

**Plan of Study for the Electrical and Computer Engineering Track of
AB Engineering Sciences Concentration**

Effective for Students Declaring the Concentration after July 1, 2023

DATE: _____

NAME: _____

CLASS: _____

EMAIL: _____

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

REQUIRED COURSES (Circle course and % for course you are taking or plan to take in each category.)	Semester (Fall/Spring Year)
Mathematics Required 4 courses Math 1a – Intro to Calculus 1 (or Math Ma & Mb) Math 1b – Calculus, Series, and Differential Equations Math 21a – Multivariable Calculus Math 21b – Linear Algebra & Differential Equations	_____ _____ _____ _____
Physics 2 courses PS 12a – Mech from an Analytic, Num & Exp Perspective (or Physics 15a, 16, or AP 50a) PS 12b – E&M from an Analytic, Num & Exp Perspective (or Physics 15b, or AP 50b)	_____ _____
Computer Science CIRCLE ONE CS 32 – Computational Thinking & Problem Solving CS 50 – Intro to Computer Science 1 CS 51 – Intro to Computer Science 2 CS 61 – Systems Programming & Machine Organization	_____
Sophomore Forum	_____
Electrical Engineering Core ES 150 – Probability with Engineering Applications ES 152 – Circuits, Devices, and Transduction CS 141 – Computing Hardware ES 155 – Systems and Control ES 156 – Signals and Communications	_____ _____ _____ _____ _____

<p>Engineering Electives* See list on page 3</p> <p>1.</p> <p>2.</p> <p>3.</p> <p>4.</p>	<hr/> <hr/> <hr/> <hr/>
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** For courses co-listed in another department, students must enroll in the Engineering Sciences offering. No more than two of Engineering Sciences 6, 50, 51, and 53 can count toward concentration credit.*

Student Signature

Date: _____

Associate Director of Undergraduate Studies

Date: _____

Advisor indicate if a petition is needed: Yes ____ No ____

Director of Undergraduate Studies

Date: _____

Engineering Electives

Students choosing to Concentrate in *Electrical and Computer Engineering* in the *Engineering Sciences A.B. Program* have a broad set of *Engineering Electives* which they may take to satisfy their degree requirements.

The following courses may serve as *Engineering Electives*, only if taken during the Freshman or Sophomore years. Only *one* of these courses may be used as an *Engineering Elective*:

- ESE 6 – Introduction to Environmental Science & Engineering
- ES 53 – Quantitative Physiology as a Basis for Bioengineering

The following courses are intended to serve as a *sampling* of allowed *Engineering Electives*. Other courses may be allowed (including 200-level courses): students should confer with their *Concentration Advisors* to determine the suitability of a course as an *Engineering Elective*.

- AM 104 – Series Expansions & Complex Analysis
- AM 105 – Ordinary & Partial Differential Equations
- AM 108 – Nonlinear Dynamical Systems
- AP 195A – Intro to Solid State Physics
- Chemistry 160 – Quantum Chemistry
- BE 128 – Intro to Biomedical Imaging & Sys
- BE 129 – Intro to Bioelectronics
- BE 130 – Neural Control of Movement
- BE 131 - Neuroengineering
- CS 51 - Intro to Computer Science 2
- CS 61 - System Program & Machine Org
- CS 128 - Convex Optimization & App in ML
- CS 143 - Computer Networks
- CS 144r – Networks Design Projects
- CS 146 - Computer Architecture
- CS 148 – Design of VLSI Circuits & Systems
- CS 161 – Operating Systems
- CS 175 – Computer Graphics
- CS 184 - Intro to Reinforcement Learning
- CS 189 - Autonomous Multi-Robot Systems
- CS 249r – Tiny Machine Learning
- CS 283 - Computer Vision
- ES 50 - Intro to Electrical Engineering
- ES 51 – Computer Aided Machine Design
- ES 105hfr – Humanitarian Design Projects (4 credits required)
- ES 120 – Intro to the Mechanics of Solids
- ES 121 – Intro to Optimization: Models & Methods
- ES 123 - Introduction to Fluid Mechanics & Transport Processes
- 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
- ESE 160 - Space Science and Engineering
- ESE 166 – State of the Art Instrumentation in Environmental Sciences
- ES 173 – Intro to Electronic & Photonic Devices
- ES 175 – Photovoltaic Devices
- ES 177 – Microfabrication Laboratory
- ES 181 – Engineering Thermodynamics
- ES 190 – Intro to Materials Science & Engineering
- PHYS 143a – Quantum Mechanics 1
- PHYS 153 – Electrodynamics

Prerequisite Planning Table for the ES AB - ECE

	Typically Offered	Math	Chemistry	Physics	Other	
<i>Required Courses</i>						
ES 150	Spring	21a, Co: 21b		Co: B	<i>CS 50</i>	
ES 152	Fall	1a,b				
CS 141	Spring					
ES 155	Fall	1a,b				
ES 156	Spring	21a,b				
ES 96	Fall & Spring					Junior Year
ES 100HF	Fall-Spring					ES 96
<i>Selected Electives</i>						
AP 195A	Fall			<i>A,B,C</i>	<i>Quant Mech</i>	
BE 128	Spring	1b		B		
BE 129	Spring				<i>ES 50/152</i>	
BE 130	Spring					
BE 131	Fall				<i>ES 50/152 & LS</i>	
CS 61	Fall				<i>CS 50</i>	
CS 128	Spring	<i>21a,b</i>			<i>Python</i>	
CS 143	Fall				<i>CS 50</i>	
CS 144r	Spring				<i>CS 51, 143, 181</i>	
CS 146	Fall				CS 141	
CS 148	Spring				CS 141	
CS 184	Fall	21b			ES 150	
CS 189	Spring				<i>CS 51</i>	
CS 249r	Fall					
ES 50	Spring					
ES 143	Spring	<i>21b</i>			<i>CS 51 or 61</i>	
ES 151	Spring	21a		A,B		
ES 153	Bracketed					
ES 154	Spring				<i>ES 152</i>	
ES 157	Fall	21a,b			<i>ES 150 or 156</i>	
ES 158	Spring				<i>ES 155 121</i>	
ES 159	Fall	21a,b		A	<i>CS 50</i>	
ES 170	Spring	21a,b				
ES 173	Fall	1b		A,B		
ES 175	Spring			A,B	ES 173	
ES 176	Fall			A,B	<i>LS 1a or PS 1</i>	
ES 177	Spring			A,B		

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

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

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