Bachelor of Science

Chemistry with a Major in Secondary Chemistry Education (6-12) (BS)

This major leads to eligibility for teacher licensure in Virginia and is available only to individuals holding a baccalaureate degree or completing requirements for a Bachelor of Science degree in chemistry. Due to changing University requirements, national accreditation standards, and the Virginia Board of Education licensure regulations, the teacher preparation programs in the College of Sciences are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and the Office of Clinical Experiences website at https://www.odu.edu/oce (https://www.odu.edu/oce/).

Admission

Students must first declare secondary chemistry education (6-12) as their major with the chemistry departmental advisor. All students must apply for and be admitted into the approved secondary chemistry education program. Students must meet the required criteria for admission by earning the minimum required grade point averages (GPA).

Virginia Board of Education Prescribed Assessments for Admission to an Approved Teacher Education Program

Old Dominion University students seeking admission to an approved teacher education program must satisfy the Virginia Board of Education required assessment for admission into an approved teacher education program. The requirement can be satisfied by meeting a passing score in the following:

- Virginia Communication and Literacy Assessment (VCLA): Scaled passing score of 235 for the reading subtest and score of 235 for the writing subtest OR a composite score of 470 for the assessment.

For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Virginia Department of Education at https://www.doe.virginia.gov/.

Required grade point averages (GPA)

- A cumulative GPA of 2.75 is required.
- A major/content GPA of 2.75 is required - all chemistry courses must be passed with a grade of C (2.0) or above and all other science content courses must be passed with a grade of C- or higher.
- A professional education GPA of 2.75 is required – all professional education courses must be passed with a grade of C- or higher.

Although students may enroll in a limited number of education courses, students must be admitted into the approved chemistry teacher preparation program prior to enrolling in any instructional strategies practicum education course. Students must also meet with an education advisor in the Office of Clinical Experiences.

Continuance

Students must maintain a cumulative GPA of 2.75, a major/content GPA of 2.75 and a professional education GPA of 2.75. Chemistry courses must be passed with a grade of C (2.0) or higher. The remaining courses required for the major and in the professional education core must be completed with a grade of C- or higher for continuance. A professional education GPA of 2.75 is required for continuance. Students must take and pass the Praxis Subject Assessment, Chemistry content knowledge (formerly Praxis II) prior to or while enrolled in the instructional strategies course. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session.

Background Clearance Requirement

Old Dominion University requires a background clearance check of candidates interested in many of the professional education programs. Professional education programs have several field experiences that are required for continuance and graduation from the program. The background clearance must be successfully completed prior to a field experience placement. Candidates will be provided a field experience placement when the background check process is completed with resolution of any issues. The process to complete the ODU clearance background check is located at: http://www.odu.edu/success/academic/teacher-education/placement/background-checks (http://www.odu.edu/success/academic/teacher-education/placement/background-checks/). The ODU clearance process includes: an FBI fingerprint, a child protective service/social service review, and a Virginia State Police sex offender registry review. Candidates interested in the professional education programs are advised to complete this clearance process immediately upon entry into the program since the clearance process takes a minimum of eight weeks to complete.

Virginia Board of Education Prescribed Assessments for Licensure

Praxis Subject Assessment, Chemistry content knowledge (test code: 5246) – passing score of 146 is required.

To review more information on the Virginia Board of Education prescribed assessments visit the Office of Clinical Experiences website at https://www.odu.edu/oce (https://www.odu.edu/oce/).

Requirements

Lower-Division General Education

Written Communication (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written)	6
Oral Communication (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral)	3
Mathematics (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math)	3
Language and Culture (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language)	0-6
Information Literacy and Research (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information)	3
Human Behavior (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior)	3
Human Creativity (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity)	3
Interpreting the Past (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret)	3
Literature (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature)	3
Philosophy and Ethics (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy)	3
The Nature of Science (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature)	8
Impact of Technology (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact)	3

Written Communication: Grade of C or better required in both courses

Oral Communication: COMM 101R

Mathematics: MATH 163 required

Information Literacy and Research: satisfied in the major by CHEM 160G

The Nature of Science: PHYS 231N & PHYS 232N

Upper-Division General Education

The professional education core satisfies the Upper-Division General Education requirement.

Requirements for Graduation

Requirements for graduation include completion of ENGL 110C, ENGL 211C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better, completion of the Senior Assessment, a minimum cumulative 2.75 GPA, in the major area, and in the professional education core, with no grade less than a C in the major and C- in the professional education core; successful completion of the Teacher Candidate Internship and a minimum of 129 credit hours, which must include both a minimum of 32 credit hours overall and 12 credit hours in upper-level courses in the major program from Old Dominion University. Note that a C (2.0) must be earned in all chemistry courses used to satisfy departmental requirements.

Licensure requirements also include certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, and Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

Chemistry Core

In addition to completing the University's lower-division general education requirements and upper-division general education requirements, a secondary chemistry education major seeking teacher licensure must complete the following courses.

CHEM 121N	Foundations of Chemistry I Lecture	3
CHEM 122N	Foundations of Chemistry I Laboratory	1
CHEM 123N	Foundations of Chemistry II Lecture	3
CHEM 124N	Foundations of Chemistry II Laboratory	1-2
or CHEM 125	Foundations of Chemistry II Lab with Introduction to Chemical Research	
CHEM 160G	Introduction to Chemistry and Biochemistry Research and Careers	3
CHEM 211	Organic Chemistry I Lecture	3
CHEM 212	Organic Chemistry I Laboratory	2
CHEM 213	Organic Chemistry II Lecture	3
CHEM 214	Organic Chemistry II Laboratory	2
or CHEM 216	Advanced Organic Chemistry Laboratory	
CHEM 321 & CHEM 322	Analytical Chemistry Lecture and Analytical Chemistry Laboratory	5
CHEM 351	Inorganic Chemistry	3
CHEM 331	Physical Chemistry Lecture I	3
CHEM 332W	Experimental Physical Chemistry I	2
CHEM 333 & CHEM 334W	Physical Chemistry Lecture II and Experimental Physical Chemistry II	5
CHEM 421 & CHEM 422	Instrumental Analysis Lecture and Instrumental Analysis Laboratory	6
CHEM 441	Biochemistry Lecture	3
CHEM 449	Environmental Chemistry	3
CHEM 485	Chemistry and Biochemistry Seminar	1
Select one CHEM elective from the following:		3
CHEM 415	Intermediate Organic Chemistry	
CHEM 439	Introduction to Pharmaceutical Chemistry	
CHEM 443	Intermediate Biochemistry	
CHEM 451	Advanced Inorganic Chemistry	
Select one CHEM Laboratory from the following:		2-4
CHEM 352	Inorganic Chemistry Laboratory	
CHEM 442W	Biochemistry Laboratory	
Other Required courses		
MATH 211	Calculus I	4
MATH 212	Calculus II	4
Total Credit Hours		**65-68**

Chemistry majors must have a C or better in all courses required for the major, including prerequisite courses, and must complete a minimum of 12 credits in upper level (300/400) chemistry courses at Old Dominion University. Written permission by the chief departmental advisor or chair is required prior to taking upper-level chemistry courses at other institutions.

Secondary Chemistry Education (6-12) Major

General Education		
Complete lower-division requirements		38-44
Complete upper-division requirements (met in the major by the professional education core)		
Chemistry Core		
Complete chemistry core		65-68
Professional Education Core Courses and Requirements		
STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
STEM 201	Knowing and Learning in STEM Education	3
STEM 202	Classroom Interactions in STEM Education	3
STEM 401	Project Based Instruction in STEM Education	3
STEM 402	Perspectives on STEM	3
STEM 485	Apprentice Teaching	9
CHEM 468	Research Methods in Mathematics and Science	3
Total Credit Hours		**129-138**

Honors in Chemistry

The honors program provides qualified students the opportunity for supervised individual study in their areas of interest. Admission to the program requires a cumulative GPA of 3.25 or higher and a GPA of 3.50 or higher in the major. Students must take two upper-division courses designated by the department to be honors courses. These are termed "Contract Honors Courses." A description of the procedures for these contract courses is found in the Honors College section of this Catalog.

Degree Program Guide

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

Course	Title	Credit Hours
Freshman		
Fall		
ENGL 110C	English Composition (Grade of C or better required)	3
MATH 163	Precalculus II	3
CHEM 121N and CHEM 122N		4
Human Creativity		3
CHEM 160G	Introduction to Chemistry and Biochemistry Research and Careers	3
	Credit Hours	**16**
Spring		
ENGL 211C or ENGL 231C (Grade of C or better required)		3
MATH 211	Calculus I	4
CHEM 123N and CHEM 124N or CHEM 125		4-5
Philosophy and Ethics		3

STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
	Credit Hours	**16-17**
Sophomore		
Fall		
CHEM 211 and CHEM 212		5
MATH 212	Calculus II	4
PHYS 231N	University Physics I	4
STEM 201	Knowing and Learning in STEM Education	3
	Credit Hours	**16**
Spring		
CHEM 213 AND CHEM 214 or CHEM 216		5
PHYS 232N	University Physics II	4
STEM 202	Classroom Interactions in STEM Education	3
CHEM 321 and CHEM 322		5
	Credit Hours	**17**
Junior		
Fall		
CHEM 331	Physical Chemistry Lecture I	3
CHEM 332W	Experimental Physical Chemistry I (C or better required)	2
CHEM 441	Biochemistry Lecture	3
CHEM 351	Inorganic Chemistry	3
CHEM 352 or CHEM 442W		2-4
Impact of Technology		3
	Credit Hours	**16-18**
Spring		
CHEM 333	Physical Chemistry Lecture II	3
CHEM 334W	Experimental Physical Chemistry II (C or better required)	2
CHEM 449	Environmental Chemistry	3
COMM 101R	Public Speaking	3
Literature		3
	Credit Hours	**14**
Senior		
Fall		
CHEM 421 and CHEM 422		6
CHEM 468	Research Methods in Mathematics and Science	3
STEM 401	Project Based Instruction in STEM Education	3
Human Behavior		3
Interpreting the Past		3
	Credit Hours	**18**
Spring		
STEM 485	Apprentice Teaching	9
CHEM 415 or CHEM 439 or CHEM 443 or CHEM 451		3
STEM 402	Perspectives on STEM	3
CHEM 485	Chemistry and Biochemistry Seminar	1
	Credit Hours	**16**
	Total Credit Hours	**129-132**

Language and Culture I & II may be met in high school and are not included in this 4-year plan. Please see requirement details.

Linked Bachelor's/Master's Degree Programs

The linked BS in chemistry and the MS in chemistry allows exceptional students to count up to 12 hours of graduate courses toward both a BS degree in chemistry and an MS degree in chemistry. Students in the combined program must complete Senior Thesis I and II (CHEM 490 and CHEM 499), be accepted into the chemistry master's program, and earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree). Additional requirements apply; please contact the Chief Departmental Advisor.

BA or BS to MBA (Master of Business Administration) Linked Program

The linked BA/MBA or BS/MBA program is an early entry to the MBA program of study. The early-entry program is designed for well qualified non-business undergraduate ODU students to start their MBA program prior to completing their undergraduate degree. Well qualified non-business undergraduate students may take MBA-level courses as early as three semesters prior to graduation and count up to 12 graduate credits toward their undergraduate degree. Students participating in the early-entry program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree). Early-entry program students should carefully consider their undergraduate degree program requirements when planning their course of study. Students in the early-entry program work in close consultation with the MBA Program Office and should refer to information in the Strome College of Business section in the graduate catalog (http://catalog.odu.edu/graduate/stromecollegeofbusiness/) to develop an individualized plan of study based on the required coursework.

BA or BS to MPA (Master of Public Administration) Linked Program

The linked BA/MPA or BS/MPA program provides qualified Old Dominion University undergraduate students with the opportunity to earn a master's degree in public administration while taking credits in the MPA program as an undergraduate student. The program is designed for highly motivated students with the desire to immediately continue their education after the bachelor's degree. The program is especially relevant to individuals seeking to work (or currently working) in the public or non-profit sectors, but is suitable for students from any undergraduate major. Graduate courses may be taken during the fall and spring semester of the student's senior undergraduate year. Up to 12 graduate credits can count toward both the undergraduate and graduate degree and can meet upper-level General Education requirements. After receiving the undergraduate degree, a student will continue with the MPA program, taking MPA courses until completing the required 39 credit hours. Students in the linked program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Requirements for admission to the graduate program can be found in the School of Public Service section of the Graduate Catalog (http://catalog.odu.edu/graduate/business/public-service/). For additional information, please contact the School of Public Service in the Strome College of Business.