



Electrical and Computer Engineering Undergraduate Advising Handbook for ECE Students

Abstract

This advising handbook is designed for ECE undergraduate students to assist them to customize their education and to help them complete their degrees in a timely and orderly fashion under curriculum and technical guidance from an ECE faculty advisor.

Table of Contents

Introduction	2
Electrical Engineering Degree (BSEE): Course Advising Sheet	6
Electrical Engineering: Suggested Course Combinations for Various Job Titles	8
Computer Engineering Degree (BSCpE): Course Advising Sheet	10
Computer Engineering Degree - Software Engineering Option: Course Advising Sheet	12
Electrical Engineering and Computer Engineering Dual Degree: Course Advising Sheet	13
Electrical Engineering, Computer Engineering, & Software Engineering: Course Advising Sheet	15
Electrical and Computer Engineering Faculty List	17
Availability of ECE Selective Courses in FY2025	18

Appendix

- Electrical Engineering Course Plan Flow Chart (BSEE)
- Computer Engineering Course Plan Flow Chart (BSCpE)
- Computer Engineering-Soft Engineering Course Plan Flow Chart (BSCpE-SOFT)

Introduction

The School of Electrical and Computer Engineering (ECE) has compiled this advising handbook for undergraduate students to assist them with the selection of their courses and to help them complete their degree in a timely and orderly fashion. This handbook is not intended to replace or supersede the University Catalog or the official degree sheets for the Bachelor of Science (BS) in Electrical Engineering (EE) or the BS in Computer Engineering (CpE) degree programs. The student is expected to meet all requirements listed on the official Degree Requirement Sheet corresponding to the year of matriculation.

Per the University Catalog, Section 7.1: “**The responsibility for satisfying all requirements for a degree rests with the student. Advisers, faculty members and administrators offer help to the student in meeting this responsibility.**” Prerequisites to courses can change from year to year. Always check the University Catalog for course prerequisites and grade requirements. Students are strongly encouraged to consult their Advisor before enrolling in or dropping any course. Prerequisites cannot be waived.

Upon admission into ECE as either a new student or transfer student, a student is assigned an Academic Staff Adviser. That adviser will assist students with course selections, prerequisite compliance, degree audit, graduation requirements, and other nuances associated with the ECE programs. Upon completion of ECEN 2714, Fundamentals of Electric Circuits, the student will also be assigned an ECE Faculty Adviser. Students are strongly encouraged to discuss with their faculty adviser all aspects of the ECE curriculum and inquire about the career paths and technologies of electrical engineering and/or computer engineering. The faculty adviser assignment can be found using Banner (<https://my.okstate.edu>).

Many lower division ECE courses have rigorous “C or better” prerequisites. For example, a “C” or better grade in ECEN 2714, MATH 2233, and PHYS 2114 is required to be enrolled in ECEN 3714. Students who do not satisfy such prerequisites will not be allowed to enroll in the intended course (e.g., ECEN 3714) or stay enrolled if they “slip” through the enrollment system. Students are strongly encouraged to review course listings in the *OSU General Catalog* to be fully informed about any course and its prerequisites.

Transfer students are encouraged to discuss previously completed courses taken at a non-OSU university with their academic adviser. Transferable courses are determined on a case-by-case basis unless an articulation agreement has been established between OSU and the non-OSU university. Students who wish to transfer a course as an equivalent ECEN course must have earned a “C” or better in that course and taken it from an ABET (or equivalent) accredited institution. In most cases, the School does not accept engineering technology courses.

Students pursuing the BS degree in Electrical Engineering (BSEE) are given the opportunity during their junior year and senior year to take courses that align with their personal interests and career goals. These “elective” courses cover many electrical engineering sub-disciplines including a) communications (Com), control systems, and digital signal processing (DSP), b) electric power and energy, c) computer architecture, embedded systems, and digital electronics, d) solid-state and analog electronics, and e) microwaves and photonics. ECE faculty can provide advice about the alignment of a student’s career goals with any given sub-discipline. To facilitate a conversation between students and faculty, the following list provides a brief overview of each sub-discipline:

- Communications: wireless technologies, internet, information theory, data networks, encryption, security, digital and analog modulation, encoding and decoding, noise, telecommunications, GPS, internet-of-things
- Control Systems: Robotics, mechatronics, autonomous vehicles, embedded control, feedback, compensation, stability, neural networks, optimization, intelligent systems
- Digital Signal Processing: Machine vision, artificial intelligence, pattern and voice recognition, speech synthesis, video and image processing, digital filters, analog/digital interfaces, data mining, graphical processors
- Electric Power and Energy: Generation, transmission, electric machines, protection, smart and micro-grids, power electronics, electric drives, electro-mechanical transducers, sustainability, renewable energy, energy storage, reliability, batteries, energy conversion and transformation
- Computer Architecture, Embedded Systems, and Digital Electronics: Computer architectures, VLSI design, central and graphical processing units, networking, memory and storage devices, software engineering and coding, embedded controllers, computer arithmetic, internet-of-things, cloud computing, sequential and combinational logic, peripherals
- Solid-State and Analog Electronics: Transistors, diodes, semiconductors, microelectronics, transmitters, receivers, amplifiers, mixers, detectors, regulators, mixed-signal devices, filters, operational amplifiers, oscillators, instrumentation, high speed and low power devices, systems-on-a-chip
- Microwaves and Photonics: Radar, lasers, LIDAR, antennas, wireless transmission, fiber optics, THz communications, medical diagnostics and surgery, beamforming, wave scattering, electromagnetic interference, lumped and distributed circuits, optoelectronics, holography, LED’s, photodetectors, imaging systems, spectroscopy

Students pursuing the BS degree in Computer Engineering (BSCpE) are by default taking a set of courses in Computer Architecture, Embedded Systems, and Digital Electronics with additional topics in computer science, including discrete mathematics, programming, data structures, and operating systems. Six credit hours of technical electives in any ECEN designated course is

allowed to broaden a student's educational experience. Computer Engineering students have the opportunity to enroll in the Software Engineering Option (BSCpE+SOFT). This option adds three credit hours to the BSCpE degree program and specifies a total of 12 credit hours of software-specific courses that need to be taken.

Students also have the option to pursue a dual degree in electrical engineering and computer engineering (BSEE+BSCpE). This dual degree program requires 137 credit hours to complete (i.e., 12 credit hours beyond the BSCpE program plus ENSC 2113, Statics, as the controlled elective). In principle, it can be completed in four years by taking approximately 17 credit hours each semester.

Likewise, Students can pursue a BSEE and BSCpE dual degree with a Software Engineering Option (BSEE+BSCpE+SOFT). This joint degree program requires 143 credit hours to complete. In principle, it can be completed in four years by taking approximately 18 credit hours each semester.

In addition to the dual degree program, the School also offers a “4+1” program that combines the BSEE or BSCpE program with the School’s Master of Engineering in Electrical Engineering (MEngEE) program. Effectively, this program adds 24 credit hours of graduate courses to the BSEE/BSCpE programs to obtain a BSEE/BSCpE degree and MEngEE degree, thus suggesting that the program requires four years to complete the BSEE/BSCpE degree and one year to complete the MEngEE degree (i.e., “4+1”). Specific details of the “4+1” program can be found on the web in the “Memorandum to Graduate Students”; see <https://ece.okstate.edu/>.

Students are highly encouraged to discuss the BSEE+BSCpE, BSCpE+SOFT, BSEE+BSCpE+SOFT, and “4+1” programs with their faculty and staff advisers. These value-added programs have been devised to give students a competitive edge in the workforce by giving them broader and deeper knowledge of the electrical and computer engineering disciplines.

Cooperative (co-op) experiences are oftentimes available that allow a student to earn credit towards their degree while being employed at a participating organization. Such experiences allow a student to be educated in a real-world, engineering setting. When such experiences are available with participating organizations, students can enroll in ENGR 2030, ENGR 3030, or ENGR 4030. Co-Op experiences can be applied to the Controlled Elective requirements of the BSEE/BSCpE degrees.

Course advising sheets for ECE’s various degree programs are available in this Handbook. Degree sheets and flow charts are provided on the web (<https://ceat.okstate.edu/studentservices/degree-req.html>) or are available from the ECE advisers.

A complete listing of all ECEN courses is available on the web (<http://catalog.okstate.edu/courses/ecen/>). It should be noted that ECE is the name of the School (i.e., School of ECE); ECEN is the four-letter, OSU course prefix (e.g., ECEN 4613). In most cases, the ECEN course numbering scheme adheres to the following algorithm: ECEN ABXY:

- A = 1 → Freshman Course
- A = 2 → Sophomore Course
- A = 3 → Junior Course
- A = 4 → Senior Course
- A = 5 → Graduate Course
- A = 6 → PhD Course
- B = 1 → Electric Power and Energy
- B = 2 → Computer Architecture, Embedded Systems, and Digital Electronic
- B = 3 → Solid-State and Analog Electronics
- B = 4 → Control Systems
- B = 5 → Communications
- B = 6 → Microwaves and Electromagnetics
- B = 7 → Signal Processing
- B = 8 → Photonics
- B = 9 → Semiconductors and Solid State Electronics
- X = 1,2,...,9 for any given course in an area
- Y = Number of credit hours (CH)

For example, ECEN 4613 is a three-credit hour, senior level course in the area of microwaves.

A list of the ECE faculty is provided in this handbook along with their area of specialization. In general, all faculty will be able to advise any undergraduate student. However, students are encouraged to contact any faculty member to get detailed information about any area or course.

The number of occupations associated with electrical engineering or computer engineering is quite large—too large to tabulate within this document. However, some course lists are provided that may be applicable for various generic position titles. The courses on the list are suggested courses; students have the flexibility to pick and choose courses as they see fit in accordance with this handbook and the official degree sheets.

Electrical Engineering (124 CH): Course Advising Sheet

I. Required Courses (91 CH):

- ENGL 1113, POLS 1113, HIST 1103, ENGL 3323
- ENGR 1111, ENSC 2113, ENSC 2611, IEM 3503
- CS1113, CS 2433
- MATH 2144, MATH 2153, MATH 2233, MATH 2163, MATH 3013
- CHEM 1414, PHYS 2014, PHYS 2114
- ECEN 2714, ECEN 3213, ECEN 2233, ECEN 3314, ECEN 3513, ECEN 3613, ECEN 3714, ECEN 3903, ECEN 4013, ECEN 4024, ECEN 4503

II. ECEN Junior Elective (3 CH): Choose one course from the following list. (Depending on departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices

III. ECEN Electives (18 CH): Choose six ECEN courses, not previously chosen, from the following list. (Depending on departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester. Note that ECEN 3723 is a prerequisite to ECEN 4413. All of other courses listed below only have required courses as prerequisites.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices
- ECEN 4133 - Power Electronics
- ECEN 4153 - Power System Analysis and Design
- ECEN 4213 - Embedded Computer Systems Design
- ECEN 4233 - High Speed Computer Arithmetic
- ECEN 4243 - Computer Architecture
- ECEN 4273 - Software Engineering
- ECEN 4283 - Computer Networks*
- ECEN 4303 - Digital Integrated Circuit Design
- ECEN 4313 - Linear Electronics Circuit Design
- ECEN 4353 - Communication Electronics
- ECEN 4413 - Automatic Control Systems

- ECEN 4493 - Artificial Intelligence in Engineering
- ECEN 4523 - Communication Theory
- ECEN 4533 - Data Communications
- ECEN 4613 - Microwave Engineering
- ECEN 4743 - Introduction to Biomedical Engineering Modeling and Systems
- ECEN 4763 - Introduction to Digital Signal Processing
- ECEN 4773 - Real Time Digital Signal Processing
- ECEN 4823 - Design of Optical Systems
- ECEN 4843 - Design of Lasers and Systems

IV. Controlled Elective (3 CH): Choose a) ENSC 2123, ENSC 2143, ENSC 2213, ENSC 3233, or ENSC 3313, b) ENGR 2030, ENGR 3030, or ENGR 4030 (Co-Ops) or c) any course, 3000 level or above from ECEN, BAE, MAE, CIVE, IEM, PHYS, MATH, CHEM, STAT, or CS. Exclusions or with ECE approval (and in some cases, approval from other departments):

- All ENGR Courses, sans ENGR 2030, ENGR 3030, ENGR 4030 (Co-Ops)
- ECEN 3020BAE 4001, BAE 4012, BAE 4400
- CHEM 4990
- CIVE 4010, CIVE 4041, CIVE 4043
- CS3570, CS 4570, CS 4993
- IEM 4010, IEM 4020, IEM 4913, IEM 4931
- MAE 4010, MAE 4342, MAE 4344, MAE 4353, MAE 4354, MAE 4363, MAE 4374
- MATH 3403, MATH 3603, MATH 3910, MATH 3933, MATH 4033, MATH 4590, MATH 4900, MATH 4910
- PHYS 4010, PHYS 4712, PHYS 4993
- STAT 4053, STAT 4063, STAT 4910, STAT 4981, STAT 4991, STAT 4993

V. Humanities, Social Science, International, & Diversity Electives (9 CH): A total of at least 6 credits designated as “H” and 3 credits designated as “S” is required. Additionally, students must satisfy the international and diversity requirements per the degree sheets.

*In FY2025, ECEN4283 can be substituted with ECEN4010.71791 Python Programming with Numerical Methods for Engineers.

BSEE Program: Suggested Course Combinations for Various Job Titles

The following lists are suggested courses that a student may wish to take as electives for a given job title. Students, however, may mix and match courses as they see fit. Although the number of job titles is quite large, the following titles are representative of common titles found in industry and laboratories.

Communications Systems Engineer:

- ECEN 3723, Systems I
- ECEN 4523, Communication Theory
- ECEN 4533, Data Communications
- ECEN 4763, Intro to Digital Signal Processing

Control Systems Engineer:

- ECEN 3723, Systems I
- ECEN 4413, Automatic Control Systems (Prereq. ECEN 3723)
- ECEN 4763, Intro to Digital Signal Processing
- ECEN 4773, Real-Time Digital Signal Processing (Prereq. ECEN 4673)

Digital Hardware Designer and/or Computer Architect:

- ECEN 4233, High-Speed Computer Arithmetic
- ECEN 4243, Computer Architecture
- ECEN 4303, Digital Integrated Circuits

Electronics Engineer:

- ECEN 3723, Systems I
- ECEN 4303, Digital Integrated Circuit Design
- ECEN 4313, Linear Electronics Circuit Design
- ECEN 4353, Communication Electronics

Embedded or Computer Systems Engineer:

- ECEN 4243, Computer Architecture
- ECEN 4273, Software Engineering
- ECEN 4213, Embedded Computer System Design
- ECEN 4283/CS 4283, Computer Networks

Microwave, Antenna or Radar Engineer:

- ECEN 3623, Applied Fields and Waves II
- ECEN 4353, Communication Electronics
- ECEN 4613, Microwave Engineering

- ECEN 4843, Design of Lasers and Systems

Optics and Photonics Engineer:

- ECEN 3623, Applied Fields and Waves II
- ECEN 3913, Solid State Electronic Devices
- ECEN 4613, Microwave Engineering
- ECEN 4843, Design of Lasers and Systems

Power Electronics Engineer

- ECEN 3113, Energy, Environment and Economics
- ECEN 3913, Solid State Electronic Devices
- ECEN 4133, Power Electronics
- ECEN 4153, Power System Analysis and Design

Power Systems Engineer:

- ECEN 3723, Systems I
- ECEN 3113, Energy, Environment and Economics
- ECEN 4133, Power Electronics
- ECEN 4153, Power System Analysis and Design

Radio Frequency (RF) Systems Engineer:

- ECEN 3723, Systems I
- ECEN 3623, Applied Fields and Waves II
- ECEN 4353, Communication Electronics
- ECEN 4613, Microwave Engineering

Signal Processing Engineer:

- ECEN 3723, Systems I
- ECEN 4743, Introduction Biomedical Engineering (Prereq. ECEN 4673)
- ECEN 4763, Introduction to Digital Signal Processing
- ECEN 4773, Real-Time Digital Signal Processing (Prereq. ECEN 4673)

Computer Engineering (125 CH): Course Advising Sheet

I. Required Courses (107 CH):

- ENGL 1113, POLS 1113, HIST 1103, ENGL 3323
- ENGR 1111, ENSC 2611, IEM 3503
- CS 1113, CS 2433, CS 2351, CS 3353, CS 3653; CS 4323 or ECEN 4283.
- MATH 2144, MATH 2153, MATH 2233, MATH 2163, MATH 3013
- CHEM 1414, PHYS 2014, PHYS 2114
- ECEN 2714, ECEN 3213, ECEN 2233, ECEN 3314, ECEN 3513, ECEN 3613, ECEN 3714, ECEN 3903, ECEN 4013, ECEN 4024, ECEN 4213, ECEN 4243, ECEN 4303, ECEN 4503

II ECEN Electives (6 CH): Choose two ECEN courses from the following list. (Depending on departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester. Note that ECEN 3723 is a prerequisite to ECEN 4413. All of other courses listed below only have required courses as prerequisites.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices
- ECEN 4133 - Power Electronics
- ECEN 4153 - Power System Analysis and Design
- ECEN 4233 - High Speed Computer Arithmetic
- ECEN 4273 - Software Engineering
- ECEN 4283 - Computer Networks*
- ECEN 4313 - Linear Electronics Circuit Design
- ECEN 4353 - Communication Electronics
- ECEN 4413 - Automatic Control Systems
- ECEN 4493 - Artificial Intelligence in Engineering
- ECEN 4523 - Communication Theory
- ECEN 4533 - Data Communications
- ECEN 4613 - Microwave Engineering
- ECEN 4743 - Introduction to Biomedical Engineering Modeling and Systems
- ECEN 4763 - Introduction to Digital Signal Processing
- ECEN 4773 - Real Time Digital Signal Processing
- ECEN 4823 - Design of Optical Systems
- ECEN 4843 - Design of Lasers and Systems

*In FY2025, ECEN4283 is substituted with ECEN4010.71791 Python Programming with Numerical Methods for Engineers.

III. Controlled Elective (3 CH): Choose a) ENSC 2123, ENSC 2143, ENSC 2213, ENSC 3233, or ENSC 3313, b) ENGR 2030, ENGR 3030, or ENGR 4030 (Co-Ops) or c) any course, 3000 level or above from ECEN, BAE, MAE, CIVE, IEM, PHYS, MATH, CHEM, STAT, or CS. Exclusions or with ECE approval (and in some cases, approval from other departments):

- All ENGR Courses, sans ENGR 2030, ENGR 3030, ENGR 4030 (Co-Ops)
- ECEN 3020
- BAE 4001, BAE 4012, BAE 4400
- CHEM 4990
- CIVE 4010, CIVE 4041, CIVE 4043
- CS 3570, CS 4570, CS 4993
- IEM 4010, IEM 4020, IEM 4913, IEM 4931
- MAE 4010, MAE 4342, MAE 4344, MAE 4353, MAE 4354, MAE 4363, MAE 4374
- MATH 3403, MATH 3603, MATH 3910, MATH 3933, MATH 4033, MATH 4590, MATH 4900, MATH 4910
- PHYS 4010, PHYS 4712, PHYS 4993
- STAT 4053, STAT 4063, STAT 4910, STAT 4981, STAT 4991, STAT 4993

IV. Humanities, Social Science, International, & Diversity Electives (9 CH): A total of at least 6 credits designated as “H” and 3 credits designated as “S” is required. Additionally, students must satisfy the international and diversity requirements per the degree sheets.

Computer Engineering plus Software Engineering Option (128 CH)
Course Advising Sheet

I. Required Courses (107 CH):

- ENGL 1113, POLS 1113, HIST 1103, ENGL 3323
- ENGR 1111, ENSC 2611, IEM 3503
- CS 1113, CS 2433, CS 2351, CS 3353, CS 3653, CS 4323
- MATH 2144, MATH 2153, MATH 2233, MATH 2163, MATH 3013
- CHEM 1414, PHYS 2014, PHYS 2114
- ECEN 2714, ECEN 3213, ECEN 2233, ECEN 3314, ECEN 3513, ECEN 3613, ECEN 3714, ECEN 3903, ECEN 4013, ECEN 4024, ECEN 4213, ECEN 4243, ECEN 4303, ECEN 4503

II. BSCpE/SOFT Requirement (12 CH): ECEN 4273, ECEN 4283*, and CS 3363 plus one course from the following list.

- ECEN 4493 - Artificial Intelligence in Engineering
- CS 4153 - Mobile Applications Development
- CS 4243 - Introduction to Computer Security
- CS 4623 - Introduction to Cyber Physical Systems

III. Humanities, Social Science, International, & Diversity Electives (9 CH): A total of at least 6 credits designated as “H” and 3 credits designated as “S” is required. Additionally, students must satisfy the international and diversity requirements per the degree sheets.

*In FY2025, ECEN4283 can be substituted with ECEN4010.71791 Python Programming with Numerical Methods for Engineers.

Computer Engineering and Electrical Engineering Dual Degree (137 CH)
Course Advising Sheet

I. Required Courses (110 CH):

- ENGL 1113, POLS 1113, HIST 1103, ENGL 3323
- ENGR 1111, ENSC 2113, ENSC 2611, IEM 3503
- CS 1113, CS 2433, CS 2351, CS 3353, CS 3653; CS 4323 or ECEN 4283.
- MATH 2144, MATH 2153, MATH 2233, MATH 2163, MATH 3013
- CHEM 1414, PHYS 2014, PHYS 2114
- ECEN 2714, ECEN 3213, ECEN 2233, ECEN 3314, ECEN 3513, ECEN 3613, ECEN 3714, ECEN 3903, ECEN 4013, ECEN 4024, ECEN 4213, ECEN 4243, ECEN 4303, ECEN 4503

II. ECEN Junior Elective (3 CH): Choose one course from the following list. (Depending departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices

III. ECEN BSEE Electives (9 CH): Choose three ECEN courses, not previously chosen, from the following list. (Depending departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester. Note that ECEN 3723 is a prerequisite to ECEN 4413. All of other courses listed below only have required courses as prerequisites.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices
- ECEN 4133 - Power Electronics
- ECEN 4153 - Power System Analysis and Design
- ECEN 4313 - Linear Electronics Circuit Design
- ECEN 4353 - Communication Electronics
- ECEN 4413 - Automatic Control Systems
- ECEN 4523 - Communication Theory
- ECEN 4533 - Data Communications
- ECEN 4613 - Microwave Engineering
- ECEN 4743 - Introduction to Biomedical Engineering Modeling and Systems
- ECEN 4763 - Introduction to Digital Signal Processing

- ECEN 4773 - Real Time Digital Signal Processing
- ECEN 4823 - Design of Optical Systems
- ECEN 4843 - Design of Lasers and Systems

IV. ECEN BSCpE Electives (6 CH): Choose two ECEN courses, not previously chosen, from the following list. (Depending departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices
- ECEN 4133 - Power Electronics
- ECEN 4153 - Power System Analysis and Design
- ECEN 4233 - High Speed Computer Arithmetic
- ECEN 4273 - Software Engineering
- ECEN 4283 - Computer Networks*
- ECEN 4313 - Linear Electronics Circuit Design
- ECEN 4353 - Communication Electronics
- ECEN 4413 - Automatic Control Systems
- ECEN 4493 - Artificial Intelligence in Engineering
- ECEN 4523 - Communication Theory
- ECEN 4533 - Data Communications
- ECEN 4613 - Microwave Engineering
- ECEN 4743 - Introduction to Biomedical Engineering Modeling and Systems
- ECEN 4763 - Introduction to Digital Signal Processing
- ECEN 4773 - Real Time Digital Signal Processing
- ECEN 4823 - Design of Optical Systems
- ECEN 4843 - Design of Lasers and Systems

V. Controlled Elective: Automatically satisfied.

VI. Humanities, Social Science, International, & Diversity Electives (9 CH): A total of at least 6 credits designated as “H” and 3 credits designated as “S” is required. Additionally, students must satisfy the international and diversity requirements per the degree sheets.

*In FY2025, ECEN4283 can be substituted with ECEN4010.71791 Python Programming with Numerical Methods for Engineers.

Electrical Engineering, Computer Engineering, and Software Engineering
Multiple Degree Program (143 CH)
Course Advising Sheet

I. Required Courses (110 CH):

- ENGL 1113, POLS 1113, HIST 1103, ENGL 3323
- ENGR 1111, ENSC 2113, ENSC 2611, IEM 3503
- CS 1113, CS 2433, CS 2351, CS 3353, CS 3653, CS 4323
- MATH 2144, MATH 2153, MATH 2233, MATH 2163, MATH 3013
- CHEM 1414, PHYS 2014, PHYS 2114
- ECEN 2714, ECEN 3213, ECEN 2233, ECEN 3314, ECEN 3513, ECEN 3613, ECEN 3714, ECEN 3903, ECEN 4013, ECEN 4024, ECEN 4213, ECEN 4243, ECEN 4303, ECEN 4503

II. ECEN Junior Elective (3 CH): Choose one course from the following list. (Depending departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices

III. ECEN BSEE Electives (9 CH): Choose three ECEN courses, not previously chosen, from the following list. (Depending departmental resources and instructor availability, courses on this list may or may not be offered in any given academic year or semester. Note that ECEN 3723 is a prerequisite to ECEN 4413. All of other courses listed below only have required courses as prerequisites.)

- ECEN 3113 - Energy, Environment and Economics
- ECEN 3623 - Applied Fields and Waves II
- ECEN 3723 - Systems I
- ECEN 3913 - Solid State Electronic Devices
- ECEN 4133 - Power Electronics
- ECEN 4153 - Power System Analysis and Design
- ECEN 4313 - Linear Electronics Circuit Design
- ECEN 4353 - Communication Electronics
- ECEN 4413 - Automatic Control Systems
- ECEN 4523 - Communication Theory
- ECEN 4533 - Data Communications
- ECEN 4613 - Microwave Engineering
- ECEN 4743 - Introduction to Biomedical Engineering Modeling and Systems

- ECEN 4763 - Introduction to Digital Signal Processing
- ECEN 4773 - Real Time Digital Signal Processing
- ECEN 4823 - Design of Optical Systems
- ECEN 4843 - Design of Lasers and Systems

IV. BSCpE/SOFT Requirement (12 CH): ECEN 4273, ECEN 4283*, and CS 3363 plus one course from the following list.

- ECEN 4493 - Artificial Intelligence in Engineering
- CS 4153 - Mobile Applications Development
- CS 4243 - Introduction to Computer Security
- CS 4623 - Introduction to Cyber Physical Systems

V. Controlled Elective: Automatically satisfied.

VI. Humanities, Social Science, International, & Diversity Electives (9 CH): A total of at least 6 credits designated as “H” and 3 credits designated as “S” is required. Additionally, students must satisfy the international and diversity requirements per the degree sheets.

*In FY2025, ECEN4283 can be substituted with ECEN4010.71791 Python Programming with Numerical Methods for Engineers

ECE Faculty Contact List

Power and Energy

- Prof. Hamidreza Nazaripouya, 261 ES (hanazar@okstate.edu)
- Prof. Ying Zhang, 217 ES (yi.zhang@okstate.edu)

Computer Engineering

- Prof. Weihua Sheng, 245 ES (weihua.sheng@okstate.edu)
- Prof. James Stine, 248 ES (james.stine@okstate.edu)
- Prof. Hritom Das, 265 ES (hritom.das@okstate.edu)
- Prof. Shahriar Shahabuddin, 202 ES (shahriar.shahabuddin@okstate.edu)

Electronics

- Prof. John Hu, 262 ES (john.hu@okstate.edu)

Control Systems, Communications and Signal Processing

- Prof. Qi Cheng, 243 ES (qi.cheng@okstate.edu)
- Prof. Guoliang Fan, 215 ES (guoliang.fan@okstate.edu)
- Prof. Ghasemzadeh, 218 ES (pejman.ghasemzadeh@okstate.edu)
- Prof. Marty Hagan, 246 ES (martin.t.hagan@okstate.edu)
- Prof. Subhash Kak, 250 ES (subhash.kak@okstate.edu)
- Prof. Scott Mattison, 260 ES (scott.mattison@okstate.edu)
- Prof. Keith Teague, 252 ES (keith.teague@okstate.edu)
- Prof. Gary Yen, 223 ES (gyen@okstate.edu)

Microwaves and Photonics

- Prof. Chuck Bunting, 225 ES (reverb@okstate.edu)
- Prof. John O'Hara, 220 ES (oharaj@okstate.edu)
- Prof. Syed Jehangir, 204 ES (syed.s.jehangir@okstate.edu)
- Prof. Daqing Piao, 258 ES (daqing.piao@okstate.edu)
- Prof. Jeffrey Young, 225 ES (jl.young@okstate.edu)
- Prof. Weili Zhang, 256 ES (wwzhang@okstate.edu)

Senior Design

- Prof. Nate Lannan, 267 ES (nate.lannan@okstate.edu)

Availability of Elective ECE Courses in FY2025

Courses	Fall 2024	Spring 2025
ECEN 3113 - Energy, Environment and Economics	Yes	No
ECEN 3623 - Applied Fields and Waves II	Yes	No
ECEN 3723 - Systems I	No	Yes
ECEN 3913 - Solid State Electronic Devices	No	Yes
ECEN 4133 - Power Electronics	No	Yes
ECEN 4153 - Power System Analysis and Design	No	No
ECEN 4213 - Embedded Computer Systems Design*	Yes	No
ECEN 4233 - High Speed Computer Arithmetic	No	Yes
ECEN 4243 - Computer Architecture*	No	Yes
ECEN 4273 - Software Engineering	Yes	Yes
ECEN 4283 - Computer Networks	No	No
ECEN 4303 - Digital Integrated Circuits*	Yes	No
ECEN 4313 - Linear Electronics Circuit Design	No	No
ECEN 4353 - Communication Electronics	No	No
ECEN 4413 - Automatic Control Systems	No	No
ECEN 4493 - Artificial Intelligence in Engineering	No	Yes
ECEN 4523 - Communication Theory	No	Yes
ECEN 4533 - Data Communications	Yes	No
ECEN 4613 - Microwave Engineering	Yes	No
ECEN 4743 - Introduction to Biomedical Engineering Modeling and Systems	No	No
ECEN 4763 - Introduction to Digital Signal Processing	No	Yes
ECEN 4773 - Real Time Digital Signal Processing	No	No
ECEN 4823 - Design of Optical Systems	Yes	No
ECEN 4843 - Design of Lasers and Systems	No	Yes
ECEN 4010.71791 Python Programming with Numerical Methods for Engineers	Yes	No
ECEN4010.70869 Mobile Robotics	Yes	No

* Required by the CpE degree.

Note: A complete listing of all ECEN courses is available online <http://catalog.okstate.edu/courses/ecen/>.

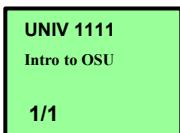
Electrical Engineering 2024-2025

Electrical Engineering Course Plan (EE)

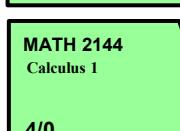
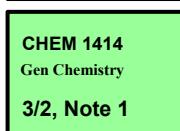
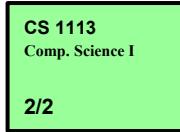
Years 1 and 2

Semester 1

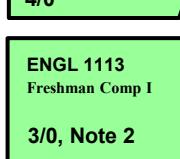
15 Credit Hours



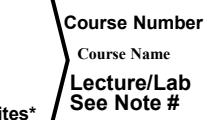
CS2433



MATH2153
ENSC2113
PHYS2014



ENGL3323



Subsequent Requirement**

*Only the last prerequisite in a sequence is listed. All earlier prerequisites must also be satisfied before taking the course.

**See your Advisor, the ECE Advising Document, and Banner for additional information.

Prerequisites*

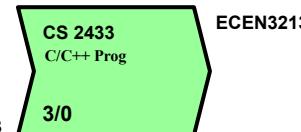
Semester 2

16 Credit Hours

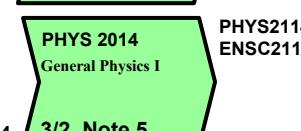
Adv Perm



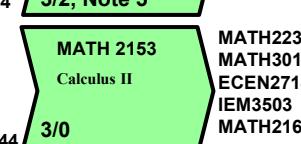
CS1113



MATH2144



MATH2144

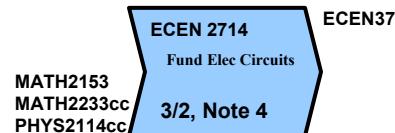


HIST 1103
American History
3/0

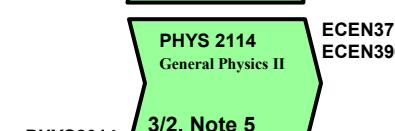
Electrical Engineering Course Plan (EE)

Semester 3

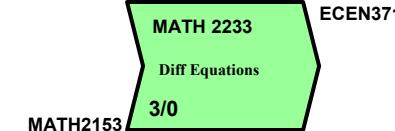
15 Credit Hours



PHYS2014



PHYS2014



MATH2153



ECEN2714cc

Semester 4

16 Credit Hours

ECEN2714
MATH2233
PHYS2114
ENSC2611

CS2433
ECEN2233
ECEN2714

ECEN 3213
Comp Based Systems
2/2

PHYS2114
ECEN2714

MATH 2163
Calculus III
3/0

POLS 1113
American Gov't
3/0

ECEN3314
ECEN3513
ECEN3613
ECEN4013

ECEN4013

ECEN 3903
Intro Semicon Dev
3/0

ECEN3314

MATH 2163
Calculus III
3/0

POLS 1113
American Gov't
3/0

Suggested Course Plan

The anticipation at OSU and most institutions of higher education is that for one semester credit hour (SCH) the student spends one hour per week in lecture (two for lab courses) and two hours studying outside of class (one for lab courses). A three credit hour class requires about nine hours per week. This study plan is recommended for students who will devote full time to university studies and do not have excessive extracurricular activities or other obligations.

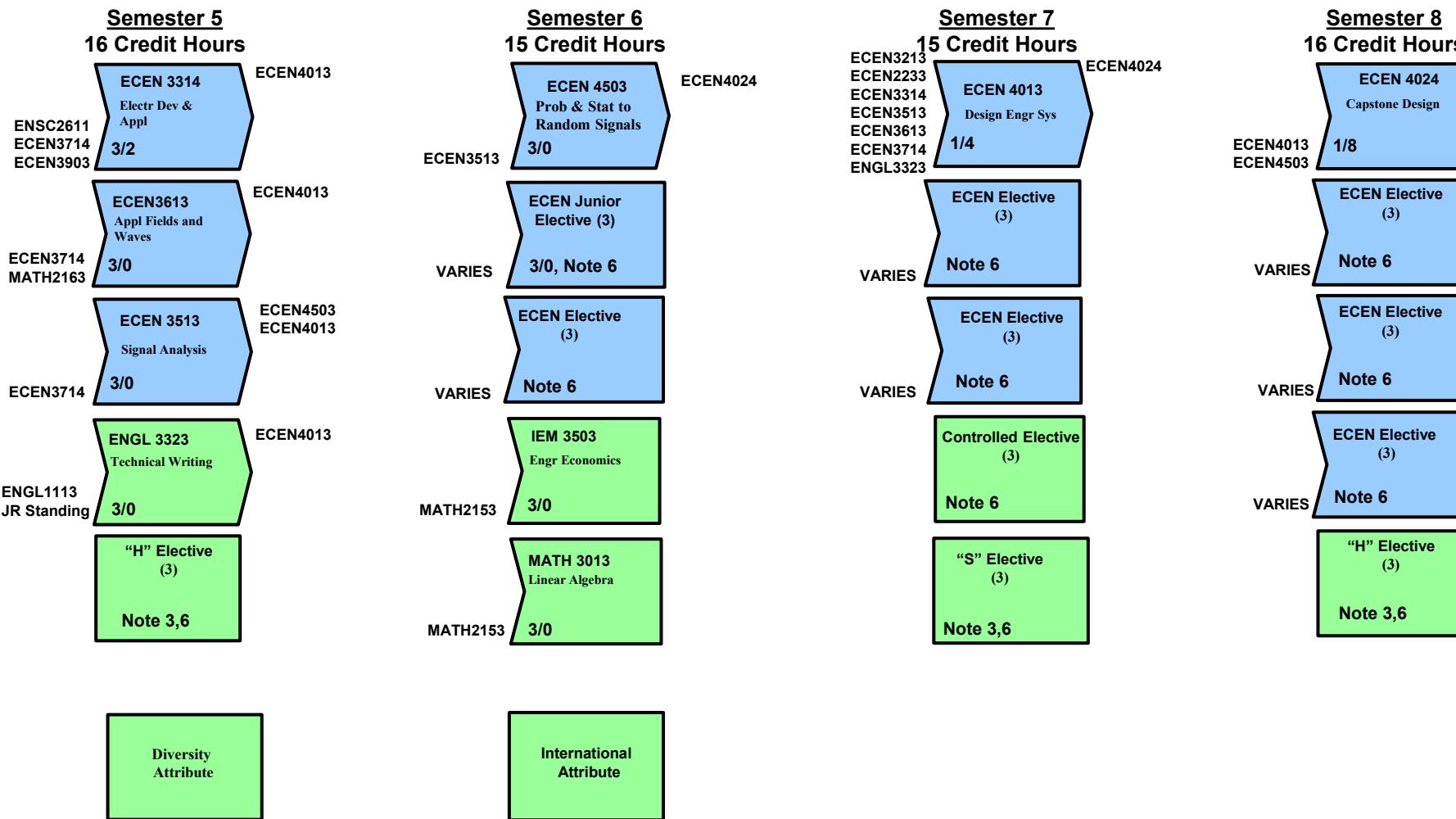
NOTES:

- 1) CHEM 1515 may be substituted for CHEM 1414 and should be taken by all students considering medical school.
- 2) Students with less than a "B" in ENGL 1113 or 1313 must take ENGL 1213 or 1413 prior to ENGL 3323.
- 3) A total of at least 6 hours designated "H" and 3 hours designated "S" is required. Of these, 3 hrs must meet the International Dimension "I" component and 3 hrs must meet the Diversity "D" component.
- 4) MATH 2233 and PHYS 2114 must be taken prior to or at the same time as ECEN 2714.
- 5) General Physics I and II are key prerequisites and should be taken at the earliest possible time.
- 6) Must be at least 3 SCH.

Electrical Engineering 2024-2025

Electrical Engineering Course Plan (EE)

Years 3 and 4



- From the OSU University Handbook: **7.1 Graduation Requirements:** "The responsibility for satisfying all requirements for a degree rests with the student. Advisors, faculty members and administrators offer help to the student in meeting this responsibility."
- This flowchart serves as an advising instrument and visual guide, not as a substitute for the official Degree Requirement sheet found in the University Catalog. When conflicts occur, the official 2023-2024 Degree Requirement Sheet takes precedence.
- This flowchart represents one path of many to graduation. While students do not have to follow the flowchart, prerequisites and course sequencing limit path options.
- Please use the most recent version of the flowchart. Pay attention to course prerequisites, grade requirements, and other official information on Banner. Prerequisites can change from year to year. Always check the most recent University Catalog for course prerequisites. Note that grade requirements are not shown on this flowchart.
- Students are strongly encouraged to consult their Advisor before enrolling in or dropping any course. As always, consult your Advisor if you have any questions or need clarification about the flowchart or official degree requirements.

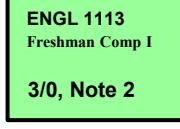
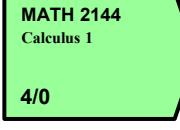
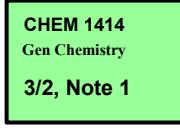
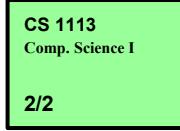
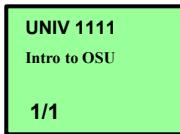
Computer Engineering 2024-2025

Computer Engineering Course Plan (CpE)

Years 1 and 2

Semester 1

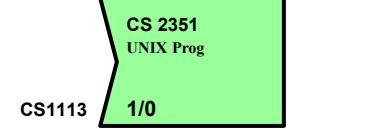
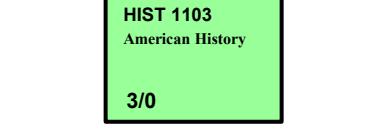
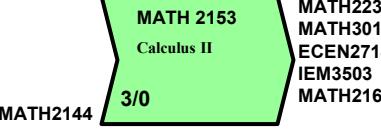
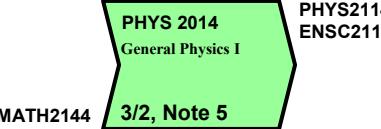
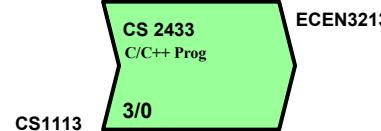
15 Credit Hours



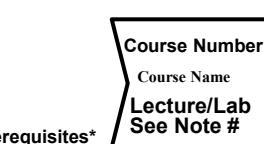
CS2433

Semester 2

17 Credit Hours

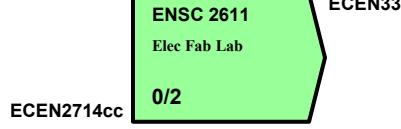
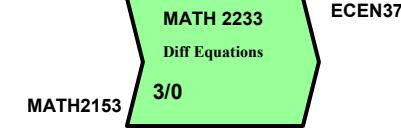
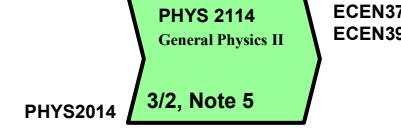
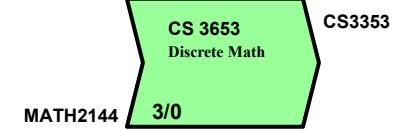
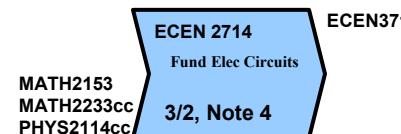


Adv Perm



Semester 3

15 Credit Hours



ECEN 2714
Fund Elec Circuits
ECEN3714

CS3353

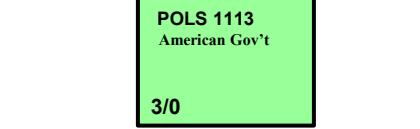
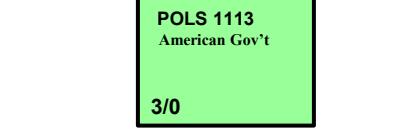
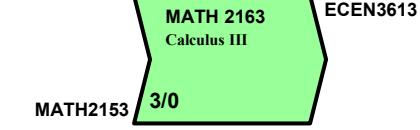
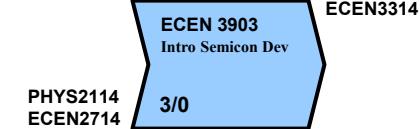
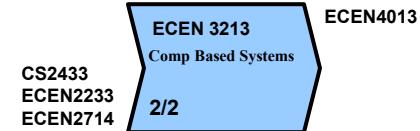
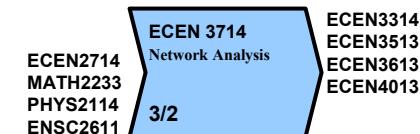
ECEN3714
ECEN3903

ECEN3714

ECEN3314

Semester 4

16 Credit Hours



ECEN3314
ECEN3513
ECEN3613
ECEN4013

Suggested Course Plan

The anticipation at OSU and most institutions of higher education is that for one semester credit hour (SCH) the student spends one hour per week in lecture (two for lab courses) and two hours studying outside of class (one for lab courses). A three credit hour class requires about nine hours per week. This study plan is recommended for students who will devote full time to university studies and do not have excessive extracurricular activities or other obligations.

NOTES:

- 1) CHEM 1515 may be substituted for CHEM 1414 and should be taken by all students considering medical school.
- 2) Students with less than a "B" in ENGL 1113 or 1313 must take ENGL 1213 or 1413 prior to ENGL 3323.
- 3) A total of at least 6 hours designated "H" and 3 hours designated "S" is required. Of these, 3 hrs must meet the International Dimension "I" component and 3 hrs must meet the Diversity "D" component.
- 4) MATH 2233 and PHYS 2114 must be taken prior to or at the same time as ECEN 2714.
- 5) General Physics I and II are key prerequisites and should be taken at the earliest possible time.
- 6) Must be at least 3 SCH.

Computer Engineering

2024-2025

Computer Engineering Course Plan (CpE)

Years 3 and 4

Semester 5

16 Credit Hours

ECEN4013

ECEN 3314
Electr Dev & Appl
3/2

ECEN4013
ECEN 3613
Appl Fields and Waves
3/0

ECEN4013
ECEN 3513
Signal Analysis
3/0

ECEN4013
ENGL 3323
Technical Writing
3/0

CS4323
CS 3353
Data Structures
3/0

CS3653
CS2433
3/0

Semester 6

15 Credit Hours

ECEN4024

ECEN3513
ECEN 4503
Prob & Stat to Random Signals
3/0

ECEN2233
ECEN3213
ECEN3714
ECEN 4243
Computer Arch
2/2

MATH2153
IEM 3503
Engr Economics
3/0

MATH2153
MATH 3013
Linear Algebra
3/0

Note 3,6
"H" Elective (3)

Semester 7

15 Credit Hours

ECEN4024

ECEN3213
ECEN2233
ECEN3314
ECEN3513
ECEN3613
ECEN3714
ENGL3323
ECEN 4013
Design Engr Sys
1/4

ECEN2233
ECEN3213
ECEN3714
ECEN 4213
Emb Comp Sys
2/2

ECEN2233
ECEN3314
ECEN 4303
Dig Elec Ckt Des
3/0

ECEN2233
ECEN3314
ECEN 4303
Dig Elec Ckt Des
3/0

VARIES
Note 6
ECEN Elective (3)

VARIES
Note 6
"S" Elective (3)

Semester 8

16 Credit Hours

ECEN4013
ECEN4503

ECEN 4024
Capstone Design
1/8

ECEN3213
ECEN3714
ECEN 4283
Comp Networks Or CS 4323
Op Systems
3/0

ECEN3213
ECEN3714
ECEN Elective (3)
Note 6

ECEN3213
ECEN3714
Controlled Elective (3)
Note 6

ECEN3213
ECEN3714
"H" Elective (3)
Note 3,6

Diversity Attribute

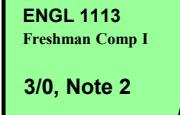
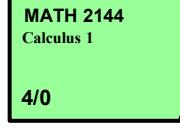
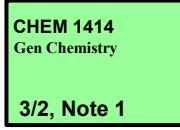
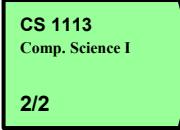
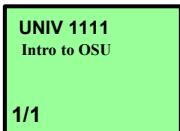
International Attribute

- From the OSU University Handbook: 7.1 Graduation Requirements:** "The responsibility for satisfying all requirements for a degree rests with the student. Advisors, faculty members and administrators offer help to the student in meeting this responsibility."
- This flowchart serves as an advising instrument and visual guide, not as a substitute for the official Degree Requirement sheet found in the University Catalog. When conflicts occur, the official 2023-2024 Degree Requirement Sheet takes precedence.
- This flowchart represents one path of many to graduation. While students do not have to follow the flowchart, prerequisites and course sequencing limit path options.
- Please use the most recent version of the flowchart. Pay attention to course prerequisites, grade requirements, and other official information on Banner. Prerequisites can change from year to year. Always check the most recent University Catalog for course prerequisites. Note that grade requirements are not shown on this flowchart.
- Students are strongly encouraged to consult their Advisor before enrolling in or dropping any course. As always, consult your Advisor if you have any questions or need clarification about the flowchart or official degree requirements.

Computer Engineering – Software Engineering Years 1 and 2

2024-2025 Course Plan (CpE-SOFT)

Semester 1 15 Credit Hours

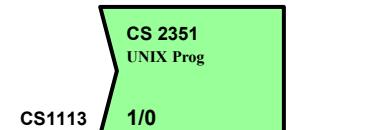
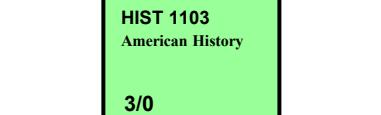
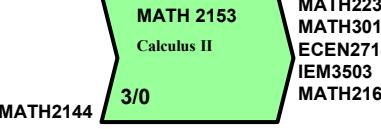
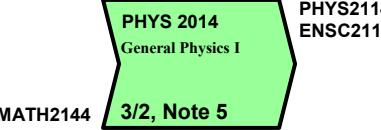
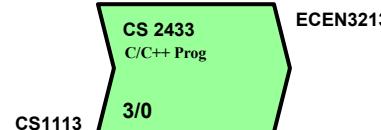


CS2433

MATH2153
ENSC2113
PHYS2014

ENGL3323

Semester 2 17 Credit Hours



Adv Perm

CS1113

MATH2144

MATH2144

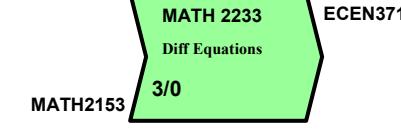
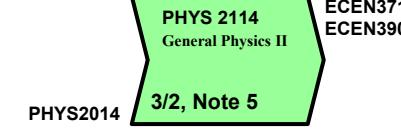
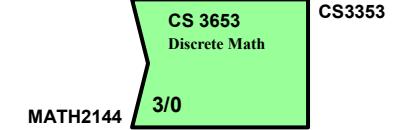
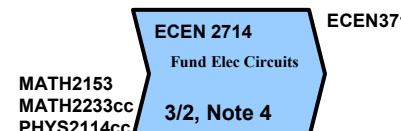
CS1113

ECEN3213
ECEN4013

ECEN3213

PHYS2114
ENSC2113MATH2233
MATH3013
ECEN2714
IEM3503
MATH2163

Semester 3 15 Credit Hours



ECEN3714

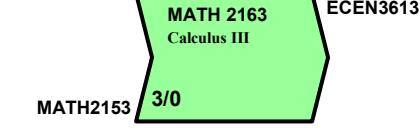
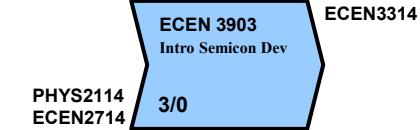
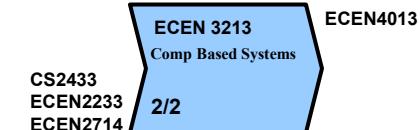
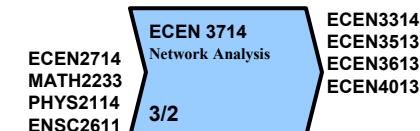
CS3353

ECEN3714
ECEN3903

ECEN3714

ECEN3314

Semester 4 16 Credit Hours

ECEN3314
ECEN3513
ECEN3613
ECEN4013

ECEN4013

ECEN3314

ECEN3613

Prerequisites*

Course Number	Subsequent Requirement**
Course Name	*Only the last prerequisite in a sequence is listed. All earlier prerequisites must also be satisfied before taking the course.
Lecture/Lab See Note #	**See your Advisor, the ECE Advising Document, and Banner for additional information.

Suggested Course Plan

The anticipation at OSU and most institutions of higher education is that for one semester credit hour (SCH) the student spends one hour per week in lecture (two for lab courses) and two hours studying outside of class (one for lab courses). A three credit hour class requires about nine hours per week. This study plan is recommended for students who will devote full time to university studies and do not have excessive extracurricular activities or other obligations.

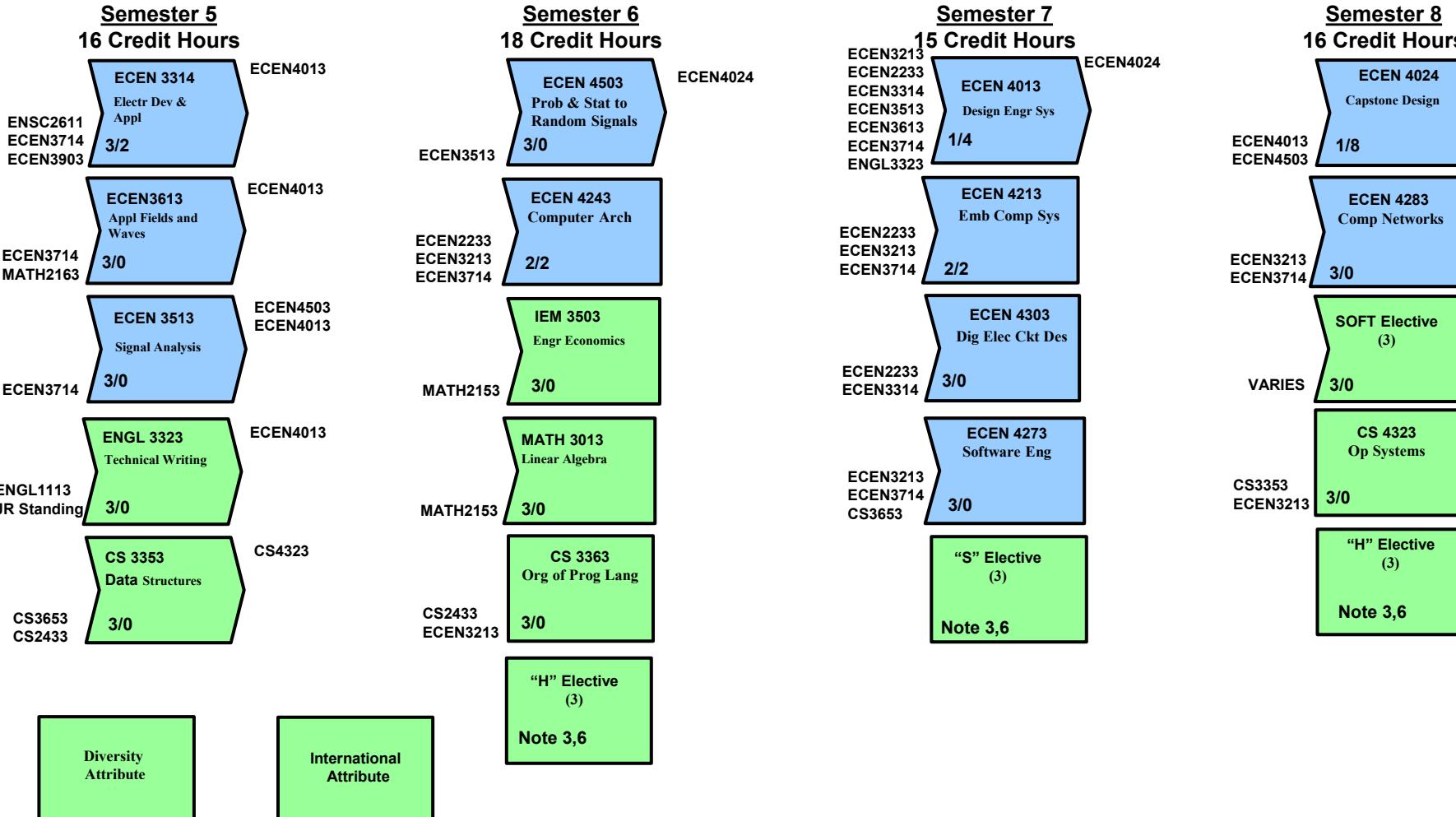
NOTES:

- 1) CHEM 1515 may be substituted for CHEM 1414 and should be taken by all students considering medical school.
- 2) Students with less than a "B" in ENGL 1113 or 1313 must take ENGL 1213 or 1413 prior to ENGL 3323.
- 3) A total of at least 6 hours designated "H" and 3 hours designated "S" is required. Of these, 3 hrs must meet the International Dimension "I" component and 3 hrs must meet the Diversity "D" component.
- 4) MATH 2233 and PHYS 2114 must be taken prior to or at the same time as ECEN 2714.
- 5) General Physics I and II are key prerequisites and should be taken at the earliest possible time.
- 6) Must be at least 3 SCH.

Computer Engineering – Software Engineering Years 3 and 4

Course Plan (CpE-SOFT)

2024-2025



- From the OSU University Handbook: **7.1 Graduation Requirements:** "The responsibility for satisfying all requirements for a degree rests with the student. Advisors, faculty members and administrators offer help to the student in meeting this responsibility."
- This flowchart serves as an advising instrument and visual guide, not as a substitute for the official Degree Requirement sheet found in the University Catalog. When conflicts occur, the official 2023-2024 Degree Requirement Sheet takes precedence.
- This flowchart represents one path of many to graduation. While students do not have to follow the flowchart, prerequisites and course sequencing limit path options.
- Please use the most recent version of the flowchart. Pay attention to course prerequisites, grade requirements, and other official information on Banner. Prerequisites can change from year to year. Always check the most recent University Catalog for course prerequisites. Note that grade requirements are not shown on this flowchart.
- Students are strongly encouraged to consult their Advisor before enrolling in or dropping any course. As always, consult your Advisor if you have any questions or need clarification about the flowchart or official degree requirements.