BIOLOGY 7-12 COMPOSITE SCIENCE CERTIFICATION

Teacher Preparation Program Admission Requirements

Traditional Undergraduate Teacher Preparation Program

Applications for admission to the Teacher Preparation Program are accepted in September for the following spring semester and in February for the following fall semester.

1. Application to program submitted through TK20 (https://tamut.tk20.com/campustoolshighered/start.do), to include the following:
   - Disposition Survey
   - Code of Ethics Reflection Statement
   - Completed FERPA form
   - Payment of $35.00 application fee.
2. Overall GPA of 2.80 or higher. The Overall GPA requirement changes to 2.70 or higher beginning with the Spring 2024 semester.
3. Complete a writing sample and interview as a requirement for the application to the Teacher Preparation program.
4. Completed hours in content area: composite science 7 - 12 certification candidates must have completed 15 semester hours in content area with **no grade below "C".**
5. Advising from assigned faculty advisors in the Teacher Education program.

For Admission to Field-Based Co-Teaching Semester

1. A Notice of Intent for Field-Based Co-Teaching semester submitted in TK20 (https://tamut.tk20.com/campustoolshighered/start.do) in September for the following spring semester and in February for the following fall semester.
2. Completion of appropriate coursework.
3. Minimum of 2.80 GPA overall; no grade below "C" in upper-division courses. The Overall GPA requirement changes to 2.70 or higher beginning with the Spring 2024 semester.

For Admission to the Clinical Co-Teaching Semester

1. Successfully complete all program requirements.
2. Successful completion of Field-Based Co-Teaching semester as determined by Chair of Teacher Education.
3. Continuance of placement in K-12 clinical placement.
4. Maintain 2.80 cumulative GPA ; no grade below "C" in upper-division courses. The Overall GPA requirement changes to 2.70 or higher beginning with the Spring 2024 semester.

Biology w/7-12 Composite Science Teacher Certification Degree Requirements

Students should refer to their DegreeWorks degree audit in their Web for Students account for more information regarding their degree requirements.

Code	Title	Hours
Major Requirements		
General Education Requirements (http://catalog.tamut.edu/academic-information/university-core-curriculum/#corecurriculumtext)		42
BIOL 1306	Biology for Science Majors I [6]	3
BIOL 1106	Biology for Science Majors I Lab [6]	1
BIOL 1307	Biology for Science Majors II [6]	3
BIOL 1107	Biology for Science Majors II Lab [6]	1
CHEM 1311	General Chemistry I [6]	3
CHEM 1111	General Chemistry I (Lab) [6]	1
CHEM 1312	General Chemistry II	3
CHEM 1112	General Chemistry II (Lab)	1
PHYS 1301	College Physics I	3
PHYS 1101	College Physics I Lab	1
PHYS 1302	College Physics II	3
PHYS 1102	College Physics II Lab	1
GEOL 1403	Physical Geology	4
BIOL 307	General Ecology	3
BIOL 308	Invertebrate Zoology	3
BIOL 310	Genetics (EL)	4

BIOL 402	Cell and Molecular Biology	4
BIOL 466	Evolutionary Biology	3
BIOL 481	Seminar in Biology	3
UD Biology Electives		3
Other Requirements		
RDG 343	Content Area Literacy Instruction for Secondary Students	3
MATH 1314	College Algebra [6]	3
MATH 1342	Elementary Statistical Methods	3
10sch Upper Division (300 & 400 level) Electives		10
Professional Development		
ED 311	Teaching and Learning for Social Change (EL)	3
ED 321	Secondary School Methods	3
Block 1:		
ED 331	Classroom and Behavior Management [8]	3
ED 495	Field-Based Co-Teaching Semester [8]	3
Block 2:		
ED 496	Clinical Co-Teaching Semester (EL) [9]	3
SPED 418	Inclusion of Students with High Support Needs in the Content Areas [9]	3
Electives (As needed to satisfy minimum degree requirements and 54 semester credit hours of Upper Division Coursework)		
Minimum Grade of "C" required in all Major, Ed, SPED and Professional Development Courses		
Minimum Hours for Degree		**120**

6 Satisfies Core Curriculum
7 Required Admission to Teacher Prep Program
8 Requires successful placement interview with a partnership public school district
9 Requires passing all TExES exams

Note: A minimum of 54 upper division hours (300 and 400 level courses) are required for this degree. Resident credit totaling 25% of the hours is required for the degree. A minimum GPA of 2.0 is required in three areas for graduation: Overall GPA, Institutional GPA, and Major GPA.

Biology 7-12 Composite Science Certification 4 Year Plan

First Year

Code	Title	Hours
Fall		
ENGL 1301	Composition I requires a minimum grade of 'C', satisfies core curriculum	3
BIOL 1306	Biology for Science Majors I requires minimum grade of 'C', Satisfies Core Curriculum	3
BIOL 1106	Biology for Science Majors I Lab requires minimum grade of 'C', Satisfies Core Curriculum	1
CHEM 1311	General Chemistry I requires minimum grade of 'C'	3
CHEM 1111	General Chemistry I (Lab) requires minimum grade of 'C'	1
IS 1100	University Foundations mandatory for FTIC students only	1
MATH 1314	College Algebra Satisfies Core Curriculum	3
Fall Total Semester Credit Hours		**16**
Spring		
ENGL 1302	Composition II requires minimum grade of 'C', Satisfies Core Curriculum	3
BIOL 1307	Biology for Science Majors II requires minimum grade of 'C', Satisfies Core Curriculum	3
BIOL 1107	Biology for Science Majors II Lab requires minimum grade of 'C', Satisfies Core Curriculum	1
MATH 1342	Elementary Statistical Methods	3
COMM 1307	Introduction to Mass Communication Satisfies Core Curriculum	3
or SPCH 1315	Public Speaking	
CHEM 1312	General Chemistry II requires minimum grade of 'C', Satisfies Core Curriculum	3
CHEM 1112	General Chemistry II (Lab) requires minimum grade of 'C', Satisfies Core Curriculum	1

Spring Total Semester Credit Hours	**17**
Total First Year Semester Credit Hours	**33**

Second Year

Code	Title	Hours
Fall		
PSCI 2301	American Government I: Federal & Texas Constitutions Satisfies Core Curriculum	3
HIST 1301	United States History I Satisfies Core Curriculum	3
PHYS 1301	College Physics I requires minimum grade of 'C', Satisfies Core Curriculum	3
PHYS 1101	College Physics I Lab requires minimum grade of 'C', satisfies Core Curriculum	1
Language, Philosophy, and Culture Core Curriculum Requirement (http://catalog.tamut.edu/academic-information/university-core-curriculum/#corecurriculumtext)		3
Creative Arts Core Curriculum Requirement (http://catalog.tamut.edu/academic-information/university-core-curriculum/#corecurriculumtext)		3
Fall Total Semester Credit Hours		**17**
Spring		
PSCI 2302	American Government II: Federal & Texas Political Behavior	3
HIST 1302	United States History II	3
PHYS 1302	College Physics II requires minimum grade of 'C', satisfies Core Curriculum	3
PHYS 1102	College Physics II Lab requires minimum grade of 'C', satisfies Core Curriculum	1
GEOL 1403	Physical Geology requires minimum grade of 'C', satisfies Core Curriculum	4
Upper Division Biology Elective (300-400 level) requires minimum grade of 'C'		3-4
Spring Total Semester Credit Hours		**17-18**
Total Second Year Semester Credit Hours		**34-35**

Third Year

Code	Title	Hours
Fall		
Social and Behavioral Sciences Core Curriculum Requirement (http://catalog.tamut.edu/academic-information/university-core-curriculum/#corecurriculumtext)		3
ED 311	Teaching and Learning for Social Change (EL) requires minimum grade of 'C'	3
BIOL 307	General Ecology requires minimum grade of 'C'	3
BIOL 402	Cell and Molecular Biology requires minimum grade of 'C'	4
BIOL 466	Evolutionary Biology requires minimum grade of 'C'	3
Fall Total Semester Credit Hours		**16**
Spring		
ED 321	Secondary School Methods requires minimum grade of 'C'	3
BIOL 308	Invertebrate Zoology requires minimum grade of 'C'	3
BIOL 310	Genetics (EL) requires minimum grade of 'C'	4
BIOL 481	Seminar in Biology requires minimum grade of 'C'	3
RDG 343	Content Area Literacy Instruction for Secondary Students requires minimum grade of 'C'	3
Spring Total Semester Credit Hours		**16**
Total Third Year Semester Credit Hours		**32**

Fourth Year

Code	Title	Hours
Fall		
ED 495	Field-Based Co-Teaching Semester requires minimum grade of 'C'	3
ED 331	Classroom and Behavior Management requires minimum grade of 'C'	3
Upper Division Elective (300-400 level)		3
Upper Division Elective (300-400 level)		4
Upper Division Elective (300-400 level)		4
Fall Total Semester Credit Hours		**17**
Spring		

ED 496	Clinical Co-Teaching Semester (EL) requires minimum grade of 'C'	3
SPED 418	Inclusion of Students with High Support Needs in the Content Areas requires minimum grade of 'C'	3
Spring Total Semester Credit Hours		**6**
Total Fourth Year Semester Credit Hours		**23**
Total Semester Credit Hours required for Degree		**120**

Minimum Grade of "C" is required in all Major, ED, RDG, SPED, and Professional Development courses

Note: A minimum of 54 upper division hours (300 and 400 level courses) are required for this degree. Resident credit totaling 25% of the hours is required for the degree. A minimum GPA of 2.0 is required in three areas for graduation: Overall GPA, Institutional GPA, and Major GPA.

Undergraduate Courses in Biology w/7-12 Composite Science

BIOL 1106. Biology for Science Majors I Lab. 1 Hour.
This course provides students with hands-on exploration in the biological sciences. Content includes the process of scientific inquiry, important concepts in biochemistry and genetics, and introduction to laboratory techniques. Corequisite: BIOL 1306.

BIOL 1107. Biology for Science Majors II Lab. 1 Hour.
This course provides students with hands-on exploration in the biological sciences. Content includes a survey of plants, animals, and microorganisms as well as studies of basic biological processes such as digestion, circulation, and nervous system function. Corequisite: BIOL 1307.

BIOL 1108. Biology for Non-science Majors I Lab. 1 Hour.
This course provides students with hands-on exploration in the biological sciences. Content includes the process of scientific inquiry, important concepts in biochemistry and genetics, and introduction to laboratory techniques. Prerequisite or Corequisite: BIOL 1308.

BIOL 1109. Biology for Non-science Majors II Lab. 1 Hour.
This course provides students with hands-on exploration in the biological sciences. Content includes the process of scientific inquiry, important concepts in biochemistry and genetics, and introduction to laboratory techniques. Prerequisite or Corequisite: BIOL 1309.

BIOL 1306. Biology for Science Majors I. 3 Hours.
This course introduces the student to the nature of science and the application of science to contemporary issues. Content includes the chemistry of life, the cell, genetics, and mechanisms of evolution. Corequisite: BIOL 1106.

BIOL 1307. Biology for Science Majors II. 3 Hours.
This course introduces the student to the nature of science and the application of science to contemporary issues. Content includes plant form and function, animal form and function, and ecology. Prerequisite: BIOL 1306. Corequisite: BIOL 1107.

BIOL 1308. Biology for Non-Science Majors I. 3 Hours.
This course introduces the student to the nature of science and the application of science to contemporary issues. Content includes the chemistry of life, the cell, genetics, and mechanisms of evolution. NOTE: Lab may be required for specific majors.

BIOL 1309. Biology for Non-Science Majors II. 3 Hours.
This course introduces the student to the nature of science and the application of science to contemporary issues. Content includes plant form and function, animal form and function, and ecology. NOTE: Lab may be required for specific majors. Prerequisite: BIOL 1308.

BIOL 2401. Human Anatomy and Physiology I. 4 Hours.
This course covers basic human anatomy and physiological principles focusing on the cellular and tissue levels and their integration into the integumentary, skeletal, muscular, and nervous systems.

BIOL 2402. Human Anatomy and Physiology II. 4 Hours.
This course covers basic human anatomy and physiological principles focusing on the nervous, endocrine, digestive, respiratory, cardiovascular, immune, urinary, and reproductive organ systems. Prerequisite: C or better in BIOL 2401.

BIOL 2405. Introduction to Microbiology. 4 Hours.
This is an introductory microbiology course consisting of lecture and laboratory sessions and designed for the non-biology majors and allied health students. Topics include the morphology, physiology, and taxonomy of representative groups of pathogenic and nonpathogenic microorganisms; human-microbe interactions; public health microbiology; and host defense mechanisms. BIOL 1306 is recommended prior to BIOL 2405.

BIOL 2406. Environmental Biology. 3 Hours.
This course provides an introduction to the basic principles of bioenvironmental science with emphasis on scientific literacy, current events, global and international issues, historic context, and the relationship between humans and the natural world. The course will also address conservation, pollution, energy, and other contemporary environmental problems.

BIOL 289. Independent Study. 1-4 Hours.
This course provides individual instruction. Students may repeat the course when topics vary.

BIOL 303. Animal Nutrition. 3 Hours.
This is a course designed to introduce the study of animal nutrition in all aspects, and is designed for Biology majors, especially those interested in Veterinary school. Topics include the nutrition of companion animals, livestock, and exotic species. Topics will also include the anatomy, physiology and biochemistry of the gastrointestinal system, nutrient procurement and use, feed additives, growth stimulants, metabolic diseases, and diet therapy. Prerequisites: BIOL 1306, BIOL 1307, BIOL 1106, BIOL 1107 or equivalent.

BIOL 307. General Ecology. 3 Hours.
This course covers the principles of ecology with special reference to populations and their ecosystems, distribution, biotic communities, and environmental relationships. This course requires field trips. Prerequisite: BIOL 1306 and BIOL 1106, and BIOL 1307 and BIOL 1107.

BIOL 308. Invertebrate Zoology. 3 Hours.
This course explores the diversity of invertebrate types, morphologically, embryologically, and physiologically. The course emphasizes the ecological role of invertebrates. Prerequisite: BIOL 1306 and BIOL 1106, and BIOL 1307 and BIOL 1107.

BIOL 310. Genetics (EL). 4 Hours.
This course deals with the principles of heredity and variation and their application to plants, lower animals and man. This course integrates the principles of experiential learning and meets the criteria for undergradute research. Prerequisite: 8 SCH of Biology.

BIOL 311. General Microbiology. 4 Hours.
General Microbiology is an upper division undergraduate course on microbial biology consisting of both lectures and laboratory activities. In depth lectures cover eukaryotic and prokaryotic microbes and viruses, but emphasis is put on bacteria. This course provides a conceptual and experimental background in microbiology. This course is highly recommended for the pre-medical and pre-pharmacy students. Prerequisite: Successful completion of two semesters of Biology.

BIOL 312. Botany. 4 Hours.
This upper division course presents a solid core of plant biology consisting of lectures and laboratory activities. The course contents encompass the areas of plant cell and tissue structure, development, differentiation, tissue culture, genetic engineering, and dynamic processes associated with higher green plants. The course blends with an account of the interrelationships between plants and people. Prerequisite: Two semesters of biology.

BIOL 330. Introduction to Geographic Information Systems. 3 Hours.
Introduces the concepts and applications of computer-based spatial data handling, known as geographic information systems (GIS) technology. Illustrates the essential methods of GIS and its applications in fields including geography, natural resource management, planning and environmental science. Students gain application skills via a series of practical exercises illustrating problem-solving strategies using up-to-date GIS software packages. Lectures, laboratories, and special assignments will be utilized in this course. Pre-requisites: MATH 1314.

BIOL 332. Molecular Pharmacology and Toxicology. 3 Hours.
This course will provide an overview of pharmacology based on principles of drug action with emphasis on drug classes. Topics include pharmacology of the autonomic, cardiovascular, central nervous and endocrine systems. Prerequisites: BIOL 1306 & 1106, BIOL 1307 & 1107; and BIOL 2401 & 2402 or BIOL 449.

BIOL 335. Medical Terminology. 3 Hours.
This web-based course utilizes a systems approach to the language of medicine, including the analysis and utilization of word roots, combining forms, prefixes, suffixes, and medical terms; emphasis is on written and spoken medical vocabulary. Prerequisite: Completion of two semesters of Biology courses.

BIOL 343. Practical Paleontology. 3 Hours.
Designed for students with an interest in fossils and how they can be used to reconstruct ancient ecosystems. This course covers principles of fossil data collection, preparation, conservation, and management with hands-on experience collecting fossils from the Texas, Oklahoma and Arkansas area. Practice fossil preparation skills and learn to identify fossils based on published descriptions. Students will be introduced to paleontological research using the fossils they find in two brief guided research project. Prerequisite: BIOL 1307 or equivalent or instructor's permission.

BIOL 402. Cell and Molecular Biology. 4 Hours.
This course consists of lectures and laboratory activities and will provide a strong background in the cellular and molecular aspects of biology. Topics include: methods in cellular and molecular biology, transcription in prokaryotes and eukaryotes, posttranscriptional events, translation, DNA replication, and recombination. Prerequisite: 8 SCH of Biology.

BIOL 415. Darwin and the Origin of Species. 3 Hours.
This course will focus on Darwin's hypotheses and compare his ideas with modern developments in the study of biological evolution.

BIOL 420. Global Change (EL). 3 Hours.
This course will focus on global change. Major topics covered include climate change, sea level change/coastal inundation, ocean acidification, and permafrost and the changing Arctic. This course integrates the principles of Experiential Learning (EL) and meets the criteria for project-based research. Prerequisite: 6 SCH of Biology.

BIOL 421. Endangered Ecosystems. 3 Hours.
This course will focus on endangered ecosystems and organisms from around the world. Coral reefs, Brazilian rain forest destruction, amphibian crisis, and the Gulf of Mexico Dead Zone will be studied in detail. Prerequisite: 6 SCH in Biology.

BIOL 422. Atmosphere and Biosphere. 3 Hours.
This course will focus on how the atmosphere affects the biosphere. Stratospheric ozone, black carbon (soot), El Nino, and the environmental impact of carbon monoxide will be studied in detail. Prerequisite: 6 SCH of Biology.

BIOL 425. Immunology. 4 Hours.
This is a course designed to introduce the immune system in all its aspects and is designed for the allied health students and biology majors. Topics include innate and adaptive immunity, generation of antibody and lymphocyte diversity, signaling molecules, cellular and humoral immunity, immunological failure in disease, and manipulation of immunity.

BIOL 430. Astrobiology. 3 Hours.
This course will focus on the understanding that astrobiology is concerned with the origin, evolution, and distribution of life in the Universe. It investigates life in its cosmic context. Cross listed with BIOL 530. Prerequisite: Two semesters of Biology or permission of the instructor.

BIOL 431. Genetic Engineering. 3 Hours.
This upper-division course will give a detailed overview of methodologies and techniques of molecular biology that allow the isolation, handling, and manipulation of DNA sequences in order to obtain a genetically modified protein or structurally alter the genome of an organism. In addition, students will explore the effects of genetic engineering applications on medicine, agriculture, biology, forensics, and other areas of technology. The discussion of potential ethical concerns of genome manipulations will also be included in this course. Prerequisites: Successful completion of two semesters of biology or approval by the instructor. It is recommended to have at least one other more specialized biology course such as Genetics (BIOL 310), General Microbiology (BIOL 311) or Introduction to Biotechnology (BIOL 490).

BIOL 437. Herpetology. 3 Hours.
This is a course designed to introduce the study of herpetology in all aspects, and is designed for Biology and science majors. Topics include the anatomy, physiology, taxonomy, systematics, natural history, distribution, ecology, and conservation of amphibians and reptiles; primarily North America species with special emphasis on local Texas native species. Prerequisites: BIOL 1306, BIOL 1307, BIOL 1106, BIOL 1107.

BIOL 443. Paleozoology. 3 Hours.
This course examines the fossil record of invertebrates and vertebrates throughout the Phanerozoic. Using lectures and hands-on workshops, this course will provide a brief overview of the geological time scale with emphasis on the importance of fossils to understand biostratigraphy, evolution, speciation, paleoclimate, stratigraphy, and biogeography. The usefulness of fossils to understand past and present climate changes will be covered.

BIOL 445. Virology. 3 Hours.
This course will introduce students to the biology of viruses, with a particular focus on viruses of medical importance. Topics covered will include virus structure; classification, evolution, and life cycles of viruses; methods used to study viruses; their interaction with host cells; mechanisms of pathogenicity; host responses of the host to viral infection and vaccine applications; in-depth study of the life cycles of the major classes of viruses and discussion of emerging viruses. Prerequisite: Two semesters of biology and BIOL 311, or instructor permission.

BIOL 446. Survey of Human Disease and Pathophysiology. 3 Hours.
This course is designed to provide the structural and functional characteristics of common and important diseases as well as the principles of diagnosis and treatment.

BIOL 447. Synthetic Biology. 3 Hours.
This course will explore the application of synthetic biology in the biomolecular sciences, looking at a range of techniques that have been used to build useful tools from biological components. We will focus on the current use of molecular bioengineering in the area of human health. This course reinforces advanced concepts in molecular biology, and would be useful for students interested in careers in medicine or pharmaceutical research. Cross-listed with BIOL 547. Prerequisite: Two semesters of biology and one semester of microbiology or approval of instructor.

BIOL 448. Vaccine and Antiviral Development. 3 Hours.
This course will focus on modern approaches to combat and immunize against dangerous viruses. Students will explore current topics in vaccine and antiviral design from proof-of-concept testing in the lab to clinical trial. This course reinforces advanced concepts in immunology, virology, and molecular biology, and would be useful for students interested in careers in health care or biomedical research. Some background knowledge of virology and/or immunology are recommended but not required. Prerequisite: Two semesters of Biology and one semester of Microbiology or approval of instructor. Some background knowledge of virology and/or immunology are recommended but not required.

BIOL 449. Vertebrate Histology. 4 Hours.
This course is the study of the cell and fundamental tissue types to include the microscopic structure of the organ systems of representative vertebrates. Emphasis will be on the relationship between microscopic structure and function. Prerequisite: Two semesters of biology, with Anatomy and Physiology recommended but not required.

BIOL 450. Limnology. 4 Hours.
This course is the study of the biological, chemical, and physical characteristics of the freshwater environment. Prerequisite: Two semesters of biology.

BIOL 456. Medical Microbiology. 3 Hours.
This upper-division course is designed to introduce students to the microbial species that cause human disease, with a special focus on bacterial and viral infections. Students will study the basic concepts of clinical microbiology, immunology, and epidemiology. Current topics will also be discussed, such as antibiotic resistance, public health threats, and global health. Prerequisites: Successful completion of two semesters of biology or approval by the instructor. It is recommended to have at least one other more specialized biology course such as Genetics (BIOL 310), General Microbiology (BIOL 311) or Cell and Molecular Biology (BIOL 402).

BIOL 466. Evolutionary Biology. 3 Hours.
This course covers the basic principles, mechanisms, and patterns of evolutionary biology including a historical survey of related ideas. Prerequisite: Two semesters of biology.

BIOL 470. Internship in Biology. 1-3 Hours.
This is a directed internship that provides biology students with the applications of biology related knowledge in an organization. The student receives hands-on experience under the joint guidance of a professional from an organization and a faculty supervisor. 1-3 credit hours available. May be repeated up to a maximum of 3 SCH. Prerequisite: Consent of instructor.

BIOL 472. Introduction to Forensic Science. 3 Hours.
This course is a study of basic concepts, techniques, practices, and procedures of criminalistics, including the most current technologies in forensic analysis. Criminal investigation of actual cases will be discussed with a minimum of scientific terminology. In addition, the course will emphasize the nature of physical evidence, including the use of DNA profiling. This course is strongly recommended for Criminal Justice majors and Pre-Allied Health track students in Biology. Prerequisite: Junior or Senior standing.

BIOL 473. Fundamentals of DNA Forensics. 4 Hours.
Fundamentals of DNA forensics explores the current methods of DNA typing. It encompasses current forensic DNA analysis methods, as well as biology, technology, and genetic interpretation. The course will follow the path of DNA evidence starting with sample collection and the processes of DNA extraction, quantitation, amplification, and statistical interpretation. By the end of the course, students will explore the important role of DNA evidence for law enforcement. Cross-listed with BTEC 473.

BIOL 481. Seminar in Biology. 3 Hours.
This course requires student participation in general and specific topics in biology. May be repeated in a different topic. Usually taken during junior or senior year. The course may be offered with or without COIL (Collaborative Online International Learning) component.

BIOL 487. Human Parasitology. 3 Hours.
This course is designed to provide students an overview of human parasites and their diseases. Topics include morphology, taxonomy, diagnosis, treatment, modes of transmission, and control of the major parasitic organisms in humans. A large portion of the above is learned by knowing the life cycles of the parasites in question and, thus, how to break the chain of infection. Parasitology is an interdisciplinary course that encompasses the fields of pathology, immunology, ecology, entomology, epidemiology, and systematics. Therefore, you won't only learn about parasites but also gain valuable knowledge of related disciplines. Prerequisites: Successful completion of two semesters of biology or approval by instructor. It is recommended to have at least one other more specialized biology course such as General Microbiology (BIOL 311), Cell and Molecular Biology (BIOL 402) or Immunology (BIOL 425).

BIOL 489. Independent Study in Biology. 1-4 Hours.
This course provides individual instruction. Students may repeat the course when topics vary.

BIOL 490. Introduction to Biotechnology. 4 Hours.
This course will explore the principles and applications of DNA science with special reference to recombinant DNA technology. This course is highly recommended for students focusing on a career in the medical field. Prerequisite: Junior or Senior standing.

BIOL 497. Special Topics. 1-4 Hours.
Instructors will provide an organized class designed to cover areas of specific interest. Students may repeat the course when topics vary.

BIOL 499. Independent Research. 1-6 Hours.
Independent research in Biology conducted by a student under the guidance of a faculty member of his or her choice. The student is required to maintain a research journal and submit a project report by the end of the semester and potentially make an oral presentation on the project. SCH and hours are by arrangement and, with a change in content, this course may be repeated for credit. Prerequisite: Consent of instructor.

CHEM 1311. General Chemistry I. 3 Hours.
This course covers the fundamental principles of chemistry. This course is the first of two general chemistry courses offered sequentially for majors in biological, health, and physical sciences. Topics include measurements, fundamental properties of matter, states of matter, chemical reactions, chemical stoichiometry, periodocity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, and an introduction to thermodynamics and descriptive chemistry. Prerequisite: MATH 1314 or MATH 2412. Corequisite: CHEM 1111.

CHEM 1111. General Chemistry I (Lab). 1 Hour.
This course introduces students to basic laboratory experiments supporting theoretical principles presented in CHEM 1311. The course introduces the scientific method, experimental design, data collection and analysis, and preparation of laboratory reports. Corequisite: CHEM 1311.

CHEM 1312. General Chemistry II. 3 Hours.
This course is the second course of the general chemistry sequence. Topics include chemical equilibrium, phase diagrams and specrometry, acid-base concepts, thermodynamics, kinetics, electrochemistry, nuclear chemistry, and an introduction to organic chemistry and descriptive organic chemistry. Prerequisite: CHEM 1111 and CHEM 1311. Corequisite: CHEM 1112.

CHEM 1112. General Chemistry II (Lab). 1 Hour.
This course introduces students to basic laboratory experiments supporting theoretical principles presented in CHEM 1312. Students will be introduced to the use of the scientific method in experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports. Prerequisite: CHEM 1111. Corequisite: CHEM 1312.

ED 311. Teaching and Learning for Social Change (EL). 3 Hours.
This foundational education course explores the breadth of educational settings for students and the role the teacher plays in disrupting structural inequities and advancing justice in the classroom. Cultural, emotional, physical, intellectual, and learning differences are studied for their impact on learning abilities and educational opportunity. The course draws upon a framework of understanding that includes the 1) introduce and prepare sections of the teacher education learning cycle and 2) the four dimensions of equity. Students will apply educational theory to practical implementation of high leverage practices and consider how such practices enhance learning for all students. Students must be considered in their junior year and will be required to participate in 10 hours of field experiences and participate in practice-based learning opportunities to complete course requirements. This course integrates the principles of experiential learning and meets the criteria for field work.

ED 321. Secondary School Methods. 3 Hours.
This course provides students seeking certification in grades 4-8 and 7-12 skills for reading, critiquing, and adapting curriculum, planning effective instruction, creating assessments that provide a feedback loop, implementing differentiated methods for diverse populations, and delivering content effectively. Students will apply skills and knowledge in lesson plans, unit plans, and teaching simulations. This course integrates the principles of Experiential Learning and meets the criteria for fieldwork.

ED 331. Classroom and Behavior Management. 3 Hours.
This course presents current strategies for classroom and behavior management including classroom procedures and expectations, organization of materials, and classroom space for optimum learner benefit. An emphasis will be placed on the high-leverage instructional practice, developing meaningful relationships. University students will engage in strategies that support equity for diverse and marginalized students and large diverse classrooms. Basic federal and state laws for all teachers, including teachers of students with disabilities (dyslexia, emotional/behavior disorders, autism), English as a Second Language (ESL) and other at-risk students will also be presented. This course will require university students to learn and practice strategies and techniques through authentic and interactive field experiences. Prerequisite: Admitted to the Teacher Preparation Program.

ED 435. Secondary Content Pedagogy. 3 Hours.
This course provides students seeking certification in grades 4-8 and 7-12 with pedagogical best-practices. Students will learn lesson planning, assessment, and available resources for their specific content area. Methods for accessing and processing information through traditional as well as new technologies will be addressed. Prerequisite: Admission to the Teacher Preparation Program.

ED 495. Field-Based Co-Teaching Semester. 3 Hours.
This course provided clinical experience in the public school setting as part of the field experience requirements for the undergraduate Teacher Preparation Program. The Teacher Candidate is required to spend six hours per week for 12 weeks in an assigned classroom. A university field supervisor in conjunction with the cooperating teacher supervises the Clincial Teacher. Block 1 is the first semester of the co-teaching assignment (2 semesters) in which the Teacher Candidate and Cooperating Teacher are considered co-teachers for the class. Course is graded on a Satisfactory (S) or Unsatisfactory (U) basis for 3 SCH. This course integrates the principles of experiential learning and meets the criterion for internship. Prerequisite: Met admission requirements to undergraduate field based placement guidelines.

ED 496. Clinical Co-Teaching Semester (EL). 3 Hours.
This course provided clinical experience in a public school setting as part of field experience requirements for the undergraduate Teacher Preparation Program. The Teacher Candidate is required to spend 72 complete instructional days in an assigned classroom. A university field supervisor in conjunction with the cooperating teacher supervises the Clinical Teacher. Block 2 is the second semester of the co-teaching assignment (2 semesters) in which Teacher Candidate and Cooperating Teacher are co-teachers for the public school class. Course graded on Satisfactory (S) or Unsatisfactory (U) basis for 3 SCH. This course integrates the principals of experiential learning and meets the criterion for internship. Prerequisite: successful completion of ED 495, continued acceptance in the public school classroom, and completion of program requirements.

ITED 350. Technology and Digital Literacy. 3 Hours.
This course is designed to assist students with developing skills for using web applications and mobile computing. The activities in the course assist students with promoting critical thinking and problem-solving skills by engaging them with digital tools being used in daily life. Topics covered include: technology in society, computers and digital components, the internet- how it works and making the most of web resources , applications for work and play, and systems software- operating systems, utilities and file management, information technology ethics, understanding and assessing hardware, digital devices and media and protection, information technology careers, software programming, databases and information systems, networking and security. There is an emphasis on using the Microsoft Office Suite of Products in this course including Word, Excel, PowerPoint, and Access.

PHYS 1301. College Physics I. 3 Hours.
This course covers algebra-level physics sequences for students in pre-professional programs, biology, geology, or architecture who do not expect to do additional work in engineering or physics. This course covers basic mechanics, fluids, and thermodynamics. Prerequisite: MATH 1314 and MATH 1316, or MATH 2312 or MATH 2412. Corequisite: PHYS 1101.

PHYS 1101. College Physics I Lab. 1 Hour.
Physics lab covers mechanics, heat, thermodynamics, and sound. Corequisite: PHYS 1301.

PHYS 1302. College Physics II. 3 Hours.
This course covers algebra-level physics sequence for students in pre-professional programs, biology, geology, and architecture who do not expect to do additional work in engineering or physics. The course covers electricity and magnetism, light, and modern physics. Prerequisite: PHYS 1301 and PHYS 1101, or PHYS 1401. Corequisite: PHYS 1102.

PHYS 1102. College Physics II Lab. 1 Hour.
Physics lab covers electricity and magnetism, light, and modern physics. Corequisite: PHYS 1302.

RDG 343. Content Area Literacy Instruction for Secondary Students. 3 Hours.
This course equips content area teachers with research-based strategies and skill to incorporate reading into science, mathematics, and/or social studies. Students will utilize strategies for morphemic awareness, comprehension, vocabulary, and written expression to develop a unit of study based on the TEKS for a subject area of choice. Additionally, students will assess curriculum materials and learn about additional tools and accommodations that teachers use to bridge student reading deficits to allow learning in the content area how to help their students learn the material presented.

SPED 410. Introduction to Individual with Exceptionalities. 3 Hours.
This course develops students' foundational knowledge of historical perspectives, educational principles, laws, and professional ethics and roles in the fields of special education and English Language Learners (ELL). It focuses on the learning and behavioral characteristics of diverse learners, including students with exceptionalities (which includes disabilities, Attention Deficit Hyperactivity Disorders, Dyslexia, and Gifted/Talented) students who are ELL and students who are Culturally and Linguistically Diverse Exceptional (CLDE) learners. Additionally, this course introduces instructional strategies, appropriate curriculum, accommodations, modifications, and assistive technology to ensure the success of all learners.

SPED 418. Inclusion of Students with High Support Needs in the Content Areas. 3 Hours.
This course presents research, issues, and trends related to the inclusion of secondary students with high-level support needs into content area classes in a manner that is equity-minded and socially just. Prerequisite: Admission to the Teacher Preparation Program.