

# MILLERSVILLE UNIVERSITY

Student Name:

Student I.D. #:

DEGREE:	BS	<b>MAJOR REQUIREMENTS FOR A BS</b>
MAJOR:	CHEM	<b>DEGREE IN CHEMISTRY</b>
OPTION:	Nanotechnology	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

A student opting for ACS certification should take all chemistry courses in the given sequence in the college catalog. The student must have successfully completed Physical Chemistry II (CHEM 342) before beginning Advanced Inorganic (CHEM 452) or Analytical Chemistry (CHEM 465).

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: **NANOTECHNOLOGY**  
 Major Field Requirements: **41.0 Credits**  
 Other Requirements: **40.0 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
<b>REQUIRED CHEMISTRY COURSES (37.0 Credits)</b>					<b>REQUIRED RELATED (22.0 credits)</b>				
CHEM	111	Intro Chemistry I	4.0	_____	<b>Mathematics (12.0 credits)</b>				
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	_____	<b>Physics (10.0 credits)</b>				
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	312	Chem in Nanotech	3.0	_____					
CHEM	341	Physical Chem I	4.0	_____					
CHEM	342	Physical Chem II	4.0	_____					
CHEM	487	Seminar in Chem I	0.5	_____					
CHEM	488	Seminar in Chem II	0.5	_____					
CHEM	498	Research	1.0	_____					
<b>Electives (4.0 credits)</b>									
CHEM	300	Co-op in Chem	3.0	_____					
CHEM	326	Biochemistry I	4.0	_____					
CHEM	375	Environmental Chem	4.0	_____					
CHEM	381	Polymer Chem 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	465	Analytical Chem	4.0	_____					
CHEM	486	Topics in Chem	1.0-4.0	_____					
CHEM	489	Dept. Honors	1.0-3.0	_____					
CHEM	498	Independent Study	1.0-3.0	_____					
CHEM	499	Dept. Honors	1.0-3.0	_____	<b>General Electives (as necessary)</b>				
<b>PROFESSIONAL BLOCK</b>									
<b>PENN STATE COURSES (18.0 credits)</b>									
NFMT	311	Matls, Safety & Equip	3.0	_____					
NFMT	312	Basic Nanofab Processes	3.0	_____					
NFMT	313	Thin Film Utilization	3.0	_____					
NFMT	314	Advanced Litho	3.0	_____					
NFMT	315	Matls Mod in Nano	3.0	_____					
NFMT	316	Charac, Pack & Test	3.0	_____					
Nanofabrication Manufacturing Technology (NFMT) Capstone Semester at Penn State University in the Nanofabrication Facility.									

**BACHELOR OF SCIENCE IN CHEMISTRY  
NANOTECHNOLOGY OPTION  
RECOMMENDED PROGRAM**

**FIRST SEMESTER**

CHEM	111	Intro Chem I.	4.0
CHEM	188	Freshman Seminar	1.0
MATH	161	Calculus I	4.0
ENGL	110	English Composition	<u>3.0</u>
		<i>Total S.H.</i>	12.0

**SECOND SEMESTER**

CHEM	112	Intro Chem II	4.0
MATH	211	Calculus II	4.0
COMM	100	Fund. Of Speech	3.0
CHEM	251	Inorganic I	<u>3.0</u>
		<i>Total S.H.</i>	14.0

**THIRD SEMESTER**

CHEM	231	Organic I	4.0
PHYS	231	Physics I	5.0
MATH	311	Calculus III	<u>4.0</u>
		<i>Total S.H.</i>	13.0

**FOURTH SEMESTER**

CHEM	232	Organic II	4.0
PHYS	232	Physics II	5.0
CHEM	265	Quant. Analysis	<u>4.0</u>
		<i>Total S.H.</i>	14.0

**SUMMER (18.0)**

Nanofabrication Courses at Penn State University

**FIFTH SEMESTER**

CHEM	312	Chem in Nanotechnology	3.0
CHEM	341	Physical Chem I	4.0
_____	_____	Humanities Course #1	3.0
_____	_____	Soc. Science Course #1	<u>3.0</u>
		<i>Total S.H.</i>	13.0

**SIXTH SEMESTER**

CHEM	342	Physical Chem II	4.0
ENGL	3XX	Advanced Writing	3.0
_____	_____	Humanities Course #2	3.0
_____	_____	Soc. Science Course #2	<u>3.0</u>
		<i>Total S.H.</i>	13.0

**SEVENTH SEMESTER**

CHEM	487	Seminar in Chem I	0.5
CHEM	498	Intro to Research (Req)	1.0
CHEM	498	Chemistry Elective	1.0
CHEM	_____	Chemistry Elective	4.0
_____	_____	Humanities Course #3	3.0
_____	_____	Soc. Science Course #3	<u>3.0</u>
		<i>Total S.H.</i>	12.5

**EIGHTH SEMESTER**

CHEM	488	Seminar in Chem II	0.5
_____	_____	Perspectives Course	3.0
_____	_____	C&E Course #1	3.0
_____	_____	C&E Course #2	3.0
WELL	175	Wellness	<u>3.0</u>
		<i>Total S.H.</i>	12.5

**COMMENTS, NOTES OR RECOMMENDATIONS:**

5. Connections & Exploration (C&E) courses #1 and #4 can be satisfied with any approved GenEd course.
6. 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.