

University of Illinois at Urbana-Champaign  
Dept. of Electrical and Computer Engineering

## ECE 120: Introduction to Computing

Introduction and Overview  
Spring 2017

## ECE120: Introduction to Computing

Prof. Steve Lumetta 4-5 p.m. 1015 ECEB  
Prof. Varodayan course coordinator  
(all administrative issues)

Other lecture sections

Prof. Jaramillo 9-10 a.m. 1002 ECEB  
Prof. Jaramillo (again) 1-2 p.m. 1015 ECEB  
Prof. Brown 3-4 p.m. 1013 ECEB

James Scholars: see Wiki,  
then talk to Prof. Varodayan

## What is ECE120?

- Teach a systems perspective that includes both hardware and software (and math!)
- ECE culture and goals
- Expectations of engineers
- Lifelong learning necessary
- Understand and identify tradeoffs
- International group—leverage it!
- Academic reality and grade philosophy

## Opportunities for International Connections

- Monthly meet and greet gatherings (free food!)
- Tuesdays 12:30 – 1:30 in 212 Engineering Hall
- 7 February, 7 March, 25 April
- URLs
  - Engineering International Student Programs  
<http://publish.illinois.edu/internationalstudentprogram/>
  - Calendar of Upcoming Events  
<http://go.engineering.illinois.edu/InternationalStudentPrograms>

main contact: Lori West,  
206 Engineering Hall, [loriwest@illinois.edu](mailto:loriwest@illinois.edu)

## Why Start with Computers?

Why study computers first?

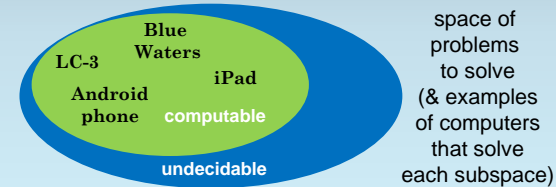
Do Aeronautical Engineers start with the high-bypass turbofan engine?

Or do they start with basic dynamics and lift?

Why not build up to computers slowly?

## Computers are Universal Computation Devices

Described by Alan Turing in 1936



Church-Turing Hypothesis: Computers and humans can compute the same things.

## More Neurons than Transistors?

"The apparatus they [animals] use for timing their movements has more in common with an electronic computer, although it is strictly different in fundamental operation. The basic unit of biological computers, the nerve cell or neurone, is really nothing like a transistor in its internal workings. Certainly the code in which neurones communicate with each other seems to be a little bit like the pulse codes of digital computers, but the individual neurone is a much more sophisticated data-processing unit than the transistor. Instead of just three connections with other components, a single neurone may have tens of thousands. The neurone is slower than the transistor, but it has gone much further in the direction of miniaturization, a trend which has dominated the electronics industry over the past two decades. This is brought home by the fact that there are some ten thousand million neurones in a human brain; you could pack only a few hundred transistors into a skull."

--Richard Dawkins, "The Selfish Gene." Oxford University Press, New York and Oxford, 1976, p. 51

## Today: Billions of Transistors

Dawkins was writing in 1976.

Moore's Law continued.

1997: Pentium released, **4.5 million** transistors

Today: **4.3 billion** transistors on **541mm<sup>2</sup>**

(Denser in 2012: **1.4B** transistors on **160mm<sup>2</sup>**)

Smaller than neurons!

... still only 3 terminals

## ECE Has Undergone a Digital Convergence

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Many alumni, including EEs, in the industry are now computer people.

Most solutions are digital.

Digital system design provides a critical set of skills needed by nearly every ECE grad.

These skills will enable you to go further faster...

## Bottom Up Approach Provides a Firm Understanding

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Why do we build from the ground up?

- Helps you develop of solid understanding of the design an operation of each level.
- Easier to make effective use of abstractions and to improve those abstractions.
- Our students have been successful based on this approach (alumni feedback).

## Where to Find Information

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Start with the Wiki!

One way: remember this link

<https://wiki.illinois.edu/wiki/display/ece120/home>

Another way:

- type “Steve Lumetta” into Google
- Follow link to 120 S17 page under “Classes”

## Read the Wiki Every Day

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<https://wiki.illinois.edu/wiki/display/ece120/home>

What you will find includes:

- announcements from course staff
- course information and timing
- assignments, solutions, exams, and due dates
- a place for exchanging information
  - ask any non-personal questions here
  - do not post answers

## What to Read (and What Not to Read)

### Reading materials

- Patt & Patel, 2<sup>nd</sup> edition
- ~150 pages of notes (free online)
- learning objectives summarized in notes

### Read the notes (see the Wiki for which parts)

- before class
- AND after class

### Look at learning objectives in notes summary sections.

### Use the online tools to practice skills.

Be wary of the Web. No one has screened the content for accuracy.

## Workload Includes Labs and Homework

### Lab assignments roughly every other week

- Software and hardware
- Usually due Wednesdays at 2:30 p.m.
- See assignment for specifics of how and when to turn in

**FIRST LAB: WEDNESDAY 25 JANUARY**

### Weekly homework assignments

- Paper and computer-based
- Due Fridays at 2:30 p.m. (box near 3070ECEB)

**FIRST HOMEWORK: FRIDAY 27 JANUARY**

## Workload Also Includes Exams

### Three midterms

- Tuesday 14 February\*, 7-8:30 p.m.
- Tuesday 14 March, 7-8:30 p.m.
- Tuesday 18 April, 7-8:30 p.m.

### Final exam

- Watch Wiki for details.

\*My apologies for not reviewing this date earlier!

## Let Us Know About Conflicts Early

### University has clear rules for conflicts (online)

- Midterms: **Section 3-202 of Student Code**
- Finals: **Section 3-201 of Student Code**

### Finals rules

- depend on class sizes;
- if you can't tell, ask Laurie Fisher in advising.

If you have a conflict, **let us know early!**  
(specific deadlines are on the Wiki)

## And Workload Includes Discussions

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A question for you:

What skill least developed in many ECE grads?

The answer that many alumni and employers give: **soft skills!**

In discussion section every Thursday, you will...

- work in small groups
- solve fun problems related to lecture together
- practice working with others

## How Will We Grade?

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Labs	15% *
Homework	15% *
Discussions	5% *
Midterms	10%, 15%, 15%
Final	25%

\* Lowest scores (of all weeks) dropped for labs, homeworks, and discussion sheets.

**No late assignments accepted.**

## ECE120 Grading Scale is Absolute

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90% of total points → A of some sort

80% of total points → B of some sort

70% of total points → C of some sort

(more detail on the Wiki)

Many of your classes here will be curved.

## Be Sure to Do the Labs!

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Labs are important. ECE is a hands-on department, and you will learn by doing.

**If you score < 50% on the lab component, you will receive an F for the class.**

Please don't do that.

## Please Go on Time to Discussion!

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In discussion, you will work in groups.

So we need you to **arrive on time**.

**If you come late**, you delay and disrupt your group...

... so **you will lose points**.

(Swap your discussion section and/or let your TA know if you have to walk a long distance.)

## Get to Know Your Fellow Students

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Say “hi” to the person next to you in lecture, discussion, Krannert, the movie theater. Go ahead, try it now. Really!

Use the “**red book**” in Terry Peterson’s office (in ECE advising) to find others in the class.

Make use of the **open lab** time:

**every Tuesday 5-7 p.m. and  
Wednesday 9 a.m.-3 p.m.  
in 2022 ECEB**

## Don't Cheat!

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See **Section 1-402 of the Academic code**.

Discussion sections are done in groups.

In some labs you will have partners.

Otherwise, work must be your own.

It's ok to talk and help each other understand, but it's not ok to **give/share/lend/copy/allow** someone to copy answers.

## Your Guide to the Slides

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The title gives the main point.

**Definitions** and **key messages** in bold blue.

**Parameters** and **variables** in bold green.

Other colors used on a per-slide basis.