

MILLERSVILLE UNIVERSITY

Student Name:

Student I.D. #:

DEGREE: BS

MAJOR: CHEM

OPTION: BIOCH

MAJOR REQUIREMENTS FOR A BS

DEGREE IN CHEMISTRY/ BIOCHEMISTRY

Total credit hours required: 120 minimum

REQUIREMENTS AND POLICIES FOR THE BS CHEMISTRY MAJOR

A. Policies for Admission to the Major

1. New students (freshmen and transfers) must be admitted to the Chemistry major by the Office of Admissions upon admission to the University.
2. Admission into the Chemistry major from other departments is upon approval of the chairperson of the Chemistry Department.
3. Non-degree and continuing education students must be admitted to the Chemistry major by the Office of Admissions.

B. Policies for Retention in the Major

1. University requirements for retention.
2. The student is required to have a 2.00 grade point average in the major courses by the end of the of sophomore year. If not, it is recommended that courses be repeated to achieve a 2.00 average in the major or that there be a change of major.
3. Chemistry majors are required to have a 2.00 grade or better in Chemistry courses required for the major at the 100 and 200 level before proceeding to a new course for which it is a prerequisite. (Currently, these courses include: CHEM 111,112,231,232,251, and 265).

C. Policies for Completion of the Major

1. Completion of all University curricular requirements.

American Chemical Society Certification

In compliance with the ACS Guidelines, the department highly recommends a modern foreign language (FORL 101-102; G1 Humanities elective) and an elementary economics course (Social Science: G3 elective) for ACS certification.

Note to the Student: *This form is provided as a guide. IT is your responsibility to consult regularly with your advisor to be aware of change and curriculum details which are not incorporated on this form.*

MAJOR SEQUENCE AND DEGREE REQUIREMENTS

Major: **BS CHEMISTRY**
 Option: **BIOCHEMISTRY**
 Major Field Requirements: **52.0 Credits**
 Other Requirements: **29.0-30.0 Credits**

When applicable, up to six of the **REQUIRED RELATED** courses may be credited toward the Liberal Arts Core subject to normal distribution rules.

Course	No.	Short Title	C.H.	Grade	Course	No.	Short Title	C.H.	Grade
REQUIRED CHEMISTRY COURSES (47.0 Credits)					REQUIRED RELATED (29.0-30.0 credits)				
CHEM	111	Intro Chemistry I	4.0	_____	Mathematics (12.0 credits)				
CHEM	112	Intro Chemistry II	4.0	_____	MATH	161	Calculus I	4.0	_____
CHEM	188	Freshman Seminar	1.0	_____	MATH	211	Calculus II	4.0	_____
CHEM	231	Organic Chem I	4.0	_____	MATH	311	Calculus III	4.0	_____
CHEM	232	Organic Chem II	4.0	_____	Physics (10.0 credits)				
CHEM	251	Inorganic Chem I	3.0	_____	PHYS	231	Physics I with Calc	5.0	_____
CHEM	265	Quant Analysis	4.0	_____	PHYS	232	Physics II with Calc	5.0	_____
CHEM	326	Biochemistry I	4.0	_____	BIOLOGY (7.0-8.0 credits)				
CHEM	327	Biochemistry II	4.0	_____	Demonstrate competency in Biology 100*				
CHEM	328	Analytical Biochem Lab	1.0	_____	BIOL	364	Fndns Genetics/Mole	4.0	_____
CHEM	341	Physical Chem I	4.0	_____	Select one additional course from the following:				
CHEM	342	Physical Chem II	4.0	_____	BIOL	362	Cell/Devel Biology	4.0	_____
CHEM	465	Analytical Chemistry	4.0	_____	BIOL	461	General Microbiol	3.0	_____
CHEM	487	Seminar in Chem I	0.5	_____	BIOL	462	Molecular Biology	4.0	_____
CHEM	488	Seminar in Chem II	0.5	_____	*Competency may be demonstrated by one of the following:				
CHEM	498	Independent Study	1.0	_____	1) a course grade of "A" or "B" in AP Biology				
CHEMISTRY ELECTIVES (5.0 Credits)					2) a score of 3 or better in the national AP exam				
CHEM	312	Chem in Nanotech	3.0	_____	3) a successful score on the CLEP exam				
CHEM	300	Cooperative Educ	3.0	_____	4) a passing grade for General Biology (BIOL 100):				
CHEM	400	Cooperative Educ	3.0	_____	required for 300 or 400-level courses. B- or higher is required if changing to biology major.				
CHEM	375	Environmental Chem	4.0	_____	General Electives (as necessary)				
CHEM	381	Polymer Chemistry I	4.0	_____	_____	_____	_____	_____	_____
CHEM	391	Advanced Lab I	1.0	_____	_____	_____	_____	_____	_____
CHEM	392	Advanced Lab II*	1.0	_____	_____	_____	_____	_____	_____
CHEM	435	Advanced Organic Chem	3.0	_____	_____	_____	_____	_____	_____
CHEM	452	Inorganic Chem II	3.0	_____	_____	_____	_____	_____	_____
CHEM	476	Environmental Chem II	4.0	_____	_____	_____	_____	_____	_____
CHEM	482	Polymer Chemistry II	3.0	_____	_____	_____	_____	_____	_____
CHEM	486	Topics in Chemistry	1.0-4.0	_____	_____	_____	_____	_____	_____
CHEM	498	Independent Study **	1.0-3.0	_____	_____	_____	_____	_____	_____
CHEM	489	Department Honors	1.0-3.0	_____	_____	_____	_____	_____	_____
CHEM	499	Department Honors	1.0-3.0	_____	_____	_____	_____	_____	_____
* This elective must be completed to gain ACS certification in Biochemistry.									
** Students seeking ACS certification must take a minimum of two hours credit of CHEM 498 under Chemistry Electives.									

**BACHELOR OF SCIENCE IN CHEMISTRY
BIOCHEMISTRY OPTION
RECOMMENDED PROGRAM (1)**

FIRST SEMESTER				SECOND SEMESTER			
CHEM	111	Intro Chem I	4.0	CHEM	112	Intro Chem II	4.0
CHEM	188	Freshman Seminar	1.0	CHEM	251	Inorganic Chem I	3.0
BIOL	100	General Biology	3.0	COMM	100	Fund. of Speech	3.0
MATH	161	Calculus I	4.0	MATH	211	Calculus II	4.0
ENGL	110	English Composition	<u>3.0</u>	WELL	175	Wellness	<u>3.0</u>
		<i>TOTAL S.H.</i>	15.0			<i>TOTAL S.H.</i>	17.0
THIRD SEMESTER				FOURTH SEMESTER			
CHEM	231	Organic I	4.0	CHEM	232	Organic II	4.0
PHYS	231	Physics I	5.0	PHYS	232	Physics II	5.0
MATH	311	Calculus III	4.0	CHEM	265	Quant. Analysis	4.0
_____	_____	Humanities Course #1	<u>3.0</u>	_____	_____	Humanities Course #2	<u>3.0</u>
		<i>TOTAL S.H.</i>	16.0			<i>TOTAL S.H.</i>	16.0
FIFTH SEMESTER				SIXTH SEMESTER			
CHEM	341	Physical Chem I	4.0	CHEM	342	Physical Chem II	4.0
BIOL	364	Fund Genetics & Molecu	4.0	CHEM	392*	Advanced Lab II	1.0
_____	_____	Humanities Course #3	3.0	CHEM	_____	Chemistry Elective	3.0
_____	_____	Social Sciences Course #1	<u>3.0</u>	ENGL	3XX	Advanced Writing	3.0
		<i>TOTAL S.H.</i>	14.0	_____	_____	Social Sciences Course #2	<u>3.0</u>
						<i>TOTAL S.H.</i>	14.0
SEVENTH SEMESTER				EIGHTH SEMESTER			
CHEM	326	Biochemistry I	4.0	CHEM	327	Biochemistry II	4.0
CHEM	487	Chemistry Seminar	0.5	CHEM	328	Anal Biochemistry Lab	1.0
CHEM	_____	Chemistry Elective***	2.0	CHEM	465	Analytical Chemistry	4.0
BIOL	_____	Req'd Biol. Course	3-4.0	CHEM	488	Chemistry Seminar	0.5
_____	_____	C&E Course #1	3.0	_____	_____	C&E Course #4	3.0
_____	_____	Social Science Course #3	<u>3.0</u>	_____	_____	Perspectives Course	<u>3.0</u>
		<i>TOTAL S.H.</i>	15.5-16.5			<i>TOTAL S.H.</i>	15.5

COMMENTS, NOTES OR RECOMMENDATIONS:

* Students opting for ACS Certification in Biochemistry should take Advanced Laboratory II (CHEM 392). The prerequisite of CHEM 391 has been waived for biochemistry majors.

** If you choose to take Genetics in the same year as CHEM 327 and 328, you MUST do so in the FALL semester to avoid scheduling conflicts in the spring semester.

*** Students seeking ACS Certification must take a minimum of 2 credit hours of CHEM 498 in the Chemistry Elective Block.

1. Connections & Exploration (C&E) courses #1 and #4 can be satisfied with any approved GenEd course.
2. Cultural Diversity & Community (D) course may be satisfied with approved courses from the GenEd requirements (including Perspectives), the major, the minor, the required related area, or general electives.

The American Chemical Society (ACS) and the Chemistry Department strongly recommend an Introductory Economics course (ECON 100, for example) among the Social Science (G3) electives and Elementary Foreign language (FORL 101 and 102) among the Humanities (G1) electives. ENGL 312 (Technical Writing) is highly recommended.

[See the next page for an alternate program sequence.]

**BACHELOR OF SCIENCE IN CHEMISTRY
BIOCHEMISTRY OPTION
RECOMMENDED PROGRAM (2)**

FIRST SEMESTER				SECOND SEMESTER			
CHEM	111	Intro Chem I	4.0	CHEM	112	Intro Chem II	4.0
CHEM	188	Freshman Seminar	1.0	CHEM	251	Inorganic Chem I	3.0
BIOL	100	General Biology	3.0	MATH	211	Calculus II	4.0
MATH	161	Calculus I	4.0	COMM	100	Fund. of Speech	3.0
ENGL	110	English Composition	<u>3.0</u>	WELL	175	Wellness	<u>3.0</u>
		<i>TOTAL S.H.</i>	15.0			<i>TOTAL S.H.</i>	17.0
THIRD SEMESTER				FOURTH SEMESTER			
CHEM	231	Organic I	4.0	CHEM	232	Organic II	4.0
PHYS	231	Physics I	5.0	PHYS	232	Physics II	5.0
MATH	311	Calculus III	4.0	CHEM	265	Quant. Analysis	4.0
_____	_____	G1 or G3 Course #1	<u>3.0</u>	_____	_____	G1 or G3 Course #2	<u>3.0</u>
		<i>TOTAL S.H.</i>	16.0			<i>TOTAL S.H.</i>	16.0
FIFTH SEMESTER				SIXTH SEMESTER			
CHEM	326	Biochemistry I	4.0	CHEM	327	Biochemistry II	4.0
BIOL	364	Fund Genetics & Molecu	4.0	CHEM	328	Anal Biochemistry Lab	1.0
ENGL	3XX	Advanced Writing	3.0	CHEM	498	Intro to Research	1.0
_____	_____	G1 or G3 Course #3	<u>3.0</u>	_____	_____	G1 or G3 Course #4	3.0
		<i>TOTAL S.H.</i>	14.0	_____	_____	G1 or G3 Course #5	3.0
				_____	_____	Perspectives Course	<u>3.0</u>
						<i>TOTAL S.H.</i>	15.0
SEVENTH SEMESTER				EIGHTH SEMESTER			
CHEM	341	Physical Chem I	4.0	CHEM	342	Physical Chem II	4.0
BIOL	_____	Req'd Biology Course	3.0-4.0	CHEM	465	Analytical Chemistry	4.0
CHEM	487	Chemistry Seminar	0.5	CHEM	488	Chemistry Seminar	0.5
CHEM	_____	Chemistry Elective***	2.0	CHEM	_____	Chemistry Elective	3.0
_____	_____	G1 or G3 Course #6	3.0	CHEM	392*	Advanced Lab II	1.0
_____	_____	C&E Course #1	<u>3.0</u>	_____	_____	C&E Course #4	<u>3.0</u>
		<i>TOTAL S.H.</i>	15.5-16.5			<i>TOTAL S.H.</i>	15.5

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