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
Choose from:
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
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
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
      BIOL 4411 Ecological Physiology of Animals
      BIOL 4412 Ornithology
      BIOL 4415 Entomology
      BIOL 4416 Mammalogy
BIOL 4419 Aquatic Entomology  
BIOL 4427 Marine Animal Field Studies  
BIOL 4432 Animal Behavior

\( c – \text{Microbiology} – 4 \text{ hours minimum (4 advanced minimum)} \)

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

\( c – \text{UTeach Certification} – 21 \text{ hours} \) (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.