

School of Natural and Social Sciences

School of Natural and Social Sciences

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Program Objectives

The courses and curriculum of the biology program are designed to achieve the following student outcomes:

- know the concepts, theories, and language of biology from historical and contemporary view points;
- actively integrate a knowledge of biology and the Christian faith to clarify the impact of Scripture on the field of biology both morally and ethically;
- give evidence of the knowledge of how to be good stewards of creation;
- appreciate the diversity and function of life; and
- demonstrate the knowledge and skills to become professional educators, health care providers and environmentalists and serve God within the global community.

Biology (BIO)

BIO1014G Principles of Biology with Laboratory [4]. A study of life processes, organization and structure common to animals, plants, and microbes. Laboratory exercises are included. The course is designed for non-majors and does not count toward the biology major or minor. Co-requisite: BIO1010.

BIO1054G General Zoology with Laboratory [4]. A survey of the animal kingdom, its taxonomy, morphology, and physiological processes at the cellular level through the organismic level, and their relationship to the environment. A laboratory includes observation, experimentation, and dissection of invertebrates and vertebrates. Prerequisite: High school biology. High school chemistry is recommended. Co-requisite: BIO1050

BIO1074G General Botany with Laboratory [4]. The systematic study of anatomy, physiology, and taxonomy of plants. The laboratory emphasizes morphology, taxonomy, and physiology of plants. Prerequisite: High school biology. Co-requisite: BIO1070

BIO1094G Conservation of Natural Resources with Laboratory [4]. A study of the problems of abuse and waste of natural and human resources. Special emphasis is given to potential resources and principles of good stewardship. Co-requisite: BIO1090.

BIO2001 Medical Terminology [1]. A self-directed course in medical terminology that uses a body systems approach.

BIO2034 Human Anatomy and Physiology I with Laboratory [4]. A study of the structure and function of the human body at cellular and organ system levels. A laboratory emphasizes anatomy. Prerequisite: BIO1014G or BIO1054G. Co-requisite: BIO2030.

BIO2044 Human Anatomy and Physiology II with Laboratory [4]. A study of the structure and function of the human body at cellular and organ system levels. A laboratory emphasizes physiology. Prerequisite: BIO2034. Co-requisite: BIO2040.

BIO2064 Invertebrate Zoology with Laboratory [4]. A study of representative invertebrates of the major and minor phyla and selected aspects of their biology. The laboratory emphasizes dissection of major phyla representatives and requires an invertebrate collection. Prerequisite: BIO1054G. Co-requisite: BIO2060.

BIO3003 Pathophysiology [3]. A study of the abnormal functions of the body during disease that includes case study discussions and research writing. Prerequisites: BIO2044 or BIO3064.

BIO3004 Introduction to Microbiology with Laboratory [4]. A study of the structure, function, and identification of microorganisms. Special emphasis is given to relations to public health, industry, and agriculture. Prerequisite: CHE1024G or CHE1043G, and BIO1054G or BIO1014G. Co-requisite: BIO3000.

BIO3009 Research Problems [1-6]. A research project in biology designed under the direction of faculty. Prerequisites: BIO1054G, BIO1074G, and instructor's permission.

BIO3014 Principles of Ecology with Laboratory [4]. A study of the interrelationships and population dynamics of living organisms with abiotic factors in the environment. A laboratory is included. Prerequisites: BIO1054G or BIO1074G. Both are recommended.

BIO3024 Field Botany with Laboratory [4]. A study of local field plants. Emphasis is given to taxonomy and making an herbarium collection. A laboratory is included. Prerequisite: BIO1074G.

BIO3034 Genetics with Laboratory [4]. A study of the principles of inheritance. Special emphasis is given to the nature and behavior of genetic material in plants, animals, and microbes. A laboratory is included. Prerequisites: BIO1054G, and CHE1024G or CHE1043. Co-requisite: BIO3030.

BIO3045 Comparative Vertebrate Anatomy with Laboratory [5]. A phylogenetic study of vertebrates based on anatomy and embryology of extinct and extant forms. A laboratory is included. Prerequisite: BIO1054G. BIO2064 is recommended. Co-requisite: BIO3040.

BIO3054 Environmental Science with Laboratory [4]. A study of the impact of human culture and activity upon the environment. Special emphasis is given to problems related to overpopulation, pollution, and exploitation of resources. A laboratory is included. Prerequisites: BIO1054G or BIO1074G. Both are recommended.

BIO3064 Vertebrate Physiology with Laboratory [4]. A study of basic physiological processes in vertebrates from cellular through organ systems levels. The laboratory investigates selected aspects of vertebrate physiology. Prerequisite: BIO3045. CHE3034 is recommended. Co-requisite: BIO3060.

BIO3074 Ornithology with Laboratory [4]. A study of the classification, life history, behavior, morphology, physiology, and ecology of birds. Emphasis is given to identifying birds of eastern North America. A laboratory is included, and field trips may be required. Prerequisite: BIO1054G.

BIO3084 Clinical Preceptorship [4]. Observation of health care professionals in a clinical setting, library research, and interviews with practitioners on societal issues that confront health care providers. Prerequisites: (a) junior standing, (b) eligibility and intent to apply to graduate or medical school the summer following completion of the preceptorship, (c) approval by the student's major department, and (d) if pre-medical, pre-dental, pre-optometry, pre-chiropractic, pre-podiatry or pre-veterinary medicine, approval by the Biology Department. BIO3064 is recommended. Prerequisite: Biology majors only.

aBIO3094 Introduction to Tropical Ecology with Laboratory [4]. An off-campus study in Central America includes tropical flora and fauna at various levels of altitude from the cloud forest to the sea shore. Prerequisites: BIO1054G or BIO1074G, and departmental permission.

BIO4001 Technical Writing in Biology [1]. A study of oral and written communication skills needed by biologists. A research paper is required. Prerequisite: Senior classification in biology or departmental permission.

BIO4002 Content Area Teaching Methods in Life Sciences [2]. An experience-based study of the methods and tools used in teaching life science in secondary schools. Students develop and teach a variety of units, including lecture-demonstration, a laboratory experiment, and assist with a science fair. Prerequisite: Admission to Teacher program or instructor's permission.

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BIO4003 Environmental Science for Nurses [3]. A study of the impact of human culture and activity upon the environment. Special emphasis is given to problems related to population, pollution and use of resources, emphasizing a science-based approach to understanding and solving environmental problems including the use of epidemiological studies in environmental science. Prerequisites: BIO1054G, and CHE1024 or CHE1043. (Not open to biology majors.)

BIO4011 Principles of Bioethics [1]. A study of Christian principles of bioethics with an emphasis on personhood and the sanctity of human life.

aBIO4014 Aquatic Biology with Laboratory [4]. A study of the freshwater environment as a resource and habitat for plants and animals. A laboratory is included. Prerequisite: BIO1054G or BIO1074G. BIO2064 is recommended.

BIO4021 Principles of Genetic Inheritance [1]. A study of fundamental principles of Mendelian and molecular genetics. Special emphasis is given to molecular mechanisms and testing methods of genetic disease as well as trends in gene therapy and genetic counseling. Prerequisites: BIO1054G, CHE1014G and CHE1024.

BIO4024 Introduction to Entomology with Laboratory [4]. A study of the morphology, physiology and diversity of insects. A laboratory is included, and an insect collection is required. Recommended: BIO2064. Prerequisite: BIO1054.

BIO4064 Molecular Biology with Laboratory [4]. A study of the principles of genes, chromosomes, transcription, translation, and regulation. The laboratory focuses on DNA manipulation using plasmids, restriction enzymes, gel electrophoresis, and tools associated with recombinant DNA technology. Prerequisites: BIO3034, and CHE3024. BIO4073 is recommended.

BIO4073 Cell Biology [3]. An introduction to the cellular structure and physiology. Special emphasis is given to the plasma membrane and the transport of molecules into cells, internal membranes and their function, cell nucleus and chromosome structure, energy conversion and mitochondria in chloroplasts, cytoskeleton, cell growth division, and the extracellular matrix. Prerequisites: BIO1054G. CHE3034 and BIO3064 are recommended.

aBIO4074 Developmental Biology with Laboratory [4]. A study of development in representative invertebrates and vertebrates from gametogenesis through organogenesis with emphasis given to physical and chemical mechanisms. A laboratory is included. Recommended: BIO3045 and BIO3064. Prerequisite: BIO1054.

BIO4089 Special Topics in Biology [1-4]. A study of specialized topics in biology. The course may be repeated as topics vary. Prerequisite: instructor's permission.

BIO4091 Biology Seminar [1]. A discussion of current topics in biology from a Christian perspective. The course is graded on a satisfactory-unsatisfactory basis. Prerequisite: Senior classification with a major in biology.

BIO5019 Independent Study [1-4].

BIO5029 Biology Internship [1-6]. A supervised experience performed in a professional environment representing a student's major discipline. Prerequisite: Senior standing and departmental application and approval.

BIO5091 Biology Honors Research Project [1-2]. A capstone research project within the major for honor students. It is supervised by a faculty mentor and evaluated by a committee of three faculty. The course is repeatable for up to four (4) hours of credit. Prerequisite: Approval of the application of Intent for Honors Research Project by the Honors Program Director.

Departmental Programs

Bachelor of Science in Biology (Environmental Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO1094G Conservation of Natural Resources with Laboratory	4
ESS1034G Earth Science with Laboratory	4

BIO2064 Invertebrate Zoology with Laboratory	4
BIO3014 Principles of Ecology with Laboratory	4
BIO3054 Environmental Science with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO3004 Introduction to Microbiology with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
Elective Courses	
Select four from the following:	15-16
BIO4014 Aquatic Biology with Laboratory	

CHE3024 Organic Chemistry I with Laboratory	
BIO3024 Field Botany with Laboratory	
BIO4024 Introduction to Entomology with Laboratory	
BIO3094 Introduction to Tropical Ecology with Laboratory	
BIO3074 Ornithology with Laboratory	
BIO4089 Special Topics in Biology	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
MAT2063 Introduction to Statistics	3
ECO1033G Principles of Macroeconomics	3

Total 67-68 Hours

The student with a major in biology (environmental track) must complete the designated cognate courses in lieu of a minor.

**Bachelor of Science in Biology
(General Track)**

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3034 Genetics with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	

Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	

Elective Courses

Biology electives	11-12
(7-8 hours selected from courses numbered 3000 or above.)	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1

Total 46-47 Hours

The student with a major in biology (general track) must complete a minor in another field.

**Bachelor of Science in Biology
(Graduate School/Industry Track)**

Required Courses

BIO1054G General Zoology with Laboratory	4
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BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3014 Principles of Ecology with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	

Elective Courses

Select one of the following:	3-4
BIO4014 Aquatic Biology with Laboratory	
BIO3024 Field Botany with Laboratory	
BIO5029 Biology Internship	
BIO4024 Introduction to Entomology with Laboratory	
BIO3094 Introduction to Tropical Ecology with Laboratory	
BIO3074 Ornithology with Laboratory	
BIO4089 Special Topics in Biology	
Biology electives	7-8
(3-4 hours selected from courses numbered 3000 or above. 4 hours selected from courses numbered 4000 or above.)	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1

Total 45-49 Hours

Recommended Electives

MAT1034 Calculus I	
CSC1013G Introduction to Computing	
PHY2014G General Physics I with Laboratory	
PHY2024 General Physics II with Laboratory	
CHE3024 Organic Chemistry I with Laboratory	
CHE3034 Organic Chemistry II with Laboratory	

The students with a major in biology (graduate school/industry) may complete an approved program of supporting courses in lieu of a minor.

**Bachelor of Science in Biology
(Pre-Dentistry Track)**

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3004 Introduction to Microbiology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
BIO3064 Vertebrate Physiology with Laboratory	4

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BIO3034 Genetics with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
BIO4064 Molecular Biology with Laboratory	4

Elective Courses

Biology electives	3-4
(3-4 hours selected from courses numbered 3000 or above.)	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
MAT1013G Trigonometry	3
CHE3024 Organic Chemistry I with Laboratory	4
CHE3034 Organic Chemistry II with Laboratory	4
CHE4014 Biochemistry I with Laboratory	4
PHY2014G General Physics I with Laboratory	4

Total 69-70 Hours

Recommended Biology Electives

BIO4073 Cell Biology
BIO3084 Clinical Preceptorship
BIO4074 Developmental Biology with Laboratory
BIO5019 Independent Study: Human Anatomy
BIO2001 Medical Terminology
BIO4089 Special Topics in Biology: Vertebrate Physiology II

Additional Recommended Electives

CHE4024 Biochemistry II with Laboratory
MAT1034 Calculus I
MAT2063 Introduction to Statistics

The student with a major in biology (pre-dentistry track) must complete the designated cognates in lieu of a minor.

Bachelor of Science in Biology (Pre-Medical Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3034 Genetics with Laboratory	4
BIO4001 Technical Writing in Biology	1
BIO4064 Molecular Biology with Laboratory	4
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	

Elective Courses

Biology electives	7-8
(7-8 hours selected from courses numbered 3000 or above.)	

Biology electives	4
(4 hours selected from courses numbered 4000 or above.)	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
MAT1034 Calculus I	4
CHE3024 Organic Chemistry I with Laboratory	4
CHE3034 Organic Chemistry II with Laboratory	4
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4

Total 66-67 Hours

Recommended Biology Electives

BIO4073 Cell Biology
BIO3084 Clinical Preceptorship
BIO4074 Developmental Biology with Laboratory
BIO5029 Biology Internship
BIO3004 Introduction to Microbiology with Laboratory
BIO3064 Vertebrate Physiology with Laboratory

Additional Recommended Electives

MAT2034 Calculus II
MAT2063 Introduction to Statistics
PSY4023 Physiological Psychology

The student with a major in biology (pre-medical/pre-dental track) must complete the designated cognates in lieu of a minor.

Bachelor of Science in Biology (Pre-Occupational Therapy Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3004 Introduction to Microbiology with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
Select from the following:	4-8
BIO2034 Human Anatomy and Physiology I with Laboratory and BIO2044 Human Anatomy and Physiology II with Laboratory	
BIO3064 Vertebrate Physiology with Laboratory	

Required Cognate Courses

CHE1014G Introduction to Chemistry with Laboratory	4
CHE1024G Introduction to Organic and Biological Chemistry with Laboratory	4
PHY2014G General Physics I with Laboratory	4
MAT1013G Trigonometry or examination proficiency	0-3
MAT2063 Introduction to Statistics	3
PSY1013G General Psychology	3
PSY/FCS2013 Life Span Developmental Psychology	3
PSY3063 Abnormal Psychology	3
SOC1013G Introduction to Sociology	3
Select two of the following:	6-7
PSY/SOC3053 Social Psychology	
PSY/MAN/SOC3083 Organizational Behavior	
PSY2044 Theories of Learning	
PSY3043 Psychology of Personality	
PSY3093 Psychology of Health and Wellness	
SOC3073 Sociology of Community	

Total 76-84 Hours

Recommended Electives

- BIO3084 Clinical Preceptorship
- BIO5019 Independent Study in Human Anatomy
- FCS2012 Contemporary Nutrition

The student with a major in biology (pre-occupational therapy track) must complete the designated cognates in lieu of a minor.

Bachelor of Science in Biology (Pre-Optometry Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3004 Introduction to Microbiology with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
BIO3064 Vertebrate Physiology with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
BIO4064 Molecular Biology with Laboratory	4

Elective Courses

Biology electives 3-4
(3-4 hours selected from courses numbered 3000 or above.)

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1

CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
CHE4014 Biochemistry I	4
MAT1013G Trigonometry	3
MAT1034 Calculus I	4
CHE3024 Organic Chemistry I with Laboratory	4
CHE3034 Organic Chemistry II with Laboratory	4
PHY2014G General Physics I with Laboratory	4
PHY2024G General Physics II with Laboratory	4

Total 77-78 Hours

Recommended Biology Electives

- BIO4073 Cell Biology
- BIO3084 Clinical Preceptorship
- BIO4074 Developmental Biology with Laboratory
- BIO5019 Independent Study: Human Anatomy
- BIO2001 Medical Terminology
- BIO4089 Special Topics in Biology: Vertebrate Physiology II

Additional Recommended Electives

- CHE4024 Biochemistry II
- MAT2063 Introduction to Statistics

The student with a major in biology (pre-optometry track) must complete the designated cognates in lieu of a minor.

Bachelor of Science in Biology (Pre-Pharmacy Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3004 Introduction to Microbiology with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3064 Vertebrate Physiology with Laboratory	4
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
BIO4064 Molecular Biology with Laboratory	4

Elective Courses

Biology electives 3-4
(3-4 hours selected from courses numbered 3000 or above.)

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
MAT1034 Calculus I	4
MAT2063G Introduction to Statistics	3

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CHE3024 Organic Chemistry I with Laboratory	4
CHE3034 Organic Chemistry II with Laboratory	4
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4

Total 74-75 Hours

Recommended Biology Electives

BIO4073 Cell Biology	
BIO3084 Clinical Preceptorship	
BIO4074 Developmental Biology with Laboratory	
BIO5019 Independent Study: Human Anatomy	
BIO2001 Medical Terminology	
BIO4089 Special Topics in Biology: Vertebrate Physiology II	

Additional Recommended Electives

CHE4014 Biochemistry I with Laboratory	
CHE4024 Biochemistry II with Laboratory	
ECO1033G Macroeconomics	
COM1023G Public Speaking	
CHE3014 Quantitative Chemistry with Laboratory (Required for Ohio State University)	

The student with a major in biology (pre-pharmacy track) must complete the designated cognates in lieu of a minor.

Bachelor of Science in Biology (Pre-Physical Therapy Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3034 Genetics with Laboratory	4
BIO3064 Vertebrate Physiology with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
Select two of the following:	7-8
BIO3004 Introduction to Microbiology with Laboratory	
BIO4089 Special Topics in Biology	
BIO4073 Cell Biology	
BIO4064 Molecular Biology with Laboratory	
BIO4074 Developmental Biology with Laboratory	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4

MAT2063 Introduction to Statistics	3
PED1002G Principles of Health and Fitness	2
PED1022 First Aid and CPR	2
PED4003 Kinesiology	3
PED4013 Physiology of Exercise	3
PSY1013G General Psychology	3
PSY/FCS2013 Life Span Developmental Psychology	3
SOC1013G Introduction to Sociology	3

Total 75-76 Hours

Recommended Electives

PSY3063 Abnormal Psychology	
PED2023 Athletic Training	
MAT1034 Calculus I	
BIO3084 Clinical Preceptorship	
FCS2012 Contemporary Nutrition	

The student with a major in biology (pre-physical therapy track) must complete the designated cognates in lieu of a minor.

Bachelor of Science in Biology (Pre-Physician Assistant Track)

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
BIO3034 Genetics with Laboratory	4
BIO3004 Introduction to Microbiology with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
Select from the following:	4-8
BIO2034 Human Anatomy and Physiology I with Laboratory and BIO2044 Human Anatomy and Physiology II with Laboratory	
BIO3064 Vertebrate Physiology with Laboratory	
Select two of the following (three hours must be numbered 4000 or above):	7-8
BIO3084 Clinical Preceptorship	
BIO4089 Special Topics in Biology	
BIO4073 Cell Biology	
BIO4064 Molecular Biology with Laboratory	
BIO4074 Developmental Biology with Laboratory	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
CHE3024 Organic Chemistry I with Laboratory	4

MAT2063 Introduction to Statistics	3
CSC1013G Introduction to Computing	3
PSY1013G General Psychology	3
PSY/FCS2013 Life Span Developmental Psychology	3
SOC1013G Introduction to Sociology	3

Total 74-80 Hours

Recommended Electives

PSY3063 Abnormal Psychology
PSY3093 Psychology of Health and Wellness
MAT1034 Calculus I
FCS2012 Contemporary Nutrition
BIO5019 Independent Study in Human Anatomy

The student with a major in biology (pre-physician assistant track) must complete the designated cognates in lieu of a minor.

**Bachelor of Science in Biology
(Pre-Veterinary Medicine Track)**

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2064 Invertebrate Zoology with Laboratory	4
BIO3004 Introduction to Microbiology with Laboratory	4
BIO3045 Comparative Vertebrate Anatomy with Laboratory	5
Select one from the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
BIO3064 Vertebrate Physiology with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO4001 Technical Writing in Biology	1
Select one from the following:	1
BIO4011 Principles of Bioethics	
BIO4091 Biology Seminar	
BIO4064 Molecular Biology with Laboratory	4

Elective Courses

Biology electives	3-4
(3-4 hours selected from courses numbered 3000 or above.)	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
MAT1013G Trigonometry	4
CHE3024 Organic Chemistry I with Laboratory	4
CHE3034 Organic Chemistry II with Laboratory	4
CHE4014 Biochemistry I with Laboratory	4
PHY2014G General Physics I with Laboratory	4
PHY2024 General Physics II with Laboratory	4

Total 73-74 Hours

Recommended Biology Electives

BIO4073 Cell Biology
BIO3084 Clinical Preceptorship
BIO4074 Developmental Biology with Laboratory
BIO5019 Independent Study: Human Anatomy
BIO2001 Medical Terminology
BIO4089 Special Topics in Biology: Vertebrate Physiology II

Additional Recommended Electives

CHE4024 Biochemistry II with Laboratory
MAT1034G Calculus I
MAT2063G Introduction to Statistics

The student with a major in biology (pre-veterinary medicine track) must complete the chemistry minor that is included above.

Bachelor of Science in Life Science Education

Required Courses

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO2034 Human Anatomy and Physiology I with Laboratory	4
BIO2044 Human Anatomy and Physiology II with Laboratory	4
BIO3034 Genetics with Laboratory	4
BIO4073 Cell Biology	3
BIO3004 Introduction to Microbiology with Laboratory	4
BIO4001 Technical Writing in Biology	1
BIO4091 Biology Seminar	1
BIO4002 Content Teaching Methods in Life Sciences	2
Select one of the following courses:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
Select one of the following biology field courses:	4
BIO2064 Invertebrate Zoology with Laboratory	
aBIO4004 Ornithology with Laboratory	
aBIO4014 Aquatic Biology with Laboratory	
aBIO4024 Introduction to Entomology with Laboratory	
BIO4034 Field Botany with Laboratory	

Required Cognate Courses

CHE1033G General Chemistry I	3
CHE1031G General Chemistry I Laboratory	1
CHE1043 General Chemistry II	3
CHE1041 General Chemistry II Laboratory	1
ESS1034G Earth Science with Laboratory	4
MAT2063G Introduction to Statistics	3
PHY2014G General Physics I with Laboratory	4

Total 58 Hours

Note: Students who wish to teach in senior high school, in multi-age education, or in vocational settings must complete general education and professional education courses which are listed in the School of Education and Professional Studies section of this catalog.

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Biology Minor

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO3034 Genetics with Laboratory	4
Select one of the following	3-4
BIO4014 Aquatic Biology with Laboratory	
BIO3024 Field Botany with Laboratory	
BIO5029 Biology Internship	
BIO4024 Introduction to Entomology with Laboratory	
BIO3094 Introduction to Tropical Ecology with Laboratory	
BIO3074 Ornithology with Laboratory	
BIO4089 Special Topics in Biology	
Biology electives	3-4
(3-4 hours selected from courses numbered 3000 or above.)	
Total	18-20 Hours

Environmental Biology Minor*

BIO1054G General Zoology with Laboratory	4
BIO1074G General Botany with Laboratory	4
BIO1094G Conservation of Natural Resources with Laboratory	4
Select one of the following:	4
BIO3014 Principles of Ecology with Laboratory	
BIO3054 Environmental Science with Laboratory	
Select one of the following:	4
BIO3094 Introduction to Tropical Ecology with Laboratory	
BIO3074 Ornithology with Laboratory	
BIO4014 Aquatic Biology with Laboratory	
BIO3024 Field Botany with Laboratory	
BIO4089 Special Topics in Biology (must have a field focus)	
BIO4024 Introduction to Entomology with Laboratory	
Total	20 Hours

*(The environmental biology minor is not available to students majoring in biology.)