BS in Computer Engineering

Computer Engineering is the application of science to the design , implementation, and maintenance of hardware/software components of: i) computers and ii) systems that include computers (i.e., embedded systems). This program prepares students to practice Computer Engineering and enter graduate programs in various disciplines of science and engineering.

Graduates acquire core knowledge in the following areas:

1. circuits and electronics
2. software design (including data structures and algorithms)
3. digital design
4. computer architecture and organization
5. embedded systems
6. computer networks
7. signal processing
8. systems resource management

Marketable Skills

This subject matter will provide students with skills that are in high demand in the labor market, including but not limited to:

1. Software development
2. Digital Design
3. Data Analysis
4. Communication network design and management
5. Computer and network security analysis
6. Cybersecurity

Educational Objectives

1. Our graduates should apply their knowledge and skills to computer engineering practice or to pursue advanced education successfully as demonstrated by some of the following:
   a. Completion of certificates, graduate degrees, or professional licensing
   b. Sustained employment and/or full-time graduate school in electrical/computer engineering or related area
   c. Advancement and/or recognition in employment
2. Our graduates should demonstrate creativity, leadership, and entrepreneurial thinking in the practice of engineering as demonstrated by some of the following
   a. Leadership roles in their organizations, their profession, and/or in society
   b. Effective participation in disciplinary and multidisciplinary teams
   c. Successful development and/or improvement of products, processes, and/or systems
3. Our graduates should engage successfully in professional communication as demonstrated by some of the following
   a. Publication of technical articles, engineering reports, and/or proposals
   b. Effective participation in disciplinary and multidisciplinary teams
   c. Presentation of their work at professional meetings or conferences
4. Our graduates should exhibit social and professional responsibility in the practice of engineering as demonstrated by some of the following
   a. Involvement in community service
   b. Evidence of commitment to lifelong learning
   c. Membership in professional organizations

Student Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as, global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Degree Requirements

The BS Degree in Computer Engineering consists of 128 semester credit hours divided into a lower division, providing diverse courses over a broad base of technical subjects, and an upper division providing more-specialized courses. The Degree culminates in a capstone design project.

Degree Plan

BS in Computer Engineering with Concentration

Required Credits: 128

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements. (p. 4)		42
Computer Engineering Designated Core (All courses require a grade of C or better)		
Required Courses:		
CE 2326	Econ for Engrs & Scientists	
CS 1320	Computer Programming Sci/Engr	
MATH 1508	Precalculus	
or MATH 1310	Trigonometry and Conics	
or MATH 1411	Calculus I	
PHYS 2320 & PHYS 2120	Introductory Mechanics and Laboratory for PHYS 2320	
or PHYS 2420	Introductory Mechanics	
PHYS 2321 & PHYS 2121	Introductory Electromagnetism and Laboratory for PHYS 2321	
or PHYS 2421	Introductory Electromagnetism	
Math/Science Core		
Required:		
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3
MATH 2326	Differential Equations	3
MATH 2300	Discrete Mathematics	3
MATH 3323	Matrix Algebra	3
Electrical/Computer Engineering Core		
Required:		
ECE 1300	Intro to Electr/Comp Eng	3
ECE 1100	Lab for ECE 1300	1
ECE 2301	Electric Circuits I	3
ECE 2302	Electric Circuits II	3
ECE 2102	Lab for ECE 2302	1
ECE 3341	Electronics I	3
ECE 3141	Lab for ECE 3341	1
ECE 3331	Discrete Time Signals & Sys	3
ECE 3332	Prob with App Elect/Comp Eng	3
ECE 3100	Junior Prof. Orientation	1
Computer Engineering Core		
Required:		
ECE 2303	Digital Systems Design I	3
ECE 2103	Lab for ECE 2303	1

ECE 2300	Software Design I	3
ECE 3350	Software Design II	3
ECE 2304	Microprocessor Systems I	3
ECE 2104	Lab for ECE 2304	1
ECE 3351	Computer Architecture	3
ECE 3352	Operating System Design	3
Senior Capstone		
Required:		
ECE 4201	CpE Capstone Project Lab I	2
ECE 4202	CpE Capstone Project Lab II	2
Select two Computer Engineering Electives with Lab		**8**
ECE 3370 & ECE 3170	Intro to Communication Netwks and Lab for ECE 3370	
ECE 4353 & ECE 4153	Digital Systems Design II and Lab for ECE 4353	
ECE 4354 & ECE 4154	Microprocessor Systems II and Lab for ECE 4354	
Elective Courses		
Required:		8
Experiential Learning		
X1XX		
X1XX		
Electives		
ECE X3XX		
ECE X3XX		
Students must select one Concentration		**6**
Total Hours		**129**

General Computer Engineering

Code	Title	Hours
Select two courses below:		6
ECE 33XX or ECE 43XX		
ECE 33XX or ECE 43XX		

Digital Design

Code	Title	Hours
Required:		6
ECE 4353 or ECE 33XX OR ECE 43XX	Digital Systems Design II	
ECE 4355	VLSI Design	

Embedded Systems

Code	Title	Hours
Select two of the following:		6
ECE 4354	Microprocessor Systems II	
ECE 4353	Digital Systems Design II	
ECE 33XX or ECE 43XX		

Communication Networks

Code	Title	Hours
Required:		6
ECE 3370	Intro to Communication Netwks	
ECE 4390	Special Topics	

Machine Learning

Code	Title	Hours
Required		6
ECE 4360	Foundations of Deep Learning	
ECE 4361	Fuzzy Logic and Engineering	
or ECE 4362	Computer Vision	

Information Security

Code	Title	Hours
Required:		6
ECE 4370	Introduction to Cybersecurity	
ECE 4390	Special Topics	

University Core Curriculum

The department may make specific suggestions for courses which are most applicable towards your major.

All courses require a C or better

I. Communication (six hours)

Code	Title	Hours
Courses in this category focus on developing ideas and expressing them clearly, considering the effect of the message, fostering understanding, and building the skills needed to communicate persuasively. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages appropriate to the subject, occasion, and audience.		
Select six hours of the following:		6
For students whose secondary education was in English:		
COMM 1611	Written and Oral Communication	
ENGL 1313	Writing About Literature	
RWS 1301	Rhetoric & Composition I	
RWS 1302	Rhetoric & Composition 2	
RWS 1601	Rhetoric, Composition & Comm	
For students whose secondary education was not in English:		
ESOL 1311	Expos Engl Compos-Spkr Esl	
ESOL 1312	Res & Crit Writng Spkr Esl	
Total Hours		**6**

II. American History (six hours)

Code	Title	Hours
Courses in this category focus on the consideration of past events and ideas relative to the United States, with the option of including Texas History for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role.		
HIST 1301	History of U.S. to 1865	3
HIST 1302	History of U.S. Since 1865	3
Total Hours		**6**

III. Language, Philosophy & Culture (three hours)

Code	Title	Hours
Courses in this category focus on how ideas, values, beliefs, and other aspects of culture express and affect human experience. Courses involve the exploration of ideas that foster aesthetic and intellectual creation in order to understand the human condition across cultures.		

Select one of the following:		3
AFST 2300	Intro-African Amer Studies	
CHIC 2302	Latina/o Presence in the U.S.	
ENGL 2311	English Literature	
ENGL 2312	English Literature	
ENGL 2313	Intro to American Fiction	
ENGL 2314	Intro to American Drama	
ENGL 2318	Intro to American Poetry	
FREN 2322	Making of the "Other" Americas	
HIST 2301	World History to 1500	
HIST 2302	World History Since 1500	
PHIL 1301	Introduction to Philosophy	
PHIL 2306	Ethics	
RS 1301	Introduct to Religious Studies	
SPAN 2340	Seeing & Naming: Conversations	
WS 2300	Introduction to Womens Studies	
WS 2350	Global Feminisms	
Total Hours		**3**

IV. Mathematics (three hours)

Code	Title	Hours
Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.		
Select one of the following:		3
MATH 1309	College Algebra	
MATH 1310	Trigonometry and Conics	
MATH 1319	Math in the Modern World	
MATH 1320	Math for Social Sciences I	
MATH 1411	Calculus I	
MATH 1508	Precalculus [1,2]	
MATH 2301	Math for Social Sciences II	
STAT 1380	Statistical Literacy	
STAT 2480	Elementary Statistical Methods	
1 A higher-level course in the calculus sequence can be substituted.		
2 TCCN MATH 1314 will also satisfy this requirement.		
Total Hours		**3**

V. Life & Physical Sciences (six hours)

Code	Title	Hours
Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on experiences.		
Select one of the following:		1-4
ASTR 1107	Astronomy Lab I	
ASTR 1307	Elem Astronomy-Solar System	
ASTR 1308	Elem Astr Stars & Galaxies	
BIOL 1103	Introductory Biology Lab	
BIOL 1104	Human Biology Laboratory	
BIOL 1107	Topics in Study of Life I	
BIOL 1108	Organismal Biology Laboratory	
BIOL 1203	Introductory Biology	
BIOL 1304	Human Biology	
BIOL 1305	General Biology	
BIOL 1306	Organismal Biology	

BIOL 2111	Human Anat/Physio Lab I	
BIOL 2113	Human Anat/Physio Lab II	
BIOL 2311	Human Anat/Physiology I	
BIOL 2313	Human Anat/Physiology II	
CHEM 1105	Laboratory for CHEM 1305	
CHEM 1106	Laboratory for CHEM 1306	
CHEM 1107	Intro General Chemistry Lab	
CHEM 1108	Intro Organic & Biochem Lab	
CHEM 1305	General Chemistry	
CHEM 1306	General Chemistry	
CHEM 1307	Intro to General Chemistry	
CHEM 1308	Intro Organic & Biochemistry	
ESCI 1101	Environmental Sci. Lab	
ESCI 1102	Non-major Lab for ESCI 1301	
ESCI 1202	Intro to Environment Science 2	
ESCI 1301	Intro to Environmental Sci	
GEOG 1106	Laboratory for GEOG 1306	
GEOG 1306	Physical Geography	
GEOL 1103	Lab for GEOL 1313	
GEOL 1104	Lab for GEOL 1314	
GEOL 1111	Principles of Earth Sci - Lab	
GEOL 1112	Laboratory for Geology 1212	
GEOL 1211	Principles of Earth Sciences	
GEOL 1212	Principles of Earth Science	
GEOL 1230	The Blue Planet	
GEOL 1231	Natural Hazards	
GEOL 1313	Intro to Physical Geology	
GEOL 1314	Intro to Historical Geol	
HSCI 2302	Fundamentals of Nutrition	
HSCI 2303	Wellness Dynamics	
MICR 2330	Microorganisms and Disease	
PHYS 1403	General Physics I	
PHYS 1404	General Physics II	
PHYS 2120	Laboratory for PHYS 2320	
PHYS 2121	Laboratory for PHYS 2321	
PHYS 2320	Introductory Mechanics	
PHYS 2321	Introductory Electromagnetism	
Total Hours		**6**

VI. Political Science (six hours)

Code	Title	Hours
Courses in this category focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations.		
Required Courses:		
POLS 2310	Introduction to Politics	3
POLS 2311	American Gover & Politics	3
Total Hours		**6**

VII. Social and Behavioral Sciences (three hours)

Code	Title	Hours
Courses in this category focus on the application of empirical and scientific methods that contribute to the understanding of what makes us human. Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the individual, society, and culture.		
Select one of the following:		3
ANTH 1301	Intro-Phys Anth/Archeolog	
ANTH 1302	Intro-Cultural Anthropology	
ANTH 1310	Cultural Geography	
ANTH 2320	Intro to Linguistics	
CE 2326	Econ for Engrs & Scientists	
CHIC 2311	Intro to Chicano Studies	
ASIA 2300	Asian American Studies	
COMM 2350	Interpersonal Communication	
COMM 2372	Mass Media and Society	
ECON 2303	Principles of Macroeconomics	
ECON 2304	Principles of Microeconomics	
EDPC 1301	Introduction to Ed Psychology	
EDU 1342	Action Research in Classrooms	
ENGL 2320	Introduction to Linguistics	
GEOG 1310	Cultural Geography	
LEAD 2300	Leadership in Action	
LING 2320	Introduction to Linguistics	
LING 2340	Lang. Inside & Out: Sel Topics	
PSYC 1301	Introduction to Psychology	
SOCI 1301	Introduction to Sociology	
SOCI 1310	Cultural Geography	
Total Hours		**3**

VIII. Creative Arts (three hours)

Code	Title	Hours
Courses in this category focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art.		
Select one of the following:		3
ART 1300	Art Appreciation	
ARTH 1305	History of Art I	
ARTH 1306	History of Art II	
CHIC 1311	Chicana/o Fine Arts Appreciat	
DANC 1304	Introduction to Dance	
FILM 1390	Intro-Art of Motion Pict.	
MUSL 1324	Music Appreciation	
MUSL 1327	Jazz to Rock	
MUSL 2321	Music, Culture, and Society	
THEA 1313	Introduction to Theatre	
Total Hours		**3**

IX. Component Area Option (six hours)

Code	Title	Hours
a. A minimum of 3 SCH must meet the definition and corresponding Core Objectives specified in one of the foundational component areas. b. As an option for up to 3 semester credit hours of the Component Area Option, an institution may select course(s) that: (i) Meet(s) the definition specified for one or more of the foundational component areas; and (ii) Include(s) a minimum of three Core Objectives, including Critical Thinking Skills, Communication Skills, and one of the remaining Core Objectives of the institution's choice.		
BUSN 1301	Intro to Global Business	

COMM 1301	Public Speaking
COMM 1302	Business/Profession Comm
CS 1310	Intro-Computational Thinking
CS 1320	Computer Programming Sci/Engr
EL 1301	Eng Innovation and Leadership
ENGR 1302	Engineering Design Experience
ENGR 1303	Applied Engineering Analysis
LEAD 1300	Introduction to Leadership
SCI 1301	Inquiry in Math & Science
SPLP 1312	Comm. Var. Across the Lifespan
UNIV 1301	Seminar/Critical Inquiry
Total Hours	**0**

4-Year Sample Degree Plan

BS Computer Engineering (Starting with Pre-calculus)

Code	Title	Hours
Bachelor of Science in Computer Engineering		
Summer		
(If needed)		
MATH 1508	Precalculus	3-5
or MATH 1310	Trigonometry and Conics	
FRESHMAN		
Fall		
MATH 1411	Calculus I	4
ECE 1300	Intro to Electr/Comp Eng	3
ECE 1100	Lab for ECE 1300	1
CS 1320	Computer Programming Sci/Engr	3
RWS 1301	Rhetoric & Composition I	3
UNIV 1301	Seminar/Critical Inquiry	3
Spring		
MATH 1312	Calculus II	3
ECE 2303	Digital Systems Design I	3
ECE 2103	Lab for ECE 2303	1
PHYS 2320 & PHYS 2120	Introductory Mechanics and Laboratory for PHYS 2320	4
RWS 1302	Rhetoric & Composition 2	3
HIST 1301	History of U.S. to 1865	3
SOPHMORE		
Fall		
MATH 2326	Differential Equations	3
ECE 2301	Electric Circuits I	3
ECE 2300	Software Design I	3
CE 2326	Econ for Engrs & Scientists	3
PHYS 2321 & PHYS 2121	Introductory Electromagnetism and Laboratory for PHYS 2321	4
Spring		
MATH 2313	Calculus III	3
ECE 2302	Electric Circuits II	3
ECE 2102	Lab for ECE 2302	1
ECE 2304	Microprocessor Systems I	3
ECE 2104	Lab for ECE 2304	1
MATH 2300	Discrete Mathematics	3

HIST 1302	History of U.S. Since 1865	3
Junior		
Fall		
MATH 3323	Matrix Algebra	3
ECE 3331	Discrete Time Signals & Sys	3
ECE 3341	Electronics I	3
ECE 3141	Lab for ECE 3341	1
ECE 3350	Software Design II	3
ECE 3351	Computer Architecture	3
Spring		
ECE 3100	Junior Prof. Orientation	1
ECE 3332	Prob with App Elect/Comp Eng	3
ECE 3352	Operating System Design	3
CpE Elective		3
CpE Elective Lab		1
Creative Arts Component		3
Senior		
Fall		
Experiential Learning		1
ECE 4201	CpE Capstone Project Lab I	2
CpE Elective		3
CpE Elective Lab		1
CpE Concentration or ECE Elective		3
Core Curriculum Course		3
POLS 2310	Introduction to Politics	3
Spring		
Experiential Learning		1
ECE 4202	CpE Capstone Project Lab II	2
CpE Concentration or ECE Elective		3
ECE Elective		3
ECE Elective		3
POLS 2311		

BS Computer Engineering (Starting with Calculus)

Code	Title	Hours
Bachelor of Science in Computer Engineering		
FRESHMAN		
Fall		
MATH 1411	Calculus I	4
ECE 1300	Intro to Electr/Comp Eng	3
ECE 1100	Lab for ECE 1300	1
CS 1320	Computer Programming Sci/Engr	3
RWS 1301	Rhetoric & Composition I	3
UNIV 1301	Seminar/Critical Inquiry	3
Spring		
MATH 1312	Calculus II	3
ECE 2303	Digital Systems Design I	3
ECE 2103	Lab for ECE 2303	1
PHYS 2320 & PHYS 2120	Introductory Mechanics and Laboratory for PHYS 2320	4
RWS 1302	Rhetoric & Composition 2	3
HIST 1301	History of U.S. to 1865	3

SOPHMORE		
Fall		
MATH 2326	Differential Equations	3
ECE 2301	Electric Circuits I	3
ECE 2300	Software Design I	3
CE 2326	Econ for Engrs & Scientists	3
PHYS 2321 & PHYS 2121	Introductory Electromagnetism and Laboratory for PHYS 2321	4
Spring		
MATH 2313	Calculus III	3
ECE 2302	Electric Circuits II	3
ECE 2102	Lab for ECE 2302	1
ECE 2304	Microprocessor Systems I	3
ECE 2104	Lab for ECE 2304	1
MATH 2300	Discrete Mathematics	3
HIST 1302	History of U.S. Since 1865	3
Junior		
Fall		
MATH 3323	Matrix Algebra	3
ECE 3331	Discrete Time Signals & Sys	3
ECE 3341	Electronics I	3
ECE 3141	Lab for ECE 3341	1
ECE 3350	Software Design II	3
ECE 3351	Computer Architecture	3
Spring		
ECE 3100	Junior Prof. Orientation	1
ECE 3332	Prob with App Elect/Comp Eng	3
ECE 3352	Operating System Design	3
CpE Elective		3
CpE Elective Lab		1
Creative Arts Component		3
Senior		
Fall		
Experiential Learning		1
ECE 4201	CpE Capstone Project Lab I	2
CpE Elective		3
CpE Elective Lab		1
CpE Concentration or ECE Elective		3
Core Curriculum Course		3
POLS 2310	Introduction to Politics	3
Spring		
Experiential Learning		1
ECE 4202	CpE Capstone Project Lab II	2
CpE Concentration or ECE Elective		3
ECE Elective		3
ECE Elective		3
POLS 2311	American Gover & Politics	3