ELECTRICAL ENGINEERING (COMMUNICATIONS AND SIGNAL PROCESSING) - BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Overview

The Bachelor of Science in Electrical Engineering (B.S. EE) program of the Klipsch School is accredited by the Engineering Accreditation Commission of ABET, Inc. This particular concentration in the B.S. EE program gives students the opportunity to explore more deeply the area of **communications and signal processing**.

Electrical Engineering Program Educational Objectives

Below are the program educational objectives (PEOs) that describe the expected accomplishments of graduate during their first few years after graduation.

1. Our graduates will obtain relevant, productive employment in the private sector, government and/or pursue an advanced degree.
2. Our graduates will be using their engineering foundation to innovate solutions to the problems of the real world.

Requirements (123-125 credits)

Students must complete all University degree requirements, which include: General Education requirements, Viewing a Wider World requirements, and elective credits to total at least 123 credits with 48 credits in courses numbered 300 or above. Developmental coursework will not count towards the degree requirements and/or elective credits, but may be needed in order to take the necessary English and Mathematics coursework.

BSEE students must earn a grade of C- or better in all engineering, technology, math and science courses (including associated prerequisite courses) required for the degree and also courses taken to satisfy the general education requirements for Area I-Communications, Area II-Mathematics, and Area III-Laboratory Sciences. If a grade lower than C- is earned in any of these courses, the student is required to retake the course immediately the next semester it is offered. Students who earn a grade less than a C- the first time will be contacted by the department and/or academic advising center and advised about this policy and resources to help in their academic success. If the student fails to achieve a C- or better in any of these courses a second time, then the student must submit a written request to the Associate Dean of Academics in the College of Engineering to enroll in the course a third time. The student should explain the circumstances impacting their grade and the actions planned to improve their performance.

Prefix	Title	Credits
General Education		
Area I: Communications		
English Composition - Level 1		
ENGL 1110G	Composition I	4
English Composition - Level 2 [1]		3
Oral Communications [1]		3
Area II: Mathematics		
MATH 1511G	Calculus and Analytic Geometry I [2]	4
Area III/IV: Laboratory Sciences and Social/Behavioral Sciences		*11*
CHEM 1215G	General Chemistry I Lecture and Laboratory for STEM Majors	
PHYS 1310G & PHYS 1310L	Calculus -Based Physics I and Calculus -Based Physics I Lab	
Area IV: Social/Behavioral Sciences (3 credits) [1]		
Area V: Humanities [1]		*3*
Area VI: Creative and Fine Arts [1]		*3*
General Education Elective		
MATH 1521G	Calculus and Analytic Geometry II	4
Viewing A Wider World		
Viewing a Wider World Electives [3]		6
Departmental/College Requirements		
Program Specific Requirements		
Mathematics and Natural Science		
MATH 3160	Introduction to Ordinary Differential Equations	3
PHYS 1320G & PHYS 1320L	Calculus -Based Physics II and Calculus -Based Physics II Lab	4
ENGR 190	Introduction to Engineering Mathematics	4
E E 200	Linear Algebra, Probability and Statistics Applications	4
E E 240	Multivariate and Vector Calculus Applications	3
STEM		
Choose two STEM Electives [4]		6
Electrical and Computer Engineering		
ENGR 120	DC Circuit Analysis	4
ENGR 130	Digital Logic	4
ENGR 140	Introduction to Programming and Embedded Systems	4
ENGR 230	AC Circuit Analysis	4
E E 300	Cornerstone Design	2
E E 317	Semiconductor Devices and Electronics I	4
E E 320	Signals and Systems I	3
E E 325	Signals and Systems II	4
E E 340	Fields and Waves	4
E E 362	Introduction to Computer Organization	4
ENGR 401	Engineering Capstone I [5]	3
ENGR 402	Engineering Capstone II	3
E E Concentration Required Courses		
E E 395	Introduction to Digital Signal Processing [6]	3
E E 496	Introduction to Communication Systems [6]	3
E E Concentration Electives: Choose two courses from the following (one must be an E E course): [7]		*6-7*
E E 403	Geometric Algebra	
or E E 576	Geometric Algebra	
E E 444	Advanced Image Processing	
or E E 588	Advanced Image Processing	
E E 446	Digital Image Processing	
or E E 596	Digital Image Processing	
E E 447	Neural Signal Processing	
or E E 597	Neural Signal Processing	
E E 460	Space System Mission Design and Analysis	
E E 465	Machine Learning I	
or E E 565	Machine Learning I	
E E 490	Selected Topics (Wireless Communications)	
E E 497	Digital Communication Systems I	
or E E 581	Digital Communication Systems I	

C S 343	Algorithm Design & Implementation	
C S 372	Data Structures and Algorithms	
C S 453	Python Programming I [8,9]	
C S 475	Artificial Intelligence I	
C S 476	Computer Graphics I	
C S 477	Digital Game Design	
C S 478	Computer Security	
C S 486	Bioinformatics	
MATH 4210	Complex Variables	
MATH 4220	Fourier Series and Boundary Value Problems	
MATH 4230	Applied Linear Algebra	
MATH 4350	Advanced Linear Algebra	
MATH 4360	Introduction to Real Analysis I	
STAT 4210	Probability: Theory and Applications	

Non-Departmental Requirements (in addition to Gen.Ed/VWW)

Programming Elective

Select one course from the following:		3-4
C S 151	C++ Programming [9]	
or C S 451	C++ Programming	
C S 152	Java Programming [9]	
or C S 452	Java Programming	
C S 153	Python Programming I [9]	
or C S 453	Python Programming I	
C S 154	Python Programming II [9]	
or C S 454	Python Programming II	
C S 172	Computer Science I	
C S 271	Object Oriented Programming	

Second Language: (not required)

Electives, to bring the total credits to 123	**0**
Total Credits	**123-125**

[1] See the General Education (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/) section of the catalog for a full list of courses.

[2] MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G Calculus and Analytic Geometry I first.

[3] See the Viewing a Wider World (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext) section of the catalog for a full list of courses.

[4] STEM Elective: Course at the 300 level or above from E E that is not used to satisfy any other E E program requirement or courses at the 300 level or above from A E, C E, CHME, I E, M E, ASTR, BIOL, CHEM, C S, MATH, PHYS and STAT. Excluded courses include VWW courses and those which are substantially equivalent to an E E course. Click to view a list of excluded STEM Electives (https://ece.nmsu.edu/undergrad-study/BSEE-STEM-electives.html).

[5] The prerequisite for ENGR 401 Engineering Capstone I for BSEE students is E E 300 Cornerstone Design.

[6] Students must take both E E 395 Introduction to Digital Signal Processing and E E 496 Introduction to Communication Systems, both of which are currently offered in the Fall semester.

[7] Some of these elective courses may have additional prerequisites.

[8] Students may count C S 453 Python Programming I toward their Programming Elective or toward their E E Concentration Electives, but may not use the course to count toward both.

[9] Only one of the 100-level xor the 400-level course may be taken to satisfy degree requirements. Students may not take the 100-level of a

course to satisfy the programming elective requirement and the 400-level of the same course to satisfy other degree requirements.

A Suggested Plan of Study for Students

This roadmap assumes student placement in MATH 1511G Calculus and Analytic Geometry I and ENGL 1110G . The contents and order of this roadmap may vary depending on initial student placement in mathematics and English. It is only a suggested plan of study for students and is not intended as a contract. Course availability may vary from fall to spring semester and may be subject to modification or change.

First Year

Fall		Credits
ENGR 190	Introduction to Engineering Mathematics	4
ENGL 1110G	Composition I	4
CHEM 1215G	General Chemistry I Lecture and Laboratory for STEM Majors	4
ENGR 120	DC Circuit Analysis	4
	Credits	**16**
Spring		
MATH 1511G	Calculus and Analytic Geometry I [1]	4
General Education Requirement (Area I, IV, V, VI or VWW) [2]		3
ENGR 130	Digital Logic	4
ENGR 140	Introduction to Programming and Embedded Systems	4
	Credits	**15**

Second Year

Fall		
MATH 1521G	Calculus and Analytic Geometry II	4
PHYS 1310G & PHYS 1310L	Calculus -Based Physics I and Calculus -Based Physics I Lab	4
E E 200	Linear Algebra, Probability and Statistics Applications	4
ENGR 230	AC Circuit Analysis	4
	Credits	**16**
Spring		
MATH 3160	Introduction to Ordinary Differential Equations	3
PHYS 1320G & PHYS 1320L	Calculus -Based Physics II and Calculus -Based Physics II Lab	4
E E 240	Multivariate and Vector Calculus Applications	3
Choose one Programming course from the following:		3-4
C S 151 or C S 451	C++ Programming or C++ Programming	
C S 152 or C S 452	Java Programming or Java Programming	
C S 153 or C S 453	Python Programming I or Python Programming I	
C S 154 or C S 454	Python Programming II or Python Programming II	
C S 172	Computer Science I	
C S 271	Object Oriented Programming	
General Education Requirement (Area I, IV, V, VI or VWW) [2]		3
	Credits	**16-17**

Third Year

Fall		
E E 300	Cornerstone Design	2
E E 320	Signals and Systems I	3

E E 340	Fields and Waves	4
General Education Requirement (Area I, IV, V, VI or VWW) [2]		3
General Education Requirement (Area I, IV, V, VI or VWW) [2]		3
	Credits	**15**
Spring		
E E 317	Semiconductor Devices and Electronics I	4
E E 325	Signals and Systems II	4
E E 362	Introduction to Computer Organization	4
General Education Requirement (Area I, IV, V, VI or VWW) [2]		3
	Credits	**15**
Fourth Year		
Fall		
ENGR 401	Engineering Capstone I	3
E E 395	Introduction to Digital Signal Processing [3]	3
E E 496	Introduction to Communication Systems [3]	3
STEM Elective [4,5]		3
General Education Requirement (Area I, IV, V or VWW) [2,5]		3
	Credits	**15**
Spring		
ENGR 402	Engineering Capstone II	3
Communications & Signal Processing Elective [5,6]		3-4
Communications & Signal Processing Elective [5,6]		3
STEM Elective [4,5]		3
General Education Requirement (Area I, IV, V or VWW) [2,5]		3
	Credits	**15-16**
	Total Credits	**123-125**

[1] MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G Calculus and Analytic Geometry I first.

[2] See the General Education and Viewing a Wider World (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/) section of the catalog for a full list of courses.

[3]   Students must take both E E 395 Introduction to Digital Signal Processing and E E 496 Introduction to Communication Systems, both of which are currently offered in the Fall semester.

[4] STEM Elective: Course at the 300 level or above from E E that is not used to satisfy any other E E program requirement or courses at the 300 level or above from A E, C E, CHME, I E, M E, ASTR, BIOL, CHEM, C S, MATH, PHYS and STAT. Excluded courses include VWW courses and those which are substantially equivalent to an E E course. Click to view a list of excluded STEM Electives (https://ece.nmsu.edu/undergrad-study/BSEE-STEM-electives.html).

[5] Depending on availability of specific courses in the fall or spring semester, students may need to reorganize the ECE Electives, STEM electives, and/or Gen Ed/VWW electives in their final year. Students are strongly advised to consult with their ECE Faculty Mentor for assistance in planning their final year.

[6] At least one Communications & Signal Processing Elective must be from the E E Prefix. See E E Concentration Electives in the Degree Requirements section above.