PURDUE UNIVERSITY | Elmore Family School of Electrical and Computer Engineering

Engineering Faculty Document No. EFD 95-24
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 Minor

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

FROM:
The total credit hour requirement for the minor is 18 credit hours.

Students pick either a Microelectronics track or a Semiconductors track and follow the course requirements for their selected track.

Track 1: Microelectronics [10 credit hours]
Required Core for the Microelectronics Track

ECE 20001: Electrical Engineering Fundamentals I [3 credits] – with FYE waived as a pre-req.
ECE 20007: Electrical Engineering Fundamentals I Lab [1 credit]
ECE 27000: Introduction to Digital System Design [4 credits]
ECE 33700: ASIC Design Lab [2 credits]

OR

Track 2: Semiconductors Track [10 credit hours]
Required Core for the Semiconductors Track

ECE 20001: Electrical Engineering Fundamentals I [3 credits] -- with FYE waived as a pre-req.
ECE 20007: Electrical Engineering Fundamentals I Lab [1 credit]
ECE 20002: Electrical Engineering Fundamentals II [3 credits]
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]

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 (common to both tracks) to reach at least 18 credit hours:

ECE 20002: Electrical Engineering Fundamentals II [3 credits] – if not done as core
ECE 27000: Introduction to Digital System Design [4 credits] – if not done as core
ECE 30500: Semiconductor Devices [3 credits] – if not done as core
ECE 33700: ASIC Design Lab [2 credits] – if not done as core
ECE 36200: Microprocessor Systems and Interfacing [4 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 55700: Integrated Circuit Fabrication Laboratory [3 credits]
ECE 55900: MOS VLSI Design [3 credits]
ECE 59500: Digital Systems Design Automation [3 credits]
ECE 59500: Microfabrication Fundamentals [1 credit]
ECE 59500: CMOS Analog IC Design [3 credits]
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]

TO:
The total credit hour requirement for the minor is 18 credit hours.

Students pick either a Microelectronics track or a Semiconductors track and follow the course requirements for their selected track.

Track 1: Microelectronics [10 credit hours]
Required Core for the Microelectronics Track

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OR

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Required Core for the Semiconductors Track

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ECE 20007: Electrical Engineering Fundamentals I Lab [1 credit]
ECE 20002: Electrical Engineering Fundamentals II [3 credits]
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]

Electives (common to both tracks) to reach at least 18 credit hours:

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ECE 33700: ASIC Design Lab [2 credits] – if not done as core
ECE 30500: Semiconductor Devices [3 credits] – if not done as core **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 36200: Microprocessor Systems and Interfacing [4 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 55700: Integrated Circuit Fabrication Laboratory [3 credits]
ECE 55900: MOS VLSI Design [3 credits]
ECE 59500: Digital Systems Design Automation [3 credits]
ECE 56800: Embedded Systems [3 credits]
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]
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ECE 59500: Advanced Lithography [1 credit]

Reason: The only change is the removal of the application process and additional course options added/updated with permanent numbers.

T. S. Mitt

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

Remove app process

Purdue University 2023-2024 University Catalog

Microelectronics and Semiconductors Minor

The Microelectronics and Semiconductors minor provides transciptable, specialized training to students interested in joining the microelectronics and advanced semiconductors workforce.

Requirements for the Minor (18 credits)

Required Courses - Choose One: (10 credits)

Option 1: Microelectronics Track (10 credits)

- ECE 20001 - Electrical Engineering Fundamentals I
- ECE 20007 - Electrical Engineering Fundamentals I Lab
- ECE 27000 - Introduction To Digital System Design
- ECE 33700 - ASIC Design Laboratory

Option 2: Semiconductors Track (10 credits)

- ECE 20001 - Electrical Engineering Fundamentals I
- ECE 20002 - Electrical Engineering Fundamentals II
- ECE 20007 - Electrical Engineering Fundamentals I Lab
- ECE 30500 - Semiconductor Devices

Electives (8 credits)

- ECE 20002 - Electrical Engineering Fundamentals II
- ECE 27000 - Introduction To Digital System Design
- ECE 30500 - Semiconductor Devices OR — add 50631 + 50632 + 50633
- ECE 33700 - ASIC Design Laboratory
- ECE 36200 - Microprocessor Systems And Interfacing
- ECE 43700 - Computer Design And Prototyping
- ECE 45500 - Integrated Circuit Engineering
- ECE 45600 - Digital Integrated Circuit Analysis And Design
- ECE 55700 - Integrated Circuit Fabrication Laboratory
- ECE 55900 - MOS VLSI Design
- ECE 59500 - Selected Topics In Electrical Engineering

  Titles:
  - CMOS Analog IC Design - Credit Hours: 3.00 — perm# 51214
  - Digital Systems Design Automation - Credit Hours: 3.00
  - Embedded Systems - Credit Hours: 3.00
  - Microfabrication Fundamentals - Credit Hours: 1.00
  - Semiconductor Fundamentals - Credit Hours: 1.00
  - Semiconductor Manufacturing - Credit Hours: 1.00

- ~~Theory & Practice of Solar Cells: A Cell to System Perspective - Credit Hours: 1.00~~
- MEMS-I: Microfabrication and Materials for MEMS - Credit Hours: 1.00
- Fundamentals of Current Flow - Credit Hours: 1.00
- Introduction to Quantum Transport - Credit Hours: 1.00
- Boltzmann Law: Physics to Computing - Credit Hours: 1.00
- ~~Primer on Semiconductors - Credit Hours: 1.00~~
- ~~Essentials~~ of Transistors - Credit Hours: 1.00
- Advanced Lithography - Credit Hours: 1.00

Disclaimer

The student is ultimately responsible for knowing and completing all degree requirements.

Consultation with an advisor may result in an altered plan customized for an individual student.

The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion.

MINOR IN MICROELECTRONICS AND SEMICONDUCTORS

General Requirements:

- Prior to adding the MESC minor, the student must have a grade of C- or better in each of the following courses: MA 16500, MA 16600, PHYS 17200 and CS 15900 (or their equivalents)
- All pre-requisites for the below listed courses must be followed. Transfer and AP credit will be accepted
- A minimum overall GPA of 2.00 is required in ECE courses to qualify for the minor. Approval of the MESC minor may be revoked if the ECE GPA falls below 2.00.
- Enrollment in all ECE courses is subject to space availability.

The total credit hour requirement for the minor is 18 credit hours.

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OR

Track 2: Semiconductors Track [10 credit hours]

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ECE 20002: Electrical Engineering Fundamentals II [3 credits]
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]

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Select from the following electives (common to both tracks) to reach at least 18 credit hours:

ECE 20002: Electrical Engineering Fundamentals II [3 credits] – if not done as core
ECE 27000: Introduction to Digital System Design [4 credits] – if not done as core
ECE 33700: ASIC Design Lab [2 credits] – if not done as core
ECE 30500: Semiconductor Devices [3 credits] – if not done as core **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]

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