Plan of Study for the Electrical Engineering SB Concentration

Effective for Students Declaring the Concentration after July 1, 2024

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.

Please list your selected concentration courses in the schedule below:

Fall 1	**Spring 1**	**Fall 2**	**Spring 2**	**Fall 3**	**Spring 3**	**Fall 4**	**Spring 4**

REQUIRED COURSES	**Selected Courses**
Mathematics Required (2-4 courses) *Begin according to placement:* Math 1a – Intro to Calculus (or Math Ma & Mb) Math 1b – Integration, Series, and Differential Equations Math 21a – Multivariable Calculus (Math 22b) Math 21b – Linear Algebra & Differential Equations (or Math 22a)	
Mathematics Elective (1 course, if you started in Math 21a or higher) 1.	
Probability and Statistics ES 150 – Probability with Engineering Applications	
Physics (2 courses) PS 12a – Mechanics and Statistical Physics (or Phys 15a, 16, or AP 50a) PS 12b – Electromagnetism and Quantum Physics (or Phys 15b, or AP 50b)	
Science Electives (2 courses, see list on page 3) 1. 2.	

REQUIRED COURSES	Selected Courses
Computer Science (1 course) CS 32 – Computational Thinking & Problem Solving CS 50 – Intro to Computer Science CS 51 – Abstraction and Design in Computation CS 61 – Systems Programming & Machine Organization	
Electrical Engineering Core (4 courses) ES 152 – Circuits, Devices, and Transduction CS 1410 – Computing Hardware ES 155 – Systems and Control ES 156 – Signals and Communications	
Electrical Engineering Electives (3 courses, see list on page 3) 1. 2. 3.	
Engineering (or Additional Electrical) Electives (2 courses, see list on page 3) 1. 2.	
Engineering Design (2 courses) ES 96 or ES 105*hfr* (4 credits are required for ES 105*hfr*)* ES 100hf – Engineering Design Projects	

No more than three of Engineering Sciences 6, 50, 51, and 53 can count toward concentration credit
** ES 96 or ES 105hfr must be taken in the junior year, prior to taking ES 100hf to count for the junior design requirement*

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
- CHEM 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, CS 61, ES 170.

- AP 195A – 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 1280 – Convex Optimization & App in ML
- CS 1430 – Computer Networks
- CS 144r – Networks Design Projects
- CS 1411 – Computer Architecture
- CS 1480 – Design of VLSI Circuits & Systems
- CS 1840 – Intro to Reinforcement Learning
- CS 1890 – Autonomous Multi-Robot Systems
- CS 2490r – Tiny Machine Learning
- ES 50 – Intro to Electrical Engineering
- ES 143 – Computer Vision
- ES 151 – Applied Electromagnetism
- ES 153 – Laboratory Electronics
- ES 154 – Electronic Devices & Circuits
- ES 157 – Biological Signal Processing
- ES 158 – Intro to Optimal Control & Estimation
- 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 – Abstraction & Design in Computation
- CS 1240 – Data Structures & Algorithms
- CS 1750 – Computer Graphics
- CS 179 – Design of Usable Interactive Sys
- CS 1810 – Machine Learning
- CS 1820 – Artificial Intelligence
- CS 1870 – Computational Linguistics
- ESE 6 – Intro to Environmental Sci & Eng
- ES 51 – Computer Aided Machine Design
- ES 53 – Quant Physiology or Bioengineering
- ES 105*hfr* – Humanitarian Design Projects (*4 credits required*)
- ES 111 – Intro to Scientific Computing
- ES 115 – Mathematical Modeling
- ES 121 – Intro to Optimization
- ES 120 – Intro to the Mechanics of Solids
- 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
Required Courses					
ES 150	Spring	**21a, Co: 21b**			
ES 152	Fall	**1a,b**		**Co: B**	
CS 1410	Spring				*CS 50*
ES 155	Fall	**1a,b**			
ES 156	Spring	**21a,b**			
ES 96	Fall & Spring				**Junior Year**
ES 100HF	Fall-Spring				**ES 96**
Selected Electives					
AP 195A	Fall			*A,B,C*	*Quant Mech*
BE 128	Spring	**1b**		**B**	
BE 129	Spring				*ES 50/152*
BE 130	Spring				
BE 131	Fall				*ES 50/152 & LS*
CS 61	Fall				*CS 50*
CS 1280	Spring	*21a,b*			*Python*
CS 1430	Fall				*CS 50*
CS 144r	Spring				*CS 51, 143, 181*
CS 1411	Fall				**CS 141**
CS 1480	Spring				**CS 141**
CS 1840	Fall	**21b**			**ES 150**
CS 1890	Spring				*CS 51*
CS 2490r	Fall				
ES 50	Spring				
ES 143	Spring	*21b*			*CS 51 or 61*
ES 151	Spring	**21a**		**A,B**	
ES 153	Bracketed				
ES 154	Spring				*ES 152*
ES 157	Fall	**21a,b**			*ES 150 or 156*
ES 158	Spring				*ES 155 121*
ES 159	Fall	**21a,b**		**A**	*CS 50*
ES 170	Spring	**21a,b**			
ES 173	Fall	**1b**		**A,B**	
ES 175	Spring			**A,B**	**ES 173**
ES 176	Fall			**A,B**	*LS 1a or PS 1*
ES 177	Spring			**A,B**	

[1]Courses listed as Recommended Preparation, and not an enforced prerequisite, are shown in italics

[2]Courses marked with a "Co:" may be taken as a co-requisite

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