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

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 courses) *Begin according to placement:* Math 21a – Multivariable Calculus Math 21b – Linear Algebra & Differential Equations	
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)	
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 (5 courses) ES 150 – Probability with Engineering Applications ES 152 – Circuits, Devices, and Transduction CS 1410 – Computing Hardware ES 155 – Systems and Control ES 156 – Signals and Communications	

REQUIRED COURSES	Selected Courses
Engineering Electives* (4 courses, see list on page 3) 1. 2. 3. 4.	

**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 - Abstraction & Design in Computation
- 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 1610 – Operating Systems
- CS 1750 – Computer Graphics
- CS 1840 - Intro to Reinforcement Learning
- CS 1890 - Autonomous Multi-Robot Systems
- CS 2490r – Tiny Machine Learning
- CS 2831 - Computer Vision
- ES 50 - Intro to Electrical Engineering
- ES 51 – Computer Aided Machine Design
- ES 105*hfr* – 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
Required Courses					
ES 150	Spring	**21a, Co: 21b**			
ES 152	Fall	**1a,b**		**Co: B**	
CS 141	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)