BIOLOGY AND CHEMISTRY

The purpose of the Department of Biology and Chemistry is multifaceted. The programs include courses that prepare science majors for a wide variety of career choices in the areas of medicine, education, industry, and postgraduate work. The curriculum is designed to provide students with both a broad understanding of the field of biology and specific knowledge in the dynamic disciplines within the field. It also emphasizes development of technical, communication, and analytical skills. The department also complements the liberal arts approach to learning by offering courses intended specifically for non-science majors. The faculty endeavors to cultivate within students a Christian perspective on bioethical issues, as well as an aesthetic appreciation of and an attitude of stewardship toward the natural world. Above all, we seek to bring students toward a deeper understanding of God as he is revealed in his creation.

Students in the premedical emphasis should be aware of unique opportunities for conferences, internships, and experiences associated with the Center for Bioethics and Human Dignity (http://www.cbhd.org) on Trinity's campus, as well as the BA/MA in Bioethics dual degree through Trinity Graduate School and the bioethics minor.

Majors

- Biology Major (http://catalog.tiu.edu/trinity-college/academic-life/majors-minors-department/biology-chemistry/biology-major/)
- Chemistry Majo (http://catalog.tiu.edu/trinity-college/academic-life/majors-minors-department/biology-chemistry/chemistry-major/)r

Minors

- Bioethics Minor (http://catalog.tiu.edu/trinity-college/academic-life/majors-minors-department/biology-chemistry/bioethics-minor/)

Courses

Subjects in this department include: Biology (BIO) (p. 1) and Chemistry (CH) (p. 3)

Biology (BIO)

BIO 103 Introductory Biology - 4 Hours
A general survey of the basic principles of biology with an emphasis on humanity and humanity's role in nature. The scientific method, evolutionary theory, and Christianity as the basis of understanding nature and its problems are considered. Laboratory is included. Not open to Biology or Health Sciences majors for credit toward a major in Biology or Health Sciences. Laboratory fee. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 111 General Biology - 4 Hours
A concentrated study of the principles and fundamentals of biology. Basic biochemistry, cellular structure and function, energetics, concepts of basic molecular biology, and genetics are included. Laboratory is included. This course is open to majors in the Division of Science and Technology only or by consent of the instructor. Prerequisite or corequisite: CH 103 or CH 111 or consent of department. Laboratory fee. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 112 Biology: Plant and Animal Kingdoms - 4 Hours
A concentrated study of the principles and fundamentals of biology, ecology, and evolutionary biology are studied. Also examined are the diversity, morphology, physiology, and reproduction of microorganisms, plants, and animals. Laboratory is included. This course is open to majors in the Division of Science and Technology only or by consent of the instructor. Prerequisite or corequisite: CH 111 or consent of department. Laboratory fee. Offered fall semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 140 Survey of Human Anatomy and Physiology - 4 Hours
A study of human anatomy and physiology. Laboratory is included. This course is open to majors in Sports and Wellness Management or minors in Health Psychology only. All others are by consent of the instructor. Not open to Biology or other Health Sciences majors for credit toward a major. Laboratory fee. Offered spring semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 145 Human Biology - 4 Hours
A study of basic principles of biology, cells, genetics, anatomy and physiology, and the human impact on the environment. Special emphasis will be given to understanding anatomy and physiology as it pertains to the workings of the human body and its response to disease. This course is suitable for non science majors and includes laboratory experience. Not for credit toward a major in biology. Laboratory fee. Delivery mode: Florida undergraduate.

BIO 150 Laboratory Methods in Biology - 1-3 Hours
This course is designed to meet the needs of the student who requires or desires laboratory experience in a particular area of biology additional to that available as part of the regularly offered coursework. The area of study will vary with the needs of the student. Prerequisites: at least one introductory course in the biology and consent of the department chair. Laboratory fee. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 201X Physiology of Exercise - 3 Hours
A systematic approach to the study of the function of the human body during physical activity and recovery. Emphasis is placed on how the physiology of the sedentary body responds and adapts to both acute and chronic workloads. The course includes application of these principles to exercise prescription for the achievement of optimal fitness and athletic performance. Laboratory is included. Prerequisites: BIO 140 or BIO 340-BIO 341 and current Community First Aid and CPR certification (or acceptable equivalent) or consent of instructor. Laboratory fee. Offered spring semester for Deerfield traditional undergraduate. Cross-listed with HS 201X, HPW 201X. Delivery mode: Deerfield traditional undergraduate.

BIO 210 Ecology and Field Biology - 4 Hours
A study of the fundamental principles and concepts of ecology emphasizing the ecosystem approach. Introduction to the principles and concepts pertaining to the ecosystem, including energy flow, nutrient cycling, limiting factors, ecological development, and organismic, population, and community ecology. The structure and characteristics of various terrestrial and aquatic ecosystems, environmental problems, and resource management are also included. Laboratory and field work are included. Prerequisites: BIO 111, 112 or consent of instructor. Laboratory fee. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 220 General Botany - 4 Hours
The taxonomy, anatomy, physiology, and ecology of vascular and nonvascular plants will be studied. Emphasis will be placed on the relationship of the cellular, organismal, and gross structures of vascular plants with development and function in time and environment. Laboratory is included. Prerequisites: BIO 111 and CH 112. Laboratory fee. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 250 Advanced Laboratory Methods in Biology - 1-3 Hours
This course is designed to provide the student with advanced laboratory experience in a particular area of interest in the biology beyond that offered as part of the regularly scheduled coursework. The field of study will vary with the needs of the student. Prerequisites: at least one introductory course in biology and consent of the department chair. Laboratory fee. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 285X Statistics - 4 Hours
An examination of both descriptive and inferential statistics. Specific topics include the scientific method, data analysis and production, measures of central tendency and variability, correlation and regression, random sampling and probability, nonparametric inferential tests, and parametric inferential tests, including one-way analysis of variance. Specific instruction and computer experience in the use of SPSS is provided. Offered each semester for Deerfield traditional undergraduate. Computer fee. Cross-listed with MA 285X, PSY 285X, SOC 285X. Delivery mode: Deerfield traditional undergraduate.

BIO 300 Environmental Conservation - 3 Hours
An ecological approach to the study of conservation of natural resources as related to current environmental problems. Significant fieldwork is required. Delivery mode: Florida undergraduate.

BIO 306 Scientific Applications Professional Experience - 1-4 Hours
In-depth instructional or laboratory experience, including teaching assistantship and laboratory assistantship, designed to enhance the student's expertise, critical thinking, laboratory, and communication skills in any of several areas. May be repeated for credit. Prerequisite: invitation of instructor. Instructor's consent by signature required. Satisfies the Professional Experience requirement. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 310 Microbiology - 4 Hours
A study of the taxonomy and identification, structure, nutrition and growth, physiology, metabolism, genetics, host microbial interactions, immunology, ecology, epidemiology, and control of microorganisms and viruses. Laboratory is included. Prerequisites or corequisites: BIO 111, CH 111-CH 112. Laboratory fee. Offered fall semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 315 Genetics - 4 Hours
A study of the basic principles of heredity, including classical, cytological and population genetics. In addition, the course will emphasize the analysis of genes at the molecular level and the study of gene expression. Laboratory is included. Prerequisite: BIO 111, BIO 112. Offered fall semester in odd-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 320 Immunology - 3 Hours
A study of the cellular and molecular nature of innate and adaptive immune systems, including immunoglobulins, humoral and cell-mediated immune responses, immunopathology, immunobiology, and cancer biology. Prerequisites: BIO 111 and CH 112. Courses in microbiology, cell and molecular biology, and genetics are highly recommended. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 321 Immunology Case Studies Laboratory - 1 Hour
A problem-based discussion/laboratory course exploring the use of contemporary immunological laboratory procedures and the application of immunological theory and practical knowledge to clinical diagnosis of immunological diseases. Clinical case studies will be used as the discussion vehicle. Course must be taken in conjunction with BIO 320 Immunology. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 340 Human Anatomy and Physiology I - 4 Hours
An in-depth study of the anatomical and physiological features of the following human body systems: integumentary, skeletal, muscular, nervous, circulatory, digestive/metabolic, lymphatic, and endocrine. Relevant clinical information and pathology are discussed. A strong emphasis is placed on experimental study and analysis of physiological processes. This course is suitable for premedical students, health sciences students, students wishing to pursue graduate studies in science, and education majors with a science emphasis. Laboratory is included. Prerequisites or corequisites: BIO 111 and CH 103 or CH 111-CH 112, or consent of instructor. Laboratory fee. Offered each year for Deerfield traditional undergraduate. Both semesters must be completed in order to apply to major. Delivery mode: Deerfield traditional undergraduate.

BIO 341 Human Anatomy and Physiology II - 4 Hours
An in-depth study of the anatomical and physiological features of the following human body systems: integumentary, skeletal, muscular, nervous, circulatory, digestive/metabolic, lymphatic, and endocrine. Relevant clinical information and pathology are discussed. A strong emphasis is placed on experimental study and analysis of physiological processes. This course is suitable for premedical students, health sciences students, students wishing to pursue graduate studies in science, and education majors with a science emphasis. Laboratory is included. Prerequisites or corequisites: BIO 111 and CH 103 or CH 111-112, or consent of instructor. Laboratory fee. Offered each year for Deerfield traditional undergraduate. Both semesters must be completed in order to apply to major. Delivery mode: Deerfield traditional undergraduate.

BIO 350 Topics In Biology - 1-4 Hours
Selected topics in biology. May be repeated for credit with different topics. Prerequisites: BIO 111, BIO 112, or consent of the instructor. Laboratory fee may be required depending on topic. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 358X Christianity and Darwinism - 3 Hours
This interdisciplinary, team-taught honors seminar will investigate the relationship between Christianity and Darwinism since the latter's inception in the mid-nineteenth century.

BIO 359 Topics for Honors Students - 3 Hours
Selected topics not taught under specific course titles. Depending on the topic, the course will be designated as falling under one or more departments. May be repeated for credit if the topic differs. Offered spring semester in odd-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 400 Origins and Evolution - 3 Hours
A critical examination of the empirical and theoretical bases for the theories of the origin of life and biological evolution. The scriptural account of creation and the various schools of thought on creation and evolution are considered. Prerequisites: BIO 111, 112 or consent of the instructor. Offered spring semester in odd-numbered years. Delivery mode: Deerfield traditional undergraduate.

BIO 406 Advanced Scientific Applications Professional Experience - 1-4 Hours
Advanced instructional, clinical, field study, or laboratory experience designed to enhance the student's expertise, critical thinking, and laboratory and communication skills in any of several areas. May be repeated for credit. Prerequisite: invitation of the instructor. Instructor's consent by signature required. Satisfies the Professional Experience Requirement. Laboratory fee may be required. Offered each semester. Delivery mode: Deerfield traditional undergraduate.

BIO 410 Biology Seminar - 1 Hour
This course includes presentations and discussions of selected papers, topics of current interest in the field, and senior research projects by students and invited speakers. Starting in the student's second year in the Biology program, this course must be taken each semester it is offered until graduation or changing of majors. The student will audit all semesters except one. During the spring semester of the student's senior year, the course must be taken for credit and a senior seminar presentation will be required. Prerequisite: major in the Division of Science and Technology, and Health, or consent of instructor. This course fulfills the IDS 499X Integrative Thought Capstone requirement for students in the Biology, Biology/Pre-Medical, and Biology/Pre-Physician Assistant. Offered spring semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 415 Molecular Genetics - 4 Hours
This course will offer a detailed study of the analysis and manipulations of genes at the molecular level, including control of gene expression, study of genome structure, and molecular evolution. Course will include reading and discussion of current literature relevant to the field of molecular genetics and instruction in the use of biological databases. The application of molecular genetics to analyze the human genome will be considered. Prerequisites: BIO 315, CH 203 or CH 212. Suggested prerequisite or corequisite: CH 320 or consent of instructor. Laboratory fee. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 420 Cell and Molecular Biology - 4 Hours
A detailed study of the structure and function of cells in their genetic, biochemical, developmental, physiological and pathophysiological aspects. This course introduces students to the relationships that exist between cell structure and biochemical processes necessary for eukaryotic cell growth, differentiation, and death. Laboratory included. Prerequisites: BIO 111, BIO 112 and CH 320. Laboratory fee. Offered spring semester in even-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 430 Developmental Biology - 4 Hours
A study of the nature of developmental processes of animals at the classical, experimental, and molecular levels. Reading, abstracting and presenting primary journal articles in the field of developmental biology constitutes the laboratory portion of the course. Prerequisites: BIO 111, BIO 340, BIO 341. Offered fall semester in even-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 450 Independent Study - 1-3 Hours
Research and specialized studies designed to meet the needs of individual students. Prerequisite: consent of instructor. Laboratory fee may be required. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

BIO 470 Undergraduate Research - 1-4 Hours
A course involving investigation of a research problem under faculty supervision. Course requirements may include a literature survey, research, a written formal report, and oral presentation of results in biology seminar (BIO 410). Prerequisites: BIO 111 and at least one of the following: BIO 310, BIO 340, BIO 341, BIO 420. Instructor's consent by signature required. May be repeated for credit. Laboratory fee may be required. Satisfies the Professional Experience Requirement. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

Chemistry (CH)

CH 101 Contemporary Chemistry - 4 Hours
A study of the fundamental principles of chemistry, chemical activity of elements and compounds, principles of organic chemistry, and principles of biochemistry. Material to be studied includes problems of the environment, energy, population, air pollution, water pollution, solid wastes, pesticides, food additives, and drugs. Consideration is given to the moral, ethical and political implications in making decisions concerning these problems. This course is for non science majors and cannot be used by Biology, Health Sciences, or Chemistry majors to fulfill major or general education requirements. Laboratory included. Laboratory fee. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 103 Introduction to Chemistry - 4 Hours
A one-semester survey of fundamental concepts, including atomic structure, chemical bonding, periodic properties, the solid, liquid and gaseous states, and solutions. Application of all these concepts to the health sciences will be emphasized. This course is intended primarily for Health Sciences majors but may be used to fulfill the general education requirement for non-majors if the student has had substantial background in chemistry. Laboratory is included. Laboratory fee. Consent of instructor required. Offered fall semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 105X Introduction to Forensic Science - 3 Hours
An overview of the many ways evidence is collected through the scientific disciplines of chemistry, biology, and physics. Principles and applications of DNA analysis, explosives analysis, detection of illegal drugs, toxicological analysis, and firearms identification will be discussed. Legal requirements for the collection, storage, and presentation of evidence with a focus on expert testimony and the standards that govern expert testimony will be presented. Offered Fall semester in even-numbered years for Deerfield traditional undergraduate. Cross-listed with CRJ 105X. Delivery mode: Deerfield traditional undergraduate.

CH 111 General Chemistry I - 4 Hours
First course of a two-course sequence in General Chemistry for science majors. A study of fundamental concepts including atomic structure, bonding, molecular theory, the solid, liquid, and gaseous states, and solutions. Laboratory is included. This course is open to majors in the Division of Science, Technology, and Health only or by consent of the instructor. Prerequisite: proficiency in algebra, high school chemistry. Laboratory fee. Offered fall semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 112 General Chemistry II - 4 Hours
A continuation of CH 111. Kinetics, equilibrium, acid base topics, and chemical thermodynamics are studied. Laboratory is included. This course is open to majors in the DIvision of Science, Technology, and Health only or by consent of the instructor. Prerequisite: CH 103 or CH 111 or consent of instructor. Laboratory fee. Offered spring semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 150 Laboratory Methods in Chemistry - 1-3 Hours
This course is designed to meet the need of the student who requires or desires a laboratory experience in chemistry additional to that available as part of the regularly offered coursework. The area of study will vary with the needs of the student. Prerequisite: at least one introductory course in chemistry and consent of the Chair of the Department of Biology and Chemistry. Laboratory fee. Offered each semester. Delivery mode: Deerfield traditional undergraduate.

CH 203 Essentials of Organic Biochemistry - 4 Hours
A one-semester survey of organic functional groups and reactions. Emphasis will be placed upon those compounds that play an important role in the biochemistry of the living cell. Laboratory is included. Prerequisite: CH 103 or CH 112. Laboratory fee. Offered spring semester in even-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 211 Organic Chemistry I - 4 Hours
A study of the structure, nomenclature, and reactions of the common classes of organic compounds. Laboratory is included. Prerequisite: CH 112. Laboratory fee. Offered fall semester in even-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 212 Organic Chemistry II - 4 Hours
A continuation of CH 211. Interpretation of NMR and IR spectra is studied. Laboratory is included. Prerequisite: CH 211. Laboratory fee. Offered spring semester in odd-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 305 Scientific Applications - 1-4 Hours
In depth instructional or laboratory experience, including teaching assistantship and laboratory assistantship, designed to enhance the student's expertise, critical thinking, and laboratory and communication skills in any of several areas. May be repeated for credit. Prerequisite: Invitation of instructor. Instructor's consent by signature required. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 306 Scientific Applications Professional Experience - 1-4 Hours
In-depth instructional or laboratory experience, including teaching assistantship and laboratory assistantship, designed to enhance the student's expertise, critical thinking, laboratory, and communication skills in any of several areas. May be repeated for credit. Prerequisite: invitation of instructor. Instructor's consent by signature required. Satisfies the Professional Experience requirement. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 311 Quantitative Analysis - 4 Hours
A study of quantitative methods of inorganic analysis. Laboratory is included. Prerequisite: CH 112. Laboratory fee. Offered fall semester in odd-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 312 Instrumental Analysis - 4 Hours
A study of instrumental methods of chemical analysis with stress on spectral, chromatographic, and electroanalytical methods. Laboratory is included. Prerequisite: CH 311. Laboratory fee. Offered spring semester in even-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 320 Biochemistry - 3 Hours
Structure, biosynthesis, and metabolism of common classes of biochemical compounds are studied. Prerequisites: CH 203 or CH 212, and BIO 111, or consent of instructor. Offered fall semester in odd-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 340 Laboratory in Chemistry - 1 Hour
Laboratory courses in inorganic, organic, organic qualitative analysis, and biochemistry. Prerequisite: CH 311 or consent of instructor. Laboratory fee. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 350 Topics in Chemistry - 1-4 Hours
Selected topics in chemistry. May be repeated for credit with different topics. Prerequisite: CH 112 or consent of instructor. Laboratory fee may be required depending on topic. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 405 Advanced Scientific Applications - 1-4 Hours
Advanced instructional, clinical, or laboratory experience designed to enhance the student's expertise, critical thinking, and laboratory and communication skills in any of several areas. May be repeated for credit. Prerequisite: Invitation of the instructor. Instructor's consent by signature required. Laboratory fee may be required. Offered each semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 406 Advanced Scientific Applications Professional Experience - 1-4 Hours
Advanced instructional, clinical, or laboratory experience designed to enhance the student's expertise, critical thinking, and laboratory and communication skills in any of several areas. May be repeated for credit. Prerequisite: invitation of the instructor. Instructor's consent by signature required. Laboratory fee may be required. Satisfies the Professional Experience Requirement. Offered each semester. Delivery mode: Deerfield traditional undergraduate.

CH 410 Chemistry Seminar - 1 Hour
Reports of current research, selected themes, research methods, and writing in chemistry shall be considered. Prerequisites: chemistry major, CH 112 or consent of the instructor. May be repeated for credit. This course fulfills the IDS 499X Integrative Thought Capstone requirement for students in the Chemistry and Chemistry/Pre-medical majors. Offered spring semester for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 411 Inorganic Chemistry - 3 Hours
An introduction to the concepts and chemical systems of inorganic chemistry, including atomic structure, the periodic table, molecular structure and bonding ionic crystals, chemistry of the transition elements, coordination compounds, noble gases, and acid-base theories. Includes a substantial amount of oral presentation. Prerequisites: CH 212, CH 311 or consent of instructor. Offered fall semester in even-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 412 Physical Chemistry of Biological Systems - 4 Hours
This course contains a general overview of the principles of thermodynamics, kinetics, quantum mechanics, and statistical thermodynamics with particular stress on biochemical and biological applications. Laboratory is included. Prerequisites: CH 411, MA 121, and CH 311, or consent of instructor. Laboratory fee. Offered spring semester in odd-numbered years for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 442 Undergraduate Research - 1-4 Hours
This is a laboratory course involving investigation of a research problem under faculty supervision. Course requirements include a literature survey, research, a written formal report, and oral presentation of results in Chemistry Seminar CH 410. Prerequisites: CH 340 and instructor's consent by signature required. May be repeated for credit. Laboratory fee may be required. Satisfies the Professional Experience Requirement. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.

CH 450 Independent Study - 1-4 Hours
Research and specialized studies designed to meet the needs of individual students. Prerequisite: consent of instructor. Laboratory fee may be required. Offered on demand for Deerfield traditional undergraduate. Delivery mode: Deerfield traditional undergraduate.