

**College of Science  
Department of Chemistry  
Bachelor of Science Checksheet  
(for students graduating in Calendar Year 2014) <sup>1</sup>**

**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)*

- |  |                      |
|--|----------------------|
| <b>I. Writing and Discourse</b> (Area 1: 6 credits + ViEWS)<br>ENGL 1105-1106 <sup>2</sup> Freshman English<br>& ViEWS requirement ( <i>Fulfilled by courses required for degree.</i> ) <sup>3</sup> | (3) _____, (3) _____ |
| <b>II. Ideas, Cultural Traditions, and Values</b> (Area 2: 6 credits required)<br>(Select from approved CLE courses)   | (3) _____, (3) _____ |
| <b>III. Society and Human Behavior</b> (Area 3: 6 credits required)<br>(Select from approved CLE courses)  | (3) _____, (3) _____ |
| <b>IV. Scientific Reasoning and Discovery</b> (Area 4) <sup>4</sup><br><i>Fulfilled by courses required for degree.</i>  |                      |
| <b>V. Quantitative and Symbolic Reasoning</b> (Area 5) <sup>5</sup><br><i>Fulfilled by courses required for degree.</i>  |                      |
| <b>VI. Creativity and Aesthetic Experience</b> (Area 6: 3 credits required)<br>(Select from approved CLE courses; must be a three-credit course.)  | (3) _____            |
| <b>VII. Critical Issues in a Global Context</b> (Area 7: 3 credits required)<br>(Select from approved CLE courses)   | (3) _____            |

**PART 1: (CLE) credit hour requirement:**

**24 credits**

**PART 2: COLLEGE AND DEPARTMENT REQUIREMENTS**

- |  |                      |
|--|----------------------|
| <b>I. Chemistry Courses (46 credits)</b>   |                      |
| CHEM 1055-1056 <sup>1,2</sup> General Chemistry for Majors   | (4) _____, (4) _____ |
| <u>MINIMUM GRADE REQUIREMENT:</u> Effective Fall 2009, Chemistry majors must earn a grade of "C" (2.0) or better in CHEM 1055 and in CHEM 1056.  |                      |
| CHEM 1065-1066 <sup>1,2</sup> General Chemistry for Majors lab   | (1) _____, (1) _____ |
| CHEM 2154 <sup>2</sup> Analytical Chemistry for Majors   | (4) _____            |
| CHEM 2164 <sup>2</sup> Analytical Chemistry for Majors lab   | (1) _____            |
| CHEM 2424 Descriptive Inorganic Chemistry  | (3) _____            |
| CHEM 2565 <sup>1,2</sup> -2566 <sup>2</sup> Principles of Organic Chemistry  | (3) _____, (3) _____ |
| <u>MINIMUM GRADE REQUIREMENT:</u> Effective Fall 2009, Chemistry majors must earn a grade of "C" (2.0) or better in CHEM 2565 to take CHEM 2566. |                      |
| CHEM 2555 <sup>2</sup> -2556 Organic Syn-Tech lab  | (2) _____, (2) _____ |
| CHEM 3615-3616 Physical Chemistry  | (3) _____, (3) _____ |
| CHEM 3625-3626 <sup>3</sup> Physical Chemistry lab   | (1) _____, (1) _____ |
| CHEM 4014 <sup>3</sup> Survey of Chemical Literature   | (1) _____            |
| CHEM 4114 Instrumental Analysis  | (3) _____            |
| CHEM 4124 Instrumental Analysis Lab  | (1) _____            |
| CHEM 4404 Physical Inorganic Chemistry   | (3) _____            |
| CHEM 4414 Inorganic Synthesis & Techniques lab   | (2) _____            |
| <b>II. Mathematics Courses (16 credits)</b>  |                      |
| MATH 1114 <sup>2</sup> Elementary Linear Algebra   | (2) _____            |
| MATH 1224 <sup>2</sup> Vector Geometry   | (2) _____            |
| MATH 1205-1206 <sup>2</sup> Calculus   | (3) _____, (3) _____ |
| MATH 2214 Introduction to Differential Equations   | (3) _____            |
| MATH 2224 <sup>2</sup> Multivariable Calculus  | (3) _____            |

**III. Physics Courses (8 credits)**  
PHYS 2305<sup>2</sup>-2306 Foundations of Physics I & II (incl. lab) (4) \_\_\_\_\_, (4) \_\_\_\_\_

**IV. Restricted Electives (9 credits)**  
BCHM 3114 or 4115 Biochemistry elective (3) \_\_\_\_\_  
STAT or CS course Statistics or Computer Science elective (3) \_\_\_\_\_  
*NOT CS 1004*  
CHEM 4xxx CHEM/BCHM/BIOC/CHE elective (3) \_\_\_\_\_  
*4000-level or higher*

**V. FREE ELECTIVES (sufficient to achieve 120 credit graduation requirement or more)**

( ) \_\_\_\_\_ ( ) \_\_\_\_\_ ( ) \_\_\_\_\_ ( ) \_\_\_\_\_  
( ) \_\_\_\_\_ ( ) \_\_\_\_\_ ( ) \_\_\_\_\_ ( ) \_\_\_\_\_  
( ) \_\_\_\_\_ ( ) \_\_\_\_\_ ( ) \_\_\_\_\_ ( ) \_\_\_\_\_

**PART 2: College and department credit hour requirement: 96 credits**

**NOTES:**

- 1 MINIMUM GRADE REQUIREMENT:** Effective Fall 2009, 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 he or she 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 the chemistry major elects to take CHEM 1035-1036, a minimum grade of “C” (2.0) is required in both in order to enroll in CHEM 2565 and progress towards the **B.A.** degree.
- 2 For “satisfactory progress towards degree,” these courses and their prerequisites must be completed by the time the student has attempted 72 hours.
- 3 CHEM 3626 and CHEM 4014 satisfy the department’s ViEWS (Visual Expression, Writing and Speaking) communication requirement.
- 4 PHYS 2305 and PHYS 2306 satisfy CLE Area 4.
- 5 MATH 1205 and MATH 1206 satisfy CLE Area 5.

**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. The in-major GPA is calculated from all chemistry courses except that not more than 6 hours of CHEM 2974, 4974, and 4994 will be included.

**Prerequisites:** This checksheet has no hidden prerequisites, although some of the courses listed are prerequisites for other courses. Please see your advisor or consult the Undergraduate Course Catalog for more information.

**Language study requirement:** The College of Science language requirement may be met by (1) completing 3 units 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 for the Chemistry degree.

**Substitutions:** Students with chemistry credits due to transferring into the major, taking summer classes, or transferring credits from elsewhere may substitute the non-majors chemistry courses for the majors chemistry courses. Course substitutions must be approved by the Chemistry Department’s Director of Undergraduate Programs.

Since CHEM 2545-2546 does not satisfy the prerequisite for CHEM 2556 (due to training on specific instrumentation), 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.

**College of Science**  
 Department of Chemistry  
 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
ENGL 1105, 1106	Freshman English	3	3
MATH 1114	Elementary Linear Algebra	2	-
MATH 1224	Vector Geometry	-	2
MATH 1205, 1206	Calculus	3	3
	Electives	3	3
	Semester Total	16	16
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 2214	Introduction to Differential Equations	-	3
MATH 2224	Multivariable Calculus	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
BCHM 3114 or 4115	biochemistry elective	3	-
STAT or CS	Statistics or Computer Science (not CS 1004)	-	3
	Electives	6	8
	Semester Total	14	15
Fourth Year			
CHEM 3626	Physical Chemistry Lab	1	-
CHEM 4114	Instrumental Analysis	3	-
CHEM 4124	Instrumental Analysis Lab	1	-
CHEM 4404	Physical Inorganic Chemistry	3	-
CHEM 4414	Inorganic Synthesis & Techniques Lab	-	2
CHEM 4xxx	CHEM/BIOC/CHE elective, 4000-level or higher	-	3
	Electives	6	9
	Semester Total	14	14