

# BIOENGINEERING: BIOMATERIALS

2022 – 2023 Curriculum

\*Fall Only    \*\*Spring Only

Student: \_\_\_\_\_

Date: \_\_\_\_\_

CUID: \_\_\_\_\_

Advisor: \_\_\_\_\_

FRESHMAN YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	4	CH 1010 & 1011 General Chemistry		4	CH 1020 & 1021 General Chemistry
	3	ENGL 1030 & 1031 Composition and Rhetoric		3	ENGR 1410 & 1411 Programming and Problem Solving <sup>4</sup>
	3	ENGR 1020 & 1021 Engineering Disciplines and Skills <sup>1</sup>		4	MATH 1080 Calculus of One Variable II
	4	MATH 1060 Calculus of One Variable I <sup>2</sup>		3	PHYS 1220 Physics with Calculus I <sup>5</sup>
	3	Arts & Humanities <i>OR</i> Social Science Req <sup>3</sup>		3	Arts & Humanities <i>OR</i> Social Science Req <sup>3</sup>
				1	Biology Requirement <sup>6</sup>
	<b>17</b>			<b>18</b>	
SOPHOMORE YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	3	BIOE 2010 Intro to Biomedical Engineering		1	BIOE 2000 Bioengineering Prof. Development
	3	CH 2010 Survey of Organic Chemistry <sup>5</sup>		3	BIOE 3020 & 3021 Biomaterials
	1	CH 2020 Survey of Organic Chemistry Lab <sup>5</sup>		3	CE 2010 Statics
	4	MATH 2060 Calculus of Several Variables		3	ECE 2020 Electric Circuits I
	3	MSE 2100 Introduction to Materials Science		1	ECE 2110 Electrical Engineering Lab I
	3	PHYS 2210 Physics with Calculus II <sup>5</sup>		2	ENGR 2080 & 2081 Engr. Graphics & Machine Design
				4	MATH 2080 Int. to Ordinary Differential Eqn.
	<b>17</b>			<b>17</b>	
JUNIOR YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	4	BIOE 3100 & 3101 Engr. Analysis of Physiological Process		3	BCHM 3010 Molecular Biochemistry <i>OR</i> BCHM 3050 Essential Elements of Biochemistry
	3	BIOE 3200 Biomechanics		3	BIOE 3470 Transport Processes in Bioengineering
	3	BIOE 3210 Biofluid Mechanics		3	BIOE 3700 & 3701 Bioinstrumentation and Bioimaging
	3	BIOE 3460 Biomolecular Thermodynamics		1	BIOE 4000 BioE Leadership and MedTech Comm. <i>OR</i> BIOE 4150 Research Principles and Concepts
	3	MATH 3020 Statistics for Science and Engineering		3	MSE 3190 Materials Processing
				3	Bioengineering Technical Requirement <sup>7</sup>
	<b>16</b>			<b>16</b>	
SENIOR YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	3	BIOE 4010 Bioengineering Design Theory		3	BIOE 4030 & 4031 Applied Biomedical Design
	3	BIOL 4610 Cell Biology		3	BIOE 4480 & 4481 Tissue Engineering
	3	MSE (CH) 4150 Polymer Science and Engineering		3	Arts & Humanities <i>OR</i> Social Science Requirement <sup>3</sup>
	3	Arts & Humanities <i>OR</i> Social Science Req <sup>3</sup>		3	Bioengineering Technical Requirement <sup>7</sup>
	3	Bioengineering Technical Requirement <sup>7</sup>		3	Bioengineering Technical Requirement <sup>7</sup>
	<b>15</b>			<b>15</b>	
<b>131 Total Semester Hours</b>					
GENERAL EDUCATION REQUIREMENTS					
Literature	Non-Literature	Social Science (SC REACH Act, if required)	Social Science (from a different department)	Global Challenges (ENGR 1020 at Clemson or another course)	Global Challenges -3000 or 4000 level Or if already met with Tech Requirement, then need Dept Arts & Humanities/Social Sci Req
CHANGE OF MAJOR REQUIREMENTS: C grade or higher in each class and a 3.0 Clemson cumulative GPA					
CH 1010	ENGL 1030	ENGR 1020	ENGR 1410	MATH 1060	PHYS 1220

Students should always refer to the Academic Catalog for course descriptions and for course pre-requisites, corequisites, and concurrent enrollment requirements. Academic Catalog can be found here: <https://www.clemson.edu/registrar/academic-catalogs/>. Advisors will assist students in scheduling courses to fulfill the requirements of the degree program; nevertheless, it is the responsibility of the student to fulfill the relevant requirements of the degree.

## Footnotes

<sup>1</sup> The combination of ENGR 1050 and ENGR 1060 or the combination of ENGR 1510 and ENGR 1520 may be substituted for ENGR 1020.

<sup>2</sup> Depending on a student's Clemson Mathematics Placement Test score, MATH 1040 and MATH 1070 may be substituted for MATH 1060; or the student may be required to take MATH 1050 before enrolling in MATH 1060.

<sup>3</sup> See General Education Requirements. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

<sup>4</sup> ENGR 1640 or the combination of ENGR 1070, ENGR 1080 and ENGR 1090 may be substituted for ENGR 1410.

<sup>5</sup> Students planning to enter medical school should take CH 2230/CH 2270 instead of CH 2010/CH 2020 and take CH 2240/CH 2280 as an additional course sequence. CH 2230 and CH 2240 may be substituted for CH 2010. CH 2270 may be substituted for CH 2020.

Students planning to enter medical school should also take physics laboratories as additional courses (PHYS 1220 course with PHYS 1240 lab and PHYS 2210 course with PHYS 2230 lab).

<sup>6</sup> Select BIOE 1010, BIOL 1030, BIOL 1040, BIOL 1100, or BIOL 1110.

<sup>7</sup> Students must take at least six credits from courses with a lecture designation. The other six credits may be selected from courses with the lecture or the non-lecture designation.

*Lecture Courses:* BIOE 4020, BIOE 4120, BIOE 4150, BIOE 4200, BIOE 4230, BIOE 4310, BIOE 4340, BIOE 4350, BIOE 4400, BIOE 4420, BIOE 4450, BIOE 4490, BIOE 4500, BIOE 4610, BIOE 4710, BIOE 4820, BMOL 4250, ECE 2720/ECE 2730, ECE 3170, ECE 3210/ECE 3120, ECE 3710/ECE 3720, ECE 3810, ECE 4090, ECE 4270, ECE 4320, ECE 4670, MATH 3650, MSE 4580, PHYS 4170, PHYS 4180

*Non-Lecture Courses:* BIOE 2910, BIOE 4510, BIOE 4600, BIOE 4690, BIOE 4900, BIOE 4910

## NOTES:

1. To transfer from General Engineering into the Bioengineering degree program, students must have a minimum cumulative grade-point average of 3.0 in courses taken at Clemson and must have earned a C or better in each course in the General Engineering Core Curriculum.
2. Depending on a student's math placement, they may be invited to take part in the General Engineering Learning Community where they complete the following courses: ENGR 1000, ENGR 1010, ENGR 1100, ENGR 1110, ENGR 1510, ENGR 1520, and ENGR 1640. The combination of ENGR 1510 and ENGR 1520 may be substituted for ENGR 1020. ENGR 1640 may be substituted for ENGR 1410.
3. A transfer course may not be used to satisfy the General Education Global Challenges Requirement. While a transfer course may fulfill other degree requirements, students must enroll in a Clemson course(s) on the Global Challenges list to fulfill the Global Challenges Requirement.