

# Learn to Fly: Private Pilot Ground School

## DeCal

Fall 2018

### General Course Information

**When:** MW 6-8pm

**Where:** 202 Wheeler Hall

**Special Studies Coordinators:**

Jeremy Axelrod ([jaxelrod@berkeley.edu](mailto:jaxelrod@berkeley.edu))

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**Course Department:** Physics

**Faculty Advisor:** Holger Mueller

**Course Number:** PHYSICS 98 002 (#22973), PHYSICS 198 002 (#24691)

**Units:** 2, P/NP

**Prerequisites:** None

### Course Description

The purpose of this course is to present the world of general civil aviation in an academic context and provide students with all necessary “book” knowledge to pass the FAA private pilot knowledge test (a written examination) and become a licensed private pilot. Students will not control/fly an actual aircraft in this DeCal (though a PC-based flight simulator will be available at least once in the semester for students to use during a class period), rather, the course is intended to prepare a student for practical flight training and delve into the world of aviation. Similar to a high school “driver’s ed” class, the course will be held in a classroom. There are no prerequisites for the class (as there are no academic prerequisites for becoming a private pilot!), and since the curriculum is varied and wide-reaching in scope, most students will find connections to their majors/areas of study. For instance, students who have science or engineering backgrounds/interests may benefit from the supplementary curriculum that explores the application of engineering in aviation. Pre-law students may also particularly enjoy learning the pertinent Federal Aviation Regulations (Title 14 of the Code of Federal

Regulations) for private pilots, and business students will appreciate the environment in which the airline industry operates.

### **Learning Outcomes**

As an introduction to the course, students will be introduced to the airplane as a concept, and the fundamentals of flight. By the end of the course, students will be: 1) proficient with the theory of aircraft systems, flight operations, aviation meteorology, airplane performance, aeronautical decision-making, and aeromedical factors; 2) able to pass ( $\geq 70\%$ ) a mock FAA private pilot knowledge test.

This course will have a heavier workload than most DeCals. There are two reasons for this:

#### **1) SAFETY**

Aviation is much less forgiving of mistakes than, say, driving. We want to make sure that all of our class graduates who leave intending to go on to earn their private pilot licenses are fully capable of performing to, and beyond, FAA knowledge standards.

#### **2) SUBJECT MATTER**

Flying is an amalgamation of different disciplines, many of which will be new and unfamiliar to most students. It is of the utmost importance to achieve mastery in all of these subject areas because they will be encountered on a daily basis when flying.

### **Materials**

By the third week of the course, you will need to purchase the following items for this course. During lecture we will let you know where the best places to buy these is from. Total is approximately \$30 + Shipping.

- 1 San Francisco VFR Sectional Chart
- 2 San Francisco Terminal Area Chart (TAC)
- 3 Course Plotter
- 4 E6B Flight Computer
- 5 FAR/AIM (Federal Aviation Regulations/Aeronautical Information Manual; available electronically online for free, or for sale in hardcopy)

The textbook for the class is the Federal Aviation Administration's *Pilot's Handbook of Aeronautical Knowledge* ("PHAK" for short, FAA document number FAA-H-8083-25B). The most recent electronic version of the text can be found free of charge at [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/phak/](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/) or can be purchased in hardcopy from various online vendors for approximately \$20 (paperback).

### **Faculty**

Professor Holger Mueller ([hm@berkeley.edu](mailto:hm@berkeley.edu)) will be the faculty sponsor for this course. While the student facilitators have the primary responsibility of running the course, Prof. Mueller has the final authority for inputting course grades. Also, if there are any complaints about the nature of the DeCal or how the course is run, he is the person to contact.

Prof. Mueller will supervise the student course facilitators through weekly communication and follow-ups at his discretion. He may also choose to visit lectures with no prior notice to the students or facilitators.

### **Method of Instruction**

**Class:** Lecture and activities. Class will meet every **Monday and Wednesday, 6-8pm in 202 Wheeler Hall** for regular discussions. Some scheduled lectures will be supplanted by guest lectures from commercial pilots, industry insiders, and aviation researchers, as well as other activities like flight simulation.

**Homework:** Questions addressing core subject understanding, as well as multiple choice questions from the FAA knowledge test bank will be assigned on a weekly basis. Homework is graded on both completion and correctness. Homework is submitted electronically via the course website on bCourses unless otherwise stated.

**Reading:** Weekly reading from the PHAK and the FAR/AIM is assigned. PHAK and AIM reading is concomitant with the subject material being taught that week, while FAR reading simply follows a mostly “front-to-back” progression through 14 CFR §1, §21 §39, §43, §61, §71, §91, and NTSB §830.

**Quizzes:** There will be 4 or 5 short multiple-choice quizzes, with questions similar to those on the FAA knowledge test, administered during lecture section over the course of the semester. See the most recent version of the course schedule below for quiz dates. If you cannot attend class when a quiz is scheduled to be administered, you must contact Jeremy Axelrod ([jaxelrod@berkeley.edu](mailto:jaxelrod@berkeley.edu)) before the date of the quiz to make alternative arrangements.

**Final Project:** The final project will consist of the completion of a flight plan including weather information and performance calculations. The student will provide a written justification of a “go/no-go” decision based on these factors upon completion of the flight plan.

The course website will be hosted on bCourses. If you are auditing the class, please notify the instructors via email so that you can be given access to the course's bCourses site. Additional information about the course is available at [fly.berkeley.edu](http://fly.berkeley.edu).

### Student Evaluation

Student attendance counts towards the course grade. **All homework must be turned in on time, no exceptions.** There will be an *optional* mock FAA private pilot knowledge test given at the end of the semester. This test will be an analog of the actual FAA knowledge test (questions from the FAA test bank, same number of questions, same time limit, etc.). The student with the highest final exam score above 80% will be given a free “discovery” flight, in which the student will fly with a certificated instructor and control the airplane themselves, at a local flight school (a \$150 value!).

The grading breakdown is as follows:

25% attendance

35% homework

20% final project

20% quizzes

A passing grade is 70% or higher. A score of 70% or higher on the optional mock FAA knowledge test results in an automatic passing grade in the course. Taking this test cannot hurt your score, but most people find it to be more difficult than they expected so don't rely on it to give you a passing grade in the course.

We encourage students to work with each other on the homework. However, you may not submit an assignment identical to another student's; your work must be your own. Likewise, you cannot copy material verbatim from any source—put it in your own words before writing it in your homework. First violations will receive a zero on the homework, and subsequent violations may trigger administrative action in accordance with the UC Berkeley code of academic conduct.

**Fall 2018 Schedule:**  
**Some guest lectures & field trips TBD**

Dates & Instructor	Monday	Wednesday	Weekly Reading
<b>Fundamentals of Flight</b>			
<b>Week 1:</b> 9/3- Jeremy	HOLIDAY	Introduction to General Aviation, Instructor Q&A panel, How to read the FARs	<ul style="list-style-type: none"> <li>• PHAK Ch. 1</li> <li>• FAR §1: 1, 2 (<i>for reference</i>), §61: 3, 23, 32, 56, 57, 113</li> <li><a href="https://www.faa.gov/pilots/become/">https://www.faa.gov/pilots/become/</a></li> </ul>
<b>Week 2:</b> 9/10- Daniel	Aircraft Construction, Principles of Flight	Aerodynamics of Flight, flight simulator demonstration	<ul style="list-style-type: none"> <li>• PHAK Ch. 3, 4, 5</li> <li>• FAR §61: 60, 69, §91: 3, 203</li> </ul>
<b>Week 3:</b> 9/17- Andrew	Flight Controls, Aircraft Systems, Flight Instruments	Flight Controls, Aircraft Systems, Flight Instruments	<ul style="list-style-type: none"> <li>• PHAK Ch. 6, 7, 8</li> <li>• FAR §39.3, §43 (all), §91: 121, 205, 207</li> </ul>
<b>Flight Operations</b>			
<b>Week 4:</b> 9/24- Orion	Airport Operations, Airspace	Airport Operations, Airspace	<ul style="list-style-type: none"> <li>• PHAK Ch. 14-1 thru 14-21, 15</li> <li>• AIM Ch. 2, 3, 4-3</li> <li>• FAR §61.95, §71.71, §91: 15, 113, 117, 155, 157, 215</li> </ul>
<b>Week 5:</b> 10/1- Daniel	Aeronautical Charts  <b>QUIZ #1: Week 1 – 3 material</b>	Aeronautical Charts  <b>Mid-semester evaluation due</b>	<ul style="list-style-type: none"> <li>• AIM Ch. 9</li> <li>• FAR §91: 111, 119, 126, 127</li> </ul>
<b>Week 6:</b> 10/8- Orion	Radar and ATC Services, Radio Procedures, Sources of Flight Information	Radar and ATC Services, Radio Procedures, Sources of Flight Information	<ul style="list-style-type: none"> <li>• PHAK Ch. 14-22 thru 14-37</li> <li>• AIM Ch. 4 Sec.1, 2, 5</li> <li>• FAR §91: 123, 125, 129, 130, 131, 135</li> <li>• Pilot/Controller Glossary (bCourses)</li> </ul>

Aviation Meteorology			
<b>Week 7:</b> 10/15- Jeremy	Basic Weather Theory, Weather Patterns  <b>QUIZ #2: Week 4-6</b>	Basic Weather Theory, Weather Patterns	<ul style="list-style-type: none"> <li>• PHAK Ch. 12</li> <li>• FAR §91: 209, 307</li> </ul> <i>Suggested: Aviation Weather AC 00-6B (bCourses)</i>
<b>Week 8:</b> 10/22- Orion	Obtaining Weather Information	Obtaining Weather Information	<ul style="list-style-type: none"> <li>• PHAK Ch. 13</li> <li>• AIM Ch. 7</li> <li>• FAR §61.69, §91: 303, 309</li> </ul> <i>Suggested: Aviation Weather Services AC 00-45H (bCourses)</i>
Performance and Navigation			
<b>Week 9:</b> 10/29- Andrew	Flight Manuals, Airplane Performance, Weight and Balance  <b>QUIZ #3: Week 7-8</b>	Flight Manuals, Airplane Performance, Weight and Balance	<ul style="list-style-type: none"> <li>• PHAK Ch. 9, 10, 11</li> <li>• FAR §91: 7, 9, 103, 313, 319</li> </ul> <i>Suggested: Aircraft Weight and Balance Handbook (bCourses)</i>
<b>Week 10:</b> 11/5- Daniel	Flight Computers, Navigation	Cross-Country Flight Planning	<ul style="list-style-type: none"> <li>• PHAK Ch. 16</li> <li>• AIM Ch. 1</li> <li>• FAR §91: 151, 159</li> </ul>
<b>Week 11:</b> 11/12- Daniel	<b>HOLIDAY</b>	Cross-Country Flight Planning  <b>Start flight planning final project</b>	<ul style="list-style-type: none"> <li>• PHAK Ch. 16</li> <li>• AIM Ch. 5 Sec. 1, 5, 6</li> <li>• FAR §91: 403, 405, 407, 409, 413, 417</li> </ul> <i>Suggested: Cold Weather Operation of Aircraft AC91-13C (bCourses)</i>
<b>Week 12:</b> 11/19- Andrew	Aeromedical Factors	<b>TBD</b>	<ul style="list-style-type: none"> <li>• PHAK Ch. 17, 2</li> <li>• AIM Ch. 6, 8</li> </ul>

			<ul style="list-style-type: none"> <li>• FAR §61.15, §91: 17, 211</li> </ul> <p><i>Suggested:</i> Pilots' Role in Collision Avoidance AC 90-48D (bCourses)</p>
<b>Week 13:</b> 11/26- Jeremy	Aeronautical Decision Making, Safety of Flight  <b>QUIZ #4: Week 9-11</b>	<b>OPTIONAL: Mock FAA Private Pilot Written Examination</b> Highest scorer above 80% receives a free flight lesson certificate (\$150 value!)  <b>End-of-semester evaluation due</b>  <b>Final project due</b>	<ul style="list-style-type: none"> <li>• PHAK Ch. 2</li> <li>• FAR §91: 105, 107</li> <li>NTSB §830: 5; 10; 15</li> </ul> <p><i>Suggested:</i> Aeronautical Decision Making AC 60-22, Risk Management Handbook (both on bCourses)</p>