



**Chemistry  
Bachelor of Science  
Arts & Sciences  
Traditional**

**Program Coordinator: S. Pickard**

The B.S. in Chemistry provides students an opportunity to receive a thorough scientific training in the context of a Christian worldview. This program integrates a strong understanding of chemical principles and quantitative problem solving with the development of hands-on research skills. Also, the Chemistry program includes a strong oral and written communication component. Thus, our students receive an educational experience that goes beyond the specific skills they need to be successful as chemists and helps them to develop into well-rounded individuals who are ready to take their places in society.

**Student Learning Outcomes**

1. Graduates will demonstrate proficiency in content knowledge, including chemistry problem solving techniques.
2. Graduates will demonstrate proficiency in traditional chemistry lab techniques.
3. Graduates will demonstrate proficiency in oral scientific communication.
4. Graduates will demonstrate proficiency in written scientific communication.

There are three tracks within this major: General Chemistry, Health Sciences Chemistry, and Chemistry for Secondary Education Licensure. The General Chemistry track has a major curriculum patterned after guidelines recommended by the American Chemical Society and is the program recommended for students who wish to pursue graduate studies in chemistry. The Health Sciences track is primarily designed for students who are preparing for a career in a health profession. The Chemistry Education track prepares the student to teach chemistry in a secondary school setting.

Thus, by selecting the correct track, a student pursuing a chemistry major will have an excellent background for medical school, graduate study in chemistry, or chemical engineering. Chemistry is valuable for those who seek careers as chemists in industry, government, business, or for those in working in science-based activities such as chemical patent work, sales, marketing, or computer science.

Students may also choose to combine a modified Chemistry major with a minor in secondary education. Science and mathematics are considered critical need areas in K-12 public education by all states.

**Technology Requirement**

Laptop computer with a minimum of Microsoft Office 2010 or later, wireless capability, and a webcam.

**Comprehensive Assessment**

The Chemistry Capstone (CHEM 4930) and Comprehensive Assessment (CHEM 4990) are required for both the General and the Health Sciences track. CHEM 4990 is an end-of-program exam which tests the student's knowledge of Chemistry in the areas of Organic,

Analytical and Physical. CHEM 4930 is review course designed to prepare the student for the end-of-program exam, and there is a letter grade assigned for CHEM 4930. Both CHEM 4930 and 4990 are normally taken during the Fall or Spring semester leading up to the student's graduation.

### **Core Curriculum Requirements**

Chemistry majors should complete the King Core Curriculum as specified below. For additional course options and descriptions in areas outside of science and mathematics, the student should see the "The Core Curriculum" section of the catalog.

#### **Science**

CHEM 1110

General Chemistry I..... 4 s.h.

#### **Quantitative Literacy**

MATH 2350

Calculus I..... 4 s.h.

### **BS in Chemistry Major Requirements**

**The following courses are taken by all chemistry majors, regardless of their track.**

CHEM 1120

General Chemistry II ..... 4 s.h.

CHEM 2110

Organic Chemistry I..... 4 s.h.

CHEM 2120

Organic Chemistry II ..... 4 s.h.

CHEM 3000

Analytical Chemistry I..... 4 s.h.

CHEM 4000

Physical Chemistry I..... 5 s.h.

PHYS 2210

General Physics I ..... 4 s.h.

IDST 4500

Interdepartmental Science and Mathematics Seminar..... 2 s.h.

#### **General Chemistry Track**

CHEM 3200

Analytical Chemistry II ..... 4 s.h.

CHEM 4200

Physical Chemistry II..... 5 s.h.

MATH 2360

Calculus II..... 4 s.h.

PHYS 2220

General Physics II..... 4 s.h.

*Choose from the following courses* ..... 4 s.h.

MATH 2370

Vector Calculus (4 s.h.)

MATH 3430

Differential Equations (4 s.h.)

PHYS 3060

Introduction to Modern Physics (4 s.h.)

PHYS 3030	
Electricity and Magnetism (4 s.h.)	
CHEM 4930	
Chemistry Capstone.....	1 s.h.
CHEM 4990	
Comprehensive Assessment .....	0 s.h.
<b>Summary of Total Credits General Chemistry Track</b>	
Core Curriculum .....	42 s.h.
Major Common Requirements.....	32 s.h.
Track Requirements.....	17 s.h.
Total Major Requirements .....	49 s.h.
Electives/Minor/Second Major .....	33 s.h.
<b>Minimum to Earn Bachelor of Science in Chemistry .....</b>	<b>124 s.h.</b>

### Health Sciences Chemistry Track

BIOL 3700	
Biochemistry.....	4 s.h.
BIOL 2110	
General Biology I.....	4 s.h.
BIOL 2120	
General Biology II .....	4 s.h.
CHEM 4930	
Chemistry Capstone.....	1 s.h.
CHEM 4990	
Comprehensive Assessment .....	0 s.h.
<i>Choose from the following .....</i>	<i>(at least) 4 s.h.</i>
CHEM 3200	
Analytical Chemistry II (4 s.h.)	
CHEM 3300	
Advanced Organic Chemistry (4 s.h.)	
CHEM 3600	
Inorganic Chemistry (4 s.h.)	
CHEM 4200	
Physical Chemistry II (5 s.h.)	
CHEM 3500	
Forensic Chemistry (4 s.h.)	
CHEM 4930	
Chemistry Capstone.....	1 s.h.
CHEM 4990	
Comprehensive Assessment .....	0 s.h.
<b>Summary of Total Credits Health Sciences Chemistry Track</b>	
Core Curriculum .....	42 s.h.
Major Common Requirements.....	32 s.h.
Track Requirements.....	16 s.h.
Total Major Requirements .....	48 s.h.
Electives/ Minor/Second Major .....	34 s.h.
<b>Minimum to Earn B.S. in Health Sciences Chemistry .....</b>	<b>124 s.h.</b>

## Teacher Education - CHEMISTRY

The B.S. in Chemistry (with Licensure for Grades 6-12) is available with modifications to the Chemistry major and the King Core Curriculum as well as successful completion of the Secondary Education minor. Licensed teachers in secondary education are in great demand, and science is considered a critical need area in K-12 public education by all fifty states.

Declaration of the Education minor and early and frequent advisement is essential to timely completion of degree and licensure requirements. Students seeking teacher licensure will be assigned a secondary education advisor in the Department of Teacher Education, in addition to their major advisor. See the “Admission to the Teacher Education Program” section of this catalog or contact the Certification Advisor in the School of Education for eligibility criteria, admissions procedures, and timelines.

### Student Learning Outcomes for Teacher Education

In addition to the discipline specific student learning outcomes for Chemistry, teacher candidates will demonstrate mastery of the following Student Learning Outcomes, which are aligned with the both Tennessee Teacher Licensure Standards: Professional Education and InTASC Standards: Interstate Teacher Assessment and Support Consortium.

1. The pre-service teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline(s) accessible and meaningful for learners to assure mastery of the content.
2. The pre-service teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.
3. The pre-service teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections and to build skills to apply knowledge in meaningful ways.

### Core Curriculum Requirements

Chemistry majors seeking teaching licensure should fulfill specified categories of the King Core Curriculum by taking the courses indicated below. See the “The Core Curriculum” section of the catalog for additional details on fulfillment of other categories.

#### Science

CHEM 1110

General Chemistry I..... 4 s.h.

#### Quantitative Literacy

MATH 2350

Calculus I ..... 4 s.h.

### BS in Chemistry Requirements for 6-12 Teaching Licensure

#### General Science and Physical Science Core

In addition to General Chemistry I, taken for general education credit, all science licensure candidates must complete this list of courses that encompass all the natural and physical sciences:

BIOL 2110

General Biology I..... 4 s.h.

CHEM 1120

General Chemistry II ..... 4 s.h.

GEOG 2010	
Physical Geography .....	3 s.h.
PHYS 2210	
General Physics I .....	4 s.h.

### **Chemistry Major Requirements**

CHEM 2110	
Organic Chemistry I.....	4 s.h.
CHEM 2120	
Organic Chemistry II .....	4 s.h.
CHEM 3000	
Analytical Chemistry I.....	4 s.h.
CHEM 3200	
Analytical Chemistry II .....	4 s.h.
CHEM 4000	
Physical Chemistry I.....	5 s.h.
<i>Choose from the following courses .....</i>	<i>4 s.h.</i>
MATH 2360	
Calculus II (4 s.h.)	
CHEM 4200	
Physical Chemistry II (4 s.h.)	
PHYS 2220	
General Physics II (4 s.h.)	
IDST 4500	
Interdepartmental Science Seminar .....	2 s.h.

*NOTE: Students in the Chemistry Secondary Education Track are not required to take CHEM 4930 Chemistry Capstone or CHEM 4990 Comprehensive Assessment. Instead they are required to take the PRAXIS exams for Secondary Education licensure in Chemistry, which serve as their comprehensive assessment for Chemistry knowledge.*

### **Secondary Education Minor**

EDUC 2030	
Introduction to Teaching: K-Grade 12.....	2 s.h.
EDUC 2031	
Introduction to Teaching Practicum: Grades PreK-12 .....	1 s.h.
EDUC 2100	
Survey of Exceptional Children.....	4 s.h.
EDUC 2370	
Reflective Teaching: Planning for Classroom Instruction.....	3 s.h.
EDUC 2900	
Foundations of Education .....	3 s.h.
EDUC 2950	
Technology for Teachers .....	2 s.h.
EDUC 3390*	
Secondary Curriculum and Methods .....	3 s.h.
EDUC 3590*	
Content Area Reading.....	3 s.h.
EDUC 3600*	
Assessment and Evaluation .....	3 s.h.

EDUC 4490*	
Student Teaching: Grades 6-10.....	5 s.h.
EDUC 4500*	
Student Teaching: Grades 9-12.....	5 s.h.
EDUC 4940	
Introduction to edTPA .....	1 s.h.
EDUC 4950*	
Capstone Seminar: Grades K-12 .....	2 s.h.
PSCI 2120	
Cultural Diversity in America.....	4 s.h.
PSYC 3320	
Adolescent Development.....	4 s.h.

\*Requires admittance to the Teacher Education Program

**Summary of Total Credits for Chemistry with Secondary Licensure**

Core Curriculum .....	42 s.h.
Science Core + Chemistry Major Requirements.....	42 s.h.
Secondary Education Minor.....	45 s.h.
<b>Minimum to Complete 6-12 Licensure Program in Chemistry.....</b>	<b>129 s.h.</b>