

SCIENCE, BACHELOR OF SCIENCE (B.S.) WITH A CONCENTRATION IN PROFESSIONAL SCIENCE

Student learning outcomes

Upon completing this program, students will know and know how to do the following:

Interdisciplinary science core learning outcomes

- Demonstrate competency in at least two sciences or in a non-science area
- Apply learning to selection and pursuit of professional or graduate career objective
- Demonstrate proficiency in communication of scientific or research findings
- Demonstrate ability to apply the scientific method/approach to professional problems
- Demonstrate appreciation of the interrelation of core sciences to interdisciplinary problems

Professional science concentration-specific learning outcome:

- Demonstrate broad science proficiency, with special preparation in advanced laboratory skills or for the teaching of science.

Special requirements

The Bachelor of Science in Science requires a minimum of 120 credits.

Along with the general education requirements of the undergraduate programs and the College of Humanities and Sciences for a Bachelor of Science degree, this curriculum requires 29 to 33 credits in foundation science and mathematics courses and 35 to 39 credits in supplemental courses in the concentration. In preparation for the required mathematical sciences courses, all students must take the Mathematics Placement Test. Science majors are strongly encouraged to select a minor in an area different from their area of concentration that will complement their career interests and contribute additional upper-level credits to their curriculum.

Grade requirements

A minimum grade of C is required in each prerequisite course:

Course	Title	Hours
CHEM 100	Introductory Chemistry (if required through placement test)	3
CHEM 101	General Chemistry I	3
CHEM 102	General Chemistry II	3
CHEM 301	Organic Chemistry	3
CHEM 302	Organic Chemistry	3

A minimum grade of C is required in the following courses before enrollment in advanced BIOL courses:

Course	Title	Hours
BIOL 151 & BIOZ 151	Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I	4
BIOL 152 & BIOZ 152	Introduction to Biological Sciences II and Introduction to Biological Science Laboratory II	4
BIOL 300	Cellular and Molecular Biology	3

Degree requirements for B.S. in Science with a concentration in professional science

Course	Title	Hours
General education (https://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/)		
Select 30 credits of general education courses in consultation with an adviser.		30
Major requirements		
• Major core requirements		
INSC 490	Capstone Research Experience in Interdisciplinary Science	3
• Additional major requirements		
BIOL 341/ANTH 301	Human Evolution (or upper-level natural science elective from list below)	4
INSC 300	Experiencing Science (or upper-level natural science elective from list below)	3
or ENVS/ENGL 368	Nature Writing	
BIOL 317	Ecology (or upper-level natural science elective from list below)	3
or BIOL 332/ENVS 330	Environmental Pollution	
or ENVS/PHYS 315	Energy and the Environment	
ENVS 301	Introduction to Meteorology (or upper-level natural science elective from list below)	3
or ENVS 401	Meteorology and Climatology	
ENVS 310	Introduction to Oceanography (or upper-level natural science elective from list below)	3
or ENVS 411	Oceanography	
Select one of the following:		4
PHYS 101 & PHYZ 101	Foundations of Physics and Foundations of Physics Laboratory (PHYS 101 is a gen ed course and cannot be counted toward the major)	
PHYS 107	Wonders of Technology	
ENVS 105 & URSZ 204	Physical Geology and Physical Geography Laboratory	
URSP 204 & URSZ 204	Physical Geography and Physical Geography Laboratory	
Or a 200-level or higher natural science elective and a 200-level or higher natural science laboratory elective from the list below		
• Concentration requirements		

Select an ethics or upper-level health-related science elective from either of the lists below.	3
Select research, internship (see research experience electives list) or upper-level service-learning experience (to equal a minimum of three credits alone or in combination with other upper-level natural or health science electives).	3
Select two additional courses at the 200-level or higher in mathematics, science, teaching mathematics and/or science with adviser's approval. Choose from the following:	5-6
EDUS 300 School and Society (may be used if student is preparing for teaching)	
EDUS 301 Human Development and Learning (may be used if student is preparing for teaching)	
LFSC/RELS 401 Faith and Life Sciences	
MATH or STAT: 200-level or higher	
Or a 200-level or higher natural or health science elective from list below	

Ancillary requirements

BIOL 151 & BIOZ 151	Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I	4
or BIOL 152 & BIOZ 152	Introduction to Biological Sciences II and Introduction to Biological Science Laboratory II	
CHEM 101 & CHEZ 101	General Chemistry I and General Chemistry Laboratory I	4
or CHEM 102 & CHEZ 102	General Chemistry II and General Chemistry Laboratory II	
HUMS 202	Choices in a Consumer Society	1
MATH 151	Precalculus Mathematics	4
MATH 200	Calculus with Analytic Geometry I	3-4
or SCMA 212	Differential Calculus and Optimization for Business	
or STAT 314	Applications of Statistics	
PHYS 201	General Physics I	4-5
or PHYS 202	General Physics II	
or PHYS 207	University Physics I	
or PHYS 208	University Physics II	
STAT 208	Statistical Thinking (either satisfies general education quantitative foundations)	3
or STAT 210	Basic Practice of Statistics	
Select one of the following:		3-4
BIOL 101 & BIOZ 101	Biological Concepts and Biological Concepts Laboratory	
CHEM 110	Chemistry and Society	
PHYS 103	Elementary Astronomy	
Or a 200-level or higher natural science elective and a 200-level or higher natural science laboratory elective from the list below		
Select a second introductory science course (with laboratory) in two of the following three areas: biology, chemistry or physics ¹		8-10
BIOL 151 & BIOZ 151	Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I	

BIOL 152 & BIOZ 152	Introduction to Biological Sciences II and Introduction to Biological Science Laboratory II	
CHEM 101 & CHEZ 101	General Chemistry I and General Chemistry Laboratory I	
CHEM 102 & CHEZ 102	General Chemistry II and General Chemistry Laboratory II	
PHYS 201	General Physics I	
PHYS 202	General Physics II	
PHYS 207	University Physics I	
PHYS 208	University Physics II	
Experiential fine arts ²		1-3
Foreign language through the 102 level (by course or placement)		0-6
Open electives		
Select any course.		16-30
Total Hours		120

1

Do not select PHYS 202 or PHYS 208 if the other course was selected above; this will ensure that you have two courses that satisfy the general education BOK for natural sciences and AOI for scientific and logical reasoning.

2

Course offered by the School of the Arts

The minimum number of credit hours required for this degree is 120.

Natural science electives

Course	Title	Hours
LFSC 301	Integrative Life Sciences Research	3
LFSC 401	Faith and Life Sciences	3
PHTX 400	Drugs and Their Actions	3
Any 200-level or higher BIOL, BNFO, CHEM, CLSE, EGRB, ENV5, FRSC, INSC or PHYS course, except:		
BIOL 392	Introduction to Research	
BIOL 475	Biology Capstone Seminar: ____	
BIOL 477	Biology Capstone Experience	
BIOL 489	Research Writing	
BIOL 490	Presenting Research	
BIOL 492	Undergraduate Research	
BIOL 493	Biology Internship	
BIOL 495	Research and Thesis II	
BIOL 496	Biology Preceptorship: ____	
BNFO 292	Independent Study	
BNFO 492	Independent Study	
BNFO 496	Undergraduate Teaching Assistantship in Bioinformatics	
CHEM 392	Directed Study	
CHEM 492	Independent Study	
CHEM 493	Chemistry Internship	
ENGR 490	Engineering Seminar	
ENGR 492	Independent Study in Engineering	

ENVS 490	Research Seminar in Environmental Studies
ENVS 492	Independent Study
ENVS 493	Environmental Studies Internship
FRSC 490	Professional Practices in Forensic Science
FRSC 492	Forensic Science Independent Study
FRSC 493	Forensic Science Internship
INSC 490	Capstone Research Experience in Interdisciplinary Science
PHYS 490	Seminar in Conceptual Physics
PHYS 492	Independent Study

Natural science laboratory electives

Course	Title	Hours
BIOL 205	Basic Human Anatomy ¹	4
BIOL 309	Entomology ¹	4
BIOL 320	Biology of the Seed Plant ¹	4
BIOL 402	Comparative Vertebrate Anatomy ¹	5
BIOL 417	Mammalogy ¹	4
BIOL 435	Herpetology ¹	3
BIOL 445	Neurobiology and Behavior ¹	4
BIOL 503	Fish Biology ¹	4
BIOZ: any 200-level or higher course		
BNFO 380	Introduction to Mathematical Biology ¹	4
BNFO 420	Applications in Bioinformatics ¹	3
BNFO 440	Computational Methods in Bioinformatics ¹	3
CHEZ: any 200-level or higher course		
EGRB 307	Biomedical Instrumentation ¹	4
EGRB 308	Biomedical Signal Processing ¹	4
EGRB 310	Biomechanics ¹	4
ENVZ 335	Environmental Geology Laboratory	1
FRSZ: any 200-level or higher course		
PHIZ 206	Human Physiology Laboratory	1
PHYS 202	General Physics II ¹	4
PHYS 208	University Physics II ¹	5
PHYZ 320	Modern Physics Laboratory	1

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Courses have a combined lecture and lab and will satisfy both natural science lecture and laboratory requirements.

Health science electives

Course	Title	Hours
AFAM/ANTH/INTL/ GSWS 309	Gender and Global Health	3
AFAM 310	Black Health Matters: Social Determinants of Health in the African American Community	3
GSWS 392	Gender and Health Across the Life Span	3
HPEX 325	Pathology and Pharmacology in Athletic Training	3
HPEX 345	Nutrition for Health and Disease	3

HPEX 350	Nutrition	3
HPEX 353	Disease Trends, Prevention and Control	3
HPEX 373	Structural Kinesiology	3
HPEX 374	Musculoskeletal Structure and Movement	4
HPEX 375	Physiology of Exercise	3
HPEX 440	Chronic Disease and Exercise Management	3
PSYC 401	Physiological Psychology	3
PSYC 412	Health Psychology	3
PSYC/GSWs 414	Psychology of Women's Health	3
SCTS 300	Introduction to Science and Technology Studies	3
SCTS 301	Illness Narratives	3
SCTS 392	Revolutions in Science I	3
SCTS 393	Revolutions in Science II	3
SCTS 397	Genetics and Society: 1865 to the Present	3
SCTS 398	Medicine and Public Health: ____	3
SOCY 344	Medical Sociology	3

Ethics electives

Course	Title	Hours
LFSC/RELS 401	Faith and Life Sciences	3
PHIL 201	Introduction to Ethics	3
PHIL 211	History of Ethics	3
PHIL 212	Ethics and Applications	3
PHIL 213	Ethics and Health Care	3
PHIL 214	Ethics and Business	3
RELS 340/INTL 341	Global Ethics and the World's Religions	3

Research, internship electives

Course	Title	Hours
AFAM 399	Interdisciplinary Research Methods	3
ANTH 303	Archaeological Methods and Research Design	4
BIOL 490	Presenting Research	1
BIOL 492	Undergraduate Research	1-4
BIOL 493	Biology Internship	1-3
CHEM 492	Independent Study	1-4
CHEM 493	Chemistry Internship	1-3
FRSC 492	Forensic Science Independent Study	1-3
FRSC 493	Forensic Science Internship	3
PHYS 492	Independent Study	1-3
PSYC 317	Experimental Methods	3
SOCY 320	Research Methods in the Social Sciences	3

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

Recommended course sequence/plan of study

Freshman year

Fall semester

Select one of the following CHEM sequences (CHEM 101 and CHEM 110 satisfy general education BOK for natural sciences and AOI for scientific and logical reasoning):

	Hours
CHEM 101 & CHEZ 101	4
CHEM 110	3
MATH 151	4
STAT 208 or STAT 210	3
UNIV 101	1
UNIV 111	3
Play course video for Introduction to Focused Inquiry: Investigation and Communication	

Term Hours: 14-15

Spring semester

Select one of the following CHEM, BIOL or PHYS sequences:

BIOL 101 & BIOZ 101	4
BIOL 151 & BIOZ 151	4
BIOL 152 & BIOZ 152	4
CHEM 102 & CHEZ 102	4
PHYS 101 & PHYZ 101	4
PHYS 107	4
PHYS 201	4
PHYS 207	5
HUMS 202	1
MATH 200 or SCMA 212 or STAT 314	3-4
UNIV 112	3
Play course video for Focused Inquiry II	
General education course	3

Term Hours: 14-16

Sophomore year

Fall semester

Select one of the following BIOL sequences: 4

BIOL 101 & BIOZ 101	4
BIOL 151 & BIOZ 151	4
BIOL 152 & BIOZ 152	4
Select one of the following PHYS sequences:	4-5
PHYS 101 & PHYZ 101	4
PHYS 107	4
PHYS 202	4
PHYS 208	5
UNIV 200	3

General education course (select AOI for diversities in the human experience) 3

General education course (select select BOK to satisfy breadth of knowledge requirement and AOI for creativity, innovation and aesthetic inquiry) 3

Term Hours: 17-18

Spring semester

Select one of the following combinations or a 200-level science with laboratory: 4

ENVS 105 & URSZ 204	4
URSP 204 & URSZ 204	4

Select a second introductory science course (with laboratory) in one of the following three areas: biology, chemistry or physics 4

Experiential fine arts (SPCH 321, ARTE 301 or other upper-level option recommended) 1-3

General education course (select BOK to satisfy breadth of knowledge requirement) 3

Open elective 3

Term Hours: 15-17

Junior year

Fall semester

Select one of the following or upper-level science:	3
INSC 300	3
ENVS 368 or ENGL 368	3
PHYS 103	3
PHYZ 103	1
Ethics or other health-related science	3
Foreign language 101, upper-level open elective or minor elective	3

General education course (if no science selection above satisfies AOI for scientific and logical reasoning) or open elective 3

Term Hours: 16

Spring semester

Select one of the following: 3

BIOL 317 Ecology 3

BIOL 332 Environmental Pollution 3
or Environmental Pollution
ENVS 330

ENVS 315 Energy and the Environment 3
or Energy and the Environment
PHYS 315

ENVS 310 Introduction to Oceanography (or upper- 3
or level science)
ENVS 411 or Oceanography

Additional course at the 200-level or higher in 3
mathematics, science, teaching mathematics and/or
science with adviser's approval

Foreign language 102, upper-level open elective or minor 3
elective

Upper-level open elective or minor elective 3

Term Hours: 15

Senior year

Fall semester

BIOL 341/ Human Evolution (or upper-level science) 4
ANTH 301

ENVS 301 Introduction to Meteorology 3
or Meteorology and Climatology
ENVS 401

Additional course at the 200-level or higher in 3
mathematics, science, teaching mathematics and/or
science with adviser's approval

Select a second introductory science course (with 4
laboratory) in a second of the following three areas:
biology, chemistry or physics

Upper-level open elective or minor elective 1-2

Term Hours: 15-16

Spring semester

INSC 490 Capstone Research Experience in 3
Interdisciplinary Science

Research, internship or upper-level service-learning 3
experience

Upper-level open electives or minor electives 8-9

Term Hours: 14-15

Total Hours: 120-128

The minimum number of credit hours required for this degree is 120.

Accelerated B.S. and M.S.

The accelerated B.S. and M.S. program allows qualified students to earn both the B.S. in Science with a concentration in professional science and M.S. in Medical Laboratory Sciences categorical concentration in a minimum of five years by completing approved graduate courses during the senior year of their undergraduate program. Students in the accelerated program may count up to 10 hours of graduate courses toward both the B.S. and M.S. degrees. Thus, the two degrees may

be earned with a minimum of 144 credits rather than the 154 credits necessary if the two degrees are pursued separately.

Students holding these degrees will be adequately trained to enter the medical laboratory workforce. A severe shortage of medical laboratory professionals is occurring throughout the United States and has worsened with the COVID pandemic demands for laboratory testing.

Entrance to the accelerated program

Interested undergraduate students should consult with their adviser as early as possible to receive specific information about the accelerated program, determine academic eligibility and submit (no later than two semesters prior to graduating with a baccalaureate degree, that is, before the end of the spring semester of their junior year) an Accelerated Program Declaration Form to be approved by the graduate program director. Limited spaces may be available in the accelerated program. Academically qualified students may not receive approval if capacity has been reached.

Minimum qualifications for entrance to this accelerated program include completion of 90 undergraduate credit hours including UNIV 111, UNIV 112 and UNIV 200; CHEM 101 and CHEZ 101, CHEM 102 and CHEZ 102, CHEM 301 and CHEZ 301, or CHEM 309 and CHEZ 309; 12 credits of biology; MATH 151 or higher; general education requirements; and an overall GPA of 3.0.

Once enrolled in the accelerated program, students must meet the standards of performance applicable to graduate students as described in the "Satisfactory academic progress (<https://bulletin.vcu.edu/academic-regs/grad/satisfactory-academic-progress/>)" section of the Graduate Bulletin, including maintaining a 3.0 GPA. Guidance to students admitted to the accelerated program is provided by both the undergraduate adviser for the science program and the faculty adviser to the graduate program.

Admission to the graduate program

Entrance to the accelerated program enables the student to take the approved shared courses that will apply to the undergraduate and graduate degrees. However, entry into an accelerated program via an approved Accelerated Program Declaration Form does not constitute application or admission into the graduate program. Admission to the graduate program requires a separate step that occurs through a formal application. In order to continue pursuing the master's degree after the baccalaureate degree is conferred, accelerated students must follow the admission to graduate study requirements outlined in the VCU Bulletin.

Degree requirements

The Bachelor of Science in Science with a concentration in professional science degree will be awarded upon completion of a minimum of 120 credits and the satisfactory completion of all undergraduate degree requirements as stated in the Undergraduate Bulletin.

A maximum of 10 graduate credits may be taken prior to completion of the baccalaureate degree and will substitute for required major course credits for the undergraduate degree. These courses are shared credits with the graduate program, meaning that they will be applied to both undergraduate and graduate degree requirements.

The graduate medical laboratory sciences courses that may be taken as an undergraduate, once a student is admitted to the program, and may be counted toward both B.S. and M.S. degrees are:

Course	Title	Hours
CLLS 500	Concepts and Techniques in Clinical Laboratory Science	3
CLLS 595	Clinical Practicum	3
CLLS 661	Research Methodology in Medical Laboratory Sciences	3
CLLS 690	Clinical Laboratory Sciences Seminar	1

Recommended course sequence/plan of study

What follows is the recommended plan of study for students interested in the accelerated program beginning in the fall of the first year, prior to admission to the accelerated program in the second year. Each of the specialty areas of the categorical concentrations is outlined below.

Clinical chemistry specialty

Course	Title	Hours
Junior year		
Fall semester		
CLLS 201	Introduction to Clinical Laboratory Science (satisfies introduction to pre-health sciences topics course option)	1
CLLS 311	Clinical Chemistry and Instrumentation I (satisfies upper-level elective option)	5
PHYS 103	Elementary Astronomy	3
Select one of the following or upper-level science:		3
INSC 300	Experiencing Science	
ENVS/ENGL 368	Nature Writing	
Ethics or other health-related science		3
Foreign language 101, upper-level open elective or minor elective		3
Term Hours:		18
Spring semester		
CLLS 312	Clinical Chemistry and Instrumentation II (satisfies upper-level open elective option)	5
ENVS 310	Introduction to Oceanography	3
or ENVS 411	Oceanography	
Select one of the following:		3
BIOL 317	Ecology	
BIOL 332	Environmental Pollution	
or ENVS 330	Environmental Pollution	
ENVS/PHYS 315	Energy and the Environment	
Foreign language 102, upper-level open elective or minor elective		3
Term Hours:		14
Senior year		
Fall semester		
BIOL 341/ANTH 301	Human Evolution	4
CLLS 500	Concepts and Techniques in Clinical Laboratory Science (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
ENVS 301	Introduction to Meteorology	3
or ENVS 401	Meteorology and Climatology	

Select a second introductory science course (with laboratory) in a second of the following three areas: biology, chemistry or physics	4
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Upper-level open elective or minor elective	1-2
Term Hours:	15-16

Spring semester

CLLS 661	Research Methodology in Medical Laboratory Sciences (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
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CLLS 690	Clinical Laboratory Sciences Seminar (shared graduate requirement; satisfies undergraduate upper-level open elective option)	1
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INSC 490	Capstone Research Experience in Interdisciplinary Science	3
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Research, internship or upper-level service-learning experience	3
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Upper-level open electives or minor electives	4-5
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Term Hours:	14-15
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Summer semester

CLLS 595	Clinical Practicum (shared graduate requirement; satisfies undergraduate upper-level open elective)	3
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Term Hours:	3
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Fifth year

Fall semester

ALHP 594	Health Education Practicum	2
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BIOS 543	Graduate Research Methods I	3
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CLLS 690	Clinical Laboratory Sciences Seminar	1
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CLLS 790	Research in Clinical Laboratory Sciences	1
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HADM 602	Health System Organization, Financing and Performance	3
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Specialty elective	3
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Term Hours	13
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Spring semester

ALHP 594	Health Education Practicum	2
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CLLS 580	Principles of Education/Management	3
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CLLS 630	Advanced Concepts in Clinical Chemistry and Instrumentation (specialty course)	2
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CLLS 690	Clinical Laboratory Sciences Seminar	1
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CLLS 790	Research in Clinical Laboratory Sciences	3
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Term Hours:	11
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Hematology specialty

Course	Title	Hours
Junior year		
Fall semester		
CLLS 201	Introduction to Clinical Laboratory Science (satisfies introduction to pre-health sciences topics course option)	1

CLLS 301	Hematology (satisfies upper-level open elective option)	3.5
CLLS 304	Urine and Body Fluid Analysis (satisfies upper-level open elective option)	2
PHYS 103	Elementary Astronomy	3
Select one of the following or upper-level science:		3
INSC 300	Experiencing Science	
ENVS/ENGL 368	Nature Writing	
Ethics or other health-related science		3
Term Hours:		15.5
Spring semester		
CLLS 302	Abnormal Hematology (satisfies upper-level open elective option)	4
ENVS 310	Introduction to Oceanography	3
or ENVS 411	Oceanography	
Select one of the following:		3
BIOL 317	Ecology	
BIOL 332	Environmental Pollution	
or ENVS 330	Environmental Pollution	
ENVS/PHYS 315	Energy and the Environment	
Additional course at the 200-level or higher in mathematics, science, teaching mathematics and/or science with adviser's approval		3
Foreign language 102, upper-level open elective or minor elective		3
Term Hours:		16
Senior year		
Fall semester		
BIOL 341/ANTH 301	Human Evolution	4
CLLS 500	Concepts and Techniques in Clinical Laboratory Science (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
ENVS 301	Introduction to Meteorology	3
or ENVS 401	Meteorology and Climatology	
Select a second introductory science course (with laboratory) in a second of the following three areas: biology, chemistry or physics		4
Upper-level open elective or minor elective		1-2
Term Hours:		15-16
Spring semester		
CLLS 661	Research Methodology in Medical Laboratory Sciences (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
CLLS 690	Clinical Laboratory Sciences Seminar (shared graduate requirement; satisfies undergraduate upper-level open elective option)	1
INSC 490	Capstone Research Experience in Interdisciplinary Science	3
Research, internship or upper-level service-learning experience		3

Upper-level open electives or minor electives		4-5
Term Hours:		14-15

Summer semester

CLLS 595	Clinical Practicum (shared graduate requirement; satisfies undergraduate upper-level open elective)	3
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Term Hours:		3
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Fifth year

Fall semester

ALHP 594	Health Education Practicum	2
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BIOS 543	Graduate Research Methods I	3
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CLLS 605	Advanced Hematology (specialty course)	3
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CLLS 690	Clinical Laboratory Sciences Seminar	1
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CLLS 790	Research in Clinical Laboratory Sciences	1
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HADM 602	Health System Organization, Financing and Performance	3
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Term Hours:		13
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Spring semester

ALHP 594	Health Education Practicum	2
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CLLS 580	Principles of Education/Management	3
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CLLS 629	Advanced Concepts in Hematology (specialty course)	2
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CLLS 690	Clinical Laboratory Sciences Seminar	1
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CLLS 790	Research in Clinical Laboratory Sciences	3
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Term Hours:		11
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Immunohematology specialty¹

Course	Title	Hours
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Junior year

Fall semester

CLLS 201	Introduction to Clinical Laboratory Science (satisfies introduction to pre-health sciences topics course option)	1
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CLLS 310	Clinical Immunology (satisfies upper-level elective option)	4.5
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PHYS 103	Elementary Astronomy	3
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Select one of the following or upper-level science:		3
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INSC 300	Experiencing Science	
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ENVS/ENGL 368	Nature Writing	
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Ethics or other health-related science		3
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Foreign language 101, upper-level open elective or minor elective		3
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Term Hours:		17.5
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Spring semester

CLLS 306	Immunohematology (satisfies upper-level open elective)	4.5
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ENVS 310	Introduction to Oceanography	3
or ENVS 411	Oceanography	

Select one of the following:		3
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BIOL 317	Ecology	
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BIOL 332	Environmental Pollution	
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or ENVS 330	Environmental Pollution	
ENVS/PHYS 315	Energy and the Environment	
Additional course at the 200-level or higher in mathematics, science, teaching mathematics and/or science with adviser's approval		3
Foreign language 102, upper-level open elective or minor elective		3
Term Hours:		16.5
Senior year		
Fall semester		
BIOL 341/ANTH 301	Human Evolution	4
CLLS 500	Concepts and Techniques in Clinical Laboratory Science (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
ENVS 301 or ENVS 401	Introduction to Meteorology Meteorology and Climatology	3
Select a second introductory science course (with laboratory) in a second of the following three areas: biology, chemistry or physics		4
Upper-level open elective or minor elective		1-2
Term Hours:		15-16
Spring semester		
CLLS 661	Research Methodology in Medical Laboratory Sciences (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
CLLS 690	Clinical Laboratory Sciences Seminar (shared graduate credit; satisfies undergraduate upper-level open elective option)	1
INSC 490	Capstone Research Experience in Interdisciplinary Science	3
Research, internship or upper-level service-learning experience		3
Upper-level open electives or minor electives		4-5
Term Hours:		14-15
Summer semester		
CLLS 595	Clinical Practicum (shared graduate requirement; satisfies undergraduate upper-level elective)	3
Term Hours:		3
Fifth year		
Fall semester		
ALHP 594	Health Education Practicum	2
BIOS 543	Graduate Research Methods I	3
CLLS 601	Theoretical Blood Banking (specialty course)	3
CLLS 690	Clinical Laboratory Sciences Seminar	1
CLLS 790	Research in Clinical Laboratory Sciences	1
HADM 602	Health System Organization, Financing and Performance	3
Term Hours:		13

Spring semester		
ALHP 594	Health Education Practicum	2
CLLS 580	Principles of Education/Management	3
CLLS 627	Advanced Concepts in Immunology and Immunohematology (specialty course)	3
CLLS 690	Clinical Laboratory Sciences Seminar	1
CLLS 790	Research in Clinical Laboratory Sciences	3
Term Hours:		12

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This specialty requires one additional credit of graduate work.

Microbiology specialty

Course	Title	Hours
Junior year		
Fall semester		
CLLS 201	Introduction to Clinical Laboratory Science (satisfies introduction to pre-health sciences topics course option)	1
CLLS 307	Introduction to Pathogenic Microbiology (satisfies upper-level elective option)	3
PHYS 103	Elementary Astronomy	3
Select one of the following or upper-level science:		3
INSC 300	Experiencing Science	
ENVS/ENGL 368	Nature Writing	
Ethics or other health-related science		3
Foreign language 101, upper-level open elective or minor elective		3
Term Hours:		16
Spring semester		
CLLS 308	Pathogenic Bacteriology (satisfies upper-level open elective)	5
ENVS 310 or ENVS 411	Introduction to Oceanography Oceanography	3
Select one of the following:		3
BIOL 317	Ecology	
BIOL 332 or ENVS 330	Environmental Pollution Environmental Pollution	
ENVS/PHYS 315	Energy and the Environment	
Additional course at the 200-level or higher in mathematics, science, teaching mathematics and/or science with adviser's approval		3
Foreign language 102, upper-level open elective or minor elective		3
Term Hours:		17
Senior year		
Fall semester		
BIOL 341/ANTH 301	Human Evolution	4

CLLS 500	Concepts and Techniques in Clinical Laboratory Science (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
ENVS 301 or ENVS 401	Introduction to Meteorology Meteorology and Climatology	3
Select a second introductory science course (with laboratory) in a second of the following three areas: biology, chemistry or physics		4
Upper-level open elective or minor elective		1-2
Term Hours:		15-16
Spring semester		
CLLS 661	Research Methodology in Medical Laboratory Sciences (shared graduate requirement; satisfies undergraduate additional science course at the 200-level or higher)	3
CLLS 690	Clinical Laboratory Sciences Seminar (shared graduate requirement; satisfies undergraduate upper-level open elective option)	1
INSC 490	Capstone Research Experience in Interdisciplinary Science	3
Research, internship or upper-level service-learning experience		3
Upper-level open electives or minor electives		4-5
Term Hours:		14-15
Summer semester		
CLLS 595	Clinical Practicum (shared graduate requirement; satisfies undergraduate upper-level elective)	3
Term Hours:		3
Fifth year		
Fall semester		
ALHP 594	Health Education Practicum	2
BIOS 543	Graduate Research Methods I	3
CLLS 608	Laboratory Diagnosis of Infectious Diseases (specialty course)	3
CLLS 690	Clinical Laboratory Sciences Seminar	1
CLLS 790	Research in Clinical Laboratory Sciences	1
HADM 602	Health System Organization, Financing and Performance	3
Term Hours:		13
Spring semester		
ALHP 594	Health Education Practicum	2
CLLS 580	Principles of Education/Management	3
CLLS 628	Advanced Concepts in Microbiology (specialty course)	2
CLLS 690	Clinical Laboratory Sciences Seminar	1
CLLS 790	Research in Clinical Laboratory Sciences	3
Term Hours:		11