

**University of Tennessee,
Chattanooga****2025-2026 Undergraduate Catalog****Course Descriptions**[Contract All Courses](#) |

Courses certified as satisfying General Education Requirements are identified in the course title with a two letter category abbreviation. General Education categories are listed below.

[Writing and Communication \(WC\)](#) [Humanities and Fine Arts \(HF\)](#) [Natural Science \(LL, LC & LB, NL\)](#)

[Behavioral and Social Science \(SB\)](#) [Quantitative Reasoning \(QR\)](#) [Individual and Global Citizenship \(CZ\)](#)

Biology**BIOL 4090 - Herpetology**

(4) Credit Hours

The biology of amphibians and non-avian reptiles with a strong emphasis on morphology, physiology, diversity, distribution, taxonomy, ecology, evolution and ethology. Laboratory includes problem solving and an in-depth approach to the identification of regional and global diversity as well as dissections, demonstrations and field trips. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#)

or [BIOL 3250](#)

or [BIOL 3350](#)

with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4100 - Pollinator Biology

4 Credit Hours

This course covers the biology and diversity of the functional group of organisms known as pollinators, that facilitate pollen transfer for plants. The focus is on their connections to the flora they pollinate, evolution of pollination and coevolution of pollinators & flora, diversity and taxonomy of pollinator groups, and ecological and agricultural importance of pollination as an ecosystem service. The laboratory includes field trips and student directed research. Spring semester. Lecture 3 hours, laboratory 4 hours. Prerequisites: [BIOL 3060](#)

or [BIOL 3250](#)

or [BIOL 3350](#)

with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4110 - Ichthyology

(4) Credit Hours

The biology of fishes, with an emphasis on the functional morphology, systematics, evolution, diversity, distribution, and

ecology of fishes. Laboratory includes identification of the diversity of regional fish faunas, as well as laboratory dissections and field trips. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4130 - Invertebrate Zoology

(4) Credit Hours

A survey of the invertebrate phyla up to the chordates with an emphasis on their evolution, morphology, and physiological adaptations. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4140 - Mammalogy

(4) Credit Hours

The biology of mammals, with an emphasis on diversity, distribution, systematics, structural evolution and paleontology, and functional morphology. Laboratory includes identification of regional diversity, as well as dissections and field trips. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4150 - Mycology

(4) Credit Hours

An introduction to the Kingdom Fungi: Mushrooms, molds, and yeasts. Morphology, life histories, classification, genetics, physiology, development, ecology, medical and economic importance of fungi. Lecture 3 hours, laboratory 2 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4170 - Ornithology

(4) Credit Hours

The biology of birds with an emphasis on avian evolution, taxonomy, anatomy and physiology, ecology, behavior and distribution. Laboratory includes identification of regional avifauna, as well as field trips and dissections. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4180 - Plant Morphology

(4) Credit Hours

A study of the form, reproductive processes, and evolutionary relationships of the algae, nonvascular and vascular plant groups. Lecture 2 hours, laboratory 4 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4190 - Plant Taxonomy

(4) Credit Hours

A study of the local vascular flora with a focus on classification systems (including artificial, natural, and phylogenetic systematic systems), the type method, nomenclature, plant evolution, ecology, speciation, pollination syndromes, origin of flowering plants, and edible vs. poisonous plants. Lecture 2 hours, laboratory 4 hours. Prerequisites: [BIOL 3060](#)
or [BIOL 3250](#)
or [BIOL 3350](#)
with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4195 - Field Botany

(3) Credit Hours

This course is designed to help mature developing field biologists / environmental consultants with respect to botany (and other field-based disciplines) or to give those with little experience the basics of field botany. It is also designed to give experiences to those looking to fields such as environmental consultant or employee of environmental governmental organizations (e.g., TVA, NFS, NPS, State Parks). The primary objectives of this course are to: (1.) learn common native and naturalized vascular plant species of our region and to learn how to properly identify these species. Training will go beyond memorizing names and focus on keying out species in scientific manuals; (2.) gain experience with how to identify, treat, and document several rare species in the Southern Appalachians; (3.) learn how to properly collect, document, and process (press, dry, label, mount, file) plant specimens from the field and build the collections at both UTC and HBS. In doing this we will also collect non-rare plant species in multiples to produce duplicate specimens for exchange, which will further build the UTC herbarium; (4.) learn how to properly use an herbarium/museum for aid in scientific determination of species and as a resource to understand the threatened and endangered species of a study area; (5.) learn the major ecological systems in our area; and (6.) learn basic plant community surveying techniques. Lecture 2 hour, laboratory 3 hours. Pre or Corequisites: [BIOL 3060](#)

or [BIOL 3350](#)

or [BIOL 3250](#)

with a minimum grade of C. Laboratory/studio course fee will be assessed. An additional Biology course fee will be assessed.

•BIOL 4200 - Molecular Genetics

(4) Credit Hours

An in-depth analysis of fundamental cellular flow of information from DNA to RNA to protein. Emphasis is on how these processes have been harnessed in the laboratory resulting in technologies such as DNA cloning and sequencing, the polymerase chain reaction (PCR), genetic testing, gene therapy, genetic engineering and DNA forensics. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3250](#)

with minimum grades of C or Department Head approval. Laboratory/studio course fee will be assessed.

•BIOL 4210 - Introductory Animal Physiology

(4) Credit Hours

A detailed analysis of animal physiology at cellular, systems, and organismal levels. Laboratory emphasizes an experimental approach to learning animal physiology. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3250](#) with a minimum grade of C; [CHEM 1120](#)

and [CHEM 1120L](#)

; or Department Head approval. Laboratory/studio course fee will be assessed.

•BIOL 4220 - Principles of Microbiology

(4) Credit Hours

The biology of prokaryotic microorganisms and their interactions with humans including clinical, industrial, and environmental aspects. An introduction to viruses is included. Lecture 3 hours, laboratory 4 hours. Prerequisites: [BIOL 3250](#)

with a minimum grade of C; [CHEM 1120](#)

and [CHEM 1120L](#)

; or Department Head approval. Credit not allowed in both [BIOL 2100](#)

and BIOL 4220. Laboratory/studio course fee will be assessed.

•BIOL 4230 - Biodiversity in Mate Selection

(3) Credit Hours

Have you ever wondered how animals select their mates? Is it based on appearance? Or the resources that individuals have? Or perhaps mates are chosen based on smell? Or is it something else? This course will provide a look into the amazing diversity of mate choice in animals (including humans!). We will address the following central questions: 1) how variable is mate choice in animals? 2) why do females tend to be the choosier sex in many animals? 3) what traits are preferred in mate choice across non-human animals? 4) how do humans select mates? 5) what are the evolutionary consequences of mate choice? Spring semesters, as needed. Prerequisites: [BIOL 3060](#) and [BIOL 3350](#)

with minimum grades of C or Department Head approval.

Effective Spring 2026.

BIOL 4240 - Molecular Ecology and Evolution

(4) Credit Hours

An integration of ecology, genetics, and evolutionary biology with emphasis on applications of genetic concepts in the areas of conservation genetics, phylogeography, and molecular phylogenetics. Lectures and computer labs will explore contemporary approaches to studying how diversity is generated and maintained in natural populations and will discuss case studies and scientific articles. Fall semester. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3250](#) and [BIOL 3350](#)

with minimum grades of C or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4260 - Outreach in Science and Education

(2) Credit Hours

Simultaneously learn how to organize public outreach and education events as well as get firsthand experience in organizing and running a nonprofit educational event centered on education, biology, environmental science, ecology, conservation, land management and more. The Spring Wildflower Pilgrimage in the Great Smoky Mountains National Park (GSMNP), which began in 1951, is the oldest and largest public outreach event of its kind in the US. Each year more than 200 educational programs are created and more than 100 leaders are organized to educate approximately 1000 people over four days in what has been called “natures greatest classroom,” the GSMNP. This class will not be based on exercises and examples, but actually building, working for, and attending the event. The course will begin with an overview of the Pilgrimage and we will get right to work assembling the Program and advertising its launch by mid-February, advertising and opening registration in March, and then **all students will be required to attend and assist with the event during a week in April (although we will make a schedule so students are not working the entire week, have time to attend programs of interest, and take some personal time).** Lodging in Gatlinburg, TN as well as three meals a day during the event will be provided for students in this class, and we can schedule time off for exams that need to be taken and for you to attend some of the event! Some of you will also need to attend the Association of Southeastern Biologists meeting, which is usually mid-March. Those of you who do this will not be required to work as much during the actual event in April and will serve more as team leaders during the actual event. Spring semesters. Junior standing. May be registered as ESC 4260, BIOL 4260, or GEOL 4260.

Effective Spring 2026.

BIOL 4280 - Cellular Biology

(4) Credit Hours

An exploration of life's basic unit: morphological and chemical organization of cells, cell biochemistry, life cycles, cellular reproduction and cell regulation, bioenergetics, cellular respiration, photosynthesis, cell molecular genetics, cell signaling and communication, cancer; immune response. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3250](#) with a minimum grade of C; [CHEM 3020](#) and [CHEM 3020L](#)

; or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4310 - Behavioral Ecology

(4) Credit Hours

An exploration of i) how ecology shapes animal behavior, ii) the survival and reproductive consequences of behavior, and iii) evolution of behavior. Lecture/discussion topics include predation, foraging, competition, mating, and social behavior of animals, including humans. In the laboratory, students engage in a semester-long project culminating in a group presentation. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3350](#) with minimum grade of C or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4325 - Wildlife Administration and Policy

(3) Credit Hours

Responsibilities of private, state, and federal natural resources management agencies. Legal and political processes in areas of environmental, wildlife and natural resources. Fall semester. Lecture 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3070](#) or Department Head approval. May be registered as ESC 4325. Credit not allowed in both BIOL 4325 and ESC 4325.

BIOL 4330 - Principles and Management of Wildlife Disease

(3) Credit Hours

Fundamental causes of disease-induced morbidity and mortality among free-ranging wildlife populations. Emphasis on the etiology, pathobiology, clinical signs, lesions, epidemiology, diagnosis, zoonoses, population significance, and management significance of diseases produced by toxicologic, viral, microbial, parasitic, and fungal pathogens. The implications for management and conservation strategies will be debated. Additional concepts such as the species-barrier, animals as model's infectious disease, the animal human interface, agricultural production, and disease surveillance will be also be covered. Fall or Spring semester. Lecture 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3070](#) or Department Head approval. May be registered as [ESC 4330](#). Credit not allowed in both BIOL 4330 and [ESC 4330](#).

BIOL 4335 - Wildlife Education and Rehabilitation

(4) Credit Hours

Studies of the natural history, ecology and rehabilitation of native wildlife species, as well as humane resolutions to common conflicts with humans. Participating in the design and delivery of educational programs focusing on these topics will be required, as well as ecological observations and volunteering with local wildlife rehabilitators. Every semester. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#) with C or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4340 - Human Development and Disease

(4) Credit Hours

The study of genetic, physiological, environmental and interactive variables that influence human development from gametogenesis to birth. Students should acquire an understanding of how development occurs in humans and the relationship between abnormal developmental processes and human disease states. Laboratory explores human development through the use of embryological slides, models, and applied techniques. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3250](#)

with a minimum grade of C or Department Head approval; [BIOL 4050](#)

recommended. Pre or Corequisites: [CHEM 3020](#)

and [CHEM 3020L](#)

or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4360 - Plant Physiology**(4) Credit Hours**

Vascular plant structure and function emphasizing physiological activities, such as photosynthesis, water relations, mineral nutrition, and hormonal action. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3250](#)

with a minimum grades of C or Department Head approval. Pre or Corequisites: [CHEM 3010](#)

and [CHEM 3010L](#)

or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4370 - Urban Gardening-Organoponics**(1) Credit Hours**

A true teaching and experiential-learning course providing students the opportunity to understand and employ basic techniques of plant production, maintenance, harvesting and processing. Students will become familiar with concepts of soil quality, preparation techniques, and soil improvement strategies, using different treatment and management approaches. Students will learn to use and manipulate basic implements utilized in gardening activities, and to evaluate alternative methods / approaches to the use of agrochemicals to guarantee the production of true natural organic products. Students will also be involved in planning and organizing activities for the establishment of urban gardens. 2 contact hours / week, including field and classroom sessions. Prerequisites: [BIOL 1120](#)

or [ESC 1510](#)

or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4380 - Toxicology**(4) Credit Hours**

Basic principles of toxicology, including physiological responses to toxicants, toxic effects, elimination of toxic agents, fundamental laws governing the interaction of foreign chemicals with biological systems, and toxicity testing methods. Lab component addresses analytical methods for measuring physiological responses to toxicant exposure. Lecture 2 hours, laboratory 4 hours. Prerequisites: [ESC 1510](#)

or [BIOL 3250](#)

with a minimum grade of C; [CHEM 3010](#)

and [CHEM 3010L](#)

; [MATH 1130](#)

; or Department Head approval. May be registered as [ESC 4380](#)

. Credit not allowed in both BIOL 4380 and [ESC 4380](#)

. Laboratory/studio course fee will be assessed.

BIOL 4390 - Marine Ecology

3 Credit Hours

This course explores the marine environment. We will examine: 1) the physical and ecological processes of the marine environment; 2) the ecosystems of the marine environment, and 3) the impacts of humans on the marine environment. Lecture and discussion topics include: The World Ocean, its role in climate, its geological features, and its circulation patterns; primary, secondary, and microbial productivity; survey of ecology of various marine ecosystems; and the impacts of fisheries, aquaculture, climate change, and pollution. Fall and Spring semesters. Lecture 3

hours. Prerequisites: [BIOL 3060](#)

with a minimum grade of C or Department Head approval. Junior standing.

BIOL 4400 - Tropical Marine Ecology

(4) Credit Hours

An examination of tropical marine habitats at the species, population and ecosystem levels with particular emphasis on seagrass beds, coral reefs, mangrove forests, tidal rivers and lakes, and the intertidal zone. The required field component is a one-week experience at a field station in the Caribbean. Lecture 2 hours, laboratory/field experience 4 hours. Prerequisites: [BIOL 3060](#)

or [BIOL 3250](#)

or [BIOL 3350](#)

with minimum grades of C, or Department Head approval. May be registered as [ESC 4400](#)

. Laboratory/studio course fee will be assessed.

BIOL 4410 - Animal Behavior

(4) Credit Hours

The principles of animal behavior emphasizing the proximate mechanisms of behavior. Topics include behavioral genetics, ontogeny, learning, perception, communication, and play. Lecture 3 hours, laboratory 2 hours. Prerequisites:

[BIOL 3060](#)

and [BIOL 3250](#)

and [BIOL 3350](#)

with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4420 - Biogeography

(3) Credit Hours

A study of the distribution of taxa through geographic space and time from an ecological and historical perspective. Prerequisites: [BIOL 3060](#)

and [BIOL 3250](#)

and [BIOL 3350](#)

with minimum grades of C, or Department Head approval.

BIOL 4430 - Bioremediation

(4) Credit Hours

A study of the potential use of biological systems in the remediation of areas contaminated with toxic pollutants. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3250](#) and [BIOL 3350](#) with minimum grades of C; and [BIOL 4220](#); and [CHEM 3010](#); or Department Head approval. May be registered as [ESC 4430](#). Credit not allowed in both BIOL 4430 and [ESC 4430](#). Laboratory/studio course fee will be assessed.

BIOL 4440 - Developmental Vertebrate Embryology

(4) Credit Hours

Current developmental processes and concepts drawn from selected invertebrate studies, but with major emphasis on experimentation in higher vertebrates. Laboratory explores vertebrate development through embryological slides, films and experimentation. Lecture 2 hours, laboratory 4 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3250](#) and [BIOL 3350](#) with minimum grades of C or Department Head approval. [BIOL 4050](#) recommended. Pre or Corequisites: [CHEM 3020](#) and [CHEM 3020L](#) or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4460 - Global Change Biology

(3) Credit Hours

A study of the influence and response of organisms to changes in the environment that are global in scale, including climate and land-use changes, from past, present and future perspectives. Lecture 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3350](#) with minimum grades of C or Department Head approval. May be registered as [ESC 4460](#). Credit not allowed in both BIOL 4460 and [ESC 4460](#).

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BIOL 4480 - Ant Ecology

(4) Credit Hours

Ant Ecology is a hands-on, research-based introduction to the influences and interactions of ant populations on ecosystem processes, with an emphasis on phenomena including population regulation, food webs, ant-species interactions, systematics, ecosystem services, biodiversity and invasive species. This course includes a lab where students will apply various field sampling methods, use lab techniques to assess morphology, behavior and interactions to develop and test their own hypotheses. Fall semester. Lecture 3 hours, laboratory 2 hours. Prerequisites: [BIOL 3060](#) or [BIOL 3350](#)

with a minimum grade of C or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4490 - Ecology of Rarity

(3) Credit Hours

Many species are rare, and rare species are the most susceptible to extinction. This course will focus on biological rarity through exploration of 1) the myriad manifestations of 'rarity', 2) the importance of rare species within communities, 3) the ecological causes and/or consequences of rarity, and 4) challenges for rare species conservation in a rapidly changing natural world. Lecture 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3350](#) with a minimum grade of C.

BIOL 4500 - Systematics

(3) Credit Hours

Principles of systematic biology including contemporary systematic philosophies, problems of species and speciation, taxonomic characters and interpretation, construction of evolutionary trees, higher categories and classification, nomenclature, taxonomic collections and procedures of identification. Prerequisites: [BIOL 3350](#) with minimum grades of C or Department Head approval.

BIOL 4512 - Amphibian Ecology and Conservation

(3) Credit Hours

To understand the biological diversity, ecology, evolution, and cultural and environmental value of amphibians and to introduce the types and sources of information that must be known should one include amphibian conservation as professional career. Students who take this course should become more informed biologically and culturally about amphibians than someone (fellow students, family, friends, politicians) who has not taken the course, and be prepared to explain the global and regional value and importance of amphibians. In this course we will examine the conservation related aspects of amphibians and their habitats. These aspects include the patterns of biological diversity, ecology, life history, law, policy, trade, and the over-arching methods used to measure, and monitor amphibian biodiversity will be reoccurring themes. Spring semester odd years. Lecture 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3070](#) or Department Head approval. May be registered as [ESC 4512](#). Credit not allowed in both BIOL 4512 and [ESC 4512](#).

BIOL 4514 - Reptile Ecology and Conservation

(3) Credit Hours

To understand the biological diversity, ecology, evolution, and cultural and environmental value of reptiles and to introduce the types and sources of information that must be known should one include reptile conservation as professional career. Students who take this course should become more informed biologically and culturally about reptiles than someone (fellow students, family, friends, politicians) who has not taken the course, and be prepared to explain the global and regional value and importance of reptiles. In this course we will examine the conservation related

aspects of reptiles and their habitats. These aspects include the patterns of biological diversity, ecology, life history, law, policy, trade, and the over-arching methods used to measure, and monitor reptile biodiversity will be reoccurring themes. Fall semester odd years. Lecture 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3070](#) or Department Head approval. May be registered as [ESC 4514](#). Credit not allowed in both BIOL 4514 and [ESC 4514](#).

• **BIOL 4520 - Limnology and Reservoir Ecology**

(4) Credit Hours

Chemical, physical, and biological processes in lake and reservoir systems (nutrient budgets and cycling, hydrodynamics, phytoplankton/ zooplankton/benthic dynamics, and physical similarities and differences in lakes and reservoirs). Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#), [BIOL 3250](#), [BIOL 3350](#), [CHEM 1110](#), and [CHEM 1120](#), all with minimum grades of C, or Department Head approval. May be registered as [ESC 4520](#). Credit not allowed in both BIOL 4520 and [ESC 4520](#). Laboratory/studio course fee will be assessed.

• **BIOL 4530 - Microbial Ecology**

(4) Credit Hours

A study of microorganisms in their natural environment with regard to microbial evolution, growth, interactions, dispersal mechanisms, ecological significance, and biotechnology applications. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#), [BIOL 3250](#), [BIOL 3350](#), [BIOL 4220](#), and [CHEM 3010](#), all with minimum grades of C, or Department Head approval. Laboratory/studio course fee will be assessed.

• **BIOL 4540 - Plant Ecology**

(4) Credit Hours

A study of relationships of plants with their living and non-living environment, explored from the levels of plant individuals, populations and communities. Laboratory component includes hands-on experimentation and field activities developed to assess plant responses to abiotic and biotic environmental conditions. Lecture 3 hours, laboratory 3 hours. Prerequisites: [BIOL 3060](#) and [BIOL 3350](#) with minimum grades of C, or Department Head approval. May be registered as [ESC 4540](#). Credit not allowed in both BIOL 4540 and [ESC 4540](#). Laboratory/studio course fee will be assessed.

BIOL 4550 - History of Evolutionary Thought

(4) Credit Hours

A study of the historical and scientific origin of the Theory of Evolution and Darwin's Theory of Natural Selection, along with their important conceptual precursors, including the significance of fossils, the reality of Extinction, and the discovery of "Deep Time," through an analysis of historical and scientific texts. Additional topics to be considered will include the nature of Science, Human Evolution and the modern Creationism/Evolution controversy. The course includes a required lab, with several required local field trips and hands-on exercises in paleontology, radiometric dating, and population genetics. Course will satisfy Advanced Ecology & Evolution category requirement for Biology majors. Prerequisites: Completion of [BIOL 3350](#)

and [BIOL 1130](#)

and 3.25 GPA or better in major, or UHON standing, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4590 - Advanced Topics in Evolutionary Ecology

(3) Credit Hours

Exploration of advanced topics in evolutionary ecology. Topics to be focused on include life-history evolution, sexual selection, parental investment, mating systems, social behavior, and/or topics that are the focus of current active research in the field of evolution. Prerequisites: [BIOL 3350](#)

and [BIOL 3060](#)

with minimum grades of C or Department Head approval. May be registered as [ESC 4590](#)

. Credit not allowed in both BIOL 4590 and [ESC 4590](#)

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BIOL 4610R - Biology Seminar

(1) Credit Hours

Presentation of programs of current biological interest by students, faculty, and outside speakers. Maximum credit: 2 hours. Prerequisites: Eight semester hours biology or Department Head approval.

Effective Spring 2026.

BIOL 4620 - Economic Botany

(3) Credit Hours

An introduction to the origins, history, diversity and importance of plants in the human experience. History of the domestication of important crops and the impact of plants on the quality of human life covered. Ethnobotany and the impacts of agriculture and exotic plants will be discussed as they relate to the future of the world's supply of food, fiber, medicines and other plant products. Prerequisites: [BIOL 3060](#)

or [BIOL 3250](#)

or [BIOL 3350](#)

with minimum grades of C, or [ESC 1510](#)

with a minimum grade of C, or Department Head approval.

BIOL 4680 - Introduction to Soil Resources

(4) Credit Hours

Introduction to the study of soils and exploration of fundamental principles of origin, nature and constitution of soils. The geological origin of soils and factors of soil formation. Study of soil's physical, chemical and biological properties in determining the suitability of land for various uses. The environmental impact of agricultural and non-agricultural soil and land use. Soil erosion and conservation. The conquest of land through 7000 years and the impact human actions. Spring semester. Lecture 3 hours, laboratory 3 hours. Prerequisites: [ESC 1510](#) with a minimum grade of C, or Department Head approval. May be registered as [ESC 4680](#)

- . Credit not allowed in both BIOL 4680 and [ESC 4680](#)
- . Laboratory/studio course fee will be assessed.

BIOL 4710 - Histology

(4) Credit Hours

Structure of animal tissues and organ levels with emphasis on recognition, origin, and function of mammalian tissues. Lecture 2 hours, laboratory 4 hours. Prerequisites: [BIOL 3060](#) or [BIOL 3250](#) or [BIOL 3350](#) with minimum grades of C; [CHEM 1120](#) and [CHEM 1120L](#); or Department Head approval. [BIOL 2060](#) or [BIOL 4220](#) recommended. [CHEM 3020](#) and [CHEM 3020L](#) recommended. Laboratory/studio course fee will be assessed.

BIOL 4720 - Immunology

(3) Credit Hours

An introduction to immunology focused on mammalian immune system responses to foreign cells or substances. Pre or Corequisites: [BIOL 2100](#) or [BIOL 4220](#) or Department Head approval.

BIOL 4740 - Virology

(3) Credit Hours

An introduction to the biology of bacteriophage and animal viruses with emphasis on the biochemical, molecular and biophysical properties of viruses. Specific areas of virology, including viral structure and assembly, viral replication, viral recombination and evolution, virus-host interactions, viral transformation, gene therapy, antiviral drugs, and vaccines will be presented with regard to basic epidemiological, medical and biotechnological applications. Viroids, prions and unconventional agents will be discussed secondarily. Prerequisites: [BIOL 3250](#) with a minimum grade of C or Department Head approval. [BIOL 4220](#) recommended.

BIOL 4750 - Dendrology

(4) Credit Hours

The biology, ecology, and culture of trees, shrubs, and woody vines. Diversity, systematics, distributions, and importance to natural, agricultural, and urban ecosystems will be covered. Laboratory will focus on forests of the Southeast and the identification of native and introduced species. Field trips required. Lecture 3 hours, laboratory 2 hours. Prerequisites:

[BIOL 3060](#)

or [BIOL 3250](#)

or [BIOL 3350](#)

with minimum grades of C, or [ESC 1510](#)

with a minimum grade of C, or Department Head approval. Laboratory/studio course fee will be assessed.

BIOL 4760 - Human Infectious Diseases

(3) Credit Hours

The course introduces basic concepts of infectious disease, including immunology, etiology, epidemiology, pathogenesis, symptoms, diagnosis, prevention and treatment. Emphasis will be on bacteria and viruses of medical importance. Lecture 3 hours. Prerequisites: [BIOL 4220](#) with a minimum grade of C or instructor approval.

BIOL 4770 - Cancer Biology

3 Credit Hours

A comprehensive overview of the biology, genetics and molecular basis of cancer. This course will explore the role of mutations in the onset and progression of cancer, and how they lead to the dysregulation of essential biological properties important to normal cell proliferation, cell cycle regulation and tissue differentiation. The implications of the biological findings on cancer prevention, diagnosis, classical and personalized cancer treatment strategies and prognosis will be discussed. Lecture 3 hours. Prerequisites: [BIOL 3250](#) with a minimum grade of C or Department Head approval. [BIOL 4280](#) recommended.

BIOL 4780 - Deja Flu: Epidemiological Impacts of Emerging and Reemerging Infectious Diseases

(3) Credit Hours

The course will examine epidemics from a variety of perspectives. With a central theme of microbial transmission dynamics, the class will consider historical, political, social, ethical, and economic factors that influence society's handling of epidemics and pandemics. Several case studies will examine viral and bacterial causes of widespread disease, highlighting advancements in epidemiology. Students will learn about the evolution of biology, public health and medicine through the lens of disease outbreaks. Spring semester. Prerequisites: [BIOL 1110](#) or Department Head approval. Junior standing.

BIOL 4995R - Departmental Thesis

(1-3) Credit Hours

A two-semester research or creative project resulting in a thesis under the supervision of a faculty member and with the approval of the Honors College. On demand. Prerequisites: Student must coordinate with Honors College to submit a Thesis Contract to get registered for this course. Restricted to Sophomore standing or higher. Laboratory/studio course fee will be assessed.

BIOL 4997R - Research

(1-9) Credit Hours

Enables students to conduct independent research. On demand. Prerequisites: Student must coordinate with a specific faculty member to complete the Research contract to get registered for the course. Restricted to Sophomore standing or higher.

BIOL 4998R - Individual Studies

(1-9) Credit Hours

Enables students to study selected topics in depth. On demand. Prerequisites: Student must coordinate with a specific faculty member to complete the Individual Studies contract to get registered for the course. Restricted to Sophomore standing or higher.

BIOL 4999R - Group Studies

(1-9) Credit Hours

Department may have additional prerequisite requirements. On demand. Prerequisites: Department Head approval.

Chemical Engineering

ENCH 1000 - Introduction to Chemical Engineering

(2) Credit Hours

This course introduces the students to Chemical Engineering methods such as material and energy balances, unit operations and systems of unit operations, engineering design and tools, and the broad variety of fields where Chemical Engineering principles and methods are important. Fall semester. Differential course fee will be assessed.

ENCH 1999R - Special Projects

(1-9) Credit Hours

Individual or group projects. On demand. Prerequisites: Department Head approval. Differential course fee will be assessed.

ENCH 2240 - Chemical Engineering Computations

(3) Credit Hours

This course introduces common computational techniques that are used in Chemical Engineering. Topics include solving algebraic equations, data analysis, numerical differentiation and integration, and numerical solutions of differential equations applied to chemical engineering problems. Multiple numerical approaches will be used, including an introduction to computer programming. Fall semester. Prerequisites: [ENCH 1000](#) or Department Head approval. Differential course fee will be assessed.

ENCH 2999R - Group Studies

(1-9) Credit Hours

On demand. Prerequisites: Department Head approval. Department may have additional prerequisite requirements. Differential course fee will be assessed.

ENCH 3030 - Thermodynamics

(3) Credit Hours

Classical thermodynamics with emphasis on first and second laws of thermodynamics. Property relationships, chemical equilibrium, and cycle analysis. Fall and Summer semesters. Lecture 3 hours. Prerequisites: [ENCE 1040](#) with a minimum grade of C and MATH 1920 or [MATH 1960](#) or Department Head approval. May be registered as [ENME 3030](#). No credit in both ENCH 3030 and [ENME 3030](#). Differential course fee will be assessed.

ENCH 3040 - Chemical Thermodynamics

(3) Credit Hours

Classical Chemical Engineering Thermodynamics, including some work cycles, vapor-liquid equilibria, non-ideal liquid mixtures, non-ideal vapor mixtures, solubility, chemical reaction equilibria, and some special topics. Prerequisites: [ENCH 3030](#) or [ENME 3030](#) with a C or better, and [MATH 2450](#) with a C or better, or Department Head approval. Differential course fee will be assessed.

ENCH 3280 - Control Systems

(3) Credit Hours

Classical feedback control systems for continuous time systems. Block diagrams and performance criteria. Root locus, frequency methods and state space approach. Fall and Spring semesters. Lecture 3 hours. Prerequisites: [ENME 2240](#) or [ENEE 2250](#) with a minimum grade of C; [ENCH 3030](#) or [ENME 3030](#) with a minimum grade of C; and [MATH 2450](#) or Department Head approval. Pre or Corequisites: [ENCH 3280L](#) or ENME 3280L or Department Head approval. May be registered as [ENME 3280](#). No credit allowed in both [ENME 3280](#) and ENCH 3280. Differential course fee will be assessed.

ENCH 3280L - Control Systems Laboratory

(1) Credit Hours

Experimental and simulation studies of dynamic engineering systems. System identification and feedback controller design. Application of statistics. Fall and Spring semesters. Laboratory 3 hours. Prerequisites: [ENCE 2220](#) with a minimum grade of C or Department Head approval. Pre or Corequisites: [ENCH 3280](#) or [ENME 3280](#) or Department Head approval. May be registered as ENME 3280L. No credit allowed in both ENME 3280L and ENCH 3280L. Laboratory/studio course fee will be assessed. Differential course fee will be assessed.

ENCH 3310 - Chemical Process Principles

(3) Credit Hours

Quantitative relations of chemical reactions and physico-chemical processes. Calculations based on gases, vapors, humidity, and process material balances. Study of industrial processes involving thermo physics, thermo chemistry, and heat balances. Fall semester. Lecture 3 hours. Prerequisites: [CHEM 1110](#) and [MATH 1960](#) with a minimum grade of C or Department Head approval. Differential course fee will be assessed.

ENCH 3320 - Heat Transfer Processes

(3) Credit Hours

Problem-solving in the three modes of heat transfer—conduction, convection, and radiation separately and in combinations. Additional topics might include boiling, condensation, and heat exchanger design. The purpose of this course is to enable the student to gain an understanding of the mechanisms and modes of heat transfer and the methods of analysis and design of heat transfer equipment. Principles of heat transfer process in engineering and industrial applications. Practical heat transfer equipment. Spring semester. Lecture 3 hours. Prerequisites: [ENCH 3030](#) or [ENME 3030](#) and [MATH 2450](#)

with minimum grade of C or Department Head approval. Differential course fee will be assessed.

ENCH 3350 - Unit Operations Laboratory

(1) Credit Hours

Laboratory experiments in unit operations such as biological growth, mechanical separations, liquid/liquid extraction, and chemical reactions. Application of current research techniques. Evaluation of environmental impacts of chemical operations and processes. Fall semester. Laboratory 3 hours. Pre or Corequisites: [CHEM 3010](#) and [CHEM 3010L](#) and [ENCH 3310](#)

or Department Head approval. Laboratory/studio course fee will be assessed. Differential course fee will be assessed.

ENCH 3999R - Group Studies

(1-9) Credit Hours

On demand. Prerequisites: Department Head approval. Department may have additional prerequisite requirements. Differential course fee will be assessed.

ENCH 4250 - Sustainability Engineering

(3) Credit Hours

Triple Bottom Line Sustainability analysis, Life Cycle Assessment, and Cleaner Production Technologies. Engineering and the Society, Green Engineering, Sustainable Energy and Design for the Environment. Fall and Spring semesters. Lecture 3 hours. Prerequisites: [ENCE 2220](#)

with a minimum grade of C or [DATA 2130](#) and MATH 1910 or [MATH 1950](#)

with minimum grades of C or Department Head approval. Pre or Corequisites: [ENCE 3520](#) or Department Head approval. Differential course fee will be assessed.

ENCH 4290 - Introduction to Chemical Engineering Design

(3) Credit Hours

Introduction to systems design techniques and the design of chemical processes. Course covers case studies of various commercial chemical production processes. Students will engage in individual and group problem solving. Emphasis is placed on preparing for routine commercial engineering assignments; including engineering diagrams, cost estimation,

environmental and health and safety considerations and project management. Corequisites: [ENCH 4350](#) or Department Head approval. Senior standing in Chemical Engineering or Department Head approval. Differential course fee will be assessed.

ENCH 4300 - Chemical System Design

(3) Credit Hours

Application of systems design techniques to the design of chemical processes. Discussion of case studies including separation processes, heat exchanger networks, and process utilities. Individual or group design problems. Spring semester. Lecture 3 hours. Prerequisites: [ENCH 4290](#)

; [ENCH 4320](#)

, [ENCH 4330](#)

, [ENCH 4350](#)

with minimum grades of C or Department Head approval. Corequisites: [ENCH 4340](#)

or Department Head approval. May be registered as ENEV 4300. Credit not allowed in both ENCH 4300 and ENEV 4300. Differential course fee will be assessed.

ENCH 4320 - Fractional Distillation Separation Processes

(3) Credit Hours

Fundamental variables of separation processes. Ideal and non-ideal binary vapor-liquid phase equilibria. Application of fundamental principles for systems with simultaneous heat and mass transfer. Design of flash, batch and continuous distillation processes. Analysis of azeotropic and extractive distillation systems, as well as absorption and liquid-liquid extraction processes. Fall semester. Lecture 3 hours. Prerequisites: [ENME 3070](#)

and [ENCH 3320](#)

with minimum grades of C or Department Head approval. Differential course fee will be assessed.

ENCH 4330 - Chemical Process Operations

(3) Credit Hours

Fundamental variables of chemical operations; generalized treatment of mass-transfer processes. Application to continuous and stage-wise separation processes. Computational and design projects. Fall semester. Lecture 3 hours. Prerequisites: [ENME 3070](#)

and [ENCH 3310](#)

with minimum grades of C or Department Head approval. Differential course fee will be assessed.

ENCH 4340 - Chemical Kinetics and Reactor Design

(3) Credit Hours

Concepts of chemical kinetics applied to reactor design. Effects of temperature, pressure, concentration, and catalysis on rates of chemical reactions. Design of batch, back mix, and tubular reactors. Computational and design projects. Lecture 3 hours. Spring semester. Prerequisites: [ENME 3070](#)

, [ENME 3070L](#)

, [ENCH 3320](#)

with minimum grades of C, [CHEM 3710](#)
or Department Head approval. Differential course fee will be assessed.

ENCH 4350 - Chemical Processes Laboratory

(2) Credit Hours

Laboratory experiments in unit operations such as energy transfer systems, distillation, drying, gas-liquid absorption, pressure swing absorption and chemical reactions. Introduction to chemical process simulations. Application of current research techniques. Evaluation of environmental impacts of chemical operations and processes. Fall semester.

Laboratory 3 hours. Lecture 1 hour. Prerequisites: [ENCE 2220](#)

, [ENCH 3310](#)

, [ENCH 3320](#)

with minimum grades of C or Department Head approval. Corequisites: [ENCH 4320](#)

, [ENCH 4330](#)

or Department Head approval. Laboratory/studio course fee will be assessed. Differential course fee will be assessed.

ENCH 4995R - Departmental Thesis

(1-3) Credit Hours

A two-semester research or creative project resulting in a thesis under the supervision of a faculty member and with the approval of the Honors College. On demand. Prerequisites: Student must coordinate with Honors College to submit a Thesis Contract to get registered for this course. Restricted to Sophomore standing or higher. Differential course fee will be assessed.

ENCH 4997R - Research

(1-9) Credit Hours

Enables students to conduct independent research. On demand. Prerequisites: Student must coordinate with a specific faculty member to complete the Research contract to get registered for the course. Restricted to Sophomore standing or higher. Differential course fee will be assessed.

ENCH 4998R - Individual Studies

(1-9) Credit Hours

Enables students to study selected topics in depth. On demand. Prerequisites: Student must coordinate with a specific faculty member to complete the Individual Studies contract to get registered for the course. Restricted to Sophomore standing or higher. Differential course fee will be assessed.

ENCH 4999R - Group Studies

(1-9) Credit Hours

Department may have additional prerequisite requirements. On demand. Differential course fee will be assessed.

Chemistry

CHEM 1000 - How to Learn Chemistry

(1) Credit Hours

The purpose of the course is to teach growth mindset strategies that empower students to succeed in chemistry and other college level courses and to reinforce basic chemistry and math skills which are fundamental to success in all chemistry courses. Students will learn the concept of metacognition and how to apply metacognitive strategies for deep learning. In parallel students will review basic chemistry and math concepts from a growth mindset perspective. Fall and Spring semesters. Pre or Corequisites: [CHEM 1050](#)

or [CHEM 1110](#)

or Department Head approval. Satisfactory/No Credit.

CHEM 1010 - Foundations of Chemistry (LC)

(3) Credit Hours

An overview of the mathematical foundations and fundamental concepts that compose introductory chemistry coursework. This course is designed to enhance problem-solving skills and practice applying mathematical procedures to chemistry concepts. This course does not count towards a chemistry major or minor, and it does not satisfy the entrance requirements of medical, veterinary medical, or dental schools. Credit may not apply toward a chemistry major.

General Education Category: Natural Science Lecture

CHEM 1019 - Light and Life: The Chemistry of Photography (LL)

(4) Credit Hours

Examines the methods of investigation that lead to our understanding of light and its role in chemical reactions as it pertains to traditional, alternative and historic photographic printing methods. Lecture 3 hours, laboratory 2 hours. Corequisites: CHEM 1019L or Department Head approval. Laboratory/studio course fee will be assessed.

General Education Category: Natural Science Lecture/Lab

CHEM 1050 - Principles of Chemistry (LC)

(3) Credit Hours

Topics include unit analysis, properties of matter, reactions in solutions, basic stoichiometry, behavior of gases, nuclear chemistry, basic atomic structure, and chemical bonding. This course does not count towards a chemistry major or minor and it does not satisfy the entrance requirements of medical, veterinary medical, or dental schools. Lecture 3

hours.Prerequisites: [MATH 1130](#)

or [MATH 1710](#)

or MATH ACT of 19 or above, or Department Head approval.Pre or Corequisites: [MATH 1720](#)

or [MATH 1730](#)

or [MATH 1830](#)

or [MATH 1950](#)

or [MATH 1960](#)

and [CHEM 1050L](#)

with a minimum grade of C, or Department Head approval.

General Education Category: Natural Science Lecture

CHEM 1050L - Principles of Chemistry Laboratory (LB)

(1) Credit Hours

Topics include unit analysis, properties of matter, reactions in solutions, basic stoichiometry, behavior of gases, nuclear chemistry, basic atomic structure, and chemical bonding. This course does not count towards a chemistry major or minor and it does not satisfy the entrance requirements of medical, veterinary medical, or dental schools.Laboratory 2 hours.Pre or Corequisites: [CHEM 1050](#)

or Department Head approval. Laboratory/studio course fee will be assessed.

General Education Category: Natural Science Lab

CHEM 1110 - General Chemistry I (LC)

(3) Credit Hours

Examines atomic structure, elements and the periodic table, molecules and compounds, chemical bonding, chemical reactions, solutions, gas properties, and physical properties of states of matter. Ability to perform algebraic calculations is necessary for success. Every semester. Lecture 3 hours. Prerequisites: [MATH 1130](#)

or [MATH 1710](#)

with a minimum grade of C or MATH ACT of 21 or above or Department Head approval. Corequisites:

Pre or Corequisites: ([MATH 1720](#)

or [MATH 1730](#)

) or ([MATH 1830](#)

or [MATH 1950](#)

or [MATH 1960](#)

) and [CHEM 1110L](#)

with a minimum grade of C or Department Head approval.

General Education Category: Natural Science Lecture

CHEM 1110L - General Chemistry I Laboratory (LB)

(1) Credit Hours

Laboratory experiments to support and enhance the topics covered in CHEM 1110. Ability to perform algebraic calculations is necessary for success.Every semester. Laboratory 2 hours.Corequisites: [CHEM 1110](#)

with a minimum grade of C, or Department Head approval. Laboratory/studio course fee will be assessed.

General Education Category: Natural Science Lab

CHEM 1120 - General Chemistry II

(3) Credit Hours

Examines properties of solutions, acids and bases, kinetics, equilibrium, thermodynamics, electrochemistry, nuclear chemistry, and possible special topics in descriptive chemistry, transition metals, or materials. Every semester. Lecture 3 hours. Prerequisites: [CHEM 1110](#)

and [CHEM 1110L](#)

with minimum grades of C or [CHEM 1050](#)

and [CHEM 1050L](#)

with minimum grades of B or Department Head approval. Pre or Corequisites: [CHEM 1120L](#)

with a minimum grade of C or Department Head approval.

CHEM 1120L - General Chemistry II Laboratory

(1) Credit Hours

Laboratory experiments to support and enhance the topics covered in [CHEM 1120](#)

. Every semester. Laboratory 2 hours. Prerequisites: [CHEM 1110](#)

and [CHEM 1110L](#)

with minimum grades of C [CHEM 1050](#)

and [CHEM 1050L](#)

or with minimum grades of B or Department Head approval. Pre or Corequisites: [CHEM 1120](#)

with a minimum grade of C or Department Head approval. Laboratory/studio course fee will be assessed.

CHEM 1250 - The First Year Experience in Chemistry

(1) Credit Hours

An introduction to the college experience for first-year students at UTC and the aspects needed for a successful transition from high school to college. This includes an introduction to the department, successful learning techniques for chemistry, and expectations for academic success. Required for majors with fewer than 30 earned hours.

Recommended during the initial semester for students who enter UTC with fewer than 15 hours. Fall semester. Lecture 1 hour. Open to freshmen.

CHEM 1999R - Special Projects

(1-9) Credit Hours

Individual or group projects. Maximum credit 4 hours. On demand. Prerequisites: Department Head approval.

CHEM 2999R - Group Studies

(1-9) Credit Hours

On demand. Prerequisites: Department Head approval. Department may have additional prerequisite requirements.

CHEM 3010 - Organic Chemistry I

(3) Credit Hours

Studies compounds of carbon with emphasis on structure, reactivity, mechanisms, and synthesis of organic molecules. Lecture 3 hours. Prerequisites: [CHEM 1120](#)

and [CHEM 1120L](#)

with minimum grades of C or Department Head approval. Pre or Corequisites: [CHEM 3010L](#)

with a minimum grade of C or Department Head approval.

CHEM 3010L - Organic Chemistry I Laboratory

(1) Credit Hours

Laboratory experiments to support and enhance the topics covered in CHEM 3010. Laboratory 3 hours. Prerequisites:

[CHEM 1120](#)

and [CHEM 1120L](#)

with minimum grades of C or Department Head approval. Pre or Corequisites: [CHEM 3010](#)

with a minimum grade of C or Department Head approval. Laboratory/studio course fee will be assessed.

CHEM 3020 - Organic Chemistry II

(3) Credit Hours

Continuation of CHEM 3010. Emphasis on functional group manipulation and synthesis. Spectroscopic methods of analysis with emphasis on structure elucidation included. Lecture 3 hours. Prerequisites: [CHEM 3010](#)

and [CHEM 3010L](#)

with minimum grades of C or Department Head approval. Pre or Corequisites: [CHEM 3020L](#)

with a minimum grade of C or Department Head approval.

CHEM 3020L - Organic Chemistry II Laboratory

(1) Credit Hours

Laboratory experiments to support and enhance topics covered in CHEM 3020. Laboratory 3 hours. Prerequisites: [CHEM 3010](#)

and [CHEM 3010L](#)

with minimum grades of C or Department Head approval. Pre or Corequisites: [CHEM 3020](#)

with a minimum grade of C, or Department Head approval. Laboratory/studio course fee will be assessed.

CHEM 3210 - Quantitative Analysis

(3) Credit Hours

Examines the theory and practice of volumetric, electrochemical, and spectrophotometric analysis applied to the study of stoichiometry and equilibrium. Lecture 3 hours. Prerequisites: [CHEM 1120](#)

and [CHEM 1120L](#)

with minimum grades of C or Department Head approval. Pre or Corequisites: [CHEM 3210L](#) with a minimum grade of C or Department Head approval.

CHEM 3210L - Quantitative Analysis Laboratory

(1) Credit Hours

Laboratory experiments to support and enhance the topics covered in [CHEM 3210](#)

.Laboratory 3 hours.Prerequisites: [CHEM 1120](#)

and [CHEM 1120L](#)

with minimum grades of C or Department Head.Pre or Corequisites: [CHEM 3210](#)

with a minimum grade of C or Department Head approval.Laboratory/studio course fee will be assessed.

CHEM 3310 - Inorganic Chemistry

(3) Credit Hours

Concepts and models in inorganic chemistry with emphasis on atomic structure and bonding, molecular orbital theory, material science, and descriptive inorganic chemistry including biological and environmental applications.Fall semester.
Lecture 3 hours.Prerequisites: [CHEM 3020](#)

and [CHEM 3020L](#)

with minimum grades of C, [MATH 1960](#)

with a minimum grade of C; or Department Head approval. Pre or Corequisites: [CHEM 3210](#)

with a minimum grade of C and [PHYS 1040](#)

and [PHYS 1040L](#)

with minimum grades of C or [PHYS 2310](#)

and [PHYS 2310L](#)

with minimum grades of C or Department Head approval.

CHEM 3710 - Physical Chemistry: Thermodynamics and Kinetics

(3) Credit Hours

Examines chemical thermodynamics and kinetics with applications to physical and chemical properties of matter. Lecture 3 hours. Prerequisites: [CHEM 3020](#)

and [CHEM 3020L](#)

with minimum grades of C and [MATH 1960](#)

with a minimum grade of C or Department Head approval. Pre or Corequisites: [PHYS 1040](#)

and [PHYS 1040L](#)

with minimum grades of C or [PHYS 2310](#)

and [PHYS 2310L](#)

with minimum grades of C or Department Head approval.

CHEM 3710L - Physical Chemistry: Thermodynamics and Kinetics Laboratory

(1) Credit Hours

Laboratory experience to support and enhance topics covered in CHEM 3710. Laboratory 3 hours. Prerequisites: [CHEM](#)

3210

and CHEM 3210L

with minimum grades of C; CHEM 3020

and CHEM 3020L

with minimum grades of C; and MATH 1960

with a minimum grade of C; or Department Head approval. Pre or Corequisites: PHYS 1040

and PHYS 1040L

with minimum grades of C or PHYS 2310

and PHYS 2310L

with minimum grades of C; CHEM 3710

with a minimum grade of C or Department Head approval. Laboratory/studio course fee will be assessed.

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