

Computer Focus Technical Electives

"Computer Focus Technical Electives" are courses not used to satisfy other degree requirements that are taken from the following list of ECE courses, or all COS courses at the 300, 400, or 500 level excluding COS 397, COS 495, COS 497 and COS 499.

An appropriate ECE 498 special topics course may be considered as "Computer Focus" if an approved degree-credit exception is filed.

| | | <i>Offered Fall 2023 (but not spring)</i> | | | |
|--|---|--|-----------|----------|-----------|
| | | | x | | |
| | | <i>Offered Spr 2024 (but not fall)</i> | | | |
| | | x | | | |
| | | <i>Offered both Fall 2023 and Spr 2024</i> | | | |
| | | x | x | | |
| | | Spr 2024 | Fall 2023 | Spr 2023 | Fall 2022 |
| ECE Courses that have been approved as "Computer Focus" | | | | | |
| ECE 417 | Mobile Robotics | | | | |
| ECE 435 | Network Engineering | x | | x | |
| ECE 490 | Neural Networks | x | | x | |
| ECE 491 | Deep Learning | | x | | x |
| ECE 498 | Selected Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | |
| ECE 531 | Advanced Operating Systems | | | | |
| ECE 533 | Advanced Robotics | | | | |
| ECE 571 | Advanced Microprocessor-Based Design | | | | x |
| ECE 573 | Microprogramming | | | | |
| ECE 574 | Cluster Computing | x | | x | |
| ECE 590 | Neural Networks | x | | x | |
| ECE 591 | Deep Learning | | x | | x |
| ECE 598 | Selected Advanced Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | |
| COS 300, 400, 500 level courses. | | | | | |
| COS 301 | Programming Languages | x | x | x | |
| COS 312 | An Introduction to Video Game Programming with the Unity Game Engine | | x | x | |
| COS 320 | Client-Side Web Development Languages | | | | |
| COS 331 | Operating Systems | x | x | | x |
| COS 412 | Advanced Game Programming with Unity | x | | | |
| COS 415 | Computer Simulation and Modeling, from Development to Display | | | | |
| COS 417 | Spatial Interaction Design | | | | |
| COS 420 | Introduction to Software Engineering | x | x | x | |
| COS 430 | Introduction to Cybersecurity | x | | x | |
| COS 435 | Information Privacy Engineering | | | | x |
| COS 440 | Computer Networks I | x | | | |
| COS 442 | Cloud Computing | | | x | |
| COS 451 | Automata, Computability, and Languages | | | | |
| COS 454 | Data Structures and Algorithms | | x | | x |
| COS 460 | Interactive Computer Graphics | | | | |
| COS 465 | Data Visualization | | | | |
| COS 470 | Introduction to Artificial Intelligence | | x | | x |
| COS 473 | Computer Vision | | | | x |
| COS 475 | Machine Learning | x | | x | |
| COS 478 | Introduction to Private Machine Learning (AI) | | | | |
| COS 480 | Database Management Systems | | | | |
| COS 482 | Introduction to Data Science | | | x | |
| COS 490 | Computers, Ethics and Society | | x | | x |
| COS 498 | Topics in Computer Science | x | | x | x |
| COS 520 | Software Engineering I | x | x | x | |
| COS 530 | Introduction to Cybersecurity | x | | x | |
| COS 535 | Information Privacy Engineering | | | | x |
| COS 540 | Computer Networks | x | | | |
| COS 542 | Cloud Computing | | | x | |
| COS 550 | Theoretical Computer Science I | | | | |
| COS 554 | Algorithms | | x | | x |
| COS 565 | Data Visualization | | | | |
| COS 570 | Topics in Artificial Intelligence | | x | | x |
| COS 573 | Computer Vision | | | | x |
| COS 575 | Machine Learning | x | | | |
| COS 578 | Introduction to Private Machine Learning (AI) | | | | |
| COS 580 | Topics in Database Management Systems | | | | |
| COS 598 | Advanced Topics in Computer Science | x | | x | |

ECE/COS Technical Electives for CEN Majors

ECE/COS Technical Electives include all "Computer Focus Electives", and any other ECE course at the 300,400, or 500 level excluding ECE 394. (Selections must not be used to fulfill other degree requirements.)

| | | <i>Offered Fall 2023 (but not spring)</i> | | | |
|--|---|--|-----------|----------|-----------|
| | | <i>Offered Spr 2024 (but not fall)</i> | | | |
| | | <i>Offered both Fall 2023 and Spr 2024</i> | | | |
| | | Spr 2024 | Fall 2023 | Spr 2023 | Fall 2022 |
| ECE Electives (in addition to Computer-Focus Electives) | | | | | |
| ECE 316 | Random Signal Analysis | | x | | x |
| ECE 343 | Electronics II | x | | x | |
| ECE 351 | Fields and Waves | x | | x | |
| ECE 414 | Feedback Control Systems | x | | x | |
| ECE 427 | Electric Power Systems | | x | | x |
| ECE 444 | Analog Integrated Circuits | | | x | |
| ECE 445 | Analysis and Design of Digital Integrated Circuits | x | | | |
| ECE 450 | Power Electronics | | x | | x |
| ECE 453 | Microwave Engineering | | x | | x |
| ECE 455 | Electric Drives | x | | x | |
| ECE 456 | Electric Drives Lab | | | | |
| ECE 457 | Nanoscience | | x | | |
| ECE 462 | Introduction to Basic Semiconductor Devices and Associated Circuit Models | | x | | x |
| ECE 464 | Microelectronics Science and Engineering | x | | x | |
| ECE 465 | Introduction to Sensors | | x | | x |
| ECE 466 | Sensor Technology and Instrumentation | | | x | |
| ECE 467 | Solar Cells and Their Applications | x | | | |
| ECE 484 | Communications Engineering | | | | |
| ECE 498 | Selected Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | |
| ECE 515 | Random Variables and Stochastic Processes | | | | x |
| ECE 523 | Mathematical Methods in Electrical Engineering | | | | x |
| ECE 543 | Microelectronic Devices I | | x | | x |
| ECE 548 | VLSI Test/Characterization | | | | |
| ECE 550 | Electromagnetic Theory | | | | |
| ECE 552 | Wave Propagation | | | | |
| ECE 565 | Solid State Device Theory I | | | | x |
| ECE 581 | Estimation and Detection Theory | | | | |
| ECE 583 | Coding Theory | | | | |
| ECE 584 | Estimation Theory | | x | | |
| ECE 585 | Fundamentals of Wireless Communication | | | x | |
| ECE 598 | Selected Advanced Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | |

Electrical Engineering Focus Technical Electives

"Electrical Engineering Focus Technical Electives" include the following list of approved courses.

An appropriate ECE 498 special topics course may be considered as "Electrical Focus" if an approved degree-credit exception is filed

| | | Offered Fall 2023 (but not spring) | | x | | |
|--|---|-------------------------------------|----------|-----------|----------|-----------|
| | | Offered Spr 2024 (but not fall) | x | | | |
| | | Offered both Fall 2023 and Spr 2024 | x | x | | |
| | | | | | | |
| | | | Spr 2024 | Fall 2023 | Spr 2023 | Fall 2022 |
| ECE Courses that have been approved as "Electrical Focus" | | | | | | |
| ECE 427 | Electric Power Systems | | | x | | x |
| ECE 444 | Analog Integrated Circuits | | | | x | |
| ECE 445 | Analysis and Design of Digital Integrated Circuits | x | | | | |
| ECE 450 | Power Electronics | | | x | | x |
| ECE 453 | Microwave Engineering | | | x | | x |
| ECE 455 | Electric Drives | x | | | x | |
| ECE 456 | Electric Drives Lab | | | | | |
| ECE 457 | Nanoscience | | | x | | |
| ECE 462 | Introduction to Basic Semiconductor Devices and Associated Circuit Models | | | x | | x |
| ECE 464 | Microelectronics Science and Engineering | x | | | x | |
| ECE 465 | Introduction to Sensors | | | x | | x |
| ECE 466 | Sensor Technology and Instrumentation | | | | x | |
| ECE 467 | Solar Cells and Their Applications | x | | | | |
| ECE 484 | Communications Engineering | | | | | |
| ECE 498 | Selected Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | | |
| ECE 543 | Microelectronic Devices I | | | x | | x |
| ECE 548 | VLSI Test/Characterization | | | | | |
| ECE 550 | Electromagnetic Theory | | | | | |
| ECE 552 | Wave Propagation | | | | | |
| ECE 565 | Solid State Device Theory I | | | | | x |
| ECE 581 | Estimation and Detection Theory | | | | | |
| ECE 583 | Coding Theory | | | | | |
| ECE 584 | Estimation Theory | | | x | | |
| ECE 585 | Fundamentals of Wireless Communication | | | | x | |
| ECE 598 | Selected Advanced Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | | |

ECE Technical Electives for ELE majors

ECE Technical Electives include all "Electrical Engineering Focus Electives", and any other ECE course at the 300,400, or 500 level excluding ECE 394. (Selections must not be used to fulfill other degree requirements.)

| | | <i>Offered Fall 2023 (but not spring)</i> | | | |
|--|---|--|------------------|-----------------|------------------|
| | | <i>Offered Spr 2024 (but not fall)</i> | | | |
| | | <i>Offered both Fall 2023 and Spr 2024</i> | | | |
| | | Spr 2024 | Fall 2023 | Spr 2023 | Fall 2022 |
| ECE Electives (in addition to "Electrical Focus" Electives) | | | | | |
| ECE 316 | Random Signal Analysis | | x | | x |
| ECE 331 | Introduction to Unix Systems Administration | x | | x | |
| ECE 417 | Mobile Robotics | | | | |
| ECE 435 | Network Engineering | x | | x | |
| ECE 471 | Embedded Systems | | x | | x |
| ECE 473 | Computer Architecture and Organization | | x | | x |
| ECE 490 | Neural Networks | x | | x | |
| ECE 491 | Deep Learning | | x | | x |
| ECE 498 | Selected Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | |
| ECE 515 | Random Variables and Stochastic Processes | | | | x |
| ECE 523 | Mathematical Methods in Electrical Engineering | | | | x |
| ECE 531 | Advanced Operating Systems | | | | |
| ECE 533 | Advanced Robotics | | | | |
| ECE 571 | Advanced Microprocessor-Based Design | | | | x |
| ECE 573 | Microprogramming | | | | |
| ECE 574 | Cluster Computing | x | | x | |
| ECE 590 | Neural Networks | x | | x | |
| ECE 591 | Deep Learning | | x | | x |
| ECE 598 | Selected Advanced Topics in Electrical and Computer Engineering (Computer/Electrical "focus") | x | x | x | |

Generic Technical Electives

- All ECE Technical Electives

- Any 300,400, or 500 level course with the designation ECE, COS, CHY, PHY, BIO, BMB, BEN, CHE, CIE, GEE, MAT, STS, BUA

- Any of the additional courses listed below (Selections must not be used to fulfill other degree requirements.)

| | <i>Offered Fall 2023 (but not spring)</i> | | x | | |
|---|---|-----------------|------------------|-----------------|------------------|
| | <i>Offered Spr 2024 (but not fall)</i> | x | | | |
| | <i>Offered both Fall 2023 and Spr 2024</i> | x | x | | |
| | | | | | |
| | | Spr 2024 | Fall 2023 | Spr 2023 | Fall 2022 |
| Pre-approved Generic Electives not fitting the above description | | | | | |
| CHE 200 | Fundamentals of Process Engineering | | x | | x |
| CIE 331 | Fundamentals of Environmental Engineering | | x | | x |
| COS 221 | Data Structures in C++ (May not be offered after Spring 2022) | | | | |
| ECE 198 | Selected Topics in Electrical and Computer Engineering | | x | x | x |
| ECE 394 | Electrical and Computer Engineering Practice | x | x | x | x |
| EET 276 | Programmable Logic Controllers | | x | | x |
| EET 321 | Electro-Mechanical Energy Conversion | x | | x | |
| EET 414 | Printed Circuit Board Design | x | x | | |
| EET 423 | Protective Relay Applications | x | | x | |
| EET 460 | Renewable Energy and Electricity Production | x | x | | |
| EET 486 | Project Management | x | | x | |
| GEE 230 | Introduction to Engineering Leadership and Management | x | | x | |
| INV 180 | Create: Innovation Engineering I | | | | |
| INV 282 | Advanced Innovation Skills | | x | x | x |
| INV 392 | Commercialize: Innovation Engineering III | | | | |
| MEE 150 | Applied Mechanics: Statics | x | x | x | x |
| MEE 230 | Thermodynamics I | x | x | x | x |
| MEE 252 | Statics and Strength of Materials | | x | | |
| MEE 270 | Applied Mechanics: Dynamics | x | x | x | x |
| PHY 236 | Introductory Quantum Physics | | x | | x |
| PPA 264 | Introduction to the Pulp and Paper Industry | x | | x | |