

**Plan of Study for the Mechanical and Materials Science and Engineering
Track of AB Engineering Sciences Concentration**

Effective for Students Declaring the Concentration after July 1, 2020

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 or 16, AP 50a) PS 12b – E & M from an Analytic, Num & Exp Perspective (or Physics 15b or AP50b)	_____ _____
Computer Science CIRCLE ONE AM 10 – Computing for Sci & Eng CS 50 – Intro to Computer Science 1	_____ _____
Sophomore Forum	_____
Applied Mathematics See list on page 3 1.	_____
Mechanical Engineering Core ES 120 – Intro to the Mechanics of Solids ES 123 – Intro to Fluid Mechanics & Transport Processes ES 125 – Mechanical Systems ES 181 – Engineering Thermodynamics ES 190 – Intro to Materials Science & Engineering	_____ _____ _____ _____ _____

Electronics* See list on page 3 1.	_____
Engineering Electives* See list on page 3 1. 2.	_____ _____ _____

** 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: _____

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

Director of Undergraduate Studies

Date: _____

Applied Mathematics

- AM 104 – Series Expansions & Complex Analysis
- AM 105 – Ordinary & Partial Differential Equations
- AM 108 – Nonlinear Dynamical Systems
- AM 111 – Intro to Scientific Computing
- AM 120 – Applied Linear Algebra and Big Data

Electronics

- ES 54 – Electronics for Engineers
- ES 153 – Laboratory Electronics
- ES 152 AND CS 141
 - If both ES 152 and CS 141 are taken, the second course can count as an Engineering Elective

Engineering Electives

Only if taken during Freshman or Sophomore years:

- ESE 6 – Introduction to Environmental Science & Engineering
- ES 50 – Introduction to Electrical Engineering
- ES 53 – Quantitative Physiology as a Basis for Bioengineering

- AP 195 – Intro to Solid State Physics
- BE 110 - Physiological Systems Analysis
- CHEM 160 – Quantum Chemistry
- ESE 109 – Earth Resources and the Environment
- ES 51 – Computer Aided Machine Design
- ES 91hfr – Humanitarian Design Projects (*must be taken twice*)
- ES 96 – Engineering Problem Solving & Design Project
- ES 128 - Computational Solid and Structural Mechanics
- ESE 131 – Introduction to Physical Oceanography and Climate
- ESE 132 - Introduction to Meteorology and Climate
- ES 151 – Applied Electromagnetism
- ES 156 - Signals and Communications
- ES 159 – Intro to Robotics
- ESE 160 - Space Science and Engineering
- ESE 162 - Hydrology
- ESE 166 – State of the Art Instrumentation in Environmental Sciences
- ES 170 – Engineering Quantum Mechanics
- ES 173 – Intro to Electronic & Photonic Devices
- ES 175 – Photovoltaic Devices
- ES 177 – Photonic & Electronic Device Laboratory
- ES 183 – Intro to Heat Transfer
- ES 192 – Material Selection & Design
- PHYS 143a – Quantum Mechanics 1

Prerequisite Planning Table for the ES AB - Mech Track

	Typically Offered	Math	Physics	Other
<i>Required Courses</i>				
ES 120	Spring	21a, Co: 21b	A	
ES 123	Spring	21a,b	A	
ES 125	Fall	21a,b	A	
ES 181	Fall		A	
ES 190	Fall	21a,b	A,B	
<i>Selected Electives</i>				
ES 54	Spring			
ES 152	Fall	1a,b	Co: B	
ES 153	Fall & Spring			
CS 141	Spring			<i>CS 50</i>

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)