

# BIOENGINEERING

## BIOELECTRICAL CONCENTRATION

Courses highlighted below are available at Francis Marion University  
Curriculum Example\*

### FRESHMAN YEAR

\_\_\_\_\_ 4 CH 1010 General Chemistry  
\_\_\_\_\_ 3 ENGL 1030 Accelerated Composition  
\_\_\_\_\_ 2 ENGR 1020 Engineering Discipline and Skills<sup>1</sup>  
\_\_\_\_\_ 3 MATH 1060 Calculus of One Variable I  
\_\_\_\_\_ 3 Gen Ed<sup>3</sup>  
16

\_\_\_\_\_ 4 CH 1020 General Chemistry  
\_\_\_\_\_ 3 ENGR 1410 Programming and Problem Solving<sup>1</sup>  
\_\_\_\_\_ 4 MATH 1080 Calculus of One Variable II  
\_\_\_\_\_ 3 PHYS 1220 Physics with Calculus I<sup>2</sup>  
\_\_\_\_\_ 3 Gen Ed<sup>3</sup>  
\_\_\_\_\_ 1 Biology Requirement<sup>4</sup>  
18

### SOPHOMORE YEAR

\_\_\_\_\_ 3 BIOE 2010 Intro. to Biomedical Engineering  
\_\_\_\_\_ 2 ECE 2010 Logic and Computing Devices  
\_\_\_\_\_ 3 ECE 2020 Electric Circuits I  
\_\_\_\_\_ 1 ECE 2090 Logic and Computing Devices Lab  
\_\_\_\_\_ 1 ECE 2110 Electrical Engineering Lab. I  
\_\_\_\_\_ 4 MATH 2060 Calculus of Several Variables  
\_\_\_\_\_ 3 PHYS 2210 Physics with Calculus II<sup>2</sup>  
17

\_\_\_\_\_ 0 BIOE 2000 Bioengineering Professional Development  
\_\_\_\_\_ 3 CE 2010 Statics  
\_\_\_\_\_ 1 ECE 2120 Electrical Engineering Lab II  
\_\_\_\_\_ 3 ECE 2620 Electric Circuits II  
\_\_\_\_\_ 2 ENGR 2080 Engineering Graphics and Machine Design  
\_\_\_\_\_ 4 MATH 2080 Int. to Ordinary Differential Eqtns  
\_\_\_\_\_ 3 MSE 2100 Introduction to Materials Science  
16

### JUNIOR YEAR

\_\_\_\_\_ 4 BIOE 3100 Engineering Analysis of Physiological Processes  
\_\_\_\_\_ 3 CH 2010 Survey of Organic Chemistry<sup>2</sup>  
\_\_\_\_\_ 1 CH 2020 Survey of Organic Chemistry Lab<sup>2</sup>  
\_\_\_\_\_ 1 ECE 3110 Electrical Engineering Lab. III  
\_\_\_\_\_ 3 ECE 3200 Electronics I  
\_\_\_\_\_ 3 ECE 3300 Signals, Systems, and Transforms  
15

\_\_\_\_\_ 3 BCHM 3050 Essential Elements of Biochem.  
\_\_\_\_\_ 0 BIOE 3000 Bioengineering Ethics & Entrepreneurship  
\_\_\_\_\_ 3 BIOE 3020 Biomaterials  
\_\_\_\_\_ 3 BIOE 3700 Bioinstrumentation and Bioimaging  
\_\_\_\_\_ 3 ECE 3800 Electromagnetics  
\_\_\_\_\_ 3 BIOE or ECE Technical Requirement<sup>5</sup>  
15

### SENIOR YEAR

\_\_\_\_\_ 3 BIOE 3200 Biomechanics  
\_\_\_\_\_ 3 BIOE 4010 Bioengineering Design Theory  
\_\_\_\_\_ 3 BIOL 4610 Cell Biology  
\_\_\_\_\_ 3 Gen Ed<sup>3</sup>  
\_\_\_\_\_ 3 BIOE or ECE Technical Requirement<sup>5</sup>  
15

\_\_\_\_\_ 1 BIOE 4000 Bioengineering Leadership & MedTech Commercialization  
\_\_\_\_\_ 3 BIOE 4030 Applied Biomedical Design  
\_\_\_\_\_ 3 BIOE 4480 Tissue Engineering  
\_\_\_\_\_ 3 Gen Ed<sup>3</sup>  
\_\_\_\_\_ 6 BIOE or ECE Technical Requirement<sup>5</sup>  
16

All Clemson engineering students begin in our General Engineering program and move into their specified major once the Departmental standards are completed. Clemson courses ENGL 1030, MATH 1060 and 1080, PHYS 1220, CH 1010, ENGR 1020 and ENGR 1410/or CHE 1300 must all be completed with a "C" or higher before declaring and starting courses in your major. **128 Total Semester Hours**

Footnotes: and ENGR 1410/or CHE 1300 must all be completed with a "C" or higher before declaring and starting courses in your major.

<sup>1</sup> ENGR 1070, ENGR 1080 and ENGR 1090 may be substituted for ENGR 1410; ENGR 1050 and ENGR 1060 may be substituted for ENGR 1020

<sup>2</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. 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>3</sup> See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

<sup>4</sup> Select from BIOE 1010, BIOL 1030, BIOL 1040, BIOL 1100, BIOL 1110

<sup>5</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 3210, BIOE 4020, BIOE 4120, BIOE 4150, BIOE 4200, BIOE 4230, BIOE 4310, BIOE 4350, BIOE 4400, 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 Non-Lecture Courses-BIOE 4510, BIOE 4600, BIOE 4690, BIOE 4900, BIOE 4910

\*See catalog for current curriculum at [catalog.clemson.edu](http://catalog.clemson.edu)

General Education Requirements						
LIT	Non-Lit	SS1	SS2		CCA	STS
Other						
LIFE	Palmetto Fellows	Honors	Athlete	RiSE	ROTC	Med School

Comments:

# BIOENGINEERING

## Biomaterials Concentration

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Curriculum Example\*

### FRESHMAN YEAR

_____ 4 CH 1010 General Chemistry	_____ 4 CH 1020 General Chemistry
_____ 3 ENGL 1030 Accelerated Composition	_____ 3 ENGR 1410 Programming and Problem Solving <sup>1</sup>
_____ 2 ENGR 1020 Engineering Discipline and Skills <sup>1</sup>	_____ 4 MATH 1080 Calculus of One Variable II
_____ 4 MATH 1060 Calculus of One Variable I	_____ 3 PHYS 1220 Physics with Calculus I <sup>2</sup>
_____ 3 Gen Ed <sup>3</sup>	_____ 3 Gen Ed <sup>3</sup>
16	_____ 1 Biology Requirement <sup>4</sup>
	18

### SOPHOMORE YEAR

_____ 3 BIOE 2010 Intro. to Biomedical Engineering	_____ 0 BIOE 2000 Bioengineering Professional Development
_____ 3 CH 2010 Survey of Organic Chemistry <sup>2</sup>	_____ 3 BIOE 3020 Biomaterials
_____ 1 CH 2020 Survey of Organic Chemistry Lab <sup>2</sup>	_____ 3 CE 2010 Statics
_____ 4 MATH 2060 Calculus of Several Variables	_____ 2 ECE 2070 Basic Electrical Engineering
_____ 3 MSE 2100 Introduction to Materials Science	_____ 1 ECE 2080 Basic Electrical Engineering Lab.
_____ 3 PHYS 2210 Physics with Calculus II <sup>2</sup>	_____ 2 ENGR 2080 Engineering Graphics and Machine Design
17	_____ 4 MATH 2080 Int. to Ordinary Differential Eqtns
	15

### JUNIOR YEAR

_____ 4 BIOE 3100 Engineering Analysis of Physiological Processes	_____ 3 BCHM 3050 Essential Elements of Biochem.
_____ 3 BIOE 3200 Biomechanics	_____ 0 BIOE 3000 Bioengineering Ethics & Entrepreneurship
_____ 3 BIOE 3470 Transport Processes in Bioengineering	_____ 3 BIOE 3210 Biofluid Mechanics
_____ 3 MATH 3020 Statistics for Science and Engineering	_____ 3 BIOE 3700 Bioinstrumentation and Bioimaging
_____ 3 MSE 3260 Thermodynamics of Materials	_____ 3 MSE 3190 Materials Processing I
16	_____ 3 Bioengineering Technical Requirement <sup>5</sup>
	15

### SENIOR YEAR

_____ 3 BIOE 4010 Bioengineering Design Theory	_____ 1 BIOE 4000 Bioengineering Leadership & MedTech Commercialization
_____ 3 BIOL 4610 Cell Biology	_____ 3 BIOE 4030 Applied Biomedical Design
_____ 3 MSE 4150 Intro. to Polymer Science and Engr.	_____ 3 BIOE 4480 Tissue Engineering
_____ 3 Gen Ed <sup>3</sup>	_____ 3 Gen Ed <sup>3</sup>
_____ 3 Bioengineering Technical Requirement <sup>5</sup>	_____ 6 Bioengineering Technical Requirement <sup>5</sup>
15	16

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128 Total Semester Hours

#### Footnotes:

<sup>1</sup> ENGR 1070, ENGR 1080 and ENGR 1090 may be substituted for ENGR 1410; ENGR 1050 and ENGR 1060 may be substituted for ENGR 1020

<sup>2</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. 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>3</sup> See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

<sup>4</sup> Select from BIOE 1010, BIOL 1030, BIOL 1040, BIOL 1100, BIOL 1110

<sup>5</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 3210, BIOE 4020, BIOE 4120, BIOE 4150, BIOE 4200, BIOE 4230, BIOE 4310, BIOE 4350, BIOE 4400, 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 Non-Lecture Courses-BIOE 4510, BIOE 4600, BIOE 4690, BIOE 4900, BIOE 4910

General Education Requirements						
LIT	Non-Lit	SS1	SS2	CCA	STS	
						Other
LIFE	Palmetto Fellows	Honors	Athlete	RiSE	ROTC	Med School

Comments: