

# CHEMISTRY MAJOR (B.A.)

## Program Curriculum

Code	Title	Credits
<b>Degree Core Requirements</b>		
CHEM 1004	First Year Experience in Chemistry	1
CHEM 1055	General Chemistry for Chemistry Majors <sup>1,2</sup>	4
CHEM 1056	General Chemistry for Chemistry Majors <sup>1,2</sup>	4
CHEM 1065	General Chemistry for Chemistry Majors Lab <sup>1,3</sup>	1
CHEM 1066	General Chemistry for Chemistry Majors Lab <sup>1,3</sup>	1
CHEM 2565	Principles of Organic Chemistry <sup>1,4</sup>	3
CHEM 2566	Principles of Organic Chemistry <sup>1,4</sup>	3
CHEM 2154	Analytical Chemistry for Chemistry Majors <sup>1</sup>	4
CHEM 2164	Analytical Chemistry for Chemistry Majors Lab <sup>1</sup>	1
Subtotal		22
<b>Additional Course Requirements <sup>5</sup></b>		
CHEM 2545	Organic Chemistry Laboratory <sup>4</sup>	1
CHEM 2546	Organic Chemistry Laboratory <sup>4</sup>	1
CHEM 2564	Problem-Solving in Organic Chemistry	1
CHEM 3004	Bridge to the Future	1
CHEM 4014	Chemistry Writing	1
Subtotal		5
<b>Major Requirements</b>		
CHEM 2424	Descriptive Inorganic Chemistry	3
CHEM 4615	Physical Chemistry for the Life Sciences <sup>6</sup>	3
CHEM 4616	Physical Chemistry for the Life Sciences <sup>7</sup>	3
CHEM 3625	Physical Chemistry Laboratory	1
CHEM 4034	Capstone Laboratory for BA Chemistry Majors <sup>8</sup>	2
Select one of the following: (Quantitative Elective)		3
MATH 2204	Introduction to Multivariable Calculus	
MATH 2114	Introduction to Linear Algebra	
STAT 3006	Statistical Methods	
STAT 3616	Biological Statistics	
CS 1014	Introduction to Computational Thinking	
CS 1064	Introduction to Programming in Python	
CS 1114	Introduction to Software Design	
Subtotal		15
<b>Restricted Electives</b>		
Students may choose any two 3-credit, 3000- or 4000-level courses in CHEM, BCHM, or CHE for which they have met applicable prerequisites. <sup>9,10,11</sup>		6
Subtotal		6
<b>Free Electives</b>		
Select remaining credit hours of free electives to fulfill 120 credit hour requirement		25
Subtotal		25
<b>Pathways to General Education</b>		

Pathways Concept 1 - Discourse

Select six credits in Pathway 1f ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01F">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01F</a> ) (foundational writing or speaking courses) and three credits in Pathway 1a ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01A">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01A</a> ) (advanced or applied writing or speaking courses).		9
<i>Pathways Concept 2 - Critical Thinking in the Humanities</i>		
Select six credits of Pathway 2 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02</a> )		6
<i>Pathways Concept 3 - Reasoning in the Social Sciences</i>		
Select six credits of Pathway 3 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03</a> ) <sup>12</sup>		6
<i>Pathways Concept 4 - Reasoning in the Natural Sciences</i>		
PHYS 2205	General Physics	4
& PHYS 2215	and General Physics Laboratory <sup>1,13</sup>	
PHYS 2206	General Physics	4
& PHYS 2216	and General Physics Laboratory <sup>1,14</sup>	
<i>Pathways Concept 5 - Quantitative and Computational Thinking</i>		
MATH 1025	Elementary Calculus (5F) <sup>1,15</sup>	3
MATH 1026	Elementary Calculus (5F) <sup>1,16</sup>	3
STAT 3005	Statistical Methods (5A) <sup>1,17</sup>	3
or STAT 3615 Biological Statistics		
<i>Pathways Concept 6 - Critique and Practice in Design and the Arts</i>		
6 credits = 3 in design + 3 in arts, or 6 in integrated design and arts		6
<i>Pathways Concept 7 - Critical Analysis of Identity and Equity in the United States</i>		
Select three credits in Pathway 7 ( <a href="https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07">https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07</a> )		3
Subtotal		47
<b>Total Credits</b>		<b>120</b>

<sup>1</sup> A course with prerequisites or co-requisites.

<sup>2</sup> *General Chemistry Lecture Substitutions.* A student who earned credit for CHEM 1035 with a grade of "B" or better prior to joining the major in Chemistry may substitute CHEM 1035 for CHEM 1055. A student who earned credit for CHEM 1036 with a grade of "B" or better prior to joining the major in Chemistry may substitute CHEM 1036 for CHEM 1056.

<sup>3</sup> *General Chemistry Lab Substitutions.* A student who earned credit for CHEM 1045 prior to joining the major in Chemistry may substitute CHEM 1045 for CHEM 1065. A student who earned credit for CHEM 1046 prior to joining the major in Chemistry may substitute CHEM 1046 for CHEM 1066.

<sup>4</sup> *Organic Chemistry Substitutions. Lecture:* A student who earned credit for CHEM 2535 with a grade of "B" or better prior to joining the major in Chemistry may substitute CHEM 2535 for CHEM 2565. A student who is substituting CHEM 2535 for CHEM 2565 may also substitute one additional credit of free elective for the one credit CHEM 2564, since CHEM 2564 is meant as a companion course to CHEM 2565. A student who earned credit for CHEM 2536 with a grade of "B" or better prior to joining the major in Chemistry may substitute CHEM 2536 for CHEM CHEM 2566. *Lab:* CHEM 2555 may be substituted for CHEM 2545. CHEM 2556 may be substituted for CHEM 2546.

<sup>5</sup> MATH 1025–MATH 1026, PHYS 2205–PHYS 2206 and PHYS 2215–PHYS 2216 are also required of all Chemistry Majors within the B.A. Degree Program in Chemistry. They are listed in the Pathways to General Education section.

<sup>6</sup> CHEM 3615 may be substituted for CHEM 4615.

- 7 CHEM 3616 may be substituted for CHEM 4616.
- 8 Three (3) credits of CHEM 4994 may be substituted for CHEM 4034.
- 9 Excluding CHEM 3054 Postconsumer Materials
- 10 SBIO 3444 or CHEM 4424 (SBIO 4424) may substitute for the Restricted Elective.
- 11 A chemistry major (BA) may count at most three (3) credits of CHEM 4994 toward the total credits for Restricted Electives. A biochemistry or chemical engineering student should not double-count coursework required for that major towards the chemistry (BA) upper-level total credits for Restricted Electives.
- 12 PSYC 1004 and SOC 1004 are recommended for students contemplating careers in health sciences.
- 13 PHYS 2305 (MATH 1225 prerequisite) may be substituted for PHYS 2205 and PHYS 2215
- 14 PHYS 2306 (MATH 1226 prerequisite) may be substituted for PHYS 2206 and PHYS 2216
- 15 MATH 1225 may be substituted for MATH 1025.
- 16 MATH 1226 (MATH 1225 prerequisite) may be substituted for MATH 1026.
- 17 Students majoring in Chemistry within the B.A. Degree in Chemistry must select either STAT 3005 or STAT 3615.

## Satisfactory Progress Towards Degree

Upon having attempted 72 credits, student must have completed

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CHEM 1055	General Chemistry for Chemistry Majors	4
CHEM 1056	General Chemistry for Chemistry Majors	4
CHEM 1065	General Chemistry for Chemistry Majors Lab	1
CHEM 1066	General Chemistry for Chemistry Majors Lab	1
CHEM 1004	First Year Experience in Chemistry	1
CHEM 2565	Principles of Organic Chemistry	3
CHEM 2566	Principles of Organic Chemistry	3
CHEM 2545	Organic Chemistry Laboratory	1
CHEM 2546	Organic Chemistry Laboratory	1
PHYS 2205	General Physics	3
PHYS 2206	General Physics	3
PHYS 2215	General Physics Laboratory	1
PHYS 2216	General Physics Laboratory	1
MATH 1025	Elementary Calculus	3
MATH 1026	Elementary Calculus	3

Chemistry majors must maintain an in-major GPA of 2.0. If a chemistry major fails to meet this requirement for one academic term the student will be placed on Policy 91 (Satisfactory Progress Towards Degree) probation. Failure to meet the standard for two consecutive semesters will result in a Policy 91 suspension.

## Graduation Requirements

### Graduation Requirements

Graduation requires completion of a minimum of 120 credit hours with a GPA of 2.0 or greater for all hours attempted. In addition, students must have an in-major GPA of 2.0 or greater counting all required chemistry courses and chemistry electives. The in-major CHEM GPA excludes CHEM 1015, CHEM 1016, CHEM 1025, CHEM 1026, CHEM 1004,

CHEM 1014. No more than 6 hours of CHEM 2974, CHEM 4974, and CHEM 4994 will be included in a student's in-major GPA.

## Minimum Grade Requirement

- A Chemistry major who earned a grade lower than "C" in CHEM 1055 may repeat this course and earn the required grade ("C" or better), or they may take CHEM 1035 and earn a grade of "B" or better.
- A Chemistry major who earned a grade lower than "C" in CHEM 1056 may repeat this course and earn the required grade ("C" or better), or they may take CHEM 1036 and earn a grade of "B" or better
- A Chemistry major who earned a grade lower than "C" in CHEM 2565 may repeat this course and earn the required grade ("C" or better), or they may take CHEM 2535 and earn a "B" or better.

## Acceptable Substitutions

All allowed substitutions were encoded in the footnotes of the Program Requirements.

## Foreign Language Requirements

Students who did not successfully complete at least two years of a single foreign, classical, or sign language during high school must successfully complete six credit hours of a single foreign, classical, or sign language at the college level. Courses taken to meet this requirement do not count toward the hours required for graduates. Please consult the Undergraduate Catalog for details.