

Engineering Faculty Document No. EFD 90-24  
February 29, 2024

Memorandum

**To:** The College of Engineering Faculty**From:** The Elmore Family School of Electrical and Computer Engineering**Re:** revision to the Microelectronics and Semiconductors Concentration for BSCmpE

The faculty of the Elmore Family School of Electrical and Computer Engineering has approved the following revisions of the Microelectronics and Semiconductors Concentration for BSCmpE from the College of Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**FROM:**

Electives (9 credits)

Must complete a minimum of 9 credits from the Elective courses below. VIP (Vertically Integrated Projects) and ECE 49600 Undergraduate Projects may be taken for a maximum of 3 credits toward the concentration upon approval of the Associate Head of Undergraduate Programs or Associate Head of Teaching and Learning.

ECE 30500 - Semiconductor Devices

ECE 33700 - ASIC Design Laboratory

ECE 43700 - Computer Design And Prototyping

ECE 45500 - Integrated Circuit Engineering

ECE 45600 - Digital Integrated Circuit Analysis And Design

ECE 49600 - Electrical And Computer Engineering Projects

VIP 37920 - Junior Participation In Vertically Integrated Projects (VIP)

VIP 47920 - Senior Participation In Vertically Integrated Projects (VIP)

ECE 55700 - Integrated Circuit Fabrication Laboratory

ECE 55900 - MOS VLSI Design

ECE 56800 - Embedded Systems

ECE 59500 - Selected Topics In Electrical Engineering Qualifying Titles: CMOS Analog IC

Design (3 credits); Digital Systems Design Automation (3 credits); Microfabrication

Fundamentals (1 credit); Semiconductor Fundamentals (1 credit); Semiconductor Manufacturing

(1 credit); Theory &amp; Practice of Solar Cells: A Cell to System Perspec (1 credit); MEMS-I:

Microfabrication and Materials for MEMS (1 credit); Fundamentals of Current Flow (1

credit); Introduction to Quantum Transport (1 credit); Boltzmann Law: Physics to Computing (1

credit); Primer on Semiconductors (1 credit); Essentials of Transistors (1 credit); Advanced

Lithography (1 credit)

**TO:**

ELMORE FAMILY SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING  
Materials Sciences and Electrical Engineering Building, Room 140  
501 Northwestern Avenue, West Lafayette, IN 47907  
Office: 765-494-3390

Electives (9 credits)

- ECE 30500 - Semiconductor Devices or
  - ECE 50631 – Fundamentals of Current Flow
  - ECE 50632 – Introduction to Quantum Transport
  - ECE 50633 -Boltzmann Law: Physics to Computing
- ECE 33700 - ASIC Design Laboratory
- ECE 43700 - Computer Design And Prototyping
- ECE 45500 - Integrated Circuit Engineering
- ECE 45600 - Digital Integrated Circuit Analysis And Design
- ECE 51214 – CMOS Analog IC Design
- ECE 51216 – Digital Systems Design Automation
- ECE 55700 - Integrated Circuit Fabrication Laboratory
- ECE 55900 - MOS VLSI Design
- ECE 56800 - Embedded Systems
- ECE 39595/49595/59500 - Selected Topics In Electrical Engineering
  - ECE 59500 - Microfabrication Fundamentals
  - ECE 59500 - Semiconductor Fundamentals
  - ECE 59500 - Semiconductor Manufacturing
  - ECE 59500 - MEMS-I: Microfabrication and Materials for MEMS
  - ECE 59500 – Fundamentals of Transistors
  - ECE 59500 - Advanced Lithography

With approval of the Associate Head of Undergraduate Programs or Associate Head of Teaching and Learning, can include up to 3 hours of:

- ECE 49600 – Electrical and Computer Engineering Projects
- VIP 37920 - Junior Participation In Vertically Integrated Projects (VIP)
- VIP 47920 - Senior Participation In Vertically Integrated Projects (VIP)

**Reason:** The area added/removed a few courses as well as some experimental courses have obtained permanent numbers.



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Mithuna Thottethodi  
Associate Head of Teaching and Learning  
Professor of Electrical and Computer Engineering

# Microelectronics and Semiconductor Concentration for Computer Engineering

Semiconductor chips form the backbone of the entire computing and electronics industries. This concentration in Microelectronics and Semiconductors provides transcriptable, specialized training in the design and manufacturing of advanced semiconductor chips with coursework focused on semiconductor devices, integrated circuits, integrated systems, and more.

## **Electives (9 credits):**

Must complete a minimum of 9 credits from the Elective courses below. VIP (Vertically Integrated Projects) and ECE 49600 Undergraduate Projects may be taken for a maximum of 3 credits toward the concentration upon approval of the Associate Head of Undergraduate Programs or Associate Head of Teaching and Learning.

ECE 30500: Semiconductor Devices [3 credits] **OR**

ECE 50631: Fundamentals of Current Flow [1 credit] **AND**

ECE 50632: Introduction to Quantum Transport [1 credit] **AND**

ECE 50633: Boltzmann Law: Physics to Computing [1 credit]

ECE 33700: ASIC Design Lab [2 credits]

ECE 43700: Computer Design and Prototyping [4 credits]

ECE 45500: Integrated Circuit Engineering [3 credits]

ECE 45600: Digital Integrated Circuit Analysis and Design [3 credits]

ECE 51214: CMOS Analog IC Design [3 credits]

ECE 51216: Digital Systems Design Automation [3 credits]

ECE 55700: Integrated Circuit Fabrication Laboratory [3 credits]

ECE 55900: MOS VLSI Design [3 credits]

ECE 56800: Embedded Systems [3 credits]

ECE 59500 – Selected Topics in Electrical Engineering Qualifying Titles:

ECE 59500: Microfabrication Fundamentals [1 credit]

ECE 59500: Semiconductor Fundamentals [1 credit]

ECE 59500: Semiconductor Manufacturing [1 credit]

ECE 59500: MEMS-I: Microfabrication and Materials for MEMS [1 credit]

ECE 59500: Fundamentals of Transistors [1 credit]

ECE 59500: Advanced Lithography [1 credit]

With Approval of the Associate Head of Undergraduate Programs or Associate Head of Teaching and Learning, can include up to 3 hours of:

•VIP 37920 [2 credits]

•VIP 47920 [2 credits]

•ECE 49600 [1-3 credits]

