you’ve read already

... or what you’re going to read tonight!

– FAA Pilot’s Handbook of Aeronautical Knowledge, Chapters 1, 3-8, 12, 14-16
– FAA Airplane Flying Handbook, Chapters 1-3, 7-8, 10
– FAA Helicopter Flying Handbook, Chapters 1-4, 9

Don’t worry if you didn’t get everything.

Optional Supplies

Typical Private student has the following in hardcopy:

– A non-FAA textbook (not necessary)
– FAR/AIM (regulations plus official FAA info)
– Test Prep Book (ASA or Gleim);
– Airman Certification Standards (ACS)

Don’t forget a noise-canceling headset, e.g., Bose or Lightspeed. Everything is available at the front desk of a flight school.
Getting the Private Pilots License

- Flight Training
- Apply for Student Pilot Certificate
- Exam for 3rd class Medical Certificate
- FAA Private Pilot Knowledge Exam
  - “The Written”
  - Variants for Airplane, Helicopter, Glider, etc.
- Checkride (Practical Exam)
  - Oral section
  - Flight section

Meenakshi Asokan

- First experience: passenger on fly-out with MIT Flying Club (Feb 2016) – Inspired me to become a pilot
Spring 2017: 16.687

- PhD student in Neuroscience, Harvard, cross-registered for 16.687
- Knowledge before the course:

![how planes fly](image)

- Enabled me to become a pilot, laid the foundation for the aviation experiences in the rest of my life

May-Sept 2017: Student Pilot

- Two years of savings -> lessons at East Coast Aero Club
Sept 29, 2017: Private Pilot

After PPL

- Spin training and aerobatics lessons in Decathlon
With the MIT flying club

2000 ft, south-bound
Spoke to Kennedy Tower!!!

With friends
With friends

With family
Why do I love it?

• **Fun**: beautiful views and experiences, and the surge of excitement every single time I have the controls.
• **Challenge**: Something new (and rewarding) to learn from every single experience.
• **People**: Amazing to meet and interact with the aviation community.

The FAA Written Exam

• Computer-based multiple-choice 2.5-hour test
• 60 questions
  • Part of question bank is published
  • New questions introduced continuously so know the principles!
  • Answers are shuffled

Passing is 70. If you sit through this class and earn less than a 70, Philip will buy you lunch.
Getting the most out of this class

- Read the FAA books three times before taking the test.
- Use a test prep book
- Take practice tests from Sporty’s Study Buddy
- Free 6-month AOPA student membership
- Physics question? Learn from a Ph.D. physicist and pilot in See How it Flies by John Denker

Testing and Grading

Final Exam
- 60-question final exam simulating the FAA Knowledge Test
- Take it at home with a web browser

For-Credit (3 units) Students
- Show up for all three days
- Score at least 70 on the final

CFI Endorsement for the real test
- Request sign-off PDF via email from Philip (FAA certificated flight instructor)
- Go to a flight school and take the real test
- Fail: Philip buys you lunch

Aero/Astro majors: The FAA material is designed for people as young as 16 and without any technical or scientific training.
Sample Question

Why is frost considered hazardous to flight?

A. Frost changes the basic aerodynamic shape of the airfoils, thereby increasing lift.
B. Frost slows the airflow over the airfoils, thereby increasing control effectiveness.
C. Frost spoils the smooth flow of air over the wings, thereby decreasing lifting capability
The Best-laid Plans

Day 1 (Tuesday)
This Intro
Aerodynamics
** Break **
Learning to Fly
Airplane Systems
** Oshkosh at Lunch! (pizza provided) **
Charts and Airspace
Navigation
** Break **
Flight Environment
Helicopters
F-22 with Randy “Laz” Gordon
MIT Flying Club

Day 2 (Wednesday)
Meteorology
** Break **
Comms, Radar, ATC
Aircraft Ownership
** Lunch Break **
IFR
Performance
Weather data
** Break **
Human Factors
Aerobatics with Marc Nathanson

Day 3
Flight Planning
** Break **
Seaplanes
UAS (drones) with Michael Holzwarth
Night flying
Multi-engine and jets
** Brazilian Air Force Lunch **
Weight and Balance
Weather Minimums and Parting words
** Break **
App Planning & Engineering with Tyson Weihs

Welcome Again

- Welcome again to our class and to the community of aviators.
- Better to be on the ground wishing you were in the air than in the air wishing you were on the ground.
- But remember that humans have been wishing to be in the air for tens of thousands of years. You’re going to be some of the lucky few to be in the air and also control your destiny through the air.
Questions?