ECE 2066: How the iPhone* Works
Fall 2016

Courtesy Brittany McCrigler/iFixit.

Key Information

Course Staff

Instructor: Daniel Weller
Email: dweller@virginia.edu [Include "ECE 2066" in the title/subject]
Office: Rice Hall 309 Phone: (434) 924-4271

TAs: Haris Jeelani (Head TA), gj8an "at" (UVA domain)
Undergrad TA's:
To be announced

Dates, Times and Locations – *First class will be lecture on Wednesday, August 24*

Lecture: Mondays and Wednesdays, 2:00 PM – 3:15 PM, in Thornton Hall E303

Labs (pick 1): Tuesdays, 1:00 PM – 1:50 PM, in Mechanical Engineering Building 215
Tuesdays, 2:00 PM – 2:50 PM, in Mechanical Engineering Building 215

Office Hours: Fridays, TBD
Email dweller@virginia.edu to set up an appointment outside this time.

*** TA Office Hours will be announced separately.

Exams: Midterm #1 on Wednesday, October 5, in class
Midterm #2 on Wednesday, November 9, in class
Final Exam on Friday, December 16, 2:00 PM – 5:00 PM, in Thornton Hall E303

Other Dates: SEAS Add Deadline is Tuesday, September 6
SEAS Drop Deadline (no penalty) is Tuesday, October 11
SEAS Drop Deadline (with a "W") is Tuesday, October 18

*** No classes on October 3 and 4 (Reading Days), and November 23 (Thanksgiving)

Course Materials

Textbook: Instead of a book, course notes will be provided via the course website (see below).

Website: This course will use UVA Collab (https://collab.itc.virginia.edu/). Look for the site titled "16F ECE 2066 (ENGR)". Email dweller@virginia.edu if you do not have access.

* The use of "iPhone" in the title is not an endorsement of either the iPhone or Apple, Inc. Students in this course are not expected to own an iPhone or other smartphone device.

So, how does an iPhone work?

How can a device small enough to fit in a pocket allow you to watch high-definition movies from just about anywhere, and even allow you to create your own? And, how can it do all this without wires? We can now use our phones with Wi-Fi in airplanes, and in our hyper-connected society, we're rarely too far from our data. So, how does the iPhone manage, process, store, and communicate the information we rely on every day? This course will introduce you to **the science of information**, empowering you with the tools and ideas that will allow you to begin to answer these and other important questions about the technology all around us.

Okay, that sounds interesting. What should I expect to learn in this class?

This course aims to teach you to think like an engineer about information, how it's recorded, how it's stored, how to communicate it, how to process it, and how to reproduce it. Starting from the physical hardware, we will learn how multimedia are represented and processed on a phone without draining batteries or running out of storage, how information is communicated using radio waves, and how multiple users can talk at the same time without intruding on each other's chats and hangouts. We will look at the ideas underlying some of the other smartphone features like location-tracking (Pokémon GO, anyone?) and voice recognition, and learn how these systems keep our information secure and private. By the time this course is done, you will appreciate the progression of technologies that keep our information-driven society functioning.

I already know the Internet is a series of tubes invented by Al Gore. How can I get my "A"?

Lecture activities (0%), homework assignments (20%), lab exercises (20%), two midterms (15% each), and one final exam (30% of your grade) will allow you (and me) to track your progress through this course. See **Key Information** for test dates, and the **"Show me the fine print"** section for important policies.

Lectures: Most lectures will involve individual and group activities that will allow you to dive deeper into the material and learn more about important concepts. If you have to skip a class, check with your classmates to see what you missed.

Homework: Roughly every week of the semester, you will be assigned problems and/or readings to complete and turn in via Collab by the due date (usually one week after it is assigned). Each problem will be graded on a scale from 0-2, with partial credit at the grader's discretion.

Labs: Starting Tuesday, August 30, weekly 50-minute labs will explore and reinforce the core concepts learned in lecture. These labs will be held in a computer lab, but you may bring your own computer to use if you prefer. See the **"What do I need to bring with me to class?"** section below for software information. All labs will be graded, but the lowest grade will be dropped when computing your final grade.

Exams: Each midterm will be 1 hour long and held in class during lecture. The final exam will be given at the assigned date and time, also in the lecture hall. You are not allowed to use anything during the exam except for a pencil/pen, a calculator, and a formula sheet. If you miss an exam, you will be given a zero for that test; no make-up tests will be given. Final exams will only be rescheduled if you notify me by the SEAS Add deadline (see **Key Information** section).

What do I need to bring with me to class?

While the course staff will not be taking attendance at lectures and laboratory sections, you are encouraged to attend each class. To ensure you are productive, you will likely find a personal laptop helpful in both lectures and labs. We will be using the MATLAB software, a student license of which is available from the UVA Bookstore Textbook Department (http://www.uvabookstores.com/uvatext/its_software.asp). Some activities will involve listening to or recording audio; you are encouraged to bring headphones on those days. Word processing and spreadsheet software (e.g., Microsoft Office or LibreOffice) also will be useful.

Success begins with good study habits. That means taking notes and paying attention during lectures. Therefore, be prepared to take notes, write during class, and leave distractions (food and drink, pets, beach balls, etc.) at home. Lastly, bring a positive attitude, confidence in your abilities, and respect for your classmates.

Show me the fine print.

This course will be governed according to the policies and regulations of the University of Virginia, including the Honor System. If you have questions about any of these policies, please contact the instructor.

Cheating: In general, you may discuss your work outside of class, but everything you turn in must be your own work, in your own words. Midterms and the final exam are strictly individual work, and students must not offer or accept any unauthorized aid. Copying another person's computer program, homework, or test solution, even with attribution, constitutes plagiarism and may be an Honor violation.

Late Policy: Assignments are considered on time if they are turned in at the beginning of class on the due date. Late homework handed in later that day will be subject to a 10% penalty. Assignments turned in by the end of the next day will be subject to a 20% penalty. Homework submitted after that point will not be graded (grade equals zero). All late assignments must be submitted to the head TA (Haris Jeelani).

Grading: All assignments will be graded by the course staff. Grading questions should be directed to the head TA; no regrades will be conducted for homework or lab assignments. All regrading decisions on exams will be considered final. If you are concerned about your progress in the class, please contact the instructor. However, the instructor will not answer emails like "What is my grade currently?" or "Where do I stand in the class?"

Disabilities: Students who need to make arrangements for disabilities should work with the Student Disability Access Center or other appropriate office and provide me with documentation detailing the accommodations requested. All reasonable efforts will be made to ensure those needs are met.

Great! Sign me up!

Come to our first lecture on Wednesday, August 24, at 2:00 PM in Thornton Hall E303 ready to learn!