

Biological Engineering: Cellular and Biomolecular Engineering

<https://ag.purdue.edu/oap/Pages/major.aspx>

Credits	Course number	Course Title	Prerequisites	Credits	Course number	Course Title	Prerequisites
Fall 1st Year				Spring 1st			
4	CHM 11500	General Chemistry	pre/co: calculus	4	CHM 11600	General Chemistry	CHM 11500
4	ENGL 10600	First-Year Composition		3	COM 11400	Fundamentals of Speech Communication	
2	ENGR 13100	Transforming Ideas to Innovation I		4	MA 16600	Plane Analytic Geometry and Calculus II	MA 16500
4	MA 16500	Plane Analytic Geometry and Calculus I	ALEKS 85+	2	ENGR 13200	Transforming Ideas to Innovation II	ENGR 13100
3	-----	UCC Humanities Selective		4	PHYS 17200	Modern Mechanics	MA 16500
17				17			

Fall 2nd Year				Spring 2nd Year			
4	ABE 20100	Thermodynamics of Biological Systems I	CHM 11600	3	ABE 20200	Thermodynamics of Biological Systems II	ABE 20100, MA 26100
1	ABE 29000	Sophomore Seminar		3	CHE 32000	Statistical Modeling and Quality Enhancement	MA 26500
3	BIOL 23000 or BIOL 23100	Biology of the Living Cell or Cell Structure and Function	CHM 11600, MA 16600	2	IT 22700 or CNIT 22700	Biotechnology Laboratory II or Bioinformatics	IT 22600
4	CHM 25700 or (CHM 25500 and CHM 25501)	Organic Chemistry or (Organic Chemistry I and Organic Chemistry Lab I)	CHM 11600	3	MA 26500	Linear Algebra	MA 26100
2	IT 22600	Biotechnology Laboratory I		3	MA 26600	Differential Equations	MA 26100
4	MA 26100	Multivariate Calculus	MA 16600	3	-----	Economics Selective	
18				17			

Fall 3rd Year				Spring 3rd Year			
3	ABE 30100	Numerical and Computational Modeling in Biological Engineering	ABE 20200, MA 26500, MA 26600	3	ABE 30400	Bioprocess Engineering Laboratory	co: ABE 30800
3	ABE 30300	Applications of Physics and Chemistry to Biological Processes	ABE 20200, CHM 25700 or (CHM 25500 and CHM 25501), pre/co: ABE 30700	3	ABE 30800	Heat and Mass Transfer in Food and Biological Systems	ABE 30700
3	ABE 30700	Momentum Transfer in Food and Biological Systems	ABE 20200, MA 26100, MA 26500, MA 26600	3	ABE 37000	Biological/Microbial Kinetics and Reaction Engineering	BIOL 22100, CHM 25700 or (CHM 25500 and CHM 25501), MA 26500, MA 26600
3	-----	Biological Science Selective		3	ABE 45700	Transport Operations in Food and Biological Engineering I	co: ABE 30800
3	-----	Humanities or Social Science Selective		3	-----	Humanities or Social Science Selective	
15				15			

Fall 4th Year				Spring 4th Year			
3	ABE 46000	Sensors and Process Controls	MA 26600	3	ABE 44000	Cell and Molecular Design Principles	BIOL 23000 or 23100, MA 26500/26600
1	ABE 49000	Professional Practice in Agricultural and Biological Engineering	ABE 29000	3	ABE 55800	Process Design for Food and Biological Systems	ABE 55700
3	ABE 55700	Transport Operations in Food and Biological Engineering II	ABE 45700	3	ABE 58000	Process Engineering of Renewable Resources	ABE 37000
3	-----	Biological Science or Science Selective		3	-----	Engineering Selective	
3	-----	Written or Oral Communication Selective		3	-----	Humanities or Social Science Selective (30000+ level)	
2	-----	Elective					
15				15			

128 semester credits required for Bachelor of Science degree.
2.0 GPA required for Bachelor of Science degree.

The highlighted course is considered critical; timely progress toward the degree depends upon steady progress through each course in the plan of study, but this course, in particular, should be completed by the semester indicated.

Consultation with an advisor may result in an altered plan customized for an individual student.

Official and complete prerequisite lists are in the course catalog; the incomplete listing presented here regards this program and course sequencing.

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128 credits required for graduation

Credits	Course number	Course Title
Departmental/Program Major Courses (128 credits)		
Required Major Courses (45 credits)		
_____	4	ABE 20100 Thermodynamics of Biological Systems I
_____	3	ABE 20200 Thermodynamics of Biological Systems II
_____	1	ABE 29000 Sophomore Seminar
_____	3	ABE 30100 Numerical and Computational Modeling in Biological Engineering
_____	3	ABE 30300 Applications of Physics and Chemistry to Biological Processes
_____	3	ABE 30400 Bioprocess Engineering Laboratory
_____	3	ABE 30700 Momentum Transfer in Food and Biological Systems
_____	3	ABE 30800 Heat and Mass Transfer in Food and Biological Systems
_____	3	ABE 37000 Biological/Microbial Kinetics and Reaction Engineering
_____	3	ABE 44000 Cell and Molecular Design Principles
_____	3	ABE 45700 Transport Operations in Food and Biological Engineering I
_____	3	ABE 46000 Sensors and Process Controls
_____	1	ABE 49000 Professional Practice in Agricultural and Biological Engineering
_____	3	ABE 55700 Transport Operations in Food and Biological Engineering II
_____	3	ABE 55800 Process Design for Food and Biological Systems
_____	3	ABE 58000 Process Engineering of Renewable Resources
<u>Other Departmental /Program Course Requirements (81 credits) (See Advising Resources)</u>		
_____	2	ENGR 13100 Transforming Ideas to Innovation I
_____	2	ENGR 13200 Transforming Ideas to Innovation II
_____	4	CHM 11500 General Chemistry (satisfies Science #1 for core)
_____	4	CHM 11600 General Chemistry (satisfies Science #2 for core)
_____		CHM 25700 or (CHM 25500 and CHM 25501)
_____	4	CHM 25501 Organic Chemistry or (Organic Chemistry I and Organic Chemistry Lab I)
_____	4	MA 16500 Plane Analytic Geometry and Calculus I (satisfies Quantitative Reasoning for core)
_____	4	MA 16600 Plane Analytic Geometry and Calculus II
_____	4	MA 26100 Multivariate Calculus
_____	3	MA 26500 Linear Algebra
_____	3	MA 26600 Differential Equations
_____	4	PHYS 17200 Modern Mechanics
_____	3	CHE 32000 Statistical Modeling and Quality Enhancement
_____		BIOL 23000 or 23100
_____	3	23100 Biology of the Living Cell or Cell Structure and Function
_____	2	IT 22600 Biotechnology Laboratory I
_____		IT 22700 or CNIT 22700
_____	2	22700 Biotechnology Laboratory II or Bioinformatics
_____	3	----- Biological Science Selective
_____	3	----- Biological Science or Science Selective
_____	3	----- Engineering Selective
_____		First-Year Composition (satisfies Written Communication for core) (satisfies Information Literacy Selective for core)
_____	4	ENGL 10600 Literacy Selective for core)
_____	3	COM 11400 Fundamentals of Speech Communication (satisfies Oral Communication for core)
_____	3	----- Written or Oral Communications Selective
_____	3	----- Economics Selective (satisfies Human Culture Behavioral/Social Science for core)
_____	3	----- UCC Humanities Selective (satisfies Human Cultures Humanities for core)
_____	2	----- Humanities or Social Science Selective
_____	3	----- Humanities or Social Science Selective
_____	3	----- Humanities or Social Science Selective (30000+ level)
Electives (2 credits)		
_____	2	----- Elective

University Core Requirements:

Human Cultures Humanities: _____	Science, Technology, and Society: _____
Human Cultures Behavioral/Social Science: _____	Written Communication: _____
Information Literacy: _____	Oral Communication: _____
Science #1: _____	Quantitative Reasoning: _____
Science #2: _____	

College of Agriculture & University Level Requirements:

2.0 GPA required for Bachelor of Science degree.

32 Upper division credits taken from Purdue

6 credits International Understanding: _____

3 credits Multicultural Awareness: _____

3 credits of Hum or Social Science Selective 30000+ level: _____

9 credits of Hum and/or Social Sciences outside the College of Agriculture: _____

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