

**Plan of Study for the Biomedical Sciences & Engineering Track**  
of the Engineering Sciences AB Concentration  
Effective for Students Declaring the Concentration after August 1, 2019

NAME: \_\_\_\_\_

CLASS: \_\_\_\_\_

EMAIL: \_\_\_\_\_

DATE: \_\_\_\_\_

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

<b>REQUIRED COURSES</b> (Circle or fill-in for courses planned in each category.)	<b>Semester</b> (FA/SP Year)
<b>Mathematics</b> (2-4 courses)  <i>Begin according to placement:</i> Math 1a – Introduction to Calculus I (or Math Ma & Mb) Math 1b – Calculus, Series, and Differential Equations Math 21a – Multivariable Calculus (or Math 22a or 23b, or Applied Math 21a or 22b) Math 21b – Linear Algebra and Differential Equations (or Math 22b or 23a, or Applied Math 21b or 22a)	     
<b>Physics</b> (2 courses)  AP 50a – Physics as a Foundation for Sci. & Eng. Part I (or PS 12a or Physics 15a or 16) AP 50b – Physics as a Foundation for Sci. & Eng. Part II (or PS 12b or Physics 15b)	  
<b>Chemistry/Life Sciences</b> (1 course)  Life Sciences 1a – An Integrated Introduction to the Life Sciences (or Life & Physical Sciences A – Foundational Chemistry and Biology)	 
<b>Computer Science</b> (1 course)  CS 50 – Introduction to Computer Science I (or CS 51 – Introduction to Computer Science II or CS 61 – Systems Programming & Machine Organization)	 
<b>Sophomore Forum</b>  <i>Required, non-credit.</i>	 
<b>Bioengineering Core: Physiology &amp; Modeling</b> (2 courses)  ES 53 – Quantitative Physiology as a Basis for Bioengineering BE 110 – Physiological Systems Analysis	  

<b>REQUIRED COURSES</b> (Circle or fill-in for courses planned in each category.)	<b>Semester</b> (FA/SP Year)
<p><b>Subtrack-specific Courses</b> (4 courses)</p> <p><i>Select one Subtrack:</i></p> <ul style="list-style-type: none"> <li>• <i>Mechanical Subtrack</i> <ul style="list-style-type: none"> <li>○ ES 120 – Intro to the Mechanics of Solids</li> <li>○ ES 123 – Intro to Fluid Mechanics</li> <li>○ ES 181 – Engineering Thermodynamics</li> <li>○ <i>One from:</i> <ul style="list-style-type: none"> <li>ES 54 – Electronics for Engineers</li> <li>ES 153 – Laboratory Electronics</li> </ul> </li> </ul> </li> <li>• <i>Electrical Subtrack</i> <ul style="list-style-type: none"> <li>○ ES 150 – Intro to Probability with Engineering Applications</li> <li>○ ES 54 – Electronics for Engineers (or ES 153 (or both ES 152 &amp; CS 141))</li> <li>○ To reach 4 courses: 1-2 of BE 128- Biomedical Imaging Systems, BE 129 – Bioelectronics, BE 130 – Neural Control of Movement, or ES 157 – Biological Signal Processing</li> </ul> </li> <li>• <i>Chemical &amp; Materials Subtrack</i> <ul style="list-style-type: none"> <li>○ ES 123 – Intro to Fluid Mechanics</li> <li>○ ES 181 – Engineering Thermodynamics</li> <li>○ BE 191 – Intro to Biomaterials (<i>preferred</i>) (or ES 190 – Intro to Materials Science &amp; Eng.)</li> <li>○ PS 1 – Chemical Bonding, Energy, &amp; Reactivity</li> </ul> </li> </ul>	<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><b>Approved Electives</b> (<i>2 courses from the list below</i>)</p> <p>Engineering Sciences 51, 91r (one term only), 120, 123, 128, 181,190, 211, 220, 221, 228, 240</p> <p>Biomedical Engineering 121, 125, 128, 129, 130, 160, 191</p> <p>Either Applied Mathematics 101 or Engineering Sciences 150</p> <p>One from Engineering Sciences 54, 153, or 154</p> <p>Physics 136, 140, 143a, 151, 153</p> <p>One from Physical Sciences 1, Chemistry 17 or 20</p> <p>Applied Mathematics 104 or 105</p>	<p>_____</p> <p>_____</p>

**Required Signatures:**

\_\_\_\_\_

Student

\_\_\_\_\_

Date

\_\_\_\_\_

Assistant/Director of Undergraduate Studies (BME)

\_\_\_\_\_

Date

**Prerequisite Planning Table for the ES AB - Biomedical Sciences & Engineering Track**

	Typically Offered	Math	Biology / Chemistry	Physics	Other
<i>Required Courses</i>					
ES 53	Fall				
BE 110	Fall	<i>21a,b</i>		<i>B</i>	<i>ES 53</i>
<i>Selected Electives</i>					
BE 121	Fall	<b>21b</b>	<b>LS 1a,1b</b>	<b>A,B</b>	<b>ES 53, Co: BE 110</b>
BE 125	Spring		<i>LS1a, Chem 17</i>		
BE 128	Spring	<b>1b</b>		<b>B</b>	
BE 129	Spring	<b>1b</b>	<b>LS 1a, Chem 17</b>	<b>B</b>	
BE 130	Spring				
BE 191	Spring	<b>1b</b>	<b>LS1a or PS 1</b>		
CS 141	Spring				<i>CS50</i>
ES 54	Spring				
ES 120	Spring	<b>21a, Co: 21b</b>		<b>A</b>	
ES 123	Spring	<b>21a,b</b>		<b>A</b>	
ES 150	Spring	<b>21a, Co:21b</b>			
ES 152	Fall	<b>1a,b</b>		<b>Co: B</b>	
ES 153	Fall & Spring				
ES 157	Fall	<b>21a,b</b>			<i>ES 150 or 156</i>
ES 181	Fall			<b>A</b>	
ES 190	Fall	<b>21a,b</b>		<b>A,B</b>	

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

<sup>2</sup>Courses marked with "Co:" may be taken as a co-requisite

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