CE Senior Elective Courses

• ECE 122A	VLSI Principles
• ECE 122B	VLSI Architecture and Design
• ECE 123	High-Performance Digital Circuit Design
• ECE 153A	The Hardware/Software Interface
• ECE 153B	Sensor and Peripheral Interface Design
• ECE 154A	Introduction to Computer Architecture
• ECE 154B	Advanced Computer Architecture
• ECE 157A	Machine Learning in Design/Test Automation
• ECE 157B	Artificial Intelligence in Design/Test Automation
• ECE 189A-189B-189C	Computer Engineering Project (Senior Capstone)

CE Senior Elective Track Courses

• Very Large Scale Integration (VLSI)	ECE 123/122A or 122A/B
• Embedded Systems Design	ECE 153A/B
• Computer Architecture	ECE 154A/B
• Design and Test Automation	ECE 157A/B
• Capstone Design Project	ECE 189A/B/C

ECE 123/122B or 122A/B Very Large Scale Integration

- Modern VLSI design of integrated circuits
  - Architectural and circuit design issues and constraints for high-performance, low-power, large-scale systems
  - Field effect transistors, layout rules, parasitics, pin limitations, noise and crosstalk, clock and power distribution
- Practical issues in integrated circuit design
  - Noise/Crosstalk/EMI, variability and yield

ECE 153 A/B Embedded Systems Design

- Technology from which modern embedded digital computer systems are built
  - Real time programming
  - Modal and reactive systems
- Major hardware/software components, design issues, implementation mechanisms, and interfaces between components
  - Hardware/software interface
  - Sensor and peripheral interface

ECE 154 A/B
Computer Architecture

- **ECE 154A: Introduction to Computer Architecture**
- **ECE 154B: Advanced Computer Architecture**
  - **Topics include computer architectures with various types (data-, task-, instruction level) of parallelism and memory systems design.**

ECE 157 A/B
Design and Test Automation

- Hardware design and verification through use of software tools: applying machine learning for data analytics in hardware design and verification process
- Design workflows to model engineering processes in hardware test and verification: capturing human perception in an engineering workflow with AI approaches

ECE 189 A/B/C
Computer Engineering Project

- **Design and implementation of a complete digital system including both hardware and software**
  - **ECE 189A (Fall) – Project definition, high-level system requirements, detailed system design, ready for manufacture**
  - **ECE 189B (Winter)- Printed circuit boards(PCB) are fabricated and assembled. Focus shifts to software development on a development kit**
  - **ECE 189C (Spring) – Final assembly, debugging, verification, subsystem and system integration, final presentation**