

# BS in Electrical Engineering (393550) MAP Sheet

Engineering and Technology, Electrical and Computer Engineering

For students entering the degree program during the 2017-2018 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
<b>University Core Requirements:</b>				<b>FRESHMAN YEAR</b>			
<b>Requirements</b>	<b>#Classes</b>	<b>Hours</b>	<b>Classes</b>	<u>1st Semester</u>		<b>JUNIOR YEAR</b>	
<b>Religion Cornerstones</b>				<u>5th Semester</u>			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	First-year Writing or American Heritage	3.0	EC EN 330	4.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	MATH 112	4.0	EC EN 340	4.0
Foundations of the Restoration	1	2.0	REL C 225	CHEM 105	4.0	EC EN 380	4.0
The Eternal Family	1	2.0	REL C 200	C S 142	3.0	EC EN 391	0.5
<b>The Individual and Society</b>				EC EN 191	0.5	Religion Cornerstone course	2.0
American Heritage	1-2	3-6.0	from approved list	Religion Cornerstone course	2.0	<b>Total Hours</b>	<b>14.5</b>
Global and Cultural Awareness	1	3.0	from approved list ‡	<b>Total Hours</b>	<b>16.5</b>	<u>6th Semester</u>	
<b>Skills</b>				<u>2nd Semester</u>		EC EN 360	4.0
First Year Writing	1	3.0	from approved list	C S 235	3.0	STAT 201	3.0
Advanced Written and Oral Communications	1	3.0	ENGL 312* or 316*	MATH 113	4.0	EC EN 390	3.0
Quantitative Reasoning	1	4.0	MATH 112* or 113*	PHSCS 121	3.0	University Core requirement	3.0
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*	First-year Writing or American Heritage	3.0	Religion elective	2.0
<b>Arts, Letters, and Sciences</b>				Religion Cornerstone course	2.0	<b>Total Hours</b>	<b>15.0</b>
Civilization 1	1	3.0	from approved list ‡	<b>Total Hours</b>	<b>15.0</b>	<b>SENIOR YEAR</b>	
Civilization 2	1	3.0	from approved list ‡	<b>SOPHOMORE YEAR</b>		<u>7th Semester</u>	
Arts	1	3.0	from approved list ‡	<u>3rd Semester</u>		ECEn 475	3.0
Letters	1	3.0	from approved list ‡	EC EN 220	3.0	Technical elective	4.0
Biological Science	1	3.0	from approved list ‡	MATH 313	3.0	Technical elective	4.0
Physical Science	2	7.0	CHEM 105* or 111* and PHSCS 121*	PHSCS 220	3.0	Technical elective	2.0
Social Science	1	3.0	from approved list ‡	University Core requirement	3.0	University Core requirement	3.0
<b>Core Enrichment: Electives</b>				University Core requirement	3.0	<b>Total Hours</b>	<b>16.0</b>
Religion Electives	3-4	6.0	from approved list	Religion Cornerstone course	2.0	<u>8th Semester</u>	
Open Electives	Variable	Variable	personal choice	<b>Total Hours</b>	<b>17.0</b>	EC EN 476	3.0
FOR GE QUESTIONS CONTACT THE ADVISEMENT CENTER — FOR PROGRAM QUESTIONS SEE YOUR DEPARTMENT ADVISOR				<u>4th Semester</u>		Technical elective	4.0
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16–17 hours overlap)				EC EN 240	4.0	Technical elective	4.0
‡REDUCTION OF TOTAL CREDITS IS RECOMMENDED by choosing a Civilization 2 course that also double counts for the Arts requirement (if a separate Letters course is taken) or the Letters requirement (if a separate Arts course is taken) --- see the University Core list for specifics. EngT 231 double counts for the Global & Cultural Awareness and the Social Science requirements.				MATH 314	3.0	ENGL 312 or 316	3.0
<b>Graduation Requirements:</b>				MATH 334	3.0	Religion elective	2.0
Minimum residence hours required		30.0		University Core requirement	3.0	<b>Total Hours</b>	<b>16.0</b>
Minimum hours needed to graduate		120.0		Religion elective	2.0		

\*Actual course sequences should be adapted to individual needs. For example, students with AP credits in Math, Physics, or Computer Science will already have credit for some initial courses. Many students find it beneficial to attend one or more spring or summer terms. On average, students take about nine semesters to graduate in this program.

Note: Students are encouraged to complete an average of 16 credit hours each semester or 32 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.

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**2017-2018 Program Requirements (89 - 90 Credit Hours)**

<b>REQUIREMENT 1</b> Complete 21 courses		EC EN 464 - Wireless Communication Circuits	2.0	MATH 342 - Theory of Analysis 2	3.0
C S 142 - Introduction to Computer Programming	3.0	EC EN 466 - Introduction to Optical Engineering	2.0	MATH 352 - Introduction to Complex Analysis	3.0
C S 235 - Data Structures and Algorithms	3.0	EC EN 483 - (EC En-Me En 431) Design of Control Systems	4.0	MATH 355 - Graph Theory	3.0
EC EN 191 - New Student Seminar	0.5	EC EN 485 - Introduction to Digital Communication Theory	4.0	MATH 371 - Abstract Algebra 1	3.0
EC EN 220 - Fundamentals of Digital Systems	3.0	EC EN 487 - Introduction to Discrete-Time Signal Processing	4.0	MATH 372 - Abstract Algebra 2	3.0
EC EN 240 - Circuit Analysis and Laboratory	4.0	<b>REQUIREMENT 4</b> Complete 2.0 hours from the following course(s)		MATH 411 - Numerical Methods	3.0
EC EN 330 - Introduction to Embedded System Programming	4.0	<b>TECHNICAL ELECTIVES. (NOTE: EC EN COURSES WILL NOT DOUBLE COUNT.)</b>		MATH 447 - Introduction to Partial Differential Equations	3.0
EC EN 340 - Electronic Circuit Design 1	4.0	<b>OTHER ENGINEERING, MATHEMATICS, PHYSICS, OR COMPUTER SCIENCE</b>		MATH 450 - Combinatorics	3.0
EC EN 360 - Electromagnetic Fields and Waves	4.0	<b>COURSES AS SPECIFIED OR APPROVED BY THE EC EN DEPARTMENT ARE</b>		MATH 487 - Number Theory	3.0
EC EN 380 - Signals and Systems	4.0	<b>ALSO ACCEPTABLE.</b>		PHSCS 222 - Modern Physics	3.0
EC EN 390 - Junior Team Design Project	3.0	C S 236 - Discrete Structures	3.0	<b>REQUIREMENT 5</b>	
EC EN 391 - Junior Seminar	0.5	C S 240 - Advanced Programming Concepts	4.0	Complete the department exit interview.	
EC EN 475 - Capstone Design 1	3.0	C S 340 - Software Design and Testing	3.0		
EC EN 476 - Capstone Design 2	3.0	C S 345 - Operating Systems Design	3.0		
MATH 112 - Calculus 1	4.0	C S 360 - (Not currently offered)			
MATH 113 - Calculus 2	4.0	C S 428 - Software Engineering	3.0		
MATH 313 - Elementary Linear Algebra	3.0	C S 431 - Algorithmic Languages and Compilers	3.0		
MATH 314 - Calculus of Several Variables	3.0	C S 452 - Database Modeling Concepts	3.0		
MATH 334 - Ordinary Differential Equations	3.0	C S 455 - Computer Graphics	3.0		
PHSCS 121 - Introduction to Newtonian Mechanics	3.0	C S 456 - Introduction to User Interface Software	3.0		
PHSCS 220 - Introduction to Electricity and Magnetism	3.0	C S 460 - Computer Communications and Networking	3.0		
STAT 201 - Statistics for Engineers and Scientists	3.0	C S 462 - Large-Scale Distributed System Design	3.0		
<b>REQUIREMENT 2</b> Complete 2 options		C S 465 - Computer Security	3.0		
<b>OPTION 2.1</b> Complete 1 course		C S 470 - Introduction to Artificial Intelligence	3.0		
CHEM 105 - General College Chemistry 1 with Lab (Integrated)	4.0	C S 478 - Tools for Machine Learning	3.0		
CHEM 111 - Principles of Chemistry 1	4.0	EC EN 323 - Computer Organization	4.0		
<b>OPTION 2.2</b> Complete 1 course		EC EN 424 - Computer Systems	4.0		
<b>NOTE: ENGL 312 RECOMMENDED.</b>		EC EN 425 - Real-Time Operating Systems	4.0		
ENGL 312 - Persuasive Writing	3.0	EC EN 427 - Embedded Systems	4.0		
ENGL 316 - Technical Communication	3.0	EC EN 443 - Communication and Power Circuits	4.0		
<b>Complete at least 18 credit hours of TECHNICAL ELECTIVES from the following two requirements.</b>		EC EN 445 - Introduction to Mixed-Signal VLSI	4.0		
<b>REQUIREMENT 3</b> Complete 16.0 hours from the following course(s)		EC EN 450 - Introduction to Semiconductor Devices	3.0		
<b>TECHNICAL ELECTIVES:</b>		EC EN 452 - Experiments in Integrated Circuit Development	1.0		
EC EN 323 - Computer Organization	4.0	EC EN 462 - Electromagnetic Radiation and Propagation	2.0		
EC EN 443 - Communication and Power Circuits	4.0	EC EN 464 - Wireless Communication Circuits	2.0		
EC EN 445 - Introduction to Mixed-Signal VLSI	4.0	EC EN 466 - Introduction to Optical Engineering	2.0		
EC EN 450 - Introduction to Semiconductor Devices	3.0	EC EN 483 - (EC En-Me En 431) Design of Control Systems	4.0		
EC EN 452 - Experiments in Integrated Circuit Development	1.0	EC EN 485 - Introduction to Digital Communication Theory	4.0		
EC EN 462 - Electromagnetic Radiation and Propagation	2.0	EC EN 487 - Introduction to Discrete-Time Signal Processing	4.0		
		MATH 341 - Theory of Analysis 1	3.0		

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2017-2018

### THE DISCIPLINE:

Electrical and Computer Engineering is one of the most exciting, diverse, and forward-looking disciplines offered at the university. Contemporary society is in the midst of an information revolution, created in large part from the fruits of electrical and computer engineering. Electrical and computer engineers have been primary contributors to the astonishing developments in communication, computer, and network technology. They have designed devices and systems that have a significant impact on manufacturing, medicine, transportation, and environmental monitoring. Smart phones, tablets, digital cameras, high definition television, solar power, microprocessors, lasers, unmanned air vehicles, medical imaging systems, and autonomous robotic systems are all examples of devices and systems designed by electrical and computer engineers. Innovations that flow out of electrical and computer engineering sustain the national economy and improve the quality of life for people throughout the world. In the future, society will look to electrical and computer engineers to address grand challenges ranging from sustainable and efficient energy to health care technologies and global communications networks.

The Department of Electrical and Computer Engineering at Brigham Young University offers accredited degrees in Electrical Engineering and Computer Engineering. Electrical Engineering focuses on microelectronics, electromagnetics, electronic circuits, wireless communications, signal processing, biomedical applications, photonics, and controls. Computer Engineering focuses on the design of digital computing devices and systems and involves hardware and software, operating systems, digital logic, real-time systems, and computer vision. Both programs combine fundamental principles with hands-on learning, including an innovative Junior Core experience that integrates classroom knowledge with project-based learning.

### CO-OP AND INTERNSHIP EXPERIENCES:

Optional co-op and internship experiences with engineering firms throughout the USA are available. These experiences may extend over one semester plus the spring/summer terms, for a total of eight months.

### PROFESSIONAL AND HONOR SOCIETIES:

The student chapter of the Institute of Electrical and Electronic Engineers is the professional organization; Eta Kappa Nu is the electrical and computer engineering honor society; and Tau Beta Pi is the honor society for all engineering fields.

### CAREERS:

Electrical and computer engineers are among the most actively recruited students graduating from a four-year program. Baccalaureate engineers typically start their careers as members of project teams with one or more of the following responsibilities: designing digital, analog, or opto-electronic circuits; creating or testing applicationspecific software; testing components or systems; or providing technical support for sales. Later on, many engineers find themselves pursuing managerial careers, starting their own companies, or even managing entrepreneurial funds. Top graduates are also well received by medical schools, law schools, and professional and management programs.

The Electrical Engineering baccalaureate program is accredited by the Engineering Accreditation Commission of ABET, Inc., <http://www.abet.org>.

### MAP DISCLAIMER

While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

## **BS in Electrical Engineering (393550)**

### **DEPARTMENT INFORMATION**

Electrical and Computer Engineering Department  
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### **ADVISEMENT CENTER INFORMATION**

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