Bachelor of Science

Biochemistry with a Major in Biochemistry-Research (BS)

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

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

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

Upper-Division General Education

- Option A. Approved Disciplinary Minor (a minimum of 12 hours determined by the department), or second degree or second major.
- Option B: Interdisciplinary Minor (specifically 12 hours, 3 of which may be in the major)
- Option C. An approved Certification Program such as teaching licensure
- Option D. Two Upper-Division Courses from outside the College of Sciences and not required by the major (6 hours)

Requirements for Graduation

Requirements for graduation include the following:

- Minimum of 120 credit hours.
- Minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward the major.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward a minor.
- 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. The W course must be taken at Old Dominion University.
- Completion of Senior Assessment.

Biochemistry Core

In addition to completing the University's lower-division general education requirements and upper-division general education requirements, a biochemistry major 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 & CHEM 333	Physical Chemistry Lecture I and Physical Chemistry Lecture II	6
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
PHYS 231N & PHYS 232N	University Physics I and University Physics II	8
BIOL 293	Cell Biology	3
BIOL 294	Genetics	3
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.

Research Major

Students with an interest in pursuing biochemical research after graduation or in graduate school or those seeking a deeper understanding of biochemical research and applications may pursue a Biochemistry-Research major. Courses taken for the research concentration will substitute for courses in the regular curriculum; please consult the Chief Departmental Advisor for specific information on substitutions. Additionally, all regular BS-Biochemistry degree requirements must be met (with the exception of approved substitutions).

General Education	
Complete lower-division requirements	38-44
Complete upper-division requirements (minimum of 6 credit hours)	6
Biohemistry Core	
Complete the biochemistry core	65-66

Chemistry-Research Major		
CHEM 490	Senior Thesis I	1
CHEM 499	Senior Thesis II	2
Select two of the following research-oriented courses:		3-5
CHEM 125	Foundations of Chemistry II Lab with Introduction to Chemical Research	
CHEM 216	Advanced Organic Chemistry Laboratory	
CHEM 497	Independent Study	
CHEM 498	Independent Study	
Total Credit Hours		**115-124**

Elective Credit

Elective credit may be needed to meet the minimum requirement of 120 credit hours.

Additional Requirements and Information

ACS-Certified Degree

Biochemistry majors can attain an ACS-certified degree for chemistry content if they also complete the following.

CHEM 332W	Experimental Physical Chemistry I	2
CHEM 351	Inorganic Chemistry	3
Select two of the following lecture electives:		6
CHEM 411	Natural Products Chemistry in the Carribean	
CHEM 415	Intermediate Organic Chemistry	
CHEM 421	Instrumental Analysis Lecture	
CHEM 449	Environmental Chemistry	
CHEM 451	Advanced Inorganic Chemistry	
Select two of the following laboratory electives:		4
CHEM 334W	Experimental Physical Chemistry II	
CHEM 352	Inorganic Chemistry Laboratory	
CHEM 422	Instrumental Analysis Laboratory	
Total Credit Hours		**15**

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
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
	Credit Hours	**15-16**
Sophomore		
Fall		
CHEM 211 and CHEM 212		5
MATH 212	Calculus II	4
COMM 101R	Public Speaking	3
Elective or Language and Culture I (May be waived; See requirement details)		3
	Credit Hours	**15**
Spring		
CHEM 213 AND CHEM 214 or CHEM 216		5
Elective or Language and Culture II (May be waived; See requirement details)		3
Human Behavior		3
Elective		3
	Credit Hours	**14**
Junior		
Fall		
CHEM 321 and CHEM 322		5
PHYS 231N	University Physics I	4
CHEM 441	Biochemistry Lecture	3
BIOL 293	Cell Biology	3
	Credit Hours	**15**
Spring		
CHEM 443	Intermediate Biochemistry	3
PHYS 232N	University Physics II	4
CHEM 442W	Biochemistry Laboratory (C or better required)	4
Elective		2
	Credit Hours	**13**
Senior		
Fall		
CHEM 331	Physical Chemistry Lecture I	3
BIOL 294	Genetics	3
Interpreting the Past		3
Philosophy and Ethics		3
Upper-Division General Education Course (Option D)		3
	Credit Hours	**15**
Spring		
CHEM 485	Chemistry and Biochemistry Seminar	1
CHEM 333	Physical Chemistry Lecture II	3
Impact of Technology		3
Literature		3
Upper-Division General Education Course (Option D)		3
Human Creativity		3
	Credit Hours	**16**
	Total Credit Hours	**120-121**

Linked Bachelor's/Master's Degree Programs

The linked 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.

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.