Discussion about electronics courses for Fall 20

6/30/20, 10am PDT

Attendees

- Eric Ayars (CSU Chico)
- Mary Lowe (Loyola, MD)
- Jonathan Maps
- David Bailey
- Eric Black (Caltech)
- Sean Robinson (MIT)
- Nathan Powers (BYU)
- Daniel Borrero (Wilammette)
- Ernie Behringer (Eastern MI)
- Istvan Danko
- Steve B (MIT)
- Kevin V (Chicago)
  Apologies to anyone missed, and to those for whom I did not catch their schools.

Discussion

Take-home equipment ideas

- Digilent Analog Discovery II
    - Can be used for light data acquisition and as a 'scope.
    - Frequently out of stock
    - $179
- Analog Devices ADALM2000
    - Similar capabilities as the Digilent ADII.
    - currently sold out everywhere
    - $162
    - Lower-end version: ADALM1000, about $40
    - Analog webpage has many labs ready to go
- NI MyDAQ – closer to $400

- Faster, can be used to build a datalogger or scope
  - Plays nicely with LabVIEW

- NI 6001, under $200 each
  - in stock, works with NI,
  - Eric Black suggests using these with Essick textbook. He did it, it worked well.

- Measurement Computing also makes interfaces similar in capability to NI, but for lower cost. They provide APIs for LabVIEW and other programming languages.

Other topics

- "Ship labs to students" model
  - loaning library of boxed experiments, 2 weeks, that sort of idea.
  - Nobody seems to have done this successfully yet, but it's in consideration by several.

- Lots of praise for John Essick's LabVIEW book, online copy here.
- Recommendation of Onshape for free CAD for students.
- How to manage electronics debugging over Zoom? (Big challenge for a lot of faculty, judging by the discussion!)
  - Document camera ($140) provided to each student! (Mary Lowe)
  - Cellphone pictures (Daniel Borrero), cellphone tripods help. (They're cheap!) but these lack zoom capability.
  - Good suggestion: Color highlighting of circuits by the students, wire colors matching highlighting. This is particularly good practice as it raises the chances the students will figure it out themselves.

- Circuit simulation options
  - Tinkercad is extremely limited.
  - LTSpice is too high-level for most intro electronics courses.
  - Simulink?
  - MultiSIM
    - has a lot of public stuff also, free options
    - MultiSIM Live in-browser option

  - Logisim
  - Simscape (Matlab add-on)
  - utiliboard? Briefly mentioned, no information given.

- Costs to students?
  - discussion about costs to students at State schools vs. private, student budget issues
  - Caltech had students buy about $60 worth of tools
    - sidecutters, wirestrippers
    - some hook-up wire
    - DMM
  - Eric Black: "These are all tools a physicist should have at home anyway." (general

agreement)

- Cheap tools / meters / scopes
  - Scope that Ernie has used that hasn't broken yet.
  - Extech DMM at Amazon for $22.