ECE 1501:An Undergrad's Guide to Electrical Engineering

Spring 2020

Instructor:	Daniel Ayoub	**Time:**	Thursday 5-6:15PM
Email:	dsa8cx@virginia.edu	**Place:**	Thornton Hall A120

About Me:
My name is Daniel Ayoub, and I am a 4th year Computer & Electrical Engineering double major and an Applied Math minor. I was a TA for Digital Logic Design (DLD) for four semesters, and an applied mathematics grader for one semester. I love teaching, and it is my hope that you guys will challenge me, as I challenge you. I look forward to this class, and am humbled, yet excited for this opportunity.

Course Description: Traditional introductory level electrical engineering courses are often inundated with many concepts, topics, and lab exercises. Because of this, much of the fundamental theories and concepts behind electrical engineering get baked out. The initial fun and creativity associated with learning entirely new material gets overshadowed by how much work needs to be done. Typical electrical engineering students must then preserve through a few of these intro level classes before they really grasp the material being presented on an intuitive and fundamental level. This is a commitment too much to ask from non-EE majors and from students considering the major who want to learn more about electrical engineering and feel that it is a useful topic. This is a shame to me as electrical engineering is perhaps one of the most important subjects in our era. Electrical engineering covers everything from sustainable energy systems, to computers and smart phones, to communications and wireless networks, and finally all the way to radar and surveillance technologies.

The goal of this class is for you to learn the fundamentals of basic electrical engineering and physics II through the use of intuition, demonstration, experimentation, and simple mathematics. In this way, I hope that learning electrical engineering principles can both be fun and easy to grasp. This course will teach non-engineers and aspiring engineers alike to think in a critical yet creative way, in a low-stress pass/fail environment. Specifically, we will be learning basic circuit theory, filtering, AC analysis, circuit simulation and design, and PCB Layout. It is my sincere hope that you leave this course with a new found appreciation for electrical engineering and its many avenues. Finally, I hope you learn that thinking creatively and intuitively is perhaps the quickest and best way to grasp a new subject.

Office Hours: After class, by appointment, or by email

Prerequisites: None

Professor of Contact: If you have a significant issue with the course, grades, or instructor, contact the course professor.

Todd DeLong
Email: tad2x@virginia.edu
Office: Thornton Hall E-208

Main References: This is a list of various interesting and useful books that will be touched upon during the course. You do not need to buy any of them:

- Roman Kuc, *Electrical Engineering in Context: Smart Devices, Robots & Communications*, Cengage Learning, 2014.

- Ulaby, Maharbiz and Furse, *Circuit Analysis & Design*, Michigan Publishing, 2018.
  Available at: https://services.publishing.umich.edu/wp-content/themes/mpub-services/library/pdf/CAD100.pdf

Lectures: Every class will be divided into two components: a lecture and a demo/experiment confirming that lecture's material. If I can not do a demo, we will always try to discuss the relevance and importance of the subject. The lecture component will incorporate the homework from the week before and should be engaging. Although I encourage taking your own notes, the notes I will teach from on a particular week will always be posted to the Collab site before our Thursday meeting. Because of just how much I am trying to do, there is a possibility the class may run over to 6 or 6:15. If this does happen and you need to leave at 5:50, please do so quietly.

Please refrain from using your phones during class. If you must take notes on your laptop, please only use it for this purpose. Doing other things on your laptop is distracting to others and impedes their learning. I trust you guys!

Grading: Attendance(30%), Homework (40%), Final Project (30%)

Attendance: Please show up to class. Because this is a one credit course, attending class is important, as there is only so much I can teach you if aren't here. Each 1-hour class takes me about 2 or 3 hours to prepare. That being said, I understand things come up. You have two excused absences that you can use as you wish. As your teacher, I care about you and would rather you attend to some pressing task then attend my class. Please just shoot me an email.

Homework: All homework you do should be your own individual work. You are permitted to work together with your classmates but everything handed in must be your own, and you should fully understand it.

All homework will be self graded on a scale from 0-3, zero being you did not do it, three being you have done everything correctly, or have made a serious effort to have everything correct. I will collect homework to make sure grading is being done honestly and will revoke the privilege should grading turn dishonest. We will review 1 or 2 homework problems in class the day they are due so no late homework will be accepted.

Homework assignments will be short and interesting so it should not feel like busy work. I will look to you guys for feedback; if the homework is a walk in the park and you want more challenging/interesting problems to work on, I can adjust. Conversely, if the problems are too hard, I can also adjust so that they are more accessible.

Final Project: I am still working on what exactly this will be, but I have plans for you guys to design, order, and solder a printed circuit board (PCB) to accomplish some function we can all together decide on.