

Emerging Interactive Technologies

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AI Use Disclosure: ChatGPT assisted with drafting and formatting the presentation materials. I reviewed and revised the content and take responsibility for the final materials.

Course overview (full MCD)

4

credits

80 min

weekly lecture

170 min

weekly studio lab

Topics

- Sensing & actuation
- Digital design and fabrication
- Wearables and tangible interfaces
- Application in robotics and healthcare

Course project

- Team-based hardware/software prototype
- Design → build → test → demonstrate
- Live demo + research-style report

Recommended preparation: E E 233, E E 474, or equivalent coursework. Students without this background should contact the instructor. Undergraduate contact instructor for approval

Justification

Integrate core ECE skills

Connect sensing, actuation, circuits, firmware, and data processing in a complete interactive system.

Connect ECE with human-centered engineering

Apply ECE principles to wearables, haptics, and interfaces for human use.

Connect coursework to research

Turn ideas into prototypes; evaluate results and communicate methods, findings, and limitations.

Current challenge

The course is hidden in special topic listing under control/device.

Turn ECE knowledge into working interactive technologies.

Learning objectives

OBJECTIVE

EVIDENCE

1 Explain the principles behind human-centered interactive technologies.

Lecture discussions and sprint artifacts

2 Analyze technology evolution and emerging research directions.

Research-informed project framing

3 Collaborate to set goals, plan tasks, and build hardware/software.

Team project and checkpoint demonstrations

4 Apply iterative design, testing, and improvement.

Digital notebooks, evaluation, and final report

Course schedule

1 WEEK

Introduction

2 WEEKS

**Sensing &
actuation for
tangible interfaces**

2 WEEKS

**Computational
design & digital
fabrication**

2 WEEKS

AI integration

1 WEEK

**Sustainable
technologies**

1 WEEK

Democratization

1 WEEK

**Healthcare &
robotics**

Research readings connect each topic to representative systems and recent advances.

Lab schedule

01

Design

Weeks 1–3

Project scope, sketches, and prototype plan

02

Fabricate

Weeks 3–5

Fabricated sensing elements and structures

03

Integrate

Weeks 5–7

Circuits, firmware, and functional sensing

04

Application

Weeks 8–9

Data capture, processing, and evaluation

Each checkpoint: in-lab prototype demonstration + digital lab notebook

Week 10: final presentation and live demo; finals week: final report

Grading

40%

Participation + in-class sprints (HW)

4 collaborative sprints

30%

Proposal + checkpoints

10% project proposal
4 checkpoints × 5%

30%

Final project deliverables

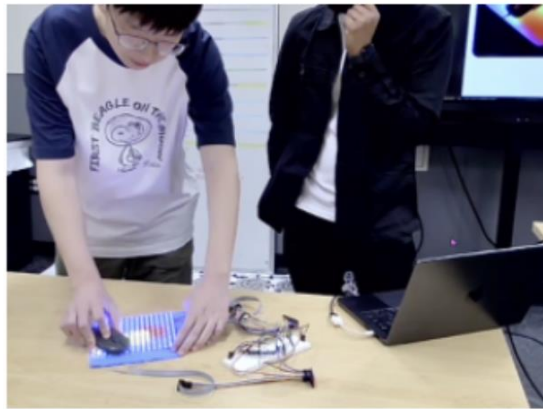
15% report
15% presentation + demo

Prior course offerings

Spring 2025: 16 students from ECE, ME, CSE, 11 graduate students, 5 undergraduate

Spring 2026: 16 students from ECE, HCDE, GIX, 15 graduate students, 1 undergraduate

Previous projects were also presented in undergraduate research symposium, poster submission, and design competition



Prior course offerings



Delivery and resources

Instruction

Faculty-led lectures
Structured studio labs

Facilities & materials

ECE 137B + The Mill
Lab kit
Laser-cutting training
Research readings

Course operations

Cap to 20 students
Budget for additional components:
\$50 per student
1 TA/grader