Bachelor of Science

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

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

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

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 biochemistry 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: https://www.odu.edu/clinical-experiences/placement/background-checks (https://www.odu.edu/clinical-experiences/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.

Students are encouraged to complete the following courses (or their approved equivalents) prior to taking the Praxis content knowledge licensure tests:

Nature and Impact of Science and Engineering: CHEM 121N & CHEM 122N
Principles & Models of Matter & Energy: CHEM 121N & CHEM 122N
Chemical Compositions, Bonding, & Structure: CHEM 121N & CHEM 122N
Chemical Reactions & Periodicity: CHEM 121N & CHEM 122N
Solutions & Acid-Base Chemistry: CHEM 121N & CHEM 122N

Please consult with your academic advisor with any questions and before registering for your licensure test.

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

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

The Nature of Science: BIOL 121N & BIOL 122N, BIOL 123N & BIOL 124N

Human Behavior: GEOG 101S

Additional hours may be required to meet the foreign language requirement.

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.

Biochemistry Core

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

Required Chemistry 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 331	Physical Chemistry Lecture I	3
CHEM 333	Physical Chemistry Lecture II	3
CHEM 441	Biochemistry Lecture	3
CHEM 442W	Biochemistry Laboratory	4
CHEM 443	Intermediate Biochemistry	3
CHEM 485	Chemistry and Biochemistry Seminar	1
Other Required courses		
MATH 211	Calculus I	4
MATH 212	Calculus II	4
BIOL 293	Cell Biology	3
BIOL 294	Genetics	3
PHYS 231N	University Physics I	4
PHYS 232N	University Physics II	4
Total Credit Hours		**65-66**

Biochemistry 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.

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General Education		
Complete lower-division requirements		38-44
Complete upper-division requirements (met by the professional education core)		
Biochemistry Core		
Complete biochemistry core		65-66
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 485	Apprentice Teaching	9
SPED 400	Foundations of Special Education: Legal Aspects and Characteristics	3
TLED 408	Reading and Writing in Content Areas	3
Total Credit Hours		**129-136**

Degree Program Guide

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
BIOL 121N and BIOL 122N		4
CHEM 160G	Introduction to Chemistry and Biochemistry Research and Careers	3
	Credit Hours	**17**
Spring		
Select one of the following:		3
ENGL 211C	Writing, Rhetoric, and Research	
ENGL 231C	Writing, Rhetoric, and Research: Special Topics	
MATH 211	Calculus I	4
CHEM 123N and CHEM 124N or CHEM 125		4-5
BIOL 123N and BIOL 124N		4
STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
	Credit Hours	**17-18**
Sophomore		
Fall		
CHEM 211 and CHEM 212		5

MATH 212	Calculus II	4
COMM 101R	Public Speaking	3
STEM 201	Knowing and Learning in STEM Education	3
Human Creativity		3
	Credit Hours	**18**
Spring		
CHEM 213 AND CHEM 214 or CHEM 216		5
STEM 202	Classroom Interactions in STEM Education	3
Literature		3
Philosophy and Ethics		3
	Credit Hours	**14**
Junior		
Fall		
CHEM 321 and CHEM 322		5
PHYS 231N	University Physics I	4
BIOL 293	Cell Biology	3
STEM 401	Project Based Instruction in STEM Education	3
Interpreting the Past		3
	Credit Hours	**18**
Spring		
CHEM 441	Biochemistry Lecture	3
PHYS 232N	University Physics II	4
CHEM 442W	Biochemistry Laboratory (C or better required))	4
Human Behavior: GEOG 101S		3
SPED 400	Foundations of Special Education: Legal Aspects and Characteristics	3
	Credit Hours	**17**
Senior		
Fall		
CHEM 331	Physical Chemistry Lecture I	3
CHEM 443	Intermediate Biochemistry	3
BIOL 294	Genetics	3
Impact of Technology		3
TLED 408	Reading and Writing in Content Areas	3
	Credit Hours	**15**
Spring		
CHEM 485	Chemistry and Biochemistry Seminar	1
CHEM 333	Physical Chemistry Lecture II	3
STEM 485	Apprentice Teaching	9
	Credit Hours	**13**
	Total Credit Hours	**129-130**

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

Dual Dominion Bachelor's/Master's Degree Programs

The Dual Dominion BS in biochemistry and the MS in chemistry allows exceptional students to count up to 12 hours of graduate courses toward both a BS degree in biochemistry 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.