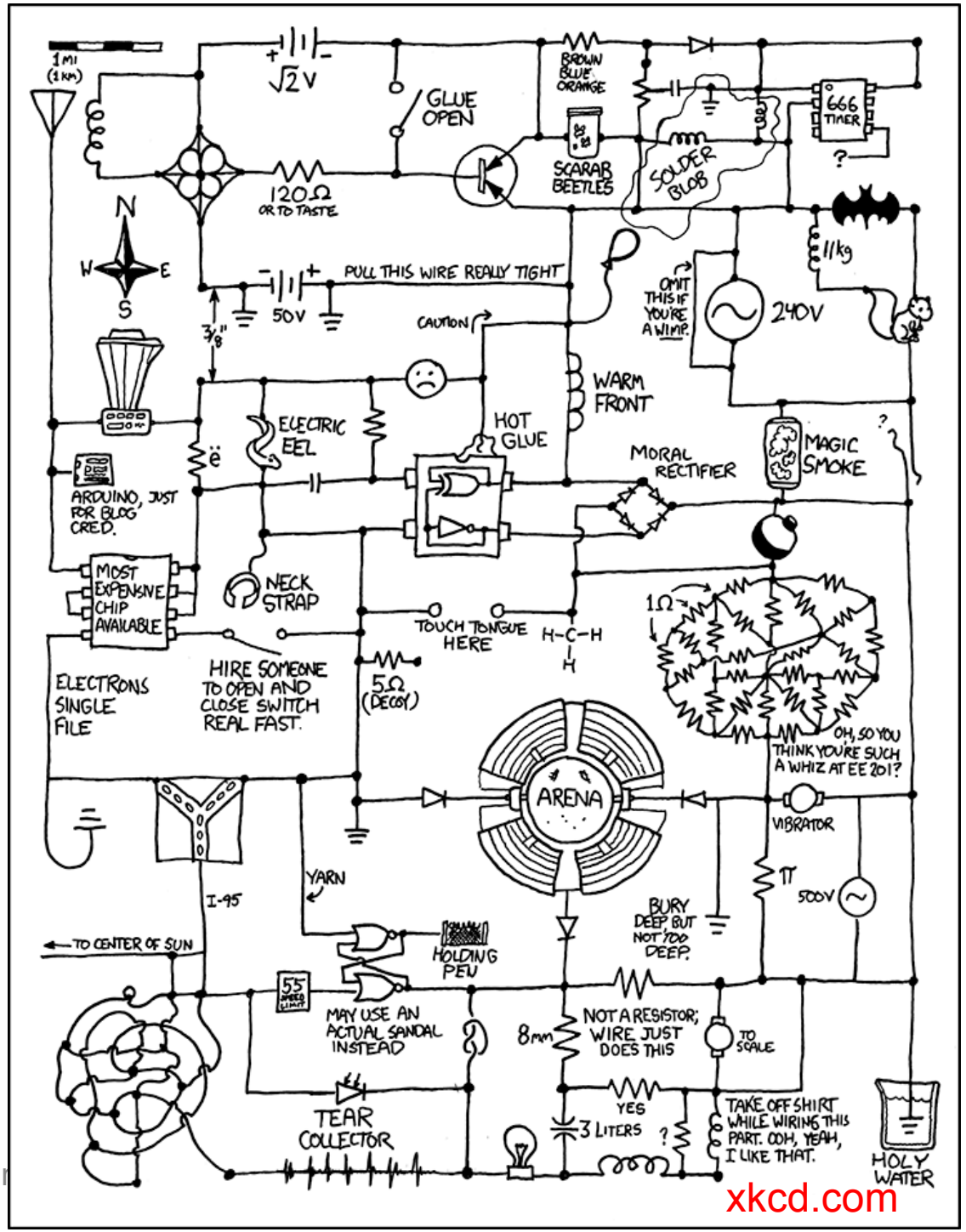
Phys 214: Introduction to Laboratory Electronics

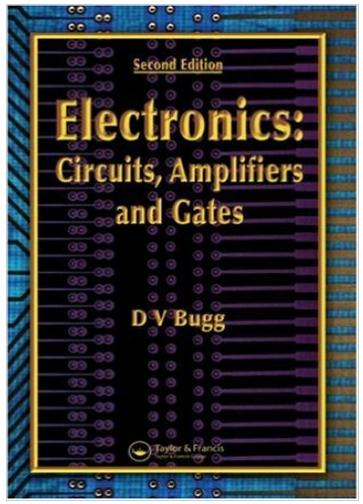


Justin's contact information

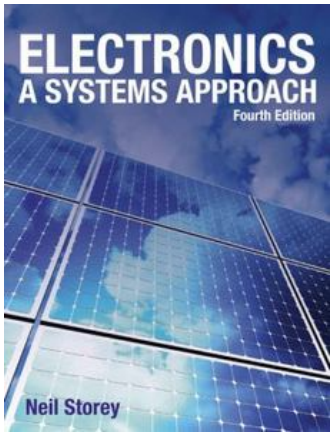
- Office hours:
  - Please come by my office (Elliott 213) ***anytime*** if you have a question. I'm a night owl (typ. hours ~10 am – 10 pm).
  - (On the relatively rare occasion that I'm just too swamped, I'll let you know and we'll set another time to meet in that case.)
- In the event I'm not in my office, I am often in the detector lab downstairs (Elliott 021).
- I do tend to leave a Post-it note on my office door saying where I am, if I'm out. At lunch I'm typically in the break room on the 4th floor upstairs.
- jalbert@uvic.ca
- My office phone #: (250) 721-7742
- My cell phone #: (250) 661-7066

Textbook & Prerequisites

- Book:
  - David V. Bugg, *Electronics: Circuits, Amplifiers and Gates*, second edition, CRC Press, 2006



- Others (not required):
  - N. Storey, *Electronics, A Systems Approach,* fourth edition, Pearson Education, 2009
  - P. Horowitz & W. Hill, The Art of Electronics, second edition, Cambridge U. Press, 1989



- Prerequisites:
  - PHYS 102, 112, 120 or 122
  - MATH 100 or 102

- Homework, Labwork, Midterm, Final exam
  - 15 / 30 / 20 / 35 %

- Students must get a passing (≥ 60% avg) grade in the labs in order to pass the course (departmental rule).

- Midterm: 50 minutes, in class, on Thurs. Oct. 15
  - one problem from assignments

- Six problem sets
  - one late (up to one week) allowed
  - others: 50% (within week after deadline) or 10% (later)

Labwork

- Labwork (30%)
- 2 labs every week
- Starting next week, Elliott 139
- Reports due at the end of lab period

Labwork

- If you fail the labs, you will fail the course!

Course Outline

I. DC and AC circuits

II. Analog and Linear Electronics

III. Digital electronics

IV. Devices for data acquisition

Course Outline

I. DC and AC circuits
   - Ohm's law
   - Kirchhoff
   - Thevenin and Norton

Course Outline

II. Analog and Linear Electronics
- RC / RL / RCL circuits
- Filters
- Diodes
- Transistors
- Feedback
- Op-amp circuits
- Differentiators / Integrators

Course Outline

III. Digital electronics

- Gates
- Logic
- Flip-flops
- Number codes

Course Outline

IV. Devices for data acquisition

- DA / AD converters

Course Outline

Chapters in Bugg:

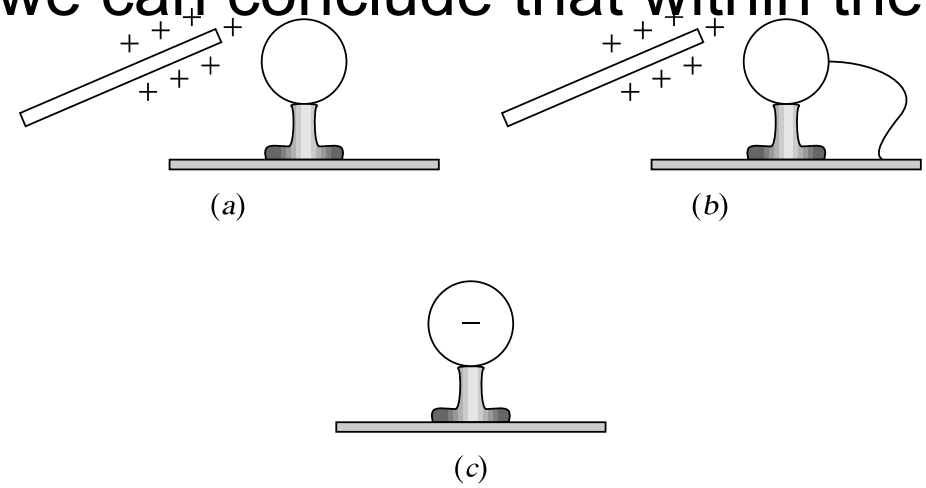
1 – 13 (we will not cover most of the material in chapters 14 – 16)

Rest of this lecture

- Electrical quantities
- Ohm's law
- Simple DC circuits
- Power

An “extra credit” problem ;)

A positively charged object is placed close to a conducting object attached to an insulating glass pedestal (a). After the opposite side of the conductor is grounded for a short time interval (b), the conductor becomes negatively charged (c). Based on this information, we can conclude that within the conductor



A. both positive and negative charges move freely.
B. only negative charges move freely.
C. only positive charges move freely.
D. We can't really conclude anything.

Answer: D. The same result is achieved regardless of whether the charge carriers are positive or negative. So, it could be either that positive charges left, or additional negative charges entered, the conductor.