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

ECE 101: Exploring Digital Information Technologies for Non-Engineers

Fall 2025

Lecture 1: Introduction and Landscape

The World Has Undergone a Digital Convergence

- **Many alumni** across many disciplines
  - inside and outside of engineering
  - **are now computer people**.
- Most work involves digital technologies.
- Understanding the basics and implications provides **a critical set of skills**.
- These skills will enable you
  - to **go further faster**, and
  - to **make sound decisions** as a voter.

What is our Class About?

Two key concepts lie at the core of technology.

- **information**: data, statistics, or knowledge about something or someone
- **computation**: systematic manipulation of information to produce new, useful, meaningful information

What is technology?

Use of computation and distribution of information to improve people's lives.

What Does the Class Cover?

An **under-the-hood view of important technologies** that will (probably) impact your daily life in the next decade.

For each technology, **we will explain**

- the core technical **challenges**,
- the **solutions** to these challenges,
- How the technology translates to **business and revenue**, and
- What the technology implies in areas such as **privacy, fairness, policy, ethics**, and other paradigm shifts.

What are We Hoping that You will Learn?

Give you **insight as to** who does what, how it all fits together, and what **the future** might hold.

Also to give you a basis for **computational thinking:** what is possible?

Help you as a citizen in a democracy **to make the best choices** about what is allowable.

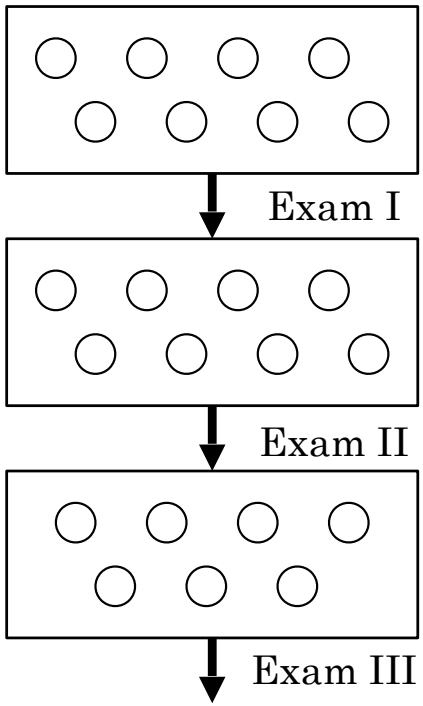
What's the Overall Structure?

Weekly structure: two lectures and a lab

Format of class

- **Three parts**: past & present, intelligence, and future technologies.
- Each part **about three to five weeks**.
- Within each part, **roughly seven or eight topics**.
- After **each part**, **an exam** on that part.

(**no final** exam)

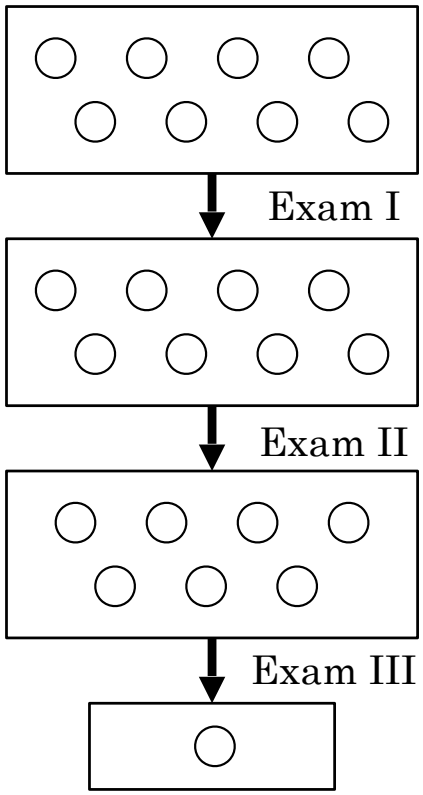


First Part of the Course Covers Past and Present

Let's look a bit more closely at the topics!

Part I: Past & Present—Connecting the World

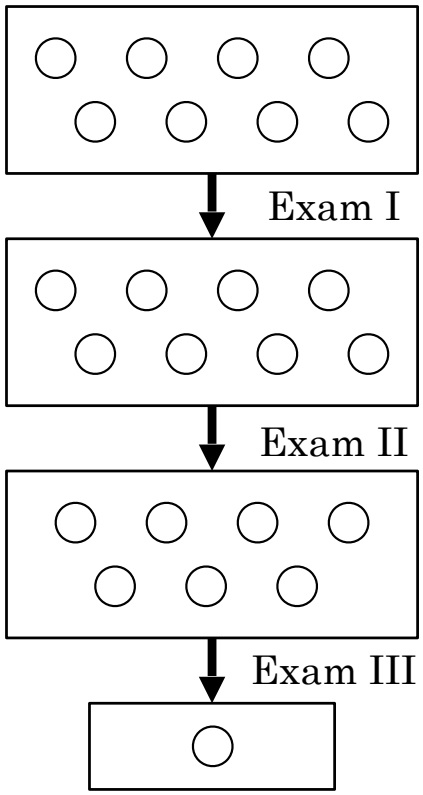
- Week 1: Landscape, History, & Terminology
- Week 2: Communication: WiFi
- Week 3: Communication: Cellular
- Week 4: How the Internet Works
- Week 5: Distributed systems and Social networks
- Week 6: Part I exam



Second Part of the Course Covers Intelligence

Part II: Intelligence & Implications

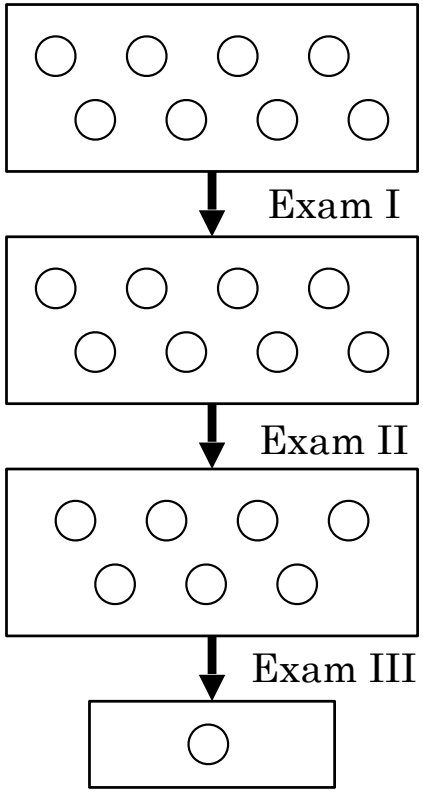
- Week 7: web search and recommendations
- Week 8: machine learning and AI
- Week 9: Physical security, authentication, ethics, privacy, and Fairness
- Week 10: Exam 2



Third Part of the Course Covers the Future

Part III: Future

- Week 11: sense-compute-communicate, voice assistants, and wearables
- Week 12: automated speech, language, and vision
- Week 13: AR/VR and automated driving
- Week 14: Fall Break
- Week 15: Working with Data
- Week 16: Exam 3



What Happens at Our Meetings?

In each lecture:

- What's **the problem** being solved?
- Where's **the computation**?
- What are **the key technologies and companies**?
- What are the **benefits, pitfalls, and issues**?

In the labs, **we'll use Wolfram Notebooks** and try out some ideas and solutions using technology.

Course Logistics

Course website: go.ece.illinois.edu/ece101

Administrivia

Course web page:
- all kinds of info,
- slides, and
- link to Canvas
- Syllabus

Canvas
- Discussions for Q/A—make sure you have notifications set up to not miss any announcements.
- Class participation assignments and homework
- Lab submissions
- Grades

How Does the Grading Work?

Your final grade will be based on a weighted combination of the following:

- Classroom participation: **25%** (6 free absences allowed on emailing instructor within 24 hours)
- Homework: **11%**
- **Late submission policy: 0.1% of the points deducted for each late day**
- Weekly Labs (best 8 out of 10): **25%** (No late submissions for labs unless with prior permission)
- Three Midterm Exams: 3 x 13 = **49%**
  (Regrade policy: You can correct mistakes and turn in for half of the points lost.)

Letter Grades

Percentage Range	Grade
98.00% - 100.00%	A+
93.00% - 97.99%	A
90.00% - 92.99%	A-
87.00% - 89.99%	B+
83.00% - 86.99%	B
80.00% - 82.99%	B-
77.00% - 79.99%	C+
73.00% - 76.99%	C
70.00% - 72.99%	C-
67.00% - 69.99%	D+
63.00% - 66.99%	D
60.00% - 62.99%	D-
59.00% and below	F

What counts towards class participation?

- Every lecture will pose a simple question (that can be answered through Canvas).
- The answer will count towards class participation points.
- Participation in class discussion either in person during lectures or online by replying to canvas discussions will also be considered in order to award class participation grades (fuzzy!!)

Summary of Exam Dates

Exams are all in-class, so please let us know (ASAP) if you need other accommodations.

Exam date summary:

- Exam on Part I: **Friday, Oct 3rd**
- Exam on Part II: **Friday, Oct 31st**
- Exam on Part III: **Wednesday, Dec 10th**

(NO FINAL EXAM)

ECE101 Team

Course Directors

Romit Roy Choudhury

Prof. ECE, CS, CSL

At UIUC since 2013

(MS, PhD from UIUC)

Research: Generative models, Blackbox optimization, Inverse problems, NeRFs, Audio denoising, and Source separation

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Steve Lumetta

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At UIUC since 1998

(BS, MS, PhD Berkeley)

Research: Networks, Processors, Accelerators, High-Performance Computing, Genomics

Education: 3×CE core courses & many others

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Who are We?

Instructor

Abrita Chakravarty

Instructor, ECE, UIUC

Wolfram U, Wolfram Research Inc. since 2013

(MS from Duke University)

Current Interests: Instruction Design, Data Science

Graduate Research: Computational Genomics

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Who are We?

Teaching Assistant

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And ECE …

We in the Illinois ECE community are committed to understanding, empathizing with, and respecting each other, embracing the many differences among us.