

## Departmental/Program Major Courses (51 credits)

### Required Major courses (42 credits)

- \_\_\_\_\_ (4) ABE 20100 Material and Energy Balances in Biological Engineering
- \_\_\_\_\_ (3) ABE 20200 Thermodynamics in Biological Engineering
- \_\_\_\_\_ (2) ABE 22600 Biotechnology Lab I ([satisfies College of Agriculture: Biological Science Selectives](#))
- \_\_\_\_\_ (1) ABE 29000 Sophomore Seminar ([satisfies UCC Science, Technology & Society requirement](#))
- \_\_\_\_\_ (3) ABE 30100 Modeling and Computational Tools in Biological Engineering
- \_\_\_\_\_ (3) ABE 30200 Biochemical Laboratory Techniques for Biological Engineering
- \_\_\_\_\_ (3) ABE 30300 Physical Chemistry in Biological Engineering
- \_\_\_\_\_ (3) ABE 30400 Biological Engineering Laboratory
- \_\_\_\_\_ (3) ABE 30700 Momentum Transfer in Biological Engineering
- \_\_\_\_\_ (3) ABE 30800 Heat and Mass Transfer in Biological Engineering
- \_\_\_\_\_ (3) ABE 37000 Reaction Kinetics in Biological Engineering
- \_\_\_\_\_ (3) ABE 45700 Unit Operations in Biological Engineering
- \_\_\_\_\_ (3) ABE 46000 Sensors and Process Control
- \_\_\_\_\_ (1) ABE 49000 Professional Practice in Agricultural and Biological Engineering
- \_\_\_\_\_ (3) ABE 55700 Biological Engineering Process Design I
- \_\_\_\_\_ (3) ABE 55800 Biological Engineering Process Design II

### Biological Engineering Major Selectives (9 credits)

- \_\_\_\_\_ (6) [Biological Engineering Selectives](#)
- \_\_\_\_\_ (3) [Biological Engineering Selective or Biological Science & Technical Selective](#)

## Other Department/Program Course Requirements (77-79 credits)

- \_\_\_\_\_ (2) ENGR 13100 Transforming Ideas to Innovation I ([satisfies UCC Information Literacy requirement](#))
- \_\_\_\_\_ (2) ENGR 13200 Transforming Ideas to Innovation II
- \_\_\_\_\_ (4) BIOL 22100 Introduction to Microbiology
- \_\_\_\_\_ (3) BIOL 23000 Biology of the Living Cell ([satisfies College of Agriculture: Biological Science Selectives](#))
- \_\_\_\_\_ (3) BCHM 30700 Biochemistry ([satisfies College of Agriculture: Biological Science Selectives](#))
- \_\_\_\_\_ (3) CHE 32000 Statistical Modeling and Quality Enhancement
- \_\_\_\_\_ (4) CHM 11500 General Chemistry I ([satisfies a UCC Science requirement](#))
- \_\_\_\_\_ (4) CHM 11600 General Chemistry II ([Recommended FYE selective](#)) ([satisfies a UCC Science requirement](#))
- \_\_\_\_\_ (4) CHM 25700 Organic Chemistry (or (3) CHM 25500 Organic Chem + (1) CHM 25501 Organic Chem I Lab)
- \_\_\_\_\_ (4) CS 177 Programming with Multiple Options
- \_\_\_\_\_ (4) MA 16500 Analytic Geometry & Calculus I (or (5) MA 16100) ([satisfies UCC Quantitative Reasoning requirement](#))
- \_\_\_\_\_ (4) MA 16600 Analytic Geometry & Calculus II (or (5) MA 16200)
- \_\_\_\_\_ (4) MA 26100 Multivariate Calculus
- \_\_\_\_\_ (4) MA 26200 Linear Algebra and Differential Equations
- \_\_\_\_\_ (4) PHYS 17200 Modern Mechanics
- \_\_\_\_\_ (3) [Economics Selective](#) ([satisfies UCC Human Cultures: Behavioral/Social Sciences requirement](#))
- \_\_\_\_\_ (3) [Human Cultures: Humanities Selective](#) ([satisfies UCC Human Cultures: Humanities requirement](#))
- \_\_\_\_\_ (6) [Humanities or Social Science Selective](#)
- \_\_\_\_\_ (3) [Humanities or Social Science Selective](#) (30000+ level)
- \_\_\_\_\_ (3) [Oral Communication Selective](#) ([satisfies UCC Oral Communication requirement](#))
- \_\_\_\_\_ (3-4) [Written Communication Selective](#) ([Written Communication requirement](#))
- \_\_\_\_\_ (3) [Written or Oral Communication Selective](#) (20000+ level)
- \_\_\_\_\_ [International Understanding](#) (6 credits - may be met with UCC or COA Core Requirements)
- \_\_\_\_\_ [Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

## Electives (0-1 credits)

- \_\_\_\_\_ (0-1) \_\_\_\_\_

129 semester credits required for degree completion. 2.0 Graduation GPA required for Bachelor of Science degree. The student is ultimately responsible for knowing and completing all degree requirements. The myPurduePlan powered by Degree Works is the knowledge source for specific requirements and completion.

## Biological Engineering Selectives (9 Credits)

### Biological Engineering Selectives (6-9 credits)

- ABE 31400 Design of Electronic Systems
- ABE 32500 Soil and Water Resource Engineering
- ABE 42500 Water Quality Engineering
- ABE 42600 Ecological Restoration Engineering
- ABE 44000 Cell and Molecular Modeling
- ABE 58000\* Advanced Processes in Biological Engineering **OR**  
CHE 52500\* Biochemical Engineering
- ABE 59100 Principles of Sustainable Biomanufacturing
- BME 47000 Biomolecular Engineering
- BME 55100 Tissue Engineering
- CE 35000 Environmental Engineering **OR**  
EEE 35000 Environmental Engineering
- CHE 30600 Design of Staged Separation Processes
- CHE 55300 Pharmaceutical Process Development and Design

### Biological Science and Technical Selectives (0-3 credits)

- ABE 32700 Biotechnology Laboratory II
- ABE 51100 Drug Development
- AGRY 25500 Soil Science
- AGRY 32000 Genetics
- BIOL 24100 Biology IV: Genetics and Molecular Biology
- BIOL 48300 Great Issues: Environmental & Conservation Biol
- EEE 35500 Engineering Environmental Sustainability
- FS 36100 Food Plant Sanitation
- FS 36200 Food Microbiology
- FS 36300 Food Microbiology Laboratory
- FS 45300 Food Chemistry
- IPPH 56200 Intro to Pharmaceutical Manufacturing Processes
- NUTR 20500 Food Science I
- NUTR 31500 Fundamentals of Nutrition
- PHSC 42800 Dosage Forms I
- PHSC 42900 Dosage Forms II
- POL 22300 Introduction to Environmental Policy

## Biological Engineering Concentration Selectives (9 Credits)

### Bioenvironmental Engineering Concentration (9 credits)

#### Bioenvironmental Engineering Selective (6-9 credits)

- ABE 31400 Design of Electronic Systems
- ABE 32500 Soil and Water Resource Engineering
- ABE 42500 Water Quality Engineering
- ABE 42600 Ecological Restoration Engineering
- CE 35000 Environmental Engineering **OR**  
EEE 350 Environmental Engineering

#### Bioenvironmental Selective (0-3 credits)

- AGRY 25500 Soil Science
- EEE 35500 Engineering Environmental Sustainability
- POL 22300 Introduction to Environmental Policy
- BIOL 48300 Great Issues: Environmental & Conservation Biol

### Cellular and Biomolecular Engineering Concentration (9 credits)

#### Cellular and Biomolecular Engineering Selective (6-9 credits)

- ABE 44000 Cell and Molecular Modeling
- ABE 58000\* Advanced Processes in Biological Engineering **OR**  
CHE 52500\* Biochemical Engineering
- BME 47000 Biomolecular Engineering
- BME 55100 Tissue Engineering

#### Cellular and Biomolecular Selective (0-3 credits)

- ABE 32700 Biotechnology Laboratory II
- AGRY 32000 Genetics
- BIOL 24100 Biology IV: Genetics and Molecular Biology

### Food and Biological Process Engineering Concentration (9 credits)

#### Food and Biological Process Engineering Selective (6-9 credits)

- ABE 31400 Design of Electronic Systems
- ABE 58000\* Advanced Processes in Biological Engineering **OR**  
CHE 52500\* Biochemical Engineering
- CHE 30600 Design of Staged Separation Processes
- ABE 59100 Principles of Sustainable Biomanufacturing

#### Food and Biological Process Selective (0-3 credits)

- NUTR 20500 Food Science I
- NUTR 31500 Fundamentals of Nutrition
- FS 36200 Food Microbiology
- FS 36300 Food Microbiology Laboratory
- FS 36100 Food Plant Sanitation
- FS 45300 Food Chemistry

### Pharmaceutical Process Engineering Concentration (9 credits)

#### Pharmaceutical Process Engineering Selective (6-9 credits)

- ABE 31400 Design of Electronic Systems
- ABE 58000\* Advanced Processes in Biological Engineering **OR**  
CHE 52500\* Biochemical Engineering
- CHE 55300 Pharmaceutical Process Development and Design
- ABE 59100 Principles of Sustainable Biomanufacturing

#### Pharmaceutical Process Selective (0-3 credits)

- ABE 32700 Biotechnology Laboratory II
- ABE 51100 Drug Development
- IPPH 56200 Intro to Pharmaceutical Manufacturing Processes
- PHSC 42800 Dosage Forms I
- PHSC 42900 Dosage Forms II

Suggested Arrangement of Courses

Note that course placement is dependent upon both pre-requisite requirements as well as limited offering terms

**(ABE courses ONLY offered in Fall or Spring terms – not both)**

Please see your academic advisor for other options creating your personalized plan of study

PRE-ABE/FYE Curriculum – must earn C- or higher in all Pre-ABE/FYE courses to transition to major					
Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
4	<b>CHM 11500*</b>	pre/co: MA 16100/16500	4	<b>CHM 11600*§</b>	CHM 11500
2	<b>ENGR 13100*</b>		2	<b>ENGR 13200</b>	ENGR 13100
4-5	<b>MA 16500* or MA 16100</b>	min. ALEKS score=85	4-5	<b>MA 16600 or MA 16200</b>	MA 16100/16500 (≥ C-)
3	<a href="#">Economics Selective</a>		4	<b>PHYS 17200*</b>	pre/co: MA 16100/16500
3-4	<a href="#">Written Communication Selective*</a>		3	<a href="#">Oral Communication Selective*</a>	
<b>16-18</b>			<b>17-18</b>		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
4	<b>ABE 20100†</b>	CHM 11600, MA 16200/16600	3	<b>ABE 20200‡</b>	ABE 20100, MA 26100 (≥ C-)
2	<b>ABE 22600†</b>		4	<b>BIOL 22100</b>	BIOL 23000, CHM 11600
1	<b>ABE 29000†</b>		3	<b>CHE 32000</b>	ABE 20100, CHM 25700, pre/co: MA 26100 (≥ C-)
3	<b>BIOL 23000†</b>	Pre/co: CHM 11500, MA 16100/16500	4	<b>CS 17700</b>	
4	<b>MA 26100</b>	MA 16200/16600 (≥ C-)	4	<b>MA 26200</b>	MA 26100 (≥ C-)
4	<b>CHM 25700 or CHM 25500+25501</b>	CHM 11600			
<b>18</b>			<b>18</b>		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	<b>ABE 30100†</b>	CS 15900 or CS 17700	3	<b>ABE 30400‡</b>	ABE 30700, CHE 32000, pre/co: ABE 30800, ABE 3700, ABE 45700
1	<b>ABE 30200†</b>	ABE 22600, pre/co: BCHM 30700	3	<b>ABE 30800‡</b>	ABE 30700, pre/co: ABE 30400, ABE 37000, ABE 45700
3	<b>ABE 30300†</b>	ABE 20200, CHM 25700, or CHM 25500/CHM 25501 pre/co: ABE 30700	3	<b>ABE 37000‡</b>	ABE 30700, BIOL 22100, CHM 25700, pre/co: ABE 30400, ABE 30800, ABE 45700
3	<b>ABE 30700†</b>	ABE 20200, MA 26200 pre/co: ABE 30100, ABE 30300	3	<b>ABE 45700‡</b>	ABE 30700, pre/co: ABE 30400, ABE 30800, ABE 37000
3	<b>BCHM 30700</b>	CHM 25700	3	<a href="#">Biological Engineering or Biological Sci &amp; Tech Selective</a>	
3	<a href="#">Written or Oral Communication Selective (20000+)</a>				
<b>16</b>			<b>15</b>		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
3	<b>ABE 46000†</b>	MA 26200 (≥ C-)	3	<b>ABE 55800‡</b>	ABE 55700
1	<b>ABE 49000†</b>	ABE 29000	3	<a href="#">Biological Engineering Selective</a>	
3	<b>ABE 55700†</b>	ABE 30400, ABE 30800, ABE 37000, ABE 45700	3	<a href="#">Human Cultures: Humanities Selective</a>	
3	<a href="#">Biological Engineering Selective</a>		3	<a href="#">Humanities or Social Science Selective</a>	
3	<a href="#">Humanities or Social Science Selective</a>		3	<a href="#">Humanities or Social Science Selective (30000+)</a>	
0-1	<b>Elective</b>				
<b>13-14</b>			<b>15</b>		

\* Fulfills University Undergraduate Core Curriculum Requirement.

§ Fulfills FYE selective for Biological Engineering

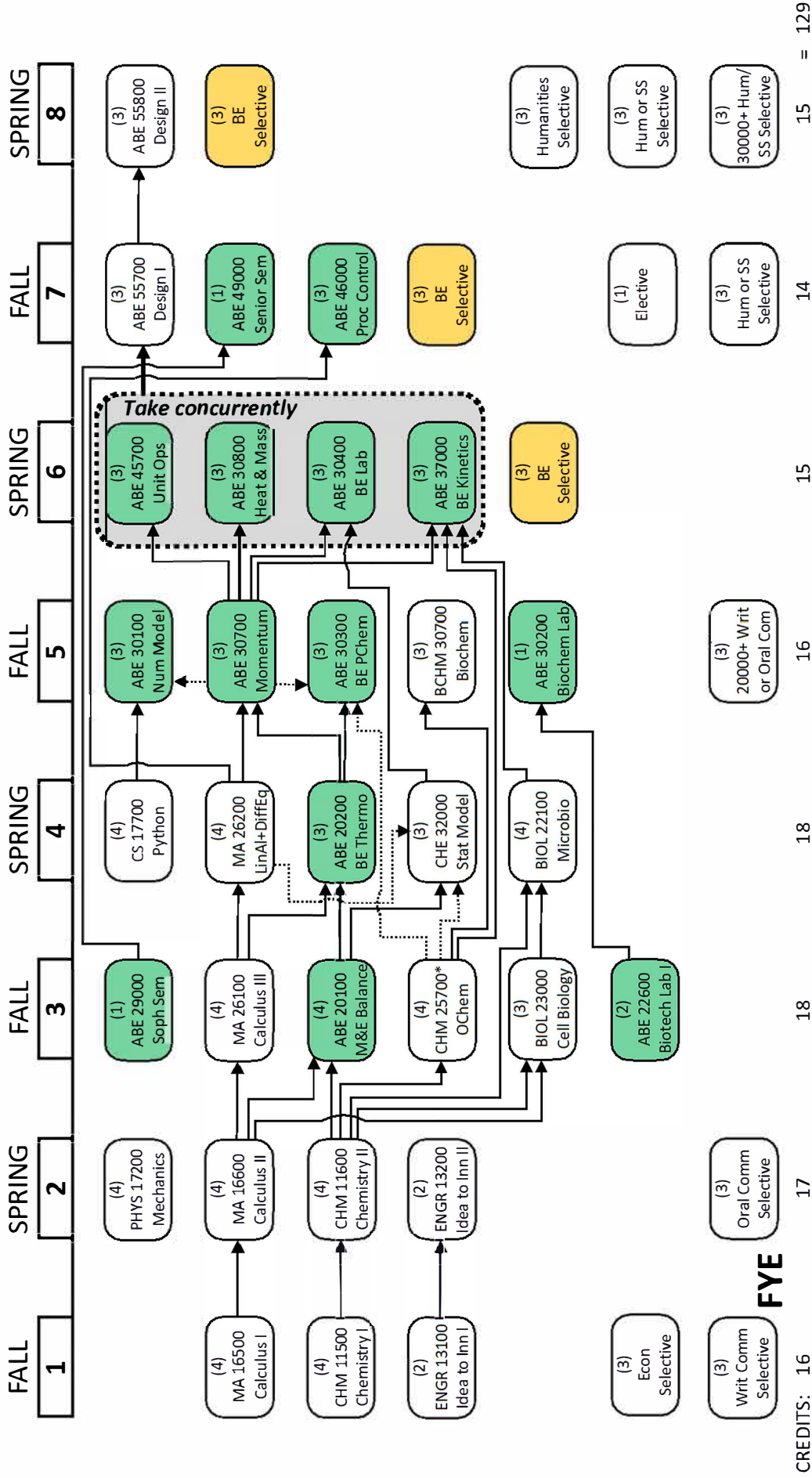
† Indicates Fall only course

‡ Indicates Spring only course

[International Understanding](#) (6 credits) and [Multicultural Awareness](#) (3 credits) may be met with UCC or COA Core Requirements).

2024-2025

# BIOLOGICAL ENGINEERING



— Pre-requisite    B ..... A    Lines A and B do not interact  
 ..... Co-requisite    A ..... B

  : ABE foundational course  
  : BE Selective option

Taking courses in the listed semesters is recommended. See the [course catalog](#) or an [ABE academic advisor](#) for complete degree requirement information. [Selective information.](#)

\*: May be replaced with CHEM 25500 + 25501



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