

**College of Science
Department of Chemistry
Bachelor of Science in Chemistry
Major in Chemistry
for students graduating in Calendar Year 2019 ^{1, 2, 3, 4, 5}**

PART 1: CURRICULUM FOR LIBERAL EDUCATION (CLE) REQUIREMENTS

CLE requirements and approved courses are available online:

<http://www.cle.prov.vt.edu/guides/index.html>

(credit hours in parentheses)

- | | | |
|------|--|----------------------|
| I. | Writing and Discourse (Area 1: 6 credits + ViEWS)
ENGL 1105-1106 ⁶ First-Year Writing
& ViEWS requirement ⁷ | (3) _____, (3) _____ |
| II. | Ideas, Cultural Traditions, and Values (Area 2: 6 credits required)
(Select from approved CLE courses) | (3) _____, (3) _____ |
| III. | Society and Human Behavior (Area 3: 6 credits required)
(Select from approved CLE courses) | (3) _____, (3) _____ |
| IV. | Scientific Reasoning and Discovery (Area 4) ⁸ | |
| V. | Quantitative and Symbolic Reasoning (Area 5) ⁹ | |
| VI. | Creativity and Aesthetic Experience (Area 6: 3 credits required)
(Select from approved CLE courses; must be a three-credit course.) | (3) _____ |
| VII. | Critical Issues in a Global Context (Area 7: 3 credits required)
(Select from approved CLE courses) | (3) _____ |

PART 1: (CLE) credit hour requirement:

24 credits

PART 2: COLLEGE AND DEPARTMENT REQUIREMENTS

- | | | |
|------|---|---|
| I. | Chemistry Courses (47 credits) ⁴
CHEM 1055-1056 ^{1, 6} General Chemistry for Majors
CHEM 1065-1066 ^{6, 10, 11} General Chemistry for Majors lab
CHEM 2154 ⁶ Analytical Chemistry for Majors
CHEM 2164 ⁶ Analytical Chemistry for Majors lab
CHEM 2424 Descriptive Inorganic Chemistry
CHEM 2565 ^{1, 6, 12} -2566 Principles of Organic Chemistry
CHEM 2555 -2556 ¹³ Organic Syn-Tech lab
CHEM 2984 Chemistry First Year Experience
CHEM 3615-3616 Physical Chemistry
CHEM 3625-3626 Physical Chemistry lab
CHEM 4014 Survey of Chemical Literature
CHEM 4114 Instrumental Analysis
CHEM 4124 Instrumental Analysis Lab
CHEM 4404 Physical Inorganic Chemistry
CHEM 4414 Inorganic Synthesis & Techniques lab | (4) _____, (4) _____
(1) _____, (1) _____
(4) _____
(1) _____
(3) _____
(3) _____, (3) _____
(2) _____, (2) _____
(1) _____
(3) _____, (3) _____
(1) _____, (1) _____
(1) _____
(3) _____
(1) _____
(3) _____
(2) _____ |
| II. | Mathematics Courses (16 credits)
MATH 1114 ⁶ Elementary Linear Algebra
MATH 1225-1226 ⁶ Calculus of a Single Variable
MATH 2204 ⁶ Introduction to Multivariable Calculus
MATH 2214 Introduction to Differential Equations | (2) _____
(4) _____, (4) _____
(3) _____
(3) _____ |
| III. | Physics Courses (8 credits)
PHYS 2305 ⁶ -2306 Foundations of Physics I & II (incl. lab) | (4) _____, (4) _____ |
| IV. | Technical Electives (12 credits)
BCHM 3114 or 4115 Biochemistry elective
STAT or CS course ¹⁴ Statistics or Computer Science elective
CHEM 4534, 4634, or 4424 ¹⁵ Polymer chemistry elective
CHEM 4xxx ¹⁶ CHEM/BCHM/CHE elective | (3) _____
(3) _____
(3) _____
(3) _____ |
| V. | FREE ELECTIVES (sufficient to achieve 120 credit graduation requirement or more)
() _____ () _____ () _____ () _____
() _____ () _____ () _____ () _____ | |

PART 2: College and department credit hour requirement:

96 credits

¹ Minimum Grade Requirement: Chemistry majors must earn a grade of “C” (2.0) or better in CHEM 1055, 1056, and 2565.

- If a chemistry major fails to earn a “C” (2.0) or better in CHEM 1055, the student must either retake this class (and earn the minimum grade) **or** take CHEM 1035-1036, *General Chemistry*, to remain in good standing for a chemistry degree. If the chemistry major elects to take CHEM 1035-1036, a minimum grade of “B” (3.0) is required in both in order to enroll in CHEM 2565 and progress towards the B.S. degree.
- If a chemistry major fails to earn a “C” (2.0) or better in CHEM 2565, the student must either retake this class (and earn the minimum grade) **or** take CHEM 2535, *Organic Chemistry*, to remain in good standing for a chemistry degree. If the chemistry major elects to take CHEM 2535, a minimum grade of “B” (3.0) is required to count CHEM 2535 as CHEM 2565 for the CHEM degree.

² This checksheet has no hidden prerequisites, although some of the courses listed are prerequisites for other courses. The checksheet for 2019 will be approved by the University Registrar in 2017. Please see your advisor or consult the Undergraduate Course Catalog for more information. Please note: Chemistry majors are expected to be “calculus ready” upon the start of their curriculum.

³ Credit hours and GPA 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 Introduction to Chemistry (CHEM 1015, 1016, 1025, 1026), Chemistry First-Year Experience, and Chemistry Problem Solving Skills. No more than 6 hours of CHEM 2974, 4974, and 4994 will be included in a student’s in-major GPA.

⁴ Effective Spring 2015, 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.

⁵ Language study requirement: The College of Science language requirement may be met by (1) completing 3 years of a single foreign or classical language in high school; (2) earning 6 semester hours of college-level foreign or classical language credit or American Sign Language; or (3) receiving credit-by-examination for a foreign or classical language or American Sign Language. (See the Undergraduate Catalog for more information.) Credits to satisfy the Language Study Requirement are in addition to the 120-credit graduation requirement.

⁶ For “satisfactory progress towards degree,” these courses and their prerequisites must be completed by the time the student has attempted 72 hours.

⁷ Fulfilled by CHEM 4014 and CHEM 3626.

⁸ Fulfilled by PHYS 2305 and PHYS 2306.

⁹ Fulfilled by MATH 1225 and MATH 1226.

¹⁰ Prior credit for CHEM 1045 may be substituted for CHEM 1065.

¹¹ Prior credit for CHEM 1046 may be substituted for CHEM 1066.

¹² Effective Fall 2014, if a student has taken CHEM 2535 prior to adding a degree in chemistry, a minimum grade of “B” (3.0) or better is required in order to substitute CHEM 2535 as CHEM 2565.

¹³ Since CHEM 2545-2546 does not satisfy the prerequisite for CHEM 2556 (due to training on specific instrumentation), if a student adds a CHEM BS degree after completing CHEM 2545-2546, two or more credits of CHEM 4994 may substitute for CHEM 2556 to meet the requirement of 400 lab hours beyond general chemistry for an ACS-approved degree.

¹⁴ Any three-credit STAT or CS course, with the exceptions of CS 1004 and CS 1xxx, may satisfy STAT/CS requirement for chemistry degree.

¹⁵ SBIO 3444 or SBIO 4424 (cross-listed with CHEM 4424) may count as polymer chemistry elective **or** upper-level restricted chemistry elective.

¹⁶ A biochemistry or chemical engineering student should not double-count coursework required for that major towards the chemistry upper-level elective.

Bachelor of Science (B.S.) in Chemistry
RECOMMENDED SCHEDULE

First Year		Fall	Spring
CHEM 1055, 1056	General Chemistry for Majors	4	4
CHEM 1065, 1066	General Chemistry for Majors Lab	1	1
CHEM 2984	Chemistry First Year Experience	1	-
ENGL 1105, 1106	First-Year Writing	3	3
MATH 1114	Elementary Linear Algebra	-	2
MATH 1225, 1226	Calculus for the Sciences	4	4
	Elective	3	-
	Semester Total	16	14
Second Year			
CHEM 2154	Analytical Chemistry for Chem Majors	4	-
CHEM 2164	Analytical Chemistry for Chem Majors Lab	1	-
CHEM 2565, 2566	Principles of Organic Chemistry	3	3
CHEM 2555	Organic Synthesis & Techniques Lab	-	2
CHEM 4014	Survey of the Chemical Literature	-	1
CHEM 2424	Descriptive Inorganic Chemistry	-	3
MATH 2204	Multivariable Calculus for the Sciences	3	-
MATH 2214	Introduction to Differential Equations	-	3
PHYS 2305, 2306	Foundations of Physics	4	4
	Semester Total	15	16
Third Year			
CHEM 2556	Organic Synthesis & Techniques Lab	2	-
CHEM 3615, 3616	Physical Chemistry	3	3
CHEM 3625	Physical Chemistry Lab	-	1
CHEM 4114	Instrumental Analysis	-	3
BCHM 3114 or 4115	Biochemistry elective	3	-
STAT or CS xxxx	Statistics or Computer Science (not CS 1004 nor CS 1xxx)	-	3
	Electives	6	6
	Semester Total	14	16
Fourth Year			
CHEM 3626	Physical Chemistry Lab	1	-
CHEM 4124	Instrumental Analysis Lab	1	-
CHEM 4404	Physical Inorganic Chemistry	3	-
CHEM 4414	Inorganic Synthesis & Techniques Lab	-	2
CHEM 4534/4634/4424	Polymer chemistry elective	3	3
CHEM 4xxx	CHEM/BCHM/CHE elective, 3000-level or higher		
	Electives	6	9
	Semester Total	14	14