

Biological Engineering (BS): Bioprocessing Engineering (11BEBS-11BEBEP)

Freshman Year

Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry, A Molecular Science ^{1B}	3	BAE 100 Intro to Biol. Engr.	1
CH 102 General Chemistry Lab ^{1B}	1	CH 221 Organic Chemistry I	3
E 101 Introduction to Engr & Prob Solv ¹	1	CH 222 Organic Chemistry I Lab	1
E 115 Intro to Computing Environ	1	MA 241 Calculus II ^{1A}	4
ENG 101 Academic Writing & Research ^{1H}	4	PY 205 Physics for Engineers & Scientists I ^{1B}	3
MA 141 Calculus I ^{1A}	4	PY 206 Physics for Engineers & Scientists I Lab	1
HES_*** Health & Exercise Studies Course ^E	1	EC 205 Economics (GEP Soc Sci Req ^D) ²	3
	15		16

Sophomore Year

Fall Semester	Credit	Spring Semester	Credit
BAE 200 Comp Meth in Biol Engr	2	BAE 202 Intro to BAE Methods	4
MAE 206 Engineering Statics or CE 214 Engineering Mechanics- Statics ¹	3	MAE 208 Engineering Dynamics ¹	3
MA 242 Calculus III	4	MA 341 Applied Diff Equations	3
PY 208 Physics for Engineers & Scientists II ^B	3	MAE 201 Engr Thermodynamics I	3
PY 209 Physics for Engineers & Scientists II Lab	1	BIO 183 Intro Biol: Cell & Mol Biol ^B	4
CH 223 Organic Chemistry II	3		
CH 224 Organic Chemistry II Lab	1		
	17		17

Junior Year

Fall Semester	Credit	Spring Semester	Credit
BAE 302 Transport Phenomena	3	BAE 401 Instrumentation for Biological Systems	3
BAE 321 Bioprocess Engineering Fundamentals	3	BAE 322 Intro Food Processing Engr	3
MB 351 General Microbiology	3	MAE 214 Solid Mechanics or CE 313 Mechanics of Solids ¹	3
MB 352 General Microbiology Lab or MB 354 Inquiry Guided Micro Lab	1	GEP Social Science Elective ^D	3
MAE 308 Fluid Mechanics or CE 382 Hydraulics ¹	3	ST 370 Prob & Statistics for Engr.	3
BAE 305 BE Circuits	4		
	17		15

Senior Year

Fall Semester	Credit	Spring Semester	Credit
BAE 451 Engr Design I	2	BAE 425 Industrial Microbiology & Bioprocess	3
Bioprocess Engr Elective ⁵	3	BAE 452 Engr Design II	2
Ethics (GEP Interdisciplinary Persp. Elec. ^G) ⁶	3	BAE Elective ⁴	3
GEP Humanities Requirement ^C	3	GEP Interdisciplinary Persp. Elec. ^G	2
HES_*** Health & Exercise Studies Course ^E	1	GEP Additional Breadth Requirement ^F	3
ENG 331 Comm. Engr. & Tech. or ENG 333 Comm. Sci. & Res.	3	GEP Humanities Requirement ^C	3
	15		16

Minimum Credit Hours Required for Graduation^{I,J,K,*}:

128

Major/Program requirements and footnotes

1 Must be completed with a grade of C- or higher.

2 Choose from EC 201 or 205, or ARE 201.

4 Choose from BAE 361, 371, or 481

5 Choose from BAE 528, CHE 435, BEC 436, 463, 485, 488 or ISE 311.

6 Choose from IDS 201, STS 302, or STS 304

*General Education Program (GEP) requirements

*To complete the requirements for graduation and the General Education Program, the following credit hours and co-requisites must be satisfied. University approved GEP course lists for each category can be found at <https://oucc.dasa.ncsu.edu/general-education-program/>.

A. Mathematical Sciences (6 credit hours – one course with MA or ST prefix)

Choose from the University approved GEP Mathematical Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: MA 141, MA 241

B. Natural Sciences (7 credit hours – include one laboratory course or course with a lab)

Choose from the University approved GEP Natural Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: CH 101, CH 102, BIO 183, PY 205, PY 208

C. Humanities (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: None

D. Social Sciences (6 credit hours selected from two different disciplines/course prefixes)

Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: EC 201, 205, or ARE 201

E. Health & Exercise Studies (2 credit hours – at least one 100-level Health & Exercise Studies Course)

Choose from the University approved GEP Health & Exercise Studies course list.

F. Additional Breadth (3 credit hours to be selected from the following checked University approved GEP course lists)

Humanities/Social Sciences/Visual and Performing Arts or Mathematical Sciences/Natural Sciences/Engineering

G. Interdisciplinary Perspectives (5-6 credit hours)

Choose from the University approved GEP Interdisciplinary Perspectives course list or the following course(s) if completed as part of the Major requirements may fulfill part or all of this requirement: None

H. Introduction to Writing (4 credit hours satisfied by completing ENG 101 with a C- or better)

The following **Co-Requisites** must be satisfied to complete the General Education Program requirements

I. U.S. Diversity (USD)

Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: None

J. Global Knowledge (GK)

Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite. The following course(s) completed as part of the Major requirements may fulfill this requirement: None

K. Foreign Language proficiency

Proficiency at the FL_102 level is required for graduation.