

# Biological Engineering: Pharmaceutical Process Engineering

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

Credits	Course number	Course Title	Prerequisites	Credits	Course number	Course Title	Prerequisites
<b>Fall 1st Year</b>				<b>Spring 1st Year</b>			
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
<b>17</b>				<b>17</b>			

<b>Fall 2nd Year</b>				<b>Spring 2nd Year</b>			
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
4	BIOL 11000	Fundamentals of Biology I		3	BCHM 30700	Biochemistry	CHM 11600
4	CHM 25700 or (CHM 25500 and CHM 25501)	Organic Chemistry or (Organic Chemistry I and Organic Chemistry Lab I)	CHM 11600	1	BCHM 30900	Biochemistry Laboratory	CHM 11600
4	MA 26100	Multivariate Calculus	MA 16600	3	MA 26500	Linear Algebra	MA 26100
				3	MA 26600	Differential Equations	MA 26100
<b>17</b>				<b>16</b>			

<b>Fall 3rd Year</b>				<b>Spring 3rd Year</b>			
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 31400	Design of Electronic Systems	MA 26500, MA 26600
4	BIOL 22100	Introduction to Microbiology	BIOL 11000, CHM 11600	3	ABE 37000	Biological/Microbial Kinetics and Reaction Engineering	ABE 30100, BIOL 22100, CHM 25700 or (CHM 25500 and CHM 25501), MA 26500, MA 26600
2	-----	Humanities or Social Science Selective		3	ABE 45700	Transport Operations in Food and Biological Engineering I	co: ABE 30800
1	-----	Elective		3	-----	Economics Selective	
<b>16</b>				<b>18</b>			

<b>Fall 4th Year</b>				<b>Spring 4th Year</b>			
3	ABE 46000	Sensors and Process Controls	MA 26600	3	ABE 55800	Process Design for Food and Biological Systems	ABE 55700
1	ABE 49000	Professional Practice in Agricultural and Biological Engineering	ABE 29000	3	ABE 58000	Process Engineering of Renewal Resources	ABE 37000
3	ABE 55700	Transport Operations in Food and Biological Engineering II	ABE 45700	2	PHRM 82900	Dosage Forms II	PHRM 82800
3	PHRM 82800	Dosage Forms I	MA 16600, CHM 25600	3	-----	Humanities or Social Science Selective	
3	-----	Written or Oral Communication Selective		3	-----	Humanities or Social Science Selective (30000+ level)	
<b>13</b>				<b>14</b>			

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.

# Biological Engineering: Pharmaceutical Process Engineering

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128 credits required for graduation

Credits	Course number	Course Title
<b>Departmental/Program Major Courses (128 credits)</b>		
<b>Required Major Courses (45 credits)</b>		
_____ 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 31400	Design of Electronic Systems
_____ 3	ABE 37000	Biological/Microbial Kinetics and Reaction Engineering
_____ 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
<b><u>Other Departmental /Program Course Requirements (84 credits) (See Advising Resources)</u></b>		
_____ 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	
_____ 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
_____ 4	BIOL 11000	Fundamentals of Biology I
_____ 4	BIOL 22100	Introduction to Microbiology
_____ 3	BCHM 30700	Biochemistry
_____ 1	BCHM 30900	Biochemistry Laboratory
_____ 3	PHRM 82800	Dosage Forms I
_____ 2	PHRM 82900	Dosage Forms II
_____ 4	ENGL 10600	First-Year Composition (satisfies Written Communication for core) (satisfies Information
_____ 3	COM 11400	Fundamentals of Speech Communication (satisfies Oral Communication for core)
_____ 3	-----	<a href="#">Written or Oral Communications Selective</a>
_____ 3	-----	<a href="#">Economics Selective (satisfies Human Culture Behavioral/Social Science for core)</a>
_____ 3	-----	<a href="#">JCC Humanities Selective (satisfies Human Cultures Humanities for core)</a>
_____ 2	-----	<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+ level)</a>
<b>Electives (1 credit)</b>		
_____ 1	-----	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 Selectives 30000+ level: \_\_\_\_\_

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

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