

Electrical and Computer Engineering, Computer Architecture and Embedded Systems (BSECE)

Computer Engineering Advanced Technical Component Areas

Computer Architecture and Embedded Systems

Computer architecture involves understanding the operation and design of computers on many different levels. These levels include the instruction set, microarchitecture, and logic design. Embedded systems represent the combination of software and hardware that are designed to perform specific functions. These systems may be stand-alone items or an integral part of a larger system. Within this technical component area, students are exposed to logic design, programming, computer architecture, systems design, and digital signal processing. The student studying computer architecture will be well positioned to join the microprocessor design industry as a logic designer or a circuit designer. After a good deal of experience on the job, the student would be well positioned to become the chief architect of a new design.

Jobs in embedded systems involve defining, designing, and fabricating application-specific processors and computers in areas such as automotive electronics, consumer devices, and telecommunications.

Total Hours Required: 125

Plan of Study

The Plan of Study is a suggested four-year course sequence to support academic planning and serves as a helpful guide. Currently enrolled students should meet with their academic advisor to tailor their course selections and timelines to their individual goals and circumstances.

Course	Title	Hours
Year 1		
Semester 1		
ECE 302	Introduction to Electrical Engineering	3
ECE 306	Introduction to Computing	3
RHE 306	Rhetoric and Writing	3
M 408C	Differential and Integral Calculus	4
First-Year Signature Course (090)		3
Hours		16
Semester 2		
ECE 319K	Introduction to Embedded Systems	3
M 408D	Sequences, Series, and Multivariable Calculus	4
PHY 303K	Engineering Physics I	3
PHY 105M	Laboratory For Physics 302K, 303K, and 317K	1
Social and Behavioral Sciences (080)		3
Hours		14
Year 2		
Semester 1		
ECE 411	Circuit Theory	4
M 427J	Differential Equations with Linear Algebra	4
PHY 303L	Engineering Physics II	3
PHY 105N	Laboratory For Physics 302L, 303L, and 317L	1

Visual and Performing Arts (050)		3
Hours		15
Semester 2		
ECE 312	Software Design and Implementation I	3
ECE 313	Linear Systems and Signals	3
M 340L	Matrices and Matrix Calculations	3
Humanities (040)		3
American and Texas Government (070)		3
Hours		15
Year 3		
Semester 1		
ECE 333T	Engineering Communication	3
ECE 351K	Probability and Random Processes	3
ECE 316	Digital Logic Design	3
ECE 445L	Embedded Systems Design Laboratory	4
ECE 460N	Computer Architecture	4
Hours		17
Semester 2		
ECE 360P	Concurrent and Distributed Systems	3
Free elective (mathematics or basic science)		4
Free Elective		4
ECE 360C	Algorithms	3
ECE 362K	Introduction to Automatic Control	3
Hours		17
Year 4		
Semester 1		
ECE 364D	Introduction to Engineering Design	3
M 325K	Discrete Mathematics	3
C S 375	Compilers	3
U.S. History (060)		3
Free Elective		3
Hours		15
Semester 2		
ECE 464C	Corporate Senior Design Project	4
U.S. History (060)		3
American and Texas Government (070)		3
Free Elective		6
Hours		16
Total Hours		125

Requirements

All requirements are listed below, starting with the most specialized moving to the most general. Additional requirements may follow the table, so be sure to read the entire page. Some required courses listed below may also satisfy [General Education](#) requirements, including [Core Curriculum](#).

Code	Title	Hours
Concentration		
ECE 316	Digital Logic Design	3
ECE 460N	Computer Architecture	4
ECE 445L	Embedded Systems Design Laboratory	4
M 325K	Discrete Mathematics	3
ECE 360C	Algorithms	3
Hours chosen from:		9
ECE 422C	Software Design and Implementation II	
ECE 445M	Embedded and Real-Time Systems Laboratory	
ECE 445S	Real-Time Digital Signal Processing Laboratory	
ECE 460M	Digital Systems Design Using Hardware Description Languages	
ECE 360P	Concurrent and Distributed Systems	
ECE 460R	Introduction to VLSI Design	

ECE 362K	Introduction to Automatic Control	
C S 375	Compilers	
<i>Subtotal</i>		26
Degree (see details below)		61
Free electives: Additional coursework to reach total hours required.		14
<i>Subtotal</i>		75
General Education		
Remaining Core Curriculum (42 hours total)		24
Foreign Language other than English, Beginning Proficiency		
<i>Subtotal</i>		24
College Requirements - Engineering		
General University Requirements		
Total Hours		125

Degree-Bachelor of Science in Electrical and Computer Engineering

Code	Title	Hours
<i>Electrical and Computer Engineering Courses</i>		
ECE 302	Introduction to Electrical Engineering (part II science and technology)	3
or ECE 302H	Introduction to Electrical Engineering: Honors	
ECE 306	Introduction to Computing	3
ECE 411	Circuit Theory	4
ECE 312	Software Design and Implementation I	3
or ECE 312H	Software Design and Implementation I: Honors	
ECE 313	Linear Systems and Signals	3
ECE 319K	Introduction to Embedded Systems	3
or ECE 319H	Introduction to Embedded Systems: Honors	
ECE 333T	Engineering Communication	3
ECE 351K	Probability and Random Processes	3
ECE 364D	Introduction to Engineering Design	3
or ECE 364E	Interdisciplinary Entrepreneurship	
Hours chosen from: senior design project		4
ECE 464G	Multidisciplinary Senior Design Project	
ECE 464H	Honors Senior Design Project	
ECE 464K	Senior Design Project	
ECE 464R	Research Senior Design Project	
ECE 464S	Start-Up Senior Design Project	
<i>Advanced Technical Elective: Within Any Core of Electrical Engineering</i>		
Within any core of Electrical Engineering, Hours chosen from:		3
One upper-division electrical engineering course		
ECE 316	Digital Logic Design	
<i>Mathematics</i>		
Choose a sequence below:		8
Sequence 1:		
M 408C	Differential and Integral Calculus	
M 408D	Sequences, Series, and Multivariable Calculus	
Sequence 2:		
M 408K	Differential Calculus	
M 408L	Integral Calculus	
M 408M	Multivariable Calculus	
M 427J	Differential Equations with Linear Algebra	4
M 340L	Matrices and Matrix Calculations	3
<i>Physics</i>		
PHY 303K	Engineering Physics I	3

PHY 105M	Laboratory For Physics 302K, 303K, and 317K	1
PHY 303L	Engineering Physics II	3
PHY 105N	Laboratory For Physics 302L, 303L, and 317L	1
<i>Rhetoric and Writing</i>		
RHE 306	Rhetoric and Writing	3
Total Hours		61

Additional Requirements and Policies

Enrollment in ECE 333T, ECE 160, ECE 260, ECE 360, ECE 460, and ECE 379K requires completion of ECE 312 or ECE 313 with a grade of at least C-.

Pre-approved courses are used to fulfill technical core, advanced math and/or science and core technical electives; other elective courses must be approved by the electrical and computer engineering faculty before the student enrolls in them.

Transfer Coursework: No more than 25 semester credit hours of transfer electrical and computer engineering coursework may be counted for credit toward the electrical and computer engineering degree.

Free Electives Policy

Must include at least one advanced mathematics or basic science course (three hours); no more than three hours of lower-division coursework; all coursework must count for a major in the offering department; all coursework must be taken in residence, except that up to three credit hours can be transferred with approval; no course can duplicate a course the student has taken or is required to take as part of the other Electrical and Computer Engineering coursework requirements.

Upper-Division Technical Component Areas

Electrical and computer engineering students must choose an advanced technical component area from the electrical engineering or computer engineering concentrations. Concentrations give students the flexibility to tailor their upper-division academic program to meet a variety of career goals, while ensuring that they graduate with a robust grounding in one or more selected technical or specialty areas.

For all concentrations, the student must complete all courses in the area on the letter-grade basis. Detailed guidelines for choosing areas and elective courses within each area are published on the electrical and computer engineering department website. Approved electives for each area may be subject to periodic change as needs arise.

Electrical Engineering Option

Advanced Technical Component (mathematics) is four hours and one Advanced Technical Component Requirement is three hours.

Computer Engineering Option

Advanced Technical Component (mathematics) is three hours and one Advanced Technical Component Elective is four hours.

Alternate Mathematics Courses

For students who choose an advanced technical component area in computer engineering:

Code	Title	Hours
M 427L	Advanced Calculus for Applications II	4
M 328K	Introduction to Number Theory	3
M 343K	Introduction to Algebraic Structures	3
M 344K	Intermediate Symbolic Logic	3
M 348	Scientific Computation in Numerical Analysis	3
M 358K	Applied Statistics	3

M 374M	Mathematical Modeling in Science and Engineering	3
C S 341	Automata Theory	3
C S 346	Cryptography	3

For students who choose an advanced technical component area in electrical engineering:

Code	Title	Hours
M 325K	Discrete Mathematics	3
M 328K	Introduction to Number Theory	3
M 346	Applied Linear Algebra	3
M 348	Scientific Computation in Numerical Analysis	3
M 358K	Applied Statistics	3
M 361	Theory of Functions of a Complex Variable	3
M 362M	Introduction to Stochastic Processes	3
M 372K	Partial Differential Equations and Applications	3
M 374	Fourier and Laplace Transforms	3
M 374M	Mathematical Modeling in Science and Engineering	3