

The Pennsylvania State University  
 Department of Biochemistry & Molecular Biology  
 BIOTECHNOLOGY MAJOR – General Option  
 Course Requirements (Effective Fall 2016 or later)



<b>1. ENTRANCE TO MAJOR</b>			
2.0 GPA is required			
CHEM 110 (H): Chemical Principals	3		
CHEM 111: Experimental Chemistry I	1		
CHEM 112 (H): Chemical Principals II	3		
MATH 140: Calculus I	4		
A student enrolled in this major must receive a grade " <b>C</b> " or better in the courses listed above specified by Senate Policy 82-44			
<b>2. HIGH SCHOOL LANGUAGE ADMISSION REQUIREMENT: Y OR N</b>			
<b>3. FIRST-YEAR SEMINAR (1 Unit)</b>			
PSU 016: First Year Seminar	1		
<b>WRITING ACROSS THE CURRICULUM (3 Units)</b>			
<b>UNITED STATES AND INTERNATIONAL CULTURES (6 Units)</b>			
(US)			
(IL)			
<b>4. MINIMUM CUMULATIVE GPA REQUIREMENT FOR GRADUATION</b>			
Overall GPA must be $\geq$ 2.0			
Total units earned (less repeats and remedial; <b>must have at least 125 units to graduate</b> ).			
<b>5. RESIDENCY REQUIREMENTS: SENATE POLICY 83-80</b>			
At least 36 of last 60 units must be earned at PSU?			
60 units in last 5 years?			
<b>6. GENERAL EDUCATION</b>			
<b>WRITING/SPEAKING (GWS) (9 Units)</b>			
^ ENGL 015 or 030; Rhetoric & Comp	3		
^ CAS 100 A, B, or C: Effective Speech	3		
^ ENGL/CAS 137H (fall) and 138T (spring) - Honor students first-year experience in place of ENGL30/CAS100.			
ENGL 202C: Technical Writing	3		
<b>ARTS (6 Units)</b>			
(GA)	3		
(GA)	3		
(GA)	3		
<b>HUMANITIES (6 Units)</b>			
(GH)	3		
(GH)	3		
(GH)	3		
<b>SOCIAL &amp; BEHAVIORAL SCIENCES (6 Units)</b>			
(GS)	3		
(GS)	3		
(GS)	3		
Students may <b>petition</b> to substitute 3 units from one of the above knowledge domains for 3 units in another domain, thereby substituting 9-6-3 unit pattern for the default 6-6-6 pattern in these general education courses.			
<b>HEALTH AND PHYSICAL ACTIVITY (3 Units)</b>			
(GHA)			
(GHA)			
(GHA)			
<b>7. REQUIREMENTS FOR THE MAJOR</b>			
<b>CHEMISTRY (14 Units)</b>			
CHEM 110 (H): Chemical Principles I - " <b>C</b> " required	3		
CHEM 111: Experimental Chemistry I - " <b>C</b> " required	1		
CHEM 112 (H): Chemical Principles II - " <b>C</b> " required	3		
CHEM 113: Experimental Chemistry II	1		
CHEM 202: Fundamentals of Organic Chemistry I	3		
CHEM 203: Fundamentals of Organic Chemistry II	3		
<b>BIOCHEMISTRY &amp; MOLECULAR BIOLOGY (14 Units)</b>			
BMB 211: Elementary Biochemistry	3		
BMB 221: Applied Biochemistry	2		
BMB 251: Molecular and Cell Biology	3		
BMB 252: Molecular and Cell Biology II	3		
BMB 442: Lab Prot., Nuc. Acids, & Molec. Cloning	3		

<b>BIOLOGY (3 Units)</b>			
BIOL 322: Genetic Analysis	3		
<b>BIOTECHNOLOGY (11 Units)</b>			
BIOTC 416: Microbial Biotechnology	2		
BIOTC 459: Plant Tissue Culture & Biotechnology	3		
BIOTC 479: Methods Biofermentations	3		
BIOTC 489: Animal Cell Culture Methods	3		
<b>MICROBIOLOGY (11 Units)</b>			
MICRB 201: Introductory Microbiology	3		
MICRB 202: Introductory Microbiology Lab	2		
MICRB 410: Principles of Immunology	3		
MICRB 421W: Lab General & Applied Microbiology	3		
<b>MATHEMATICS ( 8 Units)</b>			
MATH 140: Calculus I - " <b>C</b> " required	4		
MATH 141: Calculus II	4		
<b>PHYSICS (8 Units)</b>			
PHYS 250: Introductory Physics I	4		
PHYS 251: Introductory Physics II	4		
<b>STATISTICS (3 Units)</b>			
STAT 250: Introduction to Biostatistics	3		
A " <b>C</b> " grade or better is required in <u>2</u> of the following <u>3</u> courses. All <u>3</u> courses required			
MICRB 201: Introductory Microbiology	3		
BMB 251: Molecular and Cell Biology I	3		
BMB 252: Molecular and Cell Biology II	3		
<b>Total</b> $\geq$	<b>9</b>		
Earn " <b>C</b> " or higher in 9 units of any 400-level MICRB/BMB courses except BMB 442, 443W, 445W, 448, 488, 496, MICRB 421W, 422, and 447.			
<b>Total</b> $\geq$	<b>9</b>		
<b>8. ELECTIVES IN THE MAJOR</b>			
Select 6 credits from any 400-level BIOTC/BMB/MICRB lecture course, or FD SC 408.			
<b>Total</b>			
<b>9. LIST C FREE ELECTIVES</b>			
Select 14 – 16 units from department list			
<b>Total</b>			
<b>LIST C FREE ELECTIVES</b> - With the EXCEPTION of the courses listed below, ALL courses appearing in the University Bulletin are acceptable as elective courses: 6 units of ROTC may be applied toward graduation requirements. <b>Students MAY NOT</b> fulfill this requirement with lower level or general education courses in math and science (including but not limited to examples such as: any BI SC course, any B M B course below the 100 level, MATH 110 and 111, and the like). <b>Students MAY NOT</b> fulfill this requirement with courses that significantly repeat material from courses required for the major, (including but not limited to examples such as: CHEM 202 or 203 after taking CHEM 210 or 212, or vice-versa; PHYS 250 or 251 after taking PHYS 211, 212, 213, and 214, or vice-versa; and so forth). <b>Students MAY NOT</b> fulfill this requirement with remedial courses (including but not limited to examples such as: LL ED 005 and 010; ENGL 004, 005, and 006; CHEM courses below CHEM 110; MATH courses below MATH 110; STAT 100; PHYS courses below PHYS 211; and the like).			