

Chemical Engineering (BS): Biomolecular (14CHEBS-14CHEBIO)

Semester Display Effective Date: 1.2013

FRESHMAN YEAR			
Fall Semester	Credit	Spring Semester	Credit
CH 101 Chemistry A Molecular Sci. ¹	3	CH 201 Chemistry - Quantitative Sci. ⁵	3
CH 102 General Chemistry Lab ¹	1	CH 202 Quantitative Chem. Lab	1
E 101 Intro to Engr & Prob Solv ¹	1	MA 241 Calculus II ¹	4
E 115 Intro to Computing Environ.	1	PY 205 Physics for Engineers & Scientists I ¹	3
ENG 101 Acad. Writing & Research ¹	4	PY 206 Physics for Engineer & Scientists I Lab	1
MA 141 Calculus I ¹	4	EC 205 Economics (or EC 201 or ARE 201*)	3
HES_*** Health & Exercise Studies Course*	1	HES_*** Health & Exercise Studies Course*	1
	15		16
SOPHOMORE YEAR			
Fall Semester	Credit	Spring Semester	Credit
CH 221 Organic Chemistry I ⁶	3	CH 223 Organic Chemistry II ⁶	3
CH 222 Organic Chemistry I Lab ⁶	1	CH 224 Organic Chemistry II Lab ⁶	1
CHE 205 Chemical Proc. Princ ⁵	4	CHE 225 Chem. Proc. Systems ⁵	3
MA 242 Calculus III ⁵	4	MA 341 Applied Differential Equations ⁵	3
PY 208 Physics Engineers & Scientists II	4	BIO 183 Intro Biology: Cellular & Molecular Bio.	4
PY 209 Physics for Engineer & Scientists II Lab		GEP Requirement*	3
	16		17
JUNIOR YEAR			
Fall Semester	Credit	Spring Semester	Credit
BCH 451 Intro Biochemistry	4	BIT Lab Modules ²	4
CHE 311 Transport Processes I ⁵	3	CHE 312 Transport Processes II	3
CHE 315 Chem. Process Thermo ⁵	3	CHE 316 Thermo of Chem & Phase Eq	3
BIT 410 Manipulation ReDNA (4 cr.)	4	CHE 330 Chem Engr Lab I	4
GEP Requirement*	3	GEP Requirement *	2-3
CH 395 Professional Dev. Seminar	1		
	18		16-17
SENIOR YEAR			
Fall Semester	Credit	Spring Semester	Credit
CHE 447 Bioreactor Engineering	3	CHE 435 Proc. System Analy & Control	3
CHE 450 CHE Design I	3	CHE 451 CHE Design II	3
CHE 497 CHE Engr Projects I	3	CHE 551 Biochemical Engineering	3

GEP Requirement*	3	Technical Elective ⁴	2-3
Biotech Minor Group E (GEP IP req*) ³	3	GEP Requirement*	3
	15		14-15

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

127

Major/Program requirements and footnotes:

¹ Minimum grade of C- required.

² Students must take two 2-hour BIT lab modules from the following lists. In addition, selected BIT 495 Special Topics Courses may be approved by the Biotechnology advisor.

- **BIT Lab Module - Group 1** (2 cr): BIT 462, 464, 465, 467, 473, 495 (Cell Signaling, Genetic Engineering of Yeast and Fungi, or Immunology Methods), 572
- **BIT Lab Module - Group 2** (2 cr): Any course in Group 1 + BIT 466, 468, 471, 495 (Computational Biology, mRNA, or Stem Cells), 595 (Confocal Microscopy)

³ Biotech Minor Group E must be selected from: IDS 201, 303; STS 302, 304, 320; STS/PHI 325

⁴ Technical Elective must be selected from: BEC 330; BEC(CHE) 462, BEC(CHE) 463; BEC 480, 485, 488; BBS 426; CHE/BIT 464; PSE 425; CE 373, ECE 331, MSE 210, NE 419, PSE 425, TE 466.

⁵ Grade of C (2.0) or higher required.

⁶ CH 225/226 may substitute for CH 221/222 and CH 227/228 may substitute for CH 223/224.

***General Education Program (GEP) requirements and GEP Footnotes:**

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied.

University approved GEP course lists for each of the following categories can be found at <http://oucc.ncsu.edu/gep-courses>.

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

Course(s) completed as part of the Major requirements may fulfill part or all of this requirement.

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

Course(s) completed as part of the Major requirements may fulfill part or all of this requirement.

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:

D. Social Sciences (3 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 205, EC 201, 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

G. Interdisciplinary Perspectives (5-6 credit hours)

2 credits to be selected from the approved GEP Interdisciplinary Perspectives list. Course chosen to meet the Biotech Minor Group E requirement in the Major satisfies 3 credit hours of the 5 credit hours needed to fulfill the GEP Interdisciplinary Perspectives requirement.

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:

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:

K. Foreign Language proficiency - Proficiency at the FL_102 level is required for graduation.