

POLYMER CHEMISTRY MAJOR

Program Curriculum

Code	Title	Credits
Degree Core Requirements		
CHEM 1004	First Year Experience in Chemistry	1
CHEM 1055	General Chemistry for Chemistry Majors ^{1,2}	4
CHEM 1056	General Chemistry for Chemistry Majors ^{1,3}	4
CHEM 1065	General Chemistry for Chemistry Majors Lab ^{1,3}	1
CHEM 1066	General Chemistry for Chemistry Majors Lab ^{1,2,3}	1
CHEM 2565	Principles of Organic Chemistry ^{1,4}	3
CHEM 2566	Principles of Organic Chemistry ^{1,4}	3
CHEM 2154	Analytical Chemistry for Chemistry Majors ¹	4
CHEM 2164	Analytical Chemistry for Chemistry Majors Lab ¹	1
Subtotal		22
Additional Course Requirements		
CHEM 2555	Organic Synthesis and Techniques Lab ^{1,5}	2
CHEM 2556	Organic Synthesis and Techniques Lab ^{1,5}	2
CHEM 2564	Problem-Solving in Organic Chemistry	1
CHEM 3004	Bridge to the Future	1
CHEM 4014	Survey of Chemical Literature ¹	1
Subtotal		7
Major Requirements		
MATH 2204	Introduction to Multivariable Calculus ¹	3
CHEM 3615	Physical Chemistry ^{1,6}	3
CHEM 3625	Physical Chemistry Laboratory ¹	1
CHEM 4534	Organic Chemistry of Polymers ¹	3
CHEM 4074/ MSE 4544	Laboratory in Polymer Science ¹	2
Subtotal		12
Restricted Electives ⁷		
Select three of the following:		9
CHEM 4424	Polysaccharide Chemistry ¹	
CHEM 4524	Identification of Organic Compounds ¹	
CHEM 4624	Materials Chemistry in Energy Sciences	
CHEM 4634	Polymer and Surface Chemistry ¹	
CHE 4104	Process Materials ¹	
CHE 4214	Introduction to Polymer Materials	
CHE 4224	Introduction to Polymer Processing	
PHYS 4564	Polymer Physics ¹	
Subtotal		9
Free Electives		
Select 21 credits of free electives		21
Subtotal		21
Pathways to General Education		
<i>Pathways Concept 1 - Discourse</i>		
Select six credits in Pathway 1f (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01F) (foundational writing or speaking courses) and three credits in Pathway 1a (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G01A) (advanced or applied writing or speaking courses)		9

Pathways Concept 2 - Critical Thinking in the Humanities

Select six credits in Pathway 2 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G02) 6

Pathways Concept 3 - Reasoning in the Social Sciences

Select six credits in Pathway 3 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G03) 6

Pathways Concept 4 - Reasoning in the Natural Sciences

PHYS 2305 Foundations of Physics ¹ 4

PHYS 2306 Foundations of Physics ¹ 4

Pathways Concept 5 - Quantitative and Computational Thinking

MATH 1225 Calculus of a Single Variable 8

& MATH 1226 and Calculus of a Single Variable (5F) ¹

STAT 3005 Statistical Methods (5A) ^{1,8} 3

or STAT 3615 Biological Statistics

Pathways Concept 6 - Critique and Practice in Design and the Arts

6 credits = 3 in design + 3 in arts, or 6 in integrated design and arts 6

Pathways Concept 7 - Critical Analysis of Identity and Equity in the United States

Select three credits in Pathway 7 (https://catalog.vt.edu/course-search/?attrs_pathways=attrs_pathways_G07) 3

Subtotal 49

Total Credits 120

¹ Course has prerequisites. Please consult the course catalog for details.

² *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.

³ *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.

⁴ *Organic Chemistry Lecture Substitutions.* 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 2566.

⁵ *Organic Chemistry Lab Substitutions.* A student who earned credit for CHEM 2545 prior to joining the major in Chemistry may substitute CHEM 2545 for CHEM 2555. To compensate for differences in content (mostly with respect to training on specific instrumentation), the substitution requires the student to enroll in one credit of CHEM 4994 with a project that uses the same types of instrumentation (such as IR and NMR). A student who earned credit for CHEM 2546 prior to joining the major in Chemistry may substitute CHEM 2546 for CHEM 2556. To compensate for differences in content (mostly with respect to training on specific instrumentation), the substitution requires the student to enroll in one credit of CHEM 4994 with a project that uses the same types of instrumentation (such as IR and NMR).

⁶ Credit for CHE 2164 Chemical Engineering Thermodynamics may be substituted for CHEM 3615.

⁷ Unlike the Major in Chemistry, credits for CHEM 4994 may NOT be counted toward the nine credits of Restricted Electives.

⁸ STAT 4604 may be substituted for (STAT 3005 or STAT 3615).

Upon having attempted 72 credits, student must have completed

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CHEM 1065	General Chemistry for Chemistry Majors Lab	1
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CHEM 1004	First Year Experience in Chemistry	1
CHEM 2565	Principles of Organic Chemistry	3
CHEM 2566	Principles of Organic Chemistry	3
CHEM 2555	Organic Synthesis and Techniques Lab	2
CHEM 2556	Organic Synthesis and Techniques Lab	2
PHYS 2305	Foundations of Physics	4
PHYS 2306	Foundations of Physics	4
MATH 1225	Calculus of a Single Variable	4
MATH 1226	Calculus of a Single Variable	4

Polymer chemistry majors must maintain an in-major GPA of 2.0.

If a polymer 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, and 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 Requirements

- A Polymer 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 "B" or better.
- A Polymer 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 "B" or better.
- A Polymer 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

Substitutions have been encoded into the Program Requirements as footnotes.

Foreign Language Requirement

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.