

**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, 2019

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 (or AM 21a or 23a) Math 21b – Linear Algebra & Differential Equations (or AM 21b or 23b)	_____ _____ _____ _____
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 CS 50 – Intro to Computer Science 1 CS 51 – Intro to Computer Science 2 CS 61 – Systems Programming & Machine Organization	_____ _____
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	_____ _____ _____ _____

REQUIRED COURSES (Circle course and % for course you are taking or plan to take in each category.)	Semester (Fall/Spring Year)
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
- Chemistry 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 173 – Intro to Electronic & Photonic Devices
- ES 175 – Photovoltaic Devices
- ES 177 – Photonic & Electronic Device Laboratory
- Physics 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)