What is Electronics/Photonics?

- Understanding the physics of devices
  - diodes, transistors, lasers, detectors, ...
- Understand the materials
  - semiconductors, metals, insulators, superconductors
- Application to IC design and fabrication
  - analog, digital, microwave, optical

Senior Electives

- Semiconductor physics: ECE162ABC
- Integrated electronics: ECE 123, 120AB, 122A
- MEMs: ECE141ABC
- High frequency electronics: ECE145ABC
- E/M and optical fiber: ECE144, 135
Semiconductor Physics Series

162A Quantum Mechanics
- learn to think small! put an electron in a box

162B Solid State Physics
- crystal structure, electrons in solids, applications

162C Optoelectronic Materials and Devices
- “sheds light” on semiconductor photonic devices!
- lasers, LEDs, detectors, solar cells

• Prerequisites: ECE 130AB + 134

Integrated Electronics

122A (F), 122B (W) VLSI Principles
- IC design at the transistor level
- Issues in nanoscale CMOS
- CAD tools
- Interconnections and packaging
- Design project

• ECE 122A prerequisites: ECE152A
• ECE 122B prerequisites: ECE 123 or ECE 122A
Integrated Electronics

120A or 123 and 120B
**IC Design and Fabrication (WS)**
- Semiconductor device processing
- Fabricate ICs in the solid state lab
  - ECE 120A prerequisite: ECE132

Micro-Electro-Mechanical (MEMs)

- ECE141ABC MicroElectroMechanical Systems (MEMS)
  - Integrated actuators, sensors, processing techniques, microfluids
  - Prerequisites: ECE130A; ECE137A
High Frequency Electronics

• 145AB Communication Electronics (FW)
  – Design of high frequency wireless communication circuits
• 145C High Speed Bipolar Mixed Signal IC design (S)
  – High speed circuits for broadband communications
• Prerequisites: ECE137AB

E/M and applications

• ECE144 Electromagnetic Fields & Waves (W)
  – Physics and applications of E&M
• Prerequisite: ECE134
• ECE135 Optical Fiber Communication (S)
  – Physics, components, and applications
• Prerequisites: ECE132 and ECE134
Design – Second Sequences

Design:
• ECE 120A & 120B
• ECE 122A & 122B
• ECE 145A & 145B

Second:
• ECE 122A & 120A
• ECE 123 & 122B
• ECE 145A & 145C