

BIOSYSTEMS ENGINEERING: BIOPROCESS

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 ⁴
	3	ENGR 1020 & 1021 Engineering Disciplines and Skills ¹		4	MATH 1080 Calculus of One Variable II
	4	MATH 1060 Calculus of One Variable I ²		3	PHYS 1220 Physics with Calculus I
	3	Arts & Humanities <i>OR</i> Social Science Req ³		3	General Education Req ³
	17			17	
SOPHOMORE YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	2	BE 2100 & BE 2101 Intro to Biosystems Engineering		2	BE 2120 & 2121 Fundamentals of Biosystems Engr.
	4	BIOL 1030 <i>AND</i> BIOL 1050 General Biology I and Lab I <i>OR</i> BIOL 1100 & 1101 Principles of Biology I		2	CE 2080 Dynamics ⁵
	3	CE 2010 Statics ⁵		3	ENGL 3140 Technical Writing
	2	ENGR 2100 & 2101 CAD and Engr. Applications		4	MATH 2080 Intro to Ordinary Differential Equations
	4	MATH 2060 Calculus of Several Variables		4	MICR 3050 & 3051 General Microbiology
	3	Physics with Calculus II		3	Global Sustainability Requirement ⁶
	18			18	
JUNIOR YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	3	BE 3100 Biosystems Engr. Thermodynamics <i>OR</i> ME 3100 Thermodynamics and Heat Transfer		3	BE 3220 Small Watershed Hydrology and Sedimentology
	3	BE 3200 & 3201 Principles and Practices of Geomatics		3	BE 4120 Heat and Mass Transport in Biosystems Engr.
	3	BE 4100 & 4101 Bio. Kinetics and Reactor Modeling		3	BE 4240 Ecological Engineering
	3	CE 3410 Introduction to Fluid Mechanics		3	BE 4380 & 4381 Bioprocess Engineering Design
	1	CE 3430 Introduction to Fluid Mechanics Lab.		3	CH 2230 Organic Chemistry
	2	ECE 2070 Basic Electrical Engineering		1	CH 2270 Organic Chemistry Lab
	1	ECE 2080 Basic Electrical Engineering Lab			
	16			16	
SENIOR YEAR					
Term Info	Cr	Course	Term Info	Cr	Course
	3	BE 4150 & 4151 Inst. and Control for Biosystems		3	BCHM 3050 Essential Elements of Biochemistry
	3	BE 4280 Biochemical Engineering		3	Bioprocess Engineering Requirement ⁷
	1	BE 4740 Biosystems Engr. Design Project Management		3	General Education Req ³
	3	BE 4750 Biosystems Engr. Capstone Design		3	General Education Req ³
	3	BIOL 4410 Ecology		3	Oral Communication Req ³
	4	CE 2060 & 2061 Structural Mechanics			
	17			15	
134 Total Semester Hours					
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 2.0 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

- ¹ The combination of ENGR 1050 and ENGR 1060 or the combination of ENGR 1510 and ENGR 1520 may be substituted for ENGR 1020.
- ² 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.
- ³ See General Education Requirements. Three General Education credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.
- ⁴ ENGR 1640 or the combination of ENGR 1070, ENGR 1080, and ENGR 1090 may be substituted for ENGR 1410.
- ⁵ ME 2010 may be substituted for CE 2010 and CE 2080.
- ⁶ Select any 3000-level course from the Sustainability Minor course list that also fulfills three credits of the Global Challenges General Education Requirement.
- ⁷ Select from any BE, BIOE, BMOL or MSE course at the 3000 level or above, excluding BE 4990 or other Creative Inquiry courses.

NOTES:

1. In addition to institutional requirements, candidates for a BS degree in Biosystems Engineering are required to have a cumulative grade-point average of 2.00 or higher in all engineering courses taken at Clemson. Undergraduate and graduate courses taught in the following rubrics are used in the calculation of a student's engineering GPA (eGPA): AMFG, AUE, BE, BIOE, BMOL, CE, CES, CHE, CME, ECAS, ECE, EES, EG, EM, ENGR, ESED, IE, ME, and MSE. All attempts of these courses with grades of *A, B, C, D, F*, and *I* are included in the calculation. Grades of *CE, CR, FGD, FGF, NP, P, SCD, SCN, SCP, TR*, and *W* are NOT included in the calculation.
2. The following courses must be completed with a grade of *C* or better: CE 2010, CE 2080, CE 3410; CH 1010; ENGL 1030; ENGR 1020 (or ENGR 1050 and ENGR 1060 or ENGR 1510 and ENGR 1520 if substituted for ENGR 1020) and ENGR 1410 (or ENGR 1640 or ENGR 1070, ENGR 1080 and ENGR 1090 if substituted for ENGR 1410); MATH 1060, MATH 1080, MATH 2060, MATH 2080; ME 2010 (if substituted for CE 2010 and CE 2080); and PHYS 1220 and PHYS 2210.
3. 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.
4. 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