

Degree Type – Bachelor of Science (BS)**Degree Title – Biology****Focus: Biological Science**

The Department of Biology is committed to excellence in instruction, scholarly accomplishment, research, professional service, and student success. The Department provides a broad-based undergraduate education in Biology so as to give students the opportunity to pursue a career best-suited to their interests and abilities. Graduates are prepared to enter the workforce or continue their education in graduate or professional school. The Department provides rigorous pre-professional preparation for students seeking careers in biological sciences and health professions.

STUDENT LEARNING OUTCOMES:

- 1. Role of the Cell:** The Biology graduate knows the role of the cell in life and living systems, and understands the interrelationships among subcellular structures that contribute to its functioning as a unit
- 2. Role of Genetics:** The Biology graduate understands the role of genetics in inheritance and can explain how environmental conditions influence natural selection processes and contribute to adaptation.
- 3. Diversity of Life:** The Biology graduate is aware of the diversity of life and interrelationships between an organism and its environment.
- 4. Structure and Function:** The biology graduate understands how the organization of a specific structure within an organism is related to a specific function, understands interrelationships among organs and organ systems within an organism, and how interaction between structure and function contribute to the survival of the organism.
- 5. Scientific Method:** The biology graduate understands the Scientific Method, is able to analyze and interpret data, and communicate research findings in both oral and written form.

A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education core requirements.

Required**Mathematics – 3 hours**

Choose one:

MATH 1342 Elementary Statistical Methods (or MATH 1387 Honors)

MATH 1343 Introduction to Biostatistics (or MATH 1388 Honors)

Life and Physical Sciences – 6 hours

CHEM 1311 General Chemistry I

CHEM 1312 General Chemistry II

Language, Philosophy and Culture – 3 hours

PHIL 1301 Introduction to Philosophy (or PHIL 1387 Honors)

PHIL 1366 Philosophy and History of Science and Technology

Integrative and Experiential Learning – 2 hours

CHEM 1111 General Chemistry I Lab

CHEM 1112 General Chemistry II Lab

B – MAJOR REQUIREMENTS – 58 HOURS (24 advanced minimum)**1 – Biology Core – 42 hours (18 advanced)**

BIOL 1406 General Biology I (or BIOL 1487 Honors)

BIOL 1407 General Biology II (or BIOL 1488 Honors)

BIOL 3301 Biological Evolution

BIOL 3409 Ecology

BIOL 3413 Genetics
BIOL 4400 Biological Communication (Capstone)
CHEM 2323 Organic Chemistry I
CHEM 2123 Organic Chemistry I Lab
CHEM 2325 Organic Chemistry II
CHEM 2125 Organic Chemistry II Lab
CHEM 3303 Biochemistry
PHYS 1401 General Physics I
PHYS 1402 General Physics II

2 – Biology Electives – 16 hours (6 advanced minimum)

a – Cell/Molecular Course

Choose at least one:

BIOL 3401 General Microbiology
BIOL 3403 Medical Microbiology and Immunology
BIOL 3412 Cell Biology
BIOL 3415 Molecular Biology
BIOL 4313 Endocrinology
BIOL 4330 Molecular Evolution
BIOL 4361 Neuroscience I: Cellular and Molecular
BIOL 4413 General Virology
BIOL 4417 Bacterial Genetics
BIOL 4418 Electron Microscopy
BIOL 4421 Biotechnology

b – Developmental/Morphology

Choose at least one:

BIOL 2428 Comparative Vertebrate Anatomy
BIOL 3405 Histology
BIOL 3406 Developmental Mechanisms
BIOL 3407 Comparative Embryology
BIOL 3408 Plant Morphology
BIOL 4420 Plant Anatomy

c – Organismal/Environmental

Choose at least one:

BIOL 3404 Conservation Biology
BIOL 3409 Ecology
BIOL 3414 Invertebrate Zoology
BIOL 4316 Environmental Toxicology
BIOL 4318 Ethnobotany
BIOL 4319 Medical Entomology
BIOL 4388 Global Change Ecology
BIOL 4402 Marine Zoology
BIOL 4403 Introduction to Remote Sensing Technology
BIOL 4404 Ichthyology
BIOL 4406 Mycology
BIOL 4407 Animal Parasitology
BIOL 4408 Plant Pathology
BIOL 4409 Herpetology
BIOL 4410 Marine Botany
BIOL 4412 Ornithology
BIOL 4414 Plant Taxonomy
BIOL 4415 Entomology

BIOL 4416 Mammalogy
BIOL 4419 Aquatic Entomology
BIOL 4424 Microbial Ecology
BIOL 4426 Marine Ecology
BIOL 4427 Marine Animal Field Studies
BIOL 4432 Animal Behavior

d – Physiology

Choose at least one:

BIOL 1322 Human Nutrition
BIOL 2401 Anatomy and Physiology I
BIOL 2402 Anatomy and Physiology II
BIOL 3310 Neurobiology
BIOL 3345 Animal Nutrition
BIOL 3411 Mammalian Physiology
BIOL 4317 Disease Epidemiology
BIOL 4362 Neuroscience II: System, Developmental, and Disorders
BIOL 4405 Plant Physiology
BIOL 4411 Ecological Physiology of Animals
BIOL 4422 Neurobiology Methods

C – SUPPORT COURSES – 6 HOURS

PSYC 2301 General Psychology
SOCI 1301 Introduction to Sociology

D – FREE ELECTIVES – 14 HOURS (8 advanced minimum)

Pre-medical/Pre-dental/Pre-optometry/Pre-veterinary students are strongly encouraged to take CHEM 2325/CHEM 2125 Organic Chemistry II, CHEM 3303 Biochemistry, and PHYS 1402 General Physics II.

TOTAL CREDIT HOURS FOR GRADUATION – 120 HOURS**TOTAL ADVANCED HOURS – 42 HOURS****ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:****Admission requirements**

Admission requirements to this program: BIOL 1406 (or BIOL 1487 Honors), BIOL 1407 (or BIOL 1488 Honors), and CHEM 1311/CHEM 1111 with a 'C' or better grade in all of these courses and Department approval.

Degree Type – Bachelor of Science (BS)**Degree Title – Biology****Focus: Biology with Minor**

The Department of Biology is committed to excellence in instruction, scholarly accomplishment, research, professional service and student success. The Department provides a broad-based undergraduate education in Biology so as to give students the opportunity to pursue a career best-suited to their interests and abilities. Graduates are prepared to enter the workforce or continue their education in graduate or professional school. The Department provides rigorous pre-professional preparation for students seeking careers in biological sciences and health professions.

STUDENT LEARNING OUTCOMES:

- 1. Role of the Cell:** The Biology graduate knows the role of the cell in life and living systems, and understands the interrelationships among subcellular structures that contribute to its functioning as a unit.
- 2. Role of Genetics:** The Biology graduate understands the role of genetics in inheritance and can explain how environmental conditions influence natural selection processes and contribute to adaptation.
- 3. Diversity of Life:** The Biology graduate is aware of the diversity of life and interrelationships between an organism and its environment.
- 4. Structure and Function:** The biology graduate understands how the organization of a specific structure within an organism is related to a specific function, understands interrelationships among organs and organ systems within an organism, and how interaction between structure and function contribute to the survival of the organism.
- 5. Scientific Method:** The biology graduate understands the Scientific Method, is able to analyze and interpret data, and communicate research findings in both oral and written form.

A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education core requirements.

Required**Mathematics – 3 hours**

Choose one:

MATH 1342 Elementary Statistical Methods (or MATH 1387 Honors)

MATH 1343 Introduction to Biostatistics (or MATH 1388 Honors)

Life and Physical Science – 6 hours

CHEM 1311 General Chemistry I

CHEM 1312 General Chemistry II

Integrative and Experiential Learning – 2 hours

CHEM 1111 General Chemistry I Lab

CHEM 1112 General Chemistry II Lab

B – MAJOR REQUIREMENTS – 44 HOURS (36 advanced)**1 – Biology Foundation – 23 hours (15 advanced)**

BIOL 1406 General Biology I (or BIOL 1487 Honors)

BIOL 1407 General Biology II (or BIOL 1488 Honors)

BIOL 3301 Biological Evolution

BIOL 3409 Ecology

BIOL 3413 Genetics

BIOL 4400 Biological Communication (Capstone)

2 – Advanced Biology Electives – 21 hours (9 advanced minimum)

Students must take at least one course from each group representing one of three organizational levels of Biology. Group criteria do not need to be met with advanced hours.

a – Cellular/Molecular

Choose at least one:

BIOL 3401 General Microbiology
BIOL 3403 Medical Microbiology and Immunology
BIOL 3405 Histology
BIOL 3406 Developmental Mechanisms
BIOL 3412 Cell Biology
BIOL 3415 Molecular Biology
BIOL 4313 Endocrinology
BIOL 4330 Molecular Evolution
BIOL 4408 Plant Pathology
BIOL 4413 General Virology
BIOL 4417 Bacterial Genetics
BIOL 4418 Electron Microscopy
BIOL 4421 Biotechnology
BIOL 4428 Medical Genomics
CHEM 3303 Biochemistry

b – Organismal

Choose at least one:

BIOL 2401 Anatomy and Physiology I
BIOL 2402 Anatomy and Physiology II
BIOL 2428 Comparative Vertebrate Anatomy
BIOL 3310 Neurobiology
BIOL 3345 Animal Nutrition
BIOL 3407 Comparative Embriology
BIOL 3408 Plant Morphology
BIOL 3411 Mammalian Physiology
BIOL 3414 Invertebrate Zoology
BIOL 4319 Medical Entomology
BIOL 4362 Neuroscience II: System, Developmental, and Disorders)
BIOL 4402 Marine Zoology
BIOL 4404 Ichthyology
BIOL 4405 Plant Physiology
BIOL 4406 Mycology
BIOL 4407 Animal Parasitology
BIOL 4409 Herpetology
BIOL 4410 Marine Botany
BIOL 4412 Ornithology
BIOL 4414 Plant Taxonomy
BIOL 4415 Entomology
BIOL 4416 Mammalogy
BIOL 4419 Aquatic Entomology
BIOL 4420 Plant Anatomy
BIOL 4422 Neurobiology Methods

c – Ecological/Environmental

Choose at least one:

BIOL 3404 Conservation Biology
BIOL 4316 Environmental Toxicology

BIOL 4317 Disease Epidemiology
BIOL 4318 Ethnobotany
BIOL 4388 Global Change Ecology
BIOL 4403 Introduction to Remote Sensing Technology
BIOL 4411 Ecological Physiology of Animals
BIOL 4424 Microbial Ecology
BIOL 4426 Marine Ecology
BIOL 4427 Marine Animal Field Studies
BIOL 4429 Agroecology
BIOL 4432 Animal Behavior

C – SUPPORT COURSES – 4 HOURS

CHEM 2123 Organic Chemistry I Lab
CHEM 2323 Organic Chemistry I

D – FREE ELECTIVES – 12 HOURS

Advanced hours will vary to meet 42 advanced hour requirement.

E – MINOR – 18 HOURS (6 advanced)**TOTAL CREDIT HOURS FOR GRADUATION – 120 HOURS****TOTAL ADVANCED HOURS – 42 HOURS****ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:****Admission requirements**

Admission requirements to this program: BIOL 1406 (or BIOL 1487 Honors), BIOL 1407 (or BIOL 1488 Honors), and CHEM 1311/CHEM 1111 with a 'C' or better grade in all of these courses and Department approval.

Graduation requirements

Minimum 44 credit hours in Biology and 2.50 Biology GPA; At least 36 upper division hours in Biology.

Degree Type – Bachelor of Science (BS)
Degree Title – Biology with UTeach Certification (7-12)

Focus: Life Sciences

The Department of Biology is committed to excellence in instruction, scholarly accomplishment, research, professional service and student success. The Department provides a broad-based undergraduate education in Biology so as to give students the opportunity to pursue a career best-suited to their interests and abilities. Graduates are prepared to enter the workforce or continue their education in graduate or professional school. The Department provides rigorous pre-professional preparation for students seeking careers in biological sciences and health professions.

The Department also provides a service function to the University by providing a means for students to fulfill their science requirement. Non-majors receive instruction in scientific methods, a general overview of biology, new discoveries, and the importance of biology in society. An M.S. degree program provides the opportunity for advanced study, specialization, and research. The program prepares students for further graduate study at the doctorate level and for careers in the biological sciences and related disciplines.

The Department of Biology is committed to the discovery of new knowledge through research that is conveyed to professional and lay constituencies through publication and presentation and participation in policy decision-making. The Department of Biology also engages the community through outreach programs, continuing education, educational leadership, and collaborations with local school districts and governmental agencies. Faculty members are also encouraged to take leadership roles in societies of their research specialties.

STUDENT LEARNING OUTCOMES:

- 1. Role of the Cell:** The Biology graduate knows the role of the cell in life and living systems, and understands the interrelationships among subcellular structures that contribute to its functioning as a unit
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- 5. Scientific Method:** The biology graduate understands the Scientific Method, is able to analyze and interpret data, and communicate research findings in both oral and written form.

A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education core requirements.

Required

Mathematics – 3 hours

MATH 2413 Calculus I (or MATH 2487 Honors) three-hour lecture

Life and Physical Science – 6 hours

CHEM 1311 General Chemistry I

CHEM 1312 General Chemistry II

Social and Behavioral Sciences – 3 hours

PSYC 2301 General Psychology

Integrative and Experiential Learning – 3 hours

CHEM 1111 General Chemistry I Lab

CHEM 1112 General Chemistry II Lab
BIOL 1406 General Biology I (or BIOL 1487 Honors) one-hour lab

B – MAJOR REQUIREMENTS – 61 HOURS (37 advanced minimum)

1 – Life Sciences Foundation – 49 hours (28 advanced)

BIOL 1406 General Biology I (or BIOL 1487 Honors) three-hour lecture
BIOL 1407 General Biology II (or BIOL 1488 Honors)
BIOL 3301 Biological Evolution
BIOL 3330 Functions and Modeling
BIOL 3409 Ecology
BIOL 3412 Cell Biology
BIOL 3413 Genetics
BIOL 4392 Research Methods in the Science and Mathematics Classroom (UTeach)
BIOL 4400 Biological Communication (Capstone)
CHEM 2123 Organic Chemistry Lab
CHEM 2323 Organic Chemistry
MATH 2413 Calculus I (or MATH 2487 Honors) one-hour lecture
PHIL 3301 Perspectives on Mathematics and Science
PHYS 1401 General Physics I
PHYS 1402 General Physics II

2 – Diversity of Life – 12 hours (9 advanced minimum)

Complete 12 advanced hours from the following sections:

a – Plants – 3 hours minimum (3 advanced minimum)

Choose at least one:

BIOL 3408 Plant Morphology
BIOL 4318 Ethnobotany
BIOL 4405 Plant Physiology
BIOL 4406 Mycology
BIOL 4408 Plant Pathology
BIOL 4410 Marine Botany
BIOL 4414 Plant Taxonomy
BIOL 4420 Plant Anatomy

b – Animals – 3 hours minimum

Choose at least one:

BIOL 2428 Comparative Vertebrate Anatomy
BIOL 3345 Animal Nutrition
BIOL 3405 Histology
BIOL 3407 Comparative Embryology
BIOL 3411 Mammalian Physiology
BIOL 3414 Invertebrate Zoology
BIOL 4319 Medical Entomology
BIOL 4402 Marine Zoology
BIOL 4404 Ichthyology
BIOL 4407 Animal Parasitology
BIOL 4409 Herpetology
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BIOL 4412 Ornithology
BIOL 4415 Entomology
BIOL 4416 Mammalogy

BIOL 4419 Aquatic Entomology
BIOL 4427 Marine Animal Field Studies
BIOL 4432 Animal Behavior

c – Microbiology – 4 hours minimum (4 advanced minimum)

Choose at least one:

BIOL 3401 General Microbiology
BIOL 3403 Medical Microbiology and Immunology
BIOL 4413 General Virology
BIOL 4417 Bacterial Genetics
BIOL 4424 Microbial Ecology

C – UTEACH CERTIFICATION – 21 HOURS (19 advanced)

Area of Certification: Life Science (7-12)

UTCH 1101 Inquiry Approaches to Teaching
UTCH 1102 Inquiry-Based Lesson Design
UTCH 3301 Knowing and Learning in Mathematics and Science
UTCH 3302 Classroom Interactions
UTCH 3303 Project-Based Instruction
UTCH 4101 Apprentice Teaching Seminar
UTCH 4601 Apprentice Teaching
READ 4305 Content Area Literacy

TOTAL CREDIT HOURS FOR GRADUATION – 124 HOURS

TOTAL ADVANCED HOURS – 56 HOURS

ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:

Progression requirements

Admission to the College of Education is required for participation in Apprentice Teaching and Seminar (UTCH 4101, 4601). Students unable to be admitted to UTCH 4601 and UTCH 4101 will be required to substitute 3 advanced hours, as recommended by advisor.

Graduation requirements

Minimum GPA of 2.75 is required for graduation. BIOL 1406 (or BIOL 1487 Honors), BIOL 1407 (or BIOL 1488 Honors), CHEM 1311/CHEM 1111, CHEM 1312/1112, UTCH 1101, UTCH 1102, UTCH 3301, UTCH 3302, UTCH 3303, UTCH 4101, UTCH 4601 with a grade of 'C' or better grade in all of these courses; and approval of UTeach portfolio are required for graduation.

Degree Type – Bachelor of Interdisciplinary Studies (BIS)
Degree Title – Life Science with UTeach Certification (4-8)

The Department of Biology is committed to excellence in instruction, scholarly accomplishment, research, professional service, and student success. The Department provides a broad-based undergraduate education in Biology so as to give students the opportunity to pursue a career best-suited to their interests and abilities. Graduates are prepared to enter the workforce or continue their education in graduate or professional school. The Department provides rigorous pre-professional preparation for students seeking careers in biological sciences and health professions.

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A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education core requirements.

Required

Mathematics – 3 hours

MATH 2413 Calculus I (or MATH 2487 Honors) three-hour lecture

Life and Physical Science – 6 hours

Choose one pair:

PHYS 1401 General Physics I

PHYS 1402 General Physics II

PSCI 1421 Physical Science I

PSCI 1422 Physical Science II

Integrative and Experiential Learning – 3 hours*Choose labs corresponding to Life and Physical Science section, and complete:*

CHEM 1111 General Chemistry I Lab

B – MAJOR REQUIREMENTS – 60 HOURS (33 advanced)**1 – Life Sciences Foundation – 54 hours (27 advanced)**

ASTR 1401 Introduction to Astronomy I

BIOL 1406 General Biology I (or BIOL 1487 Honors)

BIOL 1407 General Biology II (or BIOL 1488 Honors)

BIOL 2406 Environmental Biology

BIOL 3301 Biological Evolution

BIOL 3330 Functions and Modeling

BIOL 4392 Research Methods in Science and Mathematics Classroom

BIOL 4400 Biological Communication (Capstone)

CHEM 1311 General Chemistry I

GEOG 2313 Principles of Geography Physics Elementary

GEOL 1403 Physical Geology

GEOL 3401 Geomorphology

GEOL 3405 Oceanography

MATE 3305 Fundamentals of Statistics and Probability

MATH 2413 Calculus I (or MATH 2487 Honors) one-hour lecture

PHIL 3317 Perspectives on Science and Mathematics

2 – Life Science Electives – 6 hours (6 advanced)*Choose from:*

BIOL 3404 Conservation Biology

BIOL 3409 Ecology

BIOL 3413 Genetics

GEOL 4403 Sedimentology and Stratigraphy

GEOL 4302 Environmental Geology

PSCI 3310 Planter Earth and Its Place

C – UTEACH CERTIFICATION – 21 HOURS (19 advanced)*Area of Certification: Life Science (4-8)*

UTCH 1101 Inquiry Approaches to Teaching

UTCH 1102 Inquiry-Based Lesson Design

UTCH 3301 Knowing and Learning in Mathematics and Science

UTCH 3302 Classroom Interactions

UTCH 3303 Project-Based Instruction

UTCH 4101 Apprentice Teaching Seminar

UTCH 4601 Apprentice Teaching

READ 4305 Content Area Literacy

TOTAL CREDIT HOURS FOR GRADUATION – 123 HOURS**TOTAL ADVANCED HOURS – 52 HOURS****ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:****Progression requirements**

Admission to the College of Education is required for participation in Apprentice Teaching and Seminar (UTCH 4101, 4601). Students unable to be admitted to UTCH 4601 and UTCH 4101 will be required to substitute 4 advanced hours, as recommended by advisor.

Graduation requirements

Minimum GPA of 2.75 is required for graduation. BIOL 1406 (or BIOL 1487 Honors), BIOL 1407 (or BIOL 1488 Honors), CHEM 1311/CHEM 1111, CHEM 1312/1112, UTCH 1101, UTCH 1102, UTCH 3301, UTCH 3302, UTCH 3303, UTCH 4101, UTCH 4601 with a grade of 'C' or better grade in all of these courses; and approval of UTeach portfolio are required for graduation.