

BIOLOGICAL SCIENCES

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The Department of Biological Sciences offers five distinct life sciences majors provided by a nationally recognized faculty that excels in teaching and research. Many faculty members have received University wide recognition for outstanding teaching. Research programs are funded by grants from agencies such as the National Institutes of Health and the National Science Foundation.

The department has three excellent teaching and research facilities. F.W. Olin Hall is a state-of-the-art facility for lectures and laboratories. Faculty offices and research labs are located across the science quad from Olin Hall in the Seeley G. Mudd building, which has teaching laboratories for advanced technique courses in molecular biology, cell biology and microbiology. Field-oriented courses are offered at the Mount Evans Field Station.

The up-to-date and highly integrated curriculum provides a sound foundation in molecular, cellular, developmental, organismal, ecological and environmental biology. The curriculum prepares students for futures in medicine, dentistry, veterinary medicine, graduate programs in the life sciences, graduate programs in health-related fields like physical therapy or physician assistant programs, ecology, environmental science, conservation biology and science education at the secondary school level.

Programs of Study in Biological Sciences

The department offers majors in the following areas: biological sciences, molecular biology, physiology in health and disease, ecology and biodiversity, and integrated sciences. We also offer a minor in human health science and systems.

Biological Sciences

The biological sciences major provides a curriculum that encompasses the spectrum of disciplines in the life sciences.

Bachelor of Arts Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofarts/>))

45 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	5
BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab	5
BIOL 2010 & BIOL 2011	General Ecology and General Ecology Lab	5
Additional Biology electives at the 2000 or 3000 level ¹		20
Total Credits		45

Additional Requirements

Code **Title** **Credits**

The BA requires either one year of Chemistry or a minor in Chemistry. In addition, eight credits of Mathematics are required.

Chemistry

Chemistry coursework requirements include: 12-20

CHEM 1010 & CHEM 1240	General Chemistry I and General Chemistry I Laboratory	
CHEM 1020 & CHEM 1250	General Chemistry II and General Chemistry II Laboratory	

CHEM 2000 or 3000 level course (at least 4 credits)

Mathematics

Select one of the following combinations:

8

MATH 1951 & MATH 1952	Calculus I and Calculus II
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or

MATH 1951 & BIOL 2090	Calculus I and Biostatistics
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or

MATH 1951 & PSYC 2300	Calculus I and Introduction to Statistics
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or

or

Total Credits**20-28**

¹ Only five credits of BIOL 3950 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the credit requirement for the major.

Bachelor of Science Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofscience/>))

45 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	5
BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab	5
BIOL 2010 & BIOL 2011	General Ecology and General Ecology Lab	5
Additional Biology electives at the 2000 or 3000 level ¹		20
Total Credits		45

Additional Requirements

Code	Title	Credits
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Two minors are required for the BS, one of which must be Chemistry. In addition, one year of Physics and one year of Mathematics are required.

Chemistry

A chemistry minor is required. 20

Physics

One year of Physics with lab. Select one of the following: 15

PHYS 1111 & PHYS 1112 & PHYS 1113	General Physics I and General Physics II and General Physics III
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or

PHYS 1211 & PHYS 1212 & PHYS 1213	University Physics I and University Physics II and University Physics III
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Mathematics

One year of Calculus. Select one of the following: 12

MATH 1951 & MATH 1952 & MATH 1953	Calculus I and Calculus II and Calculus III	
or		
MATH 1951 & MATH 1952 & BIOL 2090	Calculus I and Calculus II and Biostatistics	
or		
MATH 1951 & MATH 1952 & PSYC 2300	Calculus I and Calculus II and Introduction to Statistics	
Total Credits		47

¹ Only six credits of BIOL 3950 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the 45-credit requirement for the major.

Requirements for the Cognitive Neuroscience Concentration: Biological Sciences Majors

45 credits of biology. Required coursework includes those listed for the BA or BS major program in biological sciences. In addition, students must complete:

Code	Title	Credits
BA or BS Biological Sciences major required coursework		25
BIOL 3646	Seminar: Cognitive Neuroscience	2
Any three of the following:		12
BIOL 3160	Biophysics: Ion Channels & Disease	
BIOL 3640	Introductory Neurobiology	
BIOL 3641	Systems Neuroscience	
BIOL 3642	Neuropharmacology	
BIOL 3644	Neuromuscular Pathophysiology	
BIOL 3647	Neuroscience of Movement	
BIOL 3648	Molecular Mechanisms of Neurological Disease	
BIOL 3650	Endocrinology	
Additional Biology electives at the 2000 or 3000 level ¹		6
Total Credits		45

Additional Requirements: Bachelor of Arts

Code	Title	Credits
The Psychology minor is required for the BA. In addition, one year of Chemistry and eight credits of Mathematics are required.		
Psychology minor for Cognitive Neuroscience students		20
See Psychology department for requirements.		
Chemistry		
Chemistry coursework requirements include:		12-20
CHEM 1010 & CHEM 1240	General Chemistry I and General Chemistry I Laboratory	
CHEM 1020 & CHEM 1250	General Chemistry II and General Chemistry II Laboratory	
CHEM 2000 or 3000 level course (at least 4 credits)		
Mathematics		
Select one of the following combinations:		8
MATH 1951 & MATH 1952	Calculus I and Calculus II	
or		

MATH 1951 & BIOL 2090	Calculus I and Biostatistics	
or		
MATH 1951 & PSYC 2300	Calculus I and Introduction to Statistics	
or		
or		
Total Credits		40-48

Additional Requirements: Bachelor of Science

Code	Title	Credits
Two minors are required for the BS, one of which must be Chemistry with the second minor in Psychology. In addition, one year of Physics and one year of Mathematics are required.		
Psychology minor for Cognitive Neuroscience students		20
See Psychology department for requirements		
Chemistry		
A chemistry minor is required.		20
Physics		
One year of Physics with lab. Select one of the following:		15
PHYS 1111 & PHYS 1112 & PHYS 1113	General Physics I and General Physics II and General Physics III	
or		
PHYS 1211 & PHYS 1212 & PHYS 1213	University Physics I and University Physics II and University Physics III	
Mathematics		
One year of Calculus. Select one of the following:		12
MATH 1951 & MATH 1952 & MATH 1953	Calculus I and Calculus II and Calculus III	
or		
MATH 1951 & MATH 1952 & BIOL 2090	Calculus I and Calculus II and Biostatistics	
or		
MATH 1951 & MATH 1952 & PSYC 2300	Calculus I and Calculus II and Introduction to Statistics	

Total Credits **67**

¹ Only six credits of BIOL 3950 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the credit requirement for the major.

Minor Requirements

20 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
10 credits of courses at the 2000 level including one from the following courses:		10
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	

BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab
BIOL 2010 & BIOL 2011	General Ecology and General Ecology Lab
BIOL 3245	Human Anatomy
BIOL 3250	Human Physiology

Total Credits **20**

Cognitive Neuroscience

Cognitive Neuroscience Concentration: Biological Sciences Minor (with Psychology Major)

The minor requirements listed apply only to students completing a Psychology major with a Cognitive Neuroscience concentration. Please see the Department of Psychology (<http://bulletin.du.edu/undergraduate/majorsminorscoursedescriptions/traditionalbachelorsprogrammajorandminors/psychology/>) for Psychology minor requirements associated with this concentration.

Minimum of 20 credits as follows:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	5

At least two of the following courses: **8**

BIOL 3160	Biophysics: Ion Channels & Disease
BIOL 3640	Introductory Neurobiology
BIOL 3648	Molecular Mechanisms of Neurological Disease
BIOL 3641	Systems Neuroscience
BIOL 3642	Neuropharmacology
BIOL 3644	Neuromuscular Pathophysiology
BIOL 3646	Seminar: Cognitive Neuroscience
BIOL 3647	Neuroscience of Movement
BIOL 3650	Endocrinology

Total Credits **23**

Molecular Biology Major

The Molecular Biology major features upper-division courses that share the common theme of gene expression in biological systems and cellular function. This major is intended for students interested in professional postgraduate programs (medicine, dentistry, veterinary medicine), graduate programs in the life sciences and careers in the biotech industry. Students interested in biotech careers are encouraged to consider completing a master of business administration (MBA). See the chair of Biological Sciences (Olin Hall, room 102) for details concerning this dual degree program.

Bachelor of Arts Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofarts/>))

44 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	5

BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab	5
BIOL 3800	Human Molecular Biology	4
Any 3000-level BIOL course in addition to the lab and category requirements below ¹		4
Molecular Biology lab/research requirement		
BIOL 3560	Molecular Biology Laboratory	4
Category Elective Courses (minimum of three courses)		12
BIOL 3130	Molecular Evolution	
BIOL 3145	Cellular and Molecular Biology of Cancer	
BIOL 3150	Intracellular Dynamics	
BIOL 3160	Biophysics: Ion Channels & Disease	
BIOL 3570	Proteins in Biological Systems	
BIOL 3610	Developmental Biology	
BIOL 3615	Blood Vessel Development and Disease	
BIOL 3630	Cell Biology of Development	
BIOL 3640	Introductory Neurobiology	
BIOL 3642	Neuropharmacology	
BIOL 3644	Neuromuscular Pathophysiology	
BIOL 3648	Molecular Mechanisms of Neurological Disease	
BIOL 3650	Endocrinology	
BIOL 3670	Molecular Immunology	
BIOL 3704	Advanced Topics in Cell Biology	
BIOL 3705	Advanced Topics in Molecular Biology	
BIOL 3850	Genetic Engineering	
BIOL 3910	Viruses & Infectious Human Diseases	
Total Credits		44

Additional Requirements

Code	Title	Credits
The BA requires a minor in Chemistry. In addition, eight credits of Mathematics are required.		
Chemistry		
Chemistry minor course work requirements include:		20
CHEM 1010 & CHEM 1240	General Chemistry I and General Chemistry I Laboratory	
CHEM 2451 & CHEM 2461	Organic Chemistry I and Organic Chemistry Lab I	
CHEM 2452 & CHEM 2462	Organic Chemistry II and Organic Chemistry Lab II	
At least eight additional hours of 2000-level or higher course work		
Mathematics		
Select one of the following combinations:		8
or		
or		
MATH 1951 & PSYC 2300	Calculus I and Introduction to Statistics	
or		
MATH 1951 & BIOL 2090	Calculus I and Biostatistics	
Total Credits		28

¹ Only five credits of BIOL 3950 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the credit requirement for the major.

Bachelor of Science Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofscience/>))

50 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	5
BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab	5
BIOL 3800	Human Molecular Biology	4
Any 3000-level BIOL course in addition to the lab and category requirements below ¹		4
BIOL 3560	Molecular Biology Laboratory	4
Category Elective Courses (minimum of three courses)		12
BIOL 3130	Molecular Evolution	
BIOL 3145	Cellular and Molecular Biology of Cancer	
BIOL 3150	Intracellular Dynamics	
BIOL 3160	Biophysics: Ion Channels & Disease	
BIOL 3570	Proteins in Biological Systems	
BIOL 3610	Developmental Biology	
BIOL 3615	Blood Vessel Development and Disease	
BIOL 3630	Cell Biology of Development	
BIOL 3640	Introductory Neurobiology	
BIOL 3642	Neuropharmacology	
BIOL 3644	Neuromuscular Pathophysiology	
BIOL 3648	Molecular Mechanisms of Neurological Disease	
BIOL 3650	Endocrinology	
BIOL 3670	Molecular Immunology	
BIOL 3704	Advanced Topics in Cell Biology	
BIOL 3705	Advanced Topics in Molecular Biology	
BIOL 3850	Genetic Engineering	
BIOL 3910	Viruses & Infectious Human Diseases	
Additional Biology electives at the 2000 or 3000 level ¹		6
Total Credits		50

Additional Requirements

Code	Title	Credits
The BS requires two minors—one of which must be Chemistry. In addition, one year of Mathematics and one year of Physics are required		
Chemistry		
A chemistry minor is required.		20
Physics		
One year of Physics with lab. Select one of the following combinations:		15
PHYS 1111 & PHYS 1112 & PHYS 1113	General Physics I and General Physics II and General Physics III	
or		
PHYS 1211 & PHYS 1212 & PHYS 1213	University Physics I and University Physics II and University Physics III	

Mathematics

Select one of the following combinations:		12
MATH 1951 & MATH 1952 & MATH 1953	Calculus I and Calculus II and Calculus III	
or		
MATH 1951 & MATH 1952 & BIOL 2090	Calculus I and Calculus II and Biostatistics	
or		
MATH 1951 & MATH 1952 & PSYC 2300	Calculus I and Calculus II and Introduction to Statistics	

Total Credits **47**

¹ Only six credits of BIOL 3950 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the credit requirement for the major.

Cognitive Neuroscience Concentration: Molecular Biology Major

44 credits of biology (BA); 50 credits of biology (BS). Required coursework includes those listed for the BA or BS major program in molecular biology. In addition, students must complete:

Code	Title	Credits
BA or BS Molecular Biology major required coursework		28
BIOL 3646	Seminar: Cognitive Neuroscience	2
Any three of the following:		12
BIOL 3160	Biophysics: Ion Channels & Disease	
BIOL 3640	Introductory Neurobiology	
BIOL 3641	Systems Neuroscience	
BIOL 3642	Neuropharmacology	
BIOL 3644	Neuromuscular Pathophysiology	
BIOL 3647	Neuroscience of Movement	
BIOL 3648	Molecular Mechanisms of Neurological Disease	
BIOL 3650	Endocrinology	
Additional Biology electives at the 2000 or 3000 level ¹		2-8
Total Credits		44-50

Additional Requirements for the Bachelor of Arts Degree

Code	Title	Credits
The BA requires a minor in Chemistry as well as the Cognitive Neuroscience Psychology minor. In addition, eight credits of Mathematics are required.		
Cognitive Neuroscience Psychology minor		20
Refer to Psychology for requirements		
Chemistry		
A chemistry minor is required.		20
Mathematics		
Select one of the following combinations:		8
MATH 1951 & PSYC 2300	Calculus I and Introduction to Statistics	
or		
MATH 1951 & BIOL 2090	Calculus I and Biostatistics	
Total Credits		48

Additional Requirements for the Bachelor of Science Degree

Code	Title	Credits
The BS requires two minors—one of which must be Chemistry. The other minor is Cognitive Neuroscience Psychology minor. In addition, one year of Mathematics and one year of Physics are required		
Cognitive Neuroscience Psychology minor		20
Refer to Psychology for requirements		
Chemistry		
A chemistry minor is required.		20
Physics		
One year of Physics with lab. Select one of the following combinations:		15
PHYS 1111 & PHYS 1112 & PHYS 1113	General Physics I and General Physics II and General Physics III	
or		
PHYS 1211 & PHYS 1212 & PHYS 1213	University Physics I and University Physics II and University Physics III	
Mathematics		
Select one of the following combinations		12
MATH 1951 & MATH 1952 & MATH 1953	Calculus I and Calculus II and Calculus III	
or		
MATH 1951 & MATH 1952 & BIOL 2090	Calculus I and Calculus II and Biostatistics	
or		
MATH 1951 & MATH 1952 & PSYC 2300	Calculus I and Calculus II and Introduction to Statistics	
Total Credits		67

¹ Only six credits of BIOL 3950 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the credit requirement for the major.

Ecology and Biodiversity Major

The Ecology and Biodiversity major focuses on topics in the life sciences at the organismal and ecosystem levels. It is intended for students interested in graduate programs in ecology, conservation biology, evolution or environmental sciences.

Bachelor of Arts Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofarts/>))

44 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2010 & BIOL 2011	General Ecology and General Ecology Lab	5
BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab	5
Field course requirement		
BIOL 3030 or BIOL 3055	Alpine Ecology Ecology of the Rockies	4

Category elective courses ¹

Select four courses from the following	16
BIOL 3010	Evolution and Speciation
BIOL 3020	Aquatic Ecology
BIOL 3030	Alpine Ecology
BIOL 3035	Invasive Species Ecology
BIOL 3060	Tropical Ecology
BIOL 3085	Insect Ecology
BIOL 3090	Microbial Ecology
BIOL 3095	Global Change Ecology
BIOL 3110	Special Topics: Biology
BIOL 3120	General Microbiology
BIOL 3130	Molecular Evolution
BIOL 3200	Invertebrate Evolution
BIOL 3350	Conservation Biology
BIOL 3410	Animal Behavior
BIOL 3700	Topics in Ecology
Additional Biology electives at the 2000 or 3000 level ¹	4

Total Credits **44**

Additional Requirements

Code	Title	Credits
Chemistry		
CHEM 1010 & CHEM 1240	General Chemistry I and General Chemistry I Laboratory	4
Mathematics		
Select one of the following combinations:		8
MATH 1951 & BIOL 2090	Calculus I and Biostatistics	
or		
MATH 1951 & PSYC 2300	Calculus I and Introduction to Statistics	
Total Credits		12

Bachelor of Science Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofscience/>))

49 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2010 & BIOL 2011	General Ecology and General Ecology Lab	5
BIOL 2510 & BIOL 2511	General Genetics and General Genetics Lab	5
BIOL 2090	Biostatistics	4
Field course requirement		4
BIOL 3030 or BIOL 3055	Alpine Ecology Ecology of the Rockies	

Category elective courses ¹

Minimum of four courses **16**

BIOL 3010	Evolution and Speciation	
BIOL 3020	Aquatic Ecology	
BIOL 3030	Alpine Ecology	
BIOL 3035	Invasive Species Ecology	
BIOL 3060	Tropical Ecology	
BIOL 3085	Insect Ecology	
BIOL 3090	Microbial Ecology	
BIOL 3095	Global Change Ecology	
BIOL 3110	Special Topics: Biology	
BIOL 3120	General Microbiology	
BIOL 3130	Molecular Evolution	
BIOL 3200	Invertebrate Evolution	
BIOL 3350	Conservation Biology	
BIOL 3410	Animal Behavior	
BIOL 3700	Topics in Ecology	
Additional Biology electives at the 2000 or 3000 level ¹		5
Total Credits		49

Additional Requirements

Code	Title	Credits
In addition, students must complete one year of Chemistry, Physics and Calculus		
Chemistry		
One year with lab		12
CHEM 1010 & CHEM 1240	General Chemistry I and General Chemistry I Laboratory	
CHEM 1020 & CHEM 1250	General Chemistry II and General Chemistry II Laboratory	
CHEM 2240	Introduction to Environmental Chemistry	
Physics		
One year of Physics with lab. Select one of the following combinations:		15
PHYS 1111 & PHYS 1112 & PHYS 1113	General Physics I and General Physics II and General Physics III	
or		
PHYS 1211 & PHYS 1212 & PHYS 1213	University Physics I and University Physics II and University Physics III	
Mathematics		
Choose one of the following combinations:		12
MATH 1951 & MATH 1952 & BIOL 2090	Calculus I and Calculus II and Biostatistics	
or		
MATH 1951 & MATH 1952 & MATH 1953	Calculus I and Calculus II and Calculus III	
Total Credits		39

¹ Only 5 credits of Undergraduate Research (BIOL 3950) and/or Independent Study (BIOL 3991) may be counted toward the credit requirement for the major.

² Only 6 credits of Undergraduate Research (BIOL 3950) and/or Independent Study (BIOL 3991) may be counted toward the 45-credit requirement for the major.

Human Health Science & Systems

Minor Requirements

Code	Title	Credits
Required Courses (10 Credit hours)		10
HLTH 2000	Science of Human Health	
HLTH 2010	Health Systems Science	
HLTH 3000	Seminar in Health Science	
Electives (10 Credit hours)		10
HLTH 2200	Medical Terminology: Fundamentals and Applications	
HLTH 2210	Health Education and Promotion	
HLTH 3155	Leadership in Health	
HLTH 3700	Topics in Health	
HLTH 3870	Medical Ethics	
HLTH 3991	Independent Study in Human Health Science and Systems	
HLTH 3993	Internship in Human Health Science & Systems	
HLTH 3995	Independent Research in Human Health Science and Systems	
BIOL 2090	Biostatistics	
BIOL 3025	Science and the Law	
GEOG 3755	Geography of Health	
Total Credits		20

Physiology in Health & Disease

Bachelor of Science Major Requirements

(183 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/traditionalbachelorsprogram/bachelorofarts/>))

50 credits of biology. Requirements include:

Code	Title	Credits
BIOL 1010 & BIOL 1020	Physiological Systems and Physiological Systems Lab	5
BIOL 1011 & BIOL 1021	Evolution, Heredity and Biodiversity and Evolution, Heredity and Biodiversity Lab	5
BIOL 2120 & BIOL 2121	Cell Structure and Function and Cell Structure & Function Lab	5
BIOL 3245	Human Anatomy	5
BIOL 3250	Human Physiology	5
BIOL 3256	Advanced Human Anatomy & Physiology	5
Additional Biology electives at the 2000 or 3000 level ¹		20
3 electives must be from the following courses:		
BIOL 3120	General Microbiology	4
BIOL 3145	Cellular and Molecular Biology of Cancer	4
BIOL 3150	Intracellular Dynamics	4
BIOL 3251	Exercise Physiology	4
BIOL 3252	High Altitude Physiology	4
BIOL 3260	Nutrition	3
BIOL 3615	Blood Vessel Development and Disease	4
BIOL 3641	Systems Neuroscience	4
BIOL 3642	Neuropharmacology	4
BIOL 3644	Neuromuscular Pathophysiology	4
BIOL 3647	Neuroscience of Movement	4
BIOL 3648	Molecular Mechanisms of Neurological Disease	4

BIOL 3650	Endocrinology	4
BIOL 3656	Cellular Aspects of Diabetes and Obesity	4
BIOL 3670	Molecular Immunology	4
BIOL 3675	Virology	4
BIOL 3708	Topics in Integrative Physiology	2-4
BIOL 3910	Viruses & Infectious Human Diseases	4

Code	Title	Credits
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Additional Requirements

Two minors are required for the BS, one of which must be Medical Physics.

In addition, one year of Chemistry and one year of Mathematics are required.

Medical Physics minor is required	21
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PHYS 1111 & PHYS 1112 & PHYS 1113 or PHYS 1211 or PHYS 1212 & PHYS 1213	General Physics I and General Physics II and General Physics III University Physics I University Physics II and University Physics III
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PHYS 2300	Physics of the Body
PHYS 2340	Medical Imaging Physics

Mathematics. Select one of the following sequences:	12
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MATH 1951 & MATH 1952 & MATH 1953	Calculus I and Calculus II and Calculus III
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or

MATH 1951 & MATH 1952 & BIOL 2090	Calculus I and Calculus II and Biostatistics
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or

MATH 1951 & MATH 1952 & PSYC 2300	Calculus I and Calculus II and Introduction to Statistics
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Only six (6) credits of BIOL 3995 Undergraduate Research and/or BIOL 3991 Independent Study may be counted toward the 50-credit requirement for the major.

Requirements for Distinction in the Major in Biological Science

- Minimum 3.5 cumulative GPA
- At least three quarters of research (BIOL 3950 Undergraduate Research or BIOL 3991 Independent Study)
- Completion of a thesis

Requirements for Distinction in the Major in Molecular Biology

- Minimum 3.5 cumulative GPA
- At least three quarters of research (BIOL 3950 Undergraduate Research or BIOL 3991 Independent Study)
- Completion of a thesis

requirements for Distinction in the Major in Ecology and Biodiversity

- Minimum 3.5 cumulative GPA
- At least three quarters of research (BIOL 3950 Undergraduate Research or BIOL 3991 Independent Study)
- Completion of a thesis

requirements for Distinction in the major in physiology in health and disease

- Minimum 3.5 cumulative GPA
- At least three quarters of research (BIOL 3950 Undergraduate Research or (BIOL 3991 Independent Study)
- Completion of a thesis

The course plans below are intended to give students an example of how they might complete their degree requirements in the first two years. Please note that plans can vary greatly in year 2, and students should work with their Biology advisor to determine their academic path.

BS in Biological Sciences

First Year

Fall	Credits	Winter	Credits	Spring	Credits
FSEM 1111		4 WRIT 1122		4 WRIT 1133	4
CHEM 1010	3	CHEM 1020	3	CHEM 2131	3
CHEM 1240	1	CHEM 1250	1	CHEM 2141	1
MATH 1951 or BIOL 2090	4	MATH 1951 or 1952	4	MATH 1952 or 1953	4
Common Curriculum Requirement/Elective ¹	4	BIOL 1011	4	BIOL 1010	4
		BIOL 1021	1	BIOL 1020	1
	16		17		17

Second Year

Fall	Credits	Winter	Credits	Spring	Credits
BIOL 2120 & BIOL 2121 (or BIOL 2010 & BIOL 2011)		5 BIOL 2510 & BIOL 2511		5 BIOL upper level elective	4
CHEM 2451	3	CHEM 2452	3	CHEM 2453	3
CHEM 2461	1	CHEM 2462	1	CHEM 2463	1
Foreign Language	4	Foreign Language	4	Foreign Language	4
PHYS 1111 (or general elective)	5	PHYS 1112 (or general elective)	5	PHYS 1113 (or general elective)	5
	18		18		17

Total Credits: 103

¹ This "slot" will be needed for biology in Winter and Spring quarters, so do not start another full-year sequence during Fall quarter

BA in Biological Sciences

First Year

Fall	Credits	Winter	Credits	Spring	Credits
FSEM 1111		4 WRIT 1122		4 WRIT 1133	4
CHEM 1010	3	CHEM 1020	3	CHEM 2131	3
CHEM 1240	1	CHEM 1250	1	CHEM 2141	1
MATH 1951 or BIOL 2090	4	MATH 1951 or 1952	4	MATH 1952 (or general elective)	4
Common Curriculum Requirement/Elective ¹	4	BIOL 1011	4	BIOL 1010	4
		BIOL 1021	1	BIOL 1020	1
	16		17		17

Second Year

Fall	Credits	Winter	Credits	Spring	Credits
BIOL 2120 & BIOL 2121 (or BIOL 2010 & BIOL 2011)		5 BIOL 2510		4 BIOL Upper Level Elective	4
Foreign Language	4	BIOL 2511	1	Foreign Language	4
Common Curriculum Requirement/Elective	4	Foreign Language	4	Common Curriculum Requirement/Elective	4
Common Curriculum Requirement/Elective	4	Common Curriculum Requirement/Elective	4	Common Curriculum Requirement/Elective	4
		Common Curriculum Requirement/Elective	4		
	17		17		16

Total Credits: 100

¹ This "slot" will be needed for biology in Winter and Spring quarters, so do not start another full-year sequence during Fall quarter

BS in Molecular Biology

First Year

Fall	Credits	Winter	Credits	Spring	Credits
FSEM 1111		4 WRIT 1122		4 WRIT 1133	4
CHEM 1010	3	CHEM 1020		3 CHEM 2131	3
CHEM 1240	1	CHEM 1250		1 CHEM 2141	1
MATH 1951 or BIOL 2090	4	MATH 1951 or 1952		4 MATH 1952 or 1953	4
Common Curriculum Requirement/Elective ¹	4	BIOL 1011		4 BIOL 1010	4
		BIOL 1021		1 BIOL 1020	1
		16		17	17

Second Year

Fall	Credits	Winter	Credits	Spring	Credits
BIOL 2120 & BIOL 2121		5 BIOL 2510		4 BIOL 3560	4
CHEM 2451	3	BIOL 2511		1 CHEM 2453	3
CHEM 2461	1	CHEM 2452		3 CHEM 2463	1
Foreign Language	4	CHEM 2462		1 Foreign Language	4
PHYS 1111 (or general elective)	5	Foreign Language		4 PHYS 1113 (or general elective)	5
		PHYS 1112 (or general elective)		5	
		18		18	17

Total Credits: 103

¹ This "slot" will be needed for biology in Winter and Spring quarters, so do not start another full-year sequence during Fall quarter

BA in Molecular Biology

First Year

Fall	Credits	Winter	Credits	Spring	Credits
FSEM 1111		4 WRIT 1122		4 WRIT 1133	4
CHEM 1010	3	CHEM 1020		3 CHEM 2131	3
CHEM 1240	1	CHEM 1250		1 CHEM 2141	1
MATH 1951 or BIOL 2090	4	MATH 1951 or 1952		4 MATH 1952 (or general elective)	4
Common Curriculum Requirement/Elective ¹	4	BIOL 1011		4 BIOL 1010	4
		BIOL 1021		1 BIOL 1020	1
		16		17	17

Second Year

Fall	Credits	Winter	Credits	Spring	Credits
BIOL 2120 & BIOL 2121		5 BIOL 2510		4 BIOL 3560	4
CHEM 2451	3	BIOL 2511		1 CHEM 2453	3
CHEM 2461	1	CHEM 2452		3 CHEM 2463	1
Foreign Language	4	CHEM 2462		1 Foreign Language	4
Common Curriculum Requirement/Elective	4	Foreign Language		4 BIOL 3800 (or general elective)	4
		Common Curriculum Requirement/Elective		4	
		17		17	16

Total Credits: 100

¹ This "slot" will be needed for biology in Winter and Spring quarters, so do not start another full-year sequence during Fall quarter

BS in Ecology and Biodiversity

First Year

Fall	Credits	Winter	Credits	Spring	Credits
FSEM 1111		4 WRIT 1122		4 WRIT 1133	4
CHEM 1010	3	CHEM 1020		3 CHEM 2240	4
CHEM 1240	1	CHEM 1250		1 MATH 1952	4
MATH 1951 or BIOL 2090	4	MATH 1951 or 1952		4 BIOL 1010	4
Common Curriculum Requirement/Elective ¹	4	BIOL 1011		4 BIOL 1020	1

		BIOL 1021	1		
		16	17	17	
Second Year					
Fall	Credits	Winter	Credits	Spring	Credits
BIOL 2010 & BIOL 2011	5	BIOL 2510	4	Biology Elective	4
Foreign Language	4	BIOL 2511	1	Foreign Language	4
PHYS 1111 (or general elective)	5	Foreign Language	4	PHYS 1113 (or general elective)	5
Common Curriculum Requirement/Elective	4	PHYS 1112 (or general elective)	5	Common Curriculum Requirement/Elective	4
		Common Curriculum Requirement/Elective	4		
		18	18	17	

Total Credits: 103

¹ This "slot" will be needed for biology in Winter and Spring quarters, so do not start another full-year sequence during Fall quarter

BA in Ecology and Biodiversity

First Year					
Fall	Credits	Winter	Credits	Spring	Credits
FSEM 1111	4	WRIT 1122	4	WRIT 1133	4
CHEM 1010	3	CHEM 1020	3	CHEM 2240	4
CHEM 1240	1	CHEM 1250	1	Common Curriculum Requirement/Elective	4
MATH 1951 or BIOL 2090	4	MATH 1951	4	BIOL 1010	4
Common Curriculum Requirement/Elective ¹	4	BIOL 1011	4	BIOL 1020	1
		BIOL 1021	1		
		16	17	17	

Second Year					
Fall	Credits	Winter	Credits	Spring	Credits
BIOL 2010 & BIOL 2011	5	BIOL 2510 & BIOL 2511	5	Biology Elective	4
Foreign Language	4	Foreign Language	4	Foreign Language	4
Common Curriculum Requirement/Elective	4	Common Curriculum Requirement/Elective	4	Common Curriculum Requirement/Elective	4
Common Curriculum Requirement/Elective	4	Common Curriculum Requirement/Elective	4	Common Curriculum Requirement/Elective	4
		17	17	16	

Total Credits: 100

¹ This "slot" will be needed for biology in Winter and Spring quarters, so do not start another full-year sequence during Fall quarter

BIOL 1005 Perspectives-Veterinary Medicine (2 Credits)

Introduction to career areas in veterinary medicine through lectures, guest speakers and demonstrations. The credits for this course are general elective only. They do not apply to any major or minor in NSM or to SI-NPW of the common curriculum. Prerequisites: BIOL 1010 and BIOL 1020, or by departmental permission.

BIOL 1010 Physiological Systems (4 Credits)

The second required course in the introductory biology sequence required for students majoring in Biology or another science. Emphasis on physiology and development of plants and animals. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Co-requisite: BIOL 1020 lab section.

BIOL 1011 Evolution, Heredity and Biodiversity (4 Credits)

The first required courses in the introductory biology sequence required for students majoring in Biology or another science. Emphasis on evolution, basic genetics and inheritance, and biodiversity. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Co-requisite: BIOL 1021 lab section.

BIOL 1020 Physiological Systems Lab (1 Credit)

Exercises and experimentation to complement lecture material. Lab fee associated with this course. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Co-requisite: BIOL 1010 lecture section.

BIOL 1021 Evolution, Heredity and Biodiversity Lab (1 Credit)

Exercises and experimentation to complement lecture material. Lab fee associated with this course. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Co-requisite: BIOL 1011 lecture section.

BIOL 1220 Molecules to Humankind I (4 Credits)

First class in a three-quarter sequence for non-majors that examines the mechanisms that sustain life. Emphasis is placed on understanding the human body at the molecular, cellular and physiological levels. In the fall quarter our discussions start with the atom and basic chemistry. We next consider the properties of complex molecules, including DNA, proteins, carbohydrates and lipids, in order to see how such molecules are used and organized by living organisms. Our discussions of large and complex molecules lead naturally to the basic unit of life, the cell. Lab fee associated with this course. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement.

BIOL 1221 Molecules to Humankind II (4 Credits)

Second class in a three-quarter sequence for non-majors begins with an introduction to the general vertebrate body plan; we emphasize the human body plan but also compare it with other vertebrates. Discussions progress through the major organ and physiological systems of the body, including circulatory, respiratory, excretory, endocrine, nervous, skin, immune, reproductive, gastrointestinal, and skeletal and muscle systems. Discussions concentrate on the organization and function of these systems. Lab fee associated with this course. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement.

BIOL 1222 Molecules to Humankind III (4 Credits)

Third class in a three-quarter sequence focuses for non-majors on cell biology, genetics, and human reproduction and development. After a review of cell structure and function, focusing on how cells are capable of replication with modification, the mechanisms by which information is passed on from one cell to another and from one generation to the next are considered. The second half of the quarter concerns sexual reproduction and early development. Lab fee associated with this course. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement.

BIOL 1260 Sustaining Life I (4 Credits)

A three-quarter sequence for non-majors examining some important biological mechanisms that sustain life -- and "life" in general! Emphasis is placed on the understanding the critical connections between the student's health and the health of the surrounding world. The first quarter begins with a discussion of the defining characteristics of "life" and the basic mechanisms required to sustain it. The course continues with an overview of biological diversity and ends with a focus on the many important connections between food, human health, and environmental health. The second quarter begins by building a basic understanding of how ecosystems function -- including the interactions among living organisms (including humans) and between these living organisms and their environment. The course continues with focused discussions of issues related to the impact of biological diversity on infectious disease and medicine. The third quarter begins with a focus on the importance of biodiversity to biomedical research, especially related to model systems. It then reviews some of the current threats to biodiversity and concludes by exploring some possible solutions that can give hope for sustaining "life" in the future. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement.

BIOL 1261 Sustaining Life II (4 Credits)

A three-quarter sequence for non-majors examining some important biological mechanisms that sustain life -- and "life" in general! Emphasis is placed on the understanding the critical connections between the student's health and the health of the surrounding world. The first quarter begins with a discussion of the defining characteristics of "life" and the basic mechanisms required to sustain it. The course continues with an overview of biological diversity and ends with a focus on the many important connections between food, human health, and environmental health. The second quarter begins by building a basic understanding of how ecosystems function -- including the interactions among living organisms (including humans) and between these living organisms and their environment. The course continues with focused discussions of issues related to the impact of biological diversity on infectious disease and medicine. The third quarter begins with a focus on the importance of biodiversity to biomedical research, especially related to model systems. It then reviews some of the current threats to biodiversity and concludes by exploring some possible solutions that can give hope for sustaining "life" in the future. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Prerequisite: BIOL 1260.

BIOL 1262 Sustaining Life III (4 Credits)

A three-quarter sequence for non-majors examining some important biological mechanisms that sustain life -- and "life" in general! Emphasis is placed on the understanding the critical connections between the student's health and the health of the surrounding world. The first quarter begins with a discussion of the defining characteristics of "life" and the basic mechanisms required to sustain it. The course continues with an overview of biological diversity and ends with a focus on the many important connections between food, human health, and environmental health. The second quarter begins by building a basic understanding of how ecosystems function -- including the interactions among living organisms (including humans) and between these living organisms and their environment. The course continues with focused discussions of issues related to the impact of biological diversity on infectious disease and medicine. The third quarter begins with a focus on the importance of biodiversity to biomedical research, especially related to model systems. It then reviews some of the current threats to biodiversity and concludes by exploring some possible solutions that can give hope for sustaining "life" in the future. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Prerequisite: BIOL 1261.

BIOL 1270 Living in the Microbial World I (4 Credits)

Students receive an introduction to the world of microbiology, the good, the bad and the ugly. With the help of the press and movie industry, most "human hosts" believe that microorganisms are to be feared, sterilized and/or destroyed. While this is true for a very small number of microbes, the majority is composed of essential and beneficial microorganisms that help the existence of all life on Earth. This first course in the sequence for non-majors is dedicated to raising the awareness of students to the value and need of our unseen partners. Laboratory included. Lab fee associated with this course. Honors only. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement.

BIOL 1271 Living in the Microbial World II (4 Credits)

For such a small size, microorganisms can have a large impact on our human world. This second course in the sequence for non-majors brings a new perspective to students on the role microorganisms, and their associated diseases, have played in turning the tide of war victories, immigration of a country, world politics and more. We tend to believe that humans alone can control their world but sometimes the mightiest of all are our unseen partners. Laboratory included. Lab fee associated with this course. Honors only. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Prerequisite: BIOL 1270.

BIOL 1272 Living in the Microbial World III (4 Credits)

In this last course in the sequence for non-majors, students are given an opportunity to challenge their beliefs and understandings of how life came to exist on Earth and the perspective of how humans are the most evolutionarily advanced. Students are guided through time on Earth and examine the development of life and the constant contribution of their unseen partners. Laboratory included. Lab fee associated with this course. Honors only. This course counts toward the Scientific Inquiry: The Natural and Physical World requirement. Prerequisite: BIOL 1271.

BIOL 1988 Study Abroad Resident Credit (0-18 Credits)**BIOL 1990 Independent Study (1-5 Credits)****BIOL 2010 General Ecology (4 Credits)**

Topics in ecosystems, population and community ecology, as well as behavioral ecology. Prerequisite: BIOL 1011 and BIOL 1010. Co-requisite: BIOL 2011.

BIOL 2011 General Ecology Lab (1 Credit)

Exercise and experimentation to compliment the lecture. Co-requisite: BIOL 2010, and Prerequisite: BIOL 1021 with a minimum grade of D-.

BIOL 2090 Biostatistics (4 Credits)

Statistics in biological research. Computer-aided statistical analysis and hypothesis testing focusing on experiments and data unique to the biological sciences. Cross listed with BIOL 4090.

BIOL 2120 Cell Structure and Function (4 Credits)

Chemical composition of cells; structure and function of cell organelles; interrelationship of cellular unit with its environment; mechanisms of energy conversion within cells; functions of excitability, contractility and cell growth. Prerequisites: BIOL 1011. Corequisite: BIOL 2121 lab section. CHEM 1010 prerequisite or corequisite.

BIOL 2121 Cell Structure & Function Lab (1 Credit)

Exercises and experimentation to complement lecture material. Lab fee associated with this course. Co-requisite: BIOL 2120.

BIOL 2200 Medical Terminology (3 Credits)

This course presents fundamentals and applications of medical terminology using online learning modules and assessment. This review and application of human anatomy and physiology is suitable for students who have completed introductory biology (BIOL 1010 or its equivalent) and who are working toward a career in medicine or for whom communication with health care providers is essential. Students study basic anatomy and physiology at a level that is intermediate between introductory and advanced courses, discover the medical history behind medical terminology, analyze medical case studies, and work to develop skills for clear and concise articulation of the basic concepts of anatomy and physiology behind medical diagnosis and treatment. This mastery of medical terminology helps to build a strong foundation for advanced coursework in anatomy and physiology. Prerequisite: BIOL 1010 or equivalent with instructor approval.

BIOL 2320 Andean Landscapes (4 Credits)

This course introduces students to the landscapes, biodiversity, societies, and human-environment interactions in the Andes of Peru through an intensive and immersive field study and travel experience. This field intensive class equals 4 academic credits and occurs during winter interterm. Over a period of 11 days we will visit the cities and surroundings of Lima, Arequipa, and Cusco, Peru where we will examine and compare geography, cultures, history, archaeology, ecology, biodiversity, and sustainability issues. The Andean environment offers unique challenges for environment and societies and by understanding the locations and patterns of human activity in the Andes, students can better appreciate the circumstances affecting individuals and countries other than our own. Through observations, lectures, discussions, readings, assignments and immersion, the course will stress the development of in situ critical thinking skills and the promotion of cultural diversity and global awareness. This course counts toward the sustainability minor and the intercultural global studies minor.

BIOL 2450 Human Anatomy (5 Credits)

Detailed structural analysis of the tissues, organs and organ systems of the human body. Four lectures and one 3-hour laboratory each week. Lab fee associated with this course. Prerequisites: BIOL 2120 AND 2121.

BIOL 2510 General Genetics (4 Credits)

Mechanisms of heredity with application to all forms of life. One 3-hour laboratory per week. Lab fee associated with this course. Prerequisites: BIOL 1010, BIOL 1011. Recommended prerequisite: BIOL 2120. Corequisite: BIOL 2511.

BIOL 2511 General Genetics Lab (1 Credit)

The laboratory component of BIOL 2510. COREQUISITES: BIOL 2510 PREREQUISITES: BIOL 1020 AND BIOL 1021 RECOMMENDED PREREQUISITES: BIOL 2121.

BIOL 2988 Study Abroad Resident Credit (0-18 Credits)**BIOL 3010 Evolution and Speciation (4 Credits)**

Theories and supporting evidence explaining evolution from origin of universe to complex interrelationships of species. Prerequisites: BIOL 1010, BIOL 1011 and BIOL 2510.

BIOL 3025 Science and the Law (2,4 Credits)

This course will focus on the intersection of science and US law. Four major areas of focus that will be covered are the admissibility of expert witnesses / scientific evidence in court; how advances in forensic genetics and national DNA databases raise legal issues pertaining to expectations of privacy and the standards for reaching a verdict; the impact of US Supreme Court opinions on the patenting of genes used as diagnostic markers for human disease and the legal landscape surrounding issues of evolution and creationism/intelligent design. Students will then explore how the law impacts their own areas of scientific interest. The goal of this course is to increase our understanding as scientists of how advances in science impact and are impacted by the US judicial system. PREREQUISITES: BIOL 1010 AND BIOL 1011.

BIOL 3035 Invasive Species Ecology (4 Credits)

This course investigates those plants and animal species that have dramatically expanded their ranges and cause ecological harm. Topics covered include the mechanisms of ecological impacts across the globe, how invasive species are used to test basic ecological theory, the application of this research for managing real species, and related issues such as the debate within the scientific community about the term "invasive." We use a case-study approach, and students have the opportunity to go into the field as a class to observe the real invasions and learn sampling methods.

BIOL 3044 Coral Reef Ecology (3 Credits)

Ecology of coral reefs; organization and distribution of reefs; review of reef organisms and their interactions with each other and their physical environment; threats to coral reef conservation. Prerequisite: (BIOL 2010 or BIOL 2050) OR (GEOG 1201, GEOG 1202, and GEOG 1203).

BIOL 3045 Coral Reef Ecology Lab (1 Credit)

Ecology of coral reefs laboratory to supplement lecture material; travel to the Caribbean over spring break to observe coral reefs firsthand; introduction to research methods. SCUBA certification and permission of instructor required. A travel and dive fee is associated with this course.

BIOL 3055 Ecology of the Rockies (4 Credits)

A week in residence at the Mt. Evans Field Station prior to the start of fall quarter includes field projects dealing with ecology and environmental issues. On campus classes involve data analysis and interpretation and formal scientific communication. Themes include terrestrial and aquatic ecosystems, taxonomic groups ranging from conifer stands to aquatic insects and mountain goats. Lab fee associated with this course. Prerequisite: BIOL 2010 or permission of instructor.

BIOL 3070 Ecological Field Methods (4 Credits)

Series of field exercises for students to learn principles and procedures of field methodology, data analysis and technical writing in ecology; problems drawn from population, community and ecosystem ecology. Lab fee associated with this course. Prerequisite: BIOL 2010.

BIOL 3085 Insect Ecology (4 Credits)

A general introduction to insect biology and the science of entomology. Arthropods are the most diverse group of animals on Earth and insects account for more than half of all known living organisms. This course explores the biodiversity of insects on Earth, insect morphology and physiology. The evolutionary history and taxonomy of key orders of insects is emphasized as well as the importance of insects to our everyday lives. Prerequisites: BIOL 1010, BIOL 1011, and BIOL 2010.

BIOL 3090 Microbial Ecology (4 Credits)

Interactions among microorganisms and their environment. Impact of ecological principles on microbial diseases, pollutant degradation, nutrient cycles and global change. Prerequisites: BIOL 1010, BIOL 1020, AND BIOL 2010.

BIOL 3095 Global Change Ecology (4 Credits)

Over the past century, the mean surface temperature of our planet has increased slightly less than 1°C. While this may seem like a small increment, this change is already profoundly affecting Earth's organisms and ecological communities, and predictions for the impacts of continued change range from severe to catastrophic. Humans are also changing the environment through alteration of nutrient and water regimes. Topics include cause of climate change, comparison to past climatic change, human contribution to change and effect on organisms, communities and ecosystems. Prerequisites: BIOL 1010, BIOL 1011, AND BIOL 2010. RECOMMENDED PREREQUISITES/COREQUISITES: BIOL 2090.

BIOL 3110 Special Topics: Biology (1-5 Credits)

Topics of special interest to teaching/research faculty of department presented as needed to complement and expand existing curriculum. May be repeated for credit. PREREQUISITES: BIOL 1010.

BIOL 3120 General Microbiology (4 Credits)

Fundamental principles of microorganisms in the world and in disease; role of bacteria in biological phenomena. Includes laboratory. Lab fee associated with this course. Prerequisite: BIOL 2120.

BIOL 3135 Topics in Cell Motility (4 Credits)

Fibrous elements of the cytoskeleton and associated proteins and their role in cellular motility is examined in detail. The physical forces involved in cellular motile function is applied in understanding cellular motile behavior. Prerequisite: BIOL 2120.

BIOL 3145 Cellular and Molecular Biology of Cancer (4 Credits)

This course examines the mechanisms that underlie the development and progression of cancer. The cellular and molecular events that drive uncontrolled cell proliferation and eventual metastasis of tumors are discussed. Prerequisite: BIOL 2120.

BIOL 3150 Intracellular Dynamics (4 Credits)

Focuses on spatial and temporal control of intracellular processes with an emphasis on neuronal and endocrine cells. Topics include vesicular traffic, protein targeting, dynamics and spatial organization of signaling complexes. Emphasis on modern techniques of cell and molecular biology with examples from primary literature. Prerequisite: BIOL 2120.

BIOL 3160 Biophysics: Ion Channels & Disease (4 Credits)

Examines ion channel structure and function and the ways in which this information provides insight into human disease. The focus is on the use of biophysical techniques in combination with molecular and genetic analysis of channel genes. General Physics recommended. Prerequisite: BIOL 2120.

BIOL 3230 Nutrition (3 Credits)

Investigation of metabolism, all nutrients and various applications of nutrition to sports and healthy living. Prerequisite: BIOL 3250.

BIOL 3245 Human Anatomy (5 Credits)

This course is designed to introduce you to the fundamental concepts, content and scientific bases of human anatomy. Specific content covered in the course includes: the Language of Anatomy, Body Organization, Histology, and Integument, Skeletal, Muscular, Nervous, Cardiovascular, Respiratory, Urinary, Digestive and Reproductive anatomy at both macroscopic and microscopic levels. The course consists of both lecture and laboratory sessions each week and requires attendance and participation in both. The course will utilize diverse resources, exercises, and activities to engage you in the learning process, including, text, video, animations, models, dissections, inquiry-based learning, and a variety of assessments. Please note that the lab portion of this course does require dissection. Prerequisite: BIOL 2120 Cell Structure and Function.

BIOL 3250 Human Physiology (5 Credits)

Functional relationships of human organ systems with coordinated laboratory activities and experiments that demonstrate and test physiological principles. Lab fee associated with this course. Prerequisites: BIOL 1010.

BIOL 3251 Exercise Physiology (4 Credits)

This course will cover exercise physiology topics included but not limited to: energy systems, physiological response to exercise/training, and exercise programming. A strong background in human physiology is recommended. Prerequisite: BIOL 1010.

BIOL 3252 High Altitude Physiology (4 Credits)

This is a one quarter course intended for advanced biology and human health and performance majors with an interest in high altitude physiology in health and disease. This course builds upon basic understanding of human physiology and explores adaptations that occur under conditions of high altitude exposure, training and living. It will explore in greater depth the mechanisms of physiologic adaptations to short and long-term exposure to high altitude environments for conditions of improved health and also health deficits and disease states. In addition to didactic content, students will complete evaluation of primary literature and final project related to high altitude physiology. Prerequisite BIOL 3250 Human Physiology.

BIOL 3256 Advanced Human Anatomy & Physiology (5 Credits)

This one quarter course is intended for advanced biology and physiology majors with an interest in the anatomical structure and physiological functioning of body systems. This course builds upon the Human Anatomy and Human Physiology courses that are prerequisites. This advanced course will explore in greater depth understanding mechanisms of action of major body systems and elaborate on the relationship between structure and function. In addition to didactic content, students will complete evaluation of primary literature and design laboratory experiments to test hypotheses of interest. The course will utilize diverse resources, exercises, and activities in the learning process including text, video, animations, models, dissections, inquiry-based learning, experimentation and a variety of assessments. The course consists of both lecture and laboratory sessions each week and requires attendance and participation in both. Please note that the lab portion of this course requires dissection. Prerequisites: BIOL 3245 and BIOL 3250.

BIOL 3260 Nutrition (3 Credits)

From physiological and biochemical perspectives, this course explores the relationships of energy metabolism, nutrients, vitamins and minerals to human health. Prerequisite: BIOL 3250.

BIOL 3350 Conservation Biology (5 Credits)

Conservation Biology is the study of documenting the earth's biodiversity, its threats, and how it may be protected. It is a multidisciplinary science within ecology with contributions from environmental chemistry, geography, sociology, and political science, among other fields. In this class students learn the language of conservation biology, the methods used by conservation biologists, and the nuances of current issues. In class, material is learned through both lecture and interactive exercises in the classroom portion, with hands-on practice in techniques and applications during the lab. Prerequisite: BIOL 2010.

BIOL 3410 Animal Behavior (4 Credits)

This class examines animal behavior from an evolutionary and ecological perspective. The course provides the background needed to understand behavioral evolution, including a focus on the inheritance of behavior, natural selection, sexual selection, and kin selection. This class studies the evolution of a variety of behaviors, including communication and displays, mate choice, parental care, cooperation, mating systems, social behavior, habitat selection, foraging, and anti-predator behavior. The emphasis is on theoretical principles, design of experiments, and interpretation of data. Prerequisites: BIOL 1010 and BIOL 1011, AND BIOL 2010. RECOMMENDED PREREQUISITE: BIOL 2090.

BIOL 3560 Molecular Biology Laboratory (4 Credits)

Laboratory based course that covers techniques in gene excision, cloning and reinsertion and gene sequencing. Lab fee associated with this course. Prerequisite: BIOL 2510, or permission of instructor.

BIOL 3570 Proteins in Biological Systems (4 Credits)

Proteins considered in their biological setting; protein synthesis and degradation; survey of protein functions in vivo; introduction to protein biotechnology. Prerequisites: BIOL 2120.

BIOL 3610 Developmental Biology (4 Credits)

Processes and mechanisms of development, exemplified by higher animal embryogenesis, with consideration of microbial model systems. Prerequisite: BIOL 2510 and BIOL 2120.

BIOL 3615 Blood Vessel Development and Disease (4 Credits)

This course details the underlying biological programs during blood vessel development and mechanisms that lead to vascular pathologies. The class will incorporate aspects embryology, signaling transduction, and genetics as well as current techniques in developmental biology to comprehensively cover how blood vessels are formed embryonically. Additionally, we will discuss in detail how defects in blood vessel-related signaling programs later manifest into disease. Prerequisite for this course is Cell Structure and Function (BIOL2120/2121).

BIOL 3630 Cell Biology of Development (4 Credits)

Every organism has a stereotypical shape, but how does this shape arise? This course examines the cellular and molecular mechanisms that direct the forming of body and tissue shape. Prerequisite: BIOL 2120.

BIOL 3640 Introductory Neurobiology (4 Credits)

Organization and function of vertebrate central nervous system; nature of action potential, biochemistry of neurotransmitters, neuropeptides, functional anatomy of nervous system, phylogeny of nervous system. Prerequisite: BIOL 2120.

BIOL 3641 Systems Neuroscience (4 Credits)

Structure and function of the brain and spinal cord, emphasis on functional systems including sensory perception, motor control and consciousness. Prerequisite: BIOL 3640.

BIOL 3642 Neuropharmacology (4 Credits)

How psychoactive drugs exert their effects on the nervous system; drugs of abuse and drugs used in the treatment of psychotic and neurodegenerative disorders. Prerequisite: BIOL 2120. Recommended prerequisites: BIOL 3640.

BIOL 3644 Neuromuscular Pathophysiology (4 Credits)

Cellular and molecular basis for normal nerve and muscle functions and the alteration of these functions by toxins, trauma and diseases of the brain, nerves and muscles; how specific insults produce clinical symptoms and pathology. Prerequisite: BIOL 2120. Recommended Prerequisite: BIOL 3640 or BIOL 3250.

BIOL 3646 Seminar: Cognitive Neuroscience (2 Credits)

This seminar is the capstone course for the neuroscience portion of the cognitive neuroscience program. Seminar topics include but are not limited to neurological disorders, model systems in neuroscience and sensory systems.

BIOL 3647 Neuroscience of Movement (4 Credits)

Producing the vast array of movements that humans (and many animals) use everyday represents one of the body's greatest challenges and greatest successes. These various movements require that the nervous, muscular, and skeletal systems work in concert to achieve a common goal. This course will explore the scientific basis of movement production, with particular emphasis on the neuroscience of motor control. We will explore how the nervous system drives the development of movement strategies at an early age, modifies movement strategies to adapt to changing demands throughout life, and how injury, dysfunction, and/or aging can lead to movement challenges. Required prerequisite: Cell Structure & Function (BIOL 2120); Recommended prerequisite (1 or more of the following): Human Anatomy (BIOL 2450), Human Physiology (BIOL 3250), Introduction to Neuroscience (BIOL 3640) or permission of instructor.

BIOL 3648 Molecular Mechanisms of Neurological Disease (4 Credits)

This course will be an in-depth study into some of the key molecular mechanisms involved in the pathogenesis of human neurological disease. A particular emphasis will be placed on the role of RNA regulation and metabolism. The primary focus will be on five devastating diseases: 1. Spinal Muscular Atrophy (SMA) 2. Fragile X Syndrome (FXS) and Fragile X Tremor Ataxia Syndrome (FXTAS) 3. Myotonic Dystrophy type 1 and 2 (DM1 and DM2) 4. Spinocerebellar Ataxia type 2 (SCA2) 5. Amyotrophic Lateral Sclerosis (ALS) and Frontotemporal Dementia (FTD) This course will cover a variety of topics including disease pathophysiology and pathogenesis. However, readings will be assigned from the recent primary literature discussing cellular and molecular mechanisms. Prerequisite: BIOL 2510 Genetics.

BIOL 3650 Endocrinology (4 Credits)

Mechanisms of hormone action, evolution of vertebrate endocrine systems, analysis of function integration of hormonal responses in maintenance of homeostasis. Prerequisite: BIOL 2120.

BIOL 3651 Comparative Endocrinology (4 Credits)

Intercellular communication systems are essential for the proper coordination of trillions of cells in multi-cellular animals. This course will evaluate the evolution of neuroendocrine networks in both invertebrates and vertebrates with a focus on how these neuroendocrine networks influence, growth, reproduction, osmoregulation, and metabolism. Prerequisite: BIOL 3650.

BIOL 3656 Cellular Aspects of Diabetes and Obesity (4 Credits)

This course focuses on specific cellular and molecular events key to the understanding of the pathological conditions of diabetes and obesity. Topics include the endocrine pancreas, adipose tissue and neuroendocrine control energy expenditure and feeding behavior. Prerequisite: BIOL 2120.

BIOL 3670 Molecular Immunology (4 Credits)

The ability to distinguish self from non-self is crucial to all organisms. In humans Organs, cells and other higher animals, this task fall to the immune system. Suppression of this system is key to numerous pathogenic viruses including Ebola and human immunodeficiency virus. The failure to adequately regulate immune response underlies allergic reactions, arthritis and diabetes. This course will introduce students to the organs, cells and molecules that underlie mammalian immune response; immunogenetics and the fundamental mechanisms of cell mediated and humoral immune response; and the relationship of immune system to human disease. Prerequisite: BIOL 2510.

BIOL 3675 Virology (4 Credits)

Viruses are the ultimate cell biologists. They usurp essential cellular components to create new virus progeny leading to pathological cellular physiology. This course will delve into the genetic and cellular principles that govern virus entry, replication, and assembly and cover a broad range of DNA and RNA-based virus families. Prerequisites: BIOL 2120 and BIOL 2510.

BIOL 3700 Topics in Ecology (1-4 Credits)

Topics vary; may include plant, animal, biochemical, alpine or aquatic; one topic per quarter. May be repeated for credit. Taught from original literature. Prerequisite: one quarter of undergraduate ecology and/or instructor's permission.

BIOL 3701 Topics in Genetics (1-4 Credits)

Topics vary; may include genetic methods, molecular genetics, human genetics, chromosomes or population genetics; one topic per quarter. May be repeated for credit. Taught from original literature. Prerequisite: BIOL 2510 and/or instructor's permission.

BIOL 3702 Advanced Topics in Regulatory Biology (1-4 Credits)

Topics vary; may include endocrinology, physiology or immunology; one topic per quarter. May be repeated for credit. Taught from original literature. Prerequisite: varies with topic and instructor; instructor's permission usually required.

BIOL 3703 Advanced Topics in Developmental Biology (1-4 Credits)

Topics vary; may include gene expression in development, developmental immunogenetics, developmental biochemistry or aging; one topic per quarter. May be repeated for credit. Taught from original literature. Prerequisite: instructor's permission.

BIOL 3704 Advanced Topics in Cell Biology (1-4 Credits)

Topics vary; may include supramolecular structure, microscopy, membranes and techniques. May be repeated for credit. Taught from original literature. Prerequisites: BIOL 2120.

BIOL 3705 Advanced Topics in Molecular Biology (1-4 Credits)

Topics vary, but may include biochemistry, supramolecular structure and function, molecular genetics, membrane biology. May be taken more than once for credit. Taught from original literature. Prerequisite: varies with course and instructor; instructor's permission usually required.

BIOL 3706 Topics in Evolution (1-4 Credits)

Topics vary, but may include molecular evolution, plant evolution and animal evolution. Prerequisite: BIOL 2120 and BIOL 2510.

BIOL 3707 Advanced Topics in Conservation Biology (1-4 Credits)**BIOL 3708 Topics in Integrative Physiology (2-4 Credits)**

Topics for this course include, but are not limited to, human physiology and disease, integrative physiology, environmental or social impacts on human physiology and health, and comparative physiology. Students will gain knowledge of a specific topic in physiology and/or pathophysiology through discussion of current literature and research. May be repeated for credit.

BIOL 3800 Human Molecular Biology (4 Credits)

Medical Genetics is the 24th member of the American Board of Medical Specialties. This course will introduce students to the fundamentals of molecular biology with an emphasis on understanding of how the field is applied in the context of medical diagnostics, personalized/precision medicine and other commercial applications. Students will be introduced to published research reports and provided with opportunities to critically examine the application of molecular biology to central questions in such areas as oncology, inherited diseases and genetically engineered organisms. Prerequisite: BIOL 2510.

BIOL 3850 Genetic Engineering (4 Credits)

This course will cover principles in gene manipulation and its application in research, medicine and industry. More specifically, this course will explain emerging technologies in genetic engineering and its practical and ethical implications. Topics will incorporate historical and emerging aspects of developmental biology, chemistry, and genetics as well as current techniques in genetic manipulation that are related to genomic editing. Additionally, students will be trained to interface with genomic databases and employ DNA sequence editing software to manipulate DNA sequences to achieve novel cloned products. Prerequisite for this course is Genetics (BIOL2510).

BIOL 3870 Medical Ethics (4 Credits)

This course presents knowledge and discussion of ethical issues that arise from advances in the biomedical sciences and medicine. Several specific ethical issues and policies related to methodologies and procedures, emerging medical technologies, treatment decisions, doctor-patient relationship, informed consent, medical experimentation / clinical research, and health care reform. Prerequisites: BIOL 2120 or instructor approval.

BIOL 3910 Viruses & Infectious Human Diseases (4 Credits)

From sexually transmitted viruses to bacterial pneumonia, infectious pathogens are the number one threat to human health. This course will introduce students to prions, viruses and bacterial pathogens with an emphasis on those commonly encountered in clinical medical practice. Through the use of technical/scientific research journals students will be encouraged to investigate the etiology, pathogenesis and treatment of human infectious disease with an emphasis on the clinical, molecular diagnostic and therapeutic aspects of the disease. Prerequisite: BIOL 2510. Recommended prerequisite: BIOL 3800.

BIOL 3920 Forensic Pathology (2-4 Credits)

In its broadest definition, forensic science represents a fusion of the natural sciences, criminology and jurisprudence. The field of forensic pathology in particular focuses on the investigation of sudden, unnatural, unexplained or violent deaths. Using the most authoritative books available and a multimedia lecture format, students in this course gain an introductory understanding of the pathophysiology of wounding and death as well as the clinical antemortem symptomology of physical abuse, neglect and extrajudicial wounding. Students also learn about the processes responsible for the decomposition of corpses as well as the use of molecular and geometric tools for the reconstruction of crime scenes from bloodstain evidence. Finally, students learn how to integrate a variety of forensic tools in investigations of sexual assault, serial killers, traffic fatalities and mass deaths. Prerequisite: BIOL 2120 or permission of instructor.

BIOL 3950 Undergraduate Research (1-10 Credits)

Participation in faculty research programs by agreement between student and faculty member. Maximum of 5 quarter hours of BIOL 3950 and/or BIOL 3991 may be applied to the 45-quarter-hour requirement for a major in biological sciences.

BIOL 3988 Study Abroad Resident Credit (0-18 Credits)**BIOL 3991 Independent Study (1-10 Credits)**

Topic in biology studied under faculty supervision. Student's responsibility to identify faculty supervisor before registering for class. Maximum of 5 quarter hours of BIOL 3991 and/or BIOL 3950 may be applied toward the 45-quarter-hour requirement for a major in biological sciences.

BIOL 3995 Independent Research (1-10 Credits)**HLTH 2000 Science of Human Health (4 Credits)**

This keystone course focuses on individual, community and population health. Students will be introduced to topics including health & wellness through the lifespan, population and public health, health promotion and education, and social determinants of health and health equity. This course will provide students not only the insight about the scientific basis, but also the social and cultural contexts of human health and health care. Students will gain an understanding about how behavioral health and social factors affect human biology and health. In addition, students will learn to effectively employ the critical skills and competencies necessary for understanding and evaluating human health and health care, as well as to effectively identify and learn to contribute to evidence-based health care.

HLTH 2010 Health Systems Science (4 Credits)

This keystone course will provide knowledge about how education, policy and healthcare delivery function within health care systems. Students will be introduced to topics including healthcare delivery systems and management, health policy and economics, and health informatics and technology. Students will gain an understanding about the healthcare delivery organizations and systems in the United States, contributions of government and public policy to health care, and the economics that drive healthcare systems. These content areas will be presented within the themes of the 3 pillars of health equity: access to health care, quality of care, and health outcomes. Students will gain an appreciation of a perspective from the patient experience in the healthcare system. Furthermore, this course will challenge students to effectively identify and critically consider the interactions and conflicts between these entities.

HLTH 2200 Medical Terminology: Fundamentals and Applications (4 Credits)

This course presents fundamentals and applications of medical terminology. This review and application of human anatomy and physiology is suitable for students who have completed some introductory biology and who are working toward a career in medicine or for whom communication with healthcare providers is essential. Students study basic anatomy and physiology at a level that is intermediate between introductory and advanced courses, discover the medical history behind medical terminology, analyze medical case studies, and work to develop skills for clear and concise articulation of the basic concepts of anatomy and physiology behind medical diagnosis and treatment. This mastery of medical terminology helps to build a strong foundation for advanced coursework in anatomy and physiology. Prerequisites: BIOL 1010 and 1011, or BIOL 1222, or BIOL 1262.

HLTH 2210 Health Education and Promotion (4 Credits)

This course will provide students foundational knowledge about how to deliver health education and promote healthy behaviors to community. Students will focus on integrating evidence-based research into instructional strategies including preparing culturally sensitive presentations, leading difficult conversations, and activities to reinforce healthy behaviors. This course includes a weekly service-learning activity, where students will present approved workshops to youth on topics such as: mental health, sexual health, healthy behaviors and harm prevention, and accessing health care. The content delivered to youth aligns with the National Health Education Standards. Prerequisites: HLTH 2000 or HLTH 2010.

HLTH 3000 Seminar in Health Science (2 Credits)

This seminar is the capstone course for the Human Health Science & Systems program. This class will focus on the current understanding of several topics in human health. Emphasis will be on critical reading and discussion of current scientific literature related to human health and health care. Students will learn to recognize and appreciate different approaches and methods of health-related research. Students will utilize and integrate knowledge from previous courses to understand to present effective discussions on current topics in health. For students' continued development of strong oral communication skills, student presentations of primary literature will generate the basis of discussion. Prerequisites: HLTH 2000 and 2010.

HLTH 3155 Leadership in Health (1 Credit)

This course addresses the basic leadership skills necessary to succeed in the dynamic professional environment of health science and healthcare. Topics covered include individual and team leadership strategies and professional skills related to communication, management, strategic planning, implementation of change, negotiation, conflict resolution, and team building. Students will determine leadership strengths and weaknesses and learn to adapt their leadership approach to meet specific situations and challenges. Students will strengthen their leadership practices through a series of lectures, case studies, guided interactions and group exercises. Prerequisites: HLTH 2000 and 2010.

HLTH 3700 Topics in Health (2-4 Credits)

Topics in the area of, but are not limited to, human health and disease, environmental or social impacts on health, healthcare delivery, evidence-based medicine. Students will gain knowledge of a specific topic in human health and/or health care through discussion of current literature and research. May be repeated for credit. Prerequisites: HLTH 2000 or 2010.

HLTH 3870 Medical Ethics (4 Credits)

This course will present knowledge and discussion of ethical issues that arise from advances in the biomedical sciences and medicine. Several specific ethical issues and policies related to methodologies and procedures, emerging medical technologies, treatment decisions, doctor-patient relationship, informed consent, medical experimentation/clinical research, and health care reform. The overall objective of this course is to enhance awareness and critical thinking skills for future science professionals who are able to express their views in a culturally-responsive manner and listen to and appreciate others' perspectives. This course will focus on discussions, case studies, and projects. Prerequisites: BIOL 2010, or HLTH 2000 and 2010.

HLTH 3991 Independent Study in Human Health Science and Systems (1-4 Credits)

In this course, students can engage in independent study focused on a topic in human health science and/or human health system science under faculty supervision. The independent study in Human Health Science and Systems provides individualized opportunities to gain knowledge on a specific health topic of interest to the student. This course complements the student's didactic coursework in established health topics and provides an opportunity for students to delve deeper into a specific health-related topic. The student is responsible for identifying a faculty supervisor before registering for class. Maximum of 5 quarter hours of HLTH 3991 and/or HLTH 3993 and/or HLTH 3995 may be applied toward the 20-quarter-hour requirement for a minor in Human Health Science & Systems. Prerequisites: HLTH 2000 or HLTH 2010.

HLTH 3993 Internship in Human Health Science & Systems (0-4 Credits)

An internship is the opportunity to engage in a unique educational experience outside of the didactic setting of the classroom. This course includes a structured practical and productive internship experience that allows for the integration and application of coursework in a professional setting. The internship can be administrative, clinical, programmatic, or research focused. The internship must be a new experience for the student. If the proposed internship is within same setting as previous experience, the internship activities must be clearly different from past experiences. The course credit is variable (1-5 credits) depending on the rigor and time commitment required to complete the internship. Prerequisites: HLTH 2000 or 2010.

HLTH 3995 Independent Research in Human Health Science and Systems (1-4 Credits)

Independent research is an opportunity for students to be engaged in research within the fields of human health science or health systems studied under the guidance of a faculty member. This course complements the student's didactic coursework in established health topics and provides an opportunity for students to engage in focused research on health-related question. research. Students will effectively employ the critical research skills and competencies necessary critique and understand current literature, identify gaps in current knowledge, and understand and employ appropriate research approaches and methods for addressing the health-related research question. The student is responsible for identifying a faculty supervisor before registering for class. Maximum of 5 quarter hours of HLTH 3991 and/or HLTH 3993 and/or HLTH 3995 may be applied toward the 20-quarter-hour requirement for a minor in Human Health Science & Systems. Prerequisites: HLTH 2000 or 2010.