

## Plan of Study for the Electrical Engineering SB Concentration

Effective for Students Declaring the Concentration after July 1, 2022

DATE: \_\_\_\_\_

NAME: \_\_\_\_\_

CLASS: \_\_\_\_\_

EMAIL: \_\_\_\_\_

This Plan of Study Form is for a (*Circle One*):      DECLARATION                      REVISION

*The S.B. Program in Electrical Engineering must contain at least 20 half courses: 4 half-courses in mathematics, 4 half-courses in basic sciences, and 12 half-courses in engineering topics. Plans of Study will not be considered final until this form has been signed. The signature of this form ensures that the proposed plan meets the ABET distribution requirements.*

REQUIRED COURSES (Circle course and % for course you are taking or plan to take in each category.)	Math	Science	Engr. Topics	Semester (Fall/Spring Year)
<b>Mathematics Required</b>				
Math 1a – Intro to Calculus 1 (or Math Ma & Mb)	1.00			_____
Math 1b – Calculus, Series, and Differential Equations	1.00			_____
Math 21a – Multivariable Calculus	1.00			_____
Math 21b – Linear Algebra & Differential Equations	1.00			_____
<b>Mathematics Elective</b> (if you started in AM/Math 21a)				
1.	1.00			_____
<b>Probability and Statistics</b>				
ES 150 – Probability with Engineering Applications	1.00			_____
<b>Physics</b>				
PS 12a – Mech from an Analytic, Num & Exp Perspective (or Physics 15a, 16, or AP 50a)		1.00		_____
PS 12b – E&M from an Analytic, Num & Exp Perspective (or Physics 15b, or AP 50b)		1.00		_____
<b>Science Electives</b> See list on page 3				
1.		1.00		_____
2.		1.00		_____
<b>Computer Science</b> CIRCLE ONE				
CS 32 – Computational Thinking & Problem Solving			1.00	_____
CS 50 – Intro to Computer Science 1				
CS 51 – Intro to Computer Science 2				
CS 61 – Systems Programming & Machine Organization				

<b>Sophomore Forum</b>				
<b>Electrical Engineering Core</b> ES 152 – Circuits, Devices, and Transduction CS 141 – Computing Hardware ES 155 – Systems and Control ES 156 – Signals and Communications			1.00 1.00 1.00 1.00	_____ _____ _____ _____
<b>Electrical Engineering Electives*</b> See list on page 3 <i>Students should consult an advisor to select an appropriate set of Electrical/Engineering Electives</i> 1. 2. 3.			1.00 1.00 1.00	_____ _____ _____
<b>Engineering (or Additional Electrical) Electives*</b> See list on page 3 1. 2.			1.00 1.00	_____ _____
<b>Engineering Design</b> ES 96 – Engineering Problem Solving & Design Project* ES 100hf – Engineering Design Projects			1.00 1.00	_____ _____
<b>TOTALS</b>	<b>/4</b>	<b>/4</b>	<b>/12</b>	

\* For courses co-listed in another department, students must enroll in the Engineering Sciences offering. No more than three of Engineering Sciences 6, 50, 51, and 53 can count toward concentration credit. ES 96 or ES 227 must be taken in the junior year, prior to taking ES 100hf.

Student signature

\_\_\_\_\_

Date: \_\_\_\_\_

Associate/Director of Undergraduate Signature

\_\_\_\_\_

Date: \_\_\_\_\_

This plan does/does not meet the ABET distribution requirements

\_\_\_\_\_

Date: \_\_\_\_\_

Student Affairs Office

## Mathematics Electives

- AM 104 – Series Expan & Complex Analysis
- AM 105 – Ordinary & Partial Diff Eqs
- AM 106 – Applied Algebra
- AM 107 – Graph Theory & Combinatorics
- AM 108 – Nonlinear Dynamical Systems
- AM 120 – Applied Lin Algebra & Big Data

## Science Electives

### Introductory Courses

- LS 1a - Intro to the Life Sciences  
*or* LPS A – Foundational Chem & Bio
- PS 11 – Found & Frontiers of Modern Chem  
*or* PS 1 - Chem Bonding, Energy, & Reactivity
- PS 10 - Quantum & Stat Found of Chem
- PHYS 15c – Wave Phenomena
- ASTRO 16 – Stellar & Planetary Astro
- ASTRO 17 - Galactic & Extragalactic Astro

### Upper Level Courses

- CHEM 160 - Quantum Chemistry
- PHYS 19 – Intro to Theoretical Physics
- PHYS 125 – Widely Applied Physics
- PHYS 143a - Quantum Mechanics I
- PHYS 143b - Quantum Mechanics II
- PHYS 153 – Electrodynamics
- PHYS 181 – Stat Mech & Thermodynamics

## Electrical Engineering Electives

*ES 50 can only be taken for concentration credit during freshman or sophomore year. Not more than two from: ES 50 or ES 54 (formerly ES 52), CS 61, ES 170.*

- AP 195 – Intro to Solid State Physics
- BE 128 – Intro to Biomedical Imaging & Sys
- BE 129 – Intro to Bioelectronics
- BE 130 – Neural Control of Movement
- BE 131 - Neuroengineering
- CS 61 - System Program & Machine Org
- CS 143 – Computer Networks
- CS 144r – Networks Design Projects
- CS 146 – Computer Architecture
- CS 148 – Design of VLSI Circuits & Systems
- CS 189 – Autonomous Multi-Robot Systems
- CS 249r – Tiny Machine Learning
- ES 50 – Intro to Electrical Engineering
- ES 54 – Electronics for Engineers
- ES 143 – Computer Vision
- ES 151 – Applied Electromagnetism
- ES 153 – Laboratory Electronics
- ES 154 – Electronic Devices & Circuits
- ES 157 – Biological Signal Processing
- ES 159 – Intro to Robotics
- ES 170 – Engineering Quantum Mechanics
- ES 173 – Intro to Electronic & Photonic Dev
- ES 175 – Photovoltaic Devices
- ES 176 – Intro to MEMS
- ES 177 – Micro Fabrication Laboratory

## Engineering Electives (Incomplete List)

*For courses that are co-listed in another department, students must enroll in the Engineering Sciences offering. ESE 6 and ES 53 can only be taken for concentration credit during freshman or sophomore year*

- BE 191 – Intro to Biomaterials
- CS 51 – Intro to Comp Science 2
- CS 124 – Data Structures & Algorithms
  - *or* CS 125 – Algorithms & Complexity
- CS 175 – Computer Graphics
- CS 179 - Design of Usable Interactive Sys
- CS 181 – Machine Learning
- CS 182 – Artificial Intelligence
- CS 187 – Computational Linguistics
- ESE 6 – Intro to Environmental Sci & Eng
- ES 51 – Computer Aided Machine Design
- ES 53 – Quant Physiology or Bioengineering
- ES 105hfr - Humanitarian Design Projects (*must be taken twice*)
- ES 111 – Intro to Scientific Computing
- ES 115 – Mathematical Modeling
- ES 121 – Intro to Optimization
- ES 120 – Intro to the Mechanics of Solids
- ES 123 – Intro to Fluid Mech & Transport
- ES 125 – Mechanical Systems
- ESE 160 – Space Science & Engineering
- ESE 166 - State of the Art Instrument in Env Sci
- ES 190 – Intro to Materials Sci & Eng
- ES 231 – Energy Technology

**Prerequisite Planning Table for the Electrical Engineering SB**

	Typically Offered	Math	Chemistry	Physics	Other
<i>Required Courses</i>					
ES 150	Spring	<b>21a, Co: 21b</b>			
ES 152	Fall	<b>1a,b</b>		<b>Co: B</b>	
CS 141	Spring				<i>CS 50</i>
ES 155	Fall	<b>1a,b</b>			
ES 156	Spring	<b>21a,b</b>			
ES 96	Fall & Spring				<b>Junior Year ES 96</b>
ES 100HF	Fall-Spring				
<i>Selected Electives</i>					
AP 195	Fall				<i>Quant Mech</i>
BE 128	Spring	<b>1b</b>		<b>B</b>	
BE 129	Spring	<b>1b</b>	<i>LS 1a, Chem 17</i>	<b>B</b>	
BE 130	Spring				
BE 131	Fall				
CS 61	Fall				<i>CS 50</i>
CS 143	Fall				<i>CS 50</i>
CS 144r	Spring				<i>CS 51, 143, 181</i>
CS 146	Fall				<b>CS 141</b>
CS 148	Spring				<b>CS 141</b>
CS 189	Spring				<i>CS 51</i>
ES 54	Spring				
ES 151	Spring	<b>21a</b>		<b>A,B</b>	
ES 153	Fall & Spring				
ES 154	Bracketed				
ES 157	Fall	<b>21a,b</b>			<i>ES 150 or 156</i>
ES 159	Fall			<b>A</b>	<i>CS 50</i>
ES 170	Spring	<b>21a,b</b>			
ES 173	Fall	<b>1b</b>		<b>A,B</b>	
ES 175	Spring			<b>A,B</b>	<b>ES 173</b>
ES 176	Bracketed			<b>A,B</b>	
ES 177	Spring			<b>A,B</b>	<b>ES 173</b>

<sup>1</sup>Courses listed as Recommended Preparation, and not an enforced prerequisite, are shown in italics

<sup>2</sup>Courses marked with a "Co:" may be taken as a co-requisite

<sup>3</sup>Equivalent courses are accepted for prerequisites (e.g., Phys 15a, PS 12a, or AP50a all count for Physics A)