What’s the point of PC/CP320?

Terry Sturtevant

Wilfrid Laurier University

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Why are we here?

Modular design

CP104/164 taught the basics of Python programming.

PC/CP220 labs taught the basics of building and debugging digital circuits, including digital circuit simulation.

PC221 taught how to measure current, voltage and resistance in simple circuits, including AC circuits and analog circuit simulation.

PC/CP320 will teach how to design and build circuits that interact with the real world.

As embedded systems become more universal, circuits which involve logic and which interact with the real world are everywhere.

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These issues apply whether you’re in the digital world, the analog world, or some combination of both.
Modular design

Designing complex circuits is difficult. Building them up from smaller modules is essential. Several different approaches will be used to develop your abilities to think and work in modular terms.
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Learning Objectives

There are 3 types of learning objectives:

1. **Conceptual understanding**
   - Certain ideas
2. **Practical applying**
   - Knowledge to specific “real-world” tasks
3. **Communication presenting**
   - Information and results in formats typical in professional settings

Different types of learning objectives lead to different types of assessments.

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Conceptual Learning Objectives

1. Using correct terminology
2. Knowing characteristics of series and parallel circuits
3. Understanding use and properties of circuit configurations such as voltage dividers and Wheatstone bridges
4. Being familiar with analog characteristics of digital logic gates
5. Identifying common operational amplifier circuits and explaining their operation
6. Suggesting alternative ways to solve data acquisition and control problems

These will partly be assessed using quizzes.
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1. Measuring DC voltages, currents, etc. using digital meters
2. Measuring DC and AC voltages and time intervals using oscilloscopes
3. Setting up DC supplies and function generators to produce voltages and signals as needed
4. Reading data sheets for electronic components to determine how to use them
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6. Designing circuitry to control an actuator from an input signal which falls within a specified range

7. Writing code to read sensors and control actuators in order to perform a real-world task

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Communication Learning Objectives

1. Maintaining a lab notebook detailing all lab investigation
2. Drawing schematic diagrams
3. Sketching waveforms
4. Summarizing key points related to each lab exercise
5. Answering specific questions arising from lab exercises
6. Creating block diagrams for circuits and sub-circuits to explain complex circuit designs
7. Producing online documents and/or videos to help other people use the same devices and perform similar tasks

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- **Lab Demonstrations** -

Lab Postlab Requirements - show that you've identified important ideas from each lab

Lab Quizzes - show that you have internalized the important concepts

Lab Projects - show you can apply what you've learned to a real situation

The lectures will prepare you for the labs.
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What is a lab notebook?

A lab notebook is a book- or coil-bound notebook that is brought to every lab and lecture. It is used to record all data and observations in the lab and create a summary in the notebook after the lab. Photocopies of the summary are sometimes required. The lab notebook can be used for quizzes and lab tests, so it's to your benefit to keep the notebook organized and use it well.

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Everything for the course is there.

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