

Lecture 0: How This Course Works

ECE 60141 / BME 66100 — Foundations of Computational Imaging

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What this deck is

- Everything practical about the course lives here: where things are, how grading works, how the labs work, and what to do this week.
- Keep it as a reference — it stays posted on the course page.
- The science starts in Lecture 1.

Course information

- **Lectures:** MWF 1:30–2:20 pm, Brown Family Hall (BHEE) 226.
- **Course web page:**
<https://engineering.purdue.edu/~bouman/ece60141/>
- **Labs:** https://cabouman.github.io/grad_labs/
- **Brightspace:** lab and homework submission, grades.
- **Piazza** (questions and discussion) — sign up at:
<https://piazza.com/purdue/fall2026/ece60141>

The two to remember

Course information lives on the course web page. Questions go to Piazza.

- C. A. Bouman, *Foundations of Computational Imaging: A Model-Based Approach*, SIAM, 2022.
- **Chapter 1 is the reading for this week.** Reading assignments are listed on the course schedule.
- Discounts on the SIAM site:
 - 20% off with coupon code BKCABAD.
 - 30% off for SIAM members (membership is free for Purdue students) — the better deal.

- **Instructor:** Charles A. Bouman
Consultation: immediately after class (MWF) — come find me.
- **Teaching assistant:** Jingsong Lin
lin1311@purdue.edu
- Use Piazza for questions whenever possible: your question is almost certainly someone else's question too, and everyone benefits from the answer.

The predictable path

Homework is assigned and due on the schedule, and it is the best preparation for the exams. Do the homework as it comes and the exams will hold no surprises.

Homework and laboratories	30%
Midterm	30%
Final exam	40%

- Grades are curved.

You will not write the code yourself.

That does not mean the labs are easier.

- You will direct an agentic AI (Claude is recommended) to build the code from a precise written specification.
- Your job is the engineering: specify the problem, inspect what comes back, run the experiments, and interpret the results.
- This is how much of engineering is starting to work, and learning to do it well is a skill of its own.
- Each lab is submitted as a single file through Brightspace.

Lab 1: The Thingy Competition — due Friday

- Build a **Thingy**: any application you think would be fun to have. A game, a tool, a toy — your call.
- You direct an AI to build it; you do not write it yourself.
- In class, everyone demos their Thingy. The audience applauds. That is the whole scoring system.
- Everyone who builds, demos, and hands in gets 100%.
- Details: https://cabouman.github.io/grad_labs/labs/lab1/

Why this is Lab 1

It is deliberately low stakes. You are learning how to specify work for an AI and judge what comes back — exactly the skill the technical labs will need.

Policy on AI tools

- AI tools are permitted for any course work *except* in-class closed-book exams.
- Any use of AI must be disclosed.
- In the labs, using AI is not just permitted — it is the point.

Three rules. That is the whole policy.

Topics this semester

- 1 Probability and random processes
- 2 Causal and noncausal Gaussian image models
- 3 MAP reconstruction with Gaussian priors
- 4 Non-Gaussian priors and surrogate optimization
- 5 Constrained optimization
- 6 Plug-and-play reconstruction
- 7 The EM algorithm and mixture models
- 8 General Markov random fields and stochastic simulation

If half the words on this list are unfamiliar, that is exactly why you are here. Every one of them will make sense by December.

To do this week

- Read Chapter 1.
- Sign up for Piazza.
- Install the Claude desktop app and a Markdown editor (instructions on the Lab 1 page).
- Build your Thingy — due Friday, August 28.