A detailed study of the comparative morphology and anatomy of tracheophytes. Prerequisite: BIO 124.

BIO/MATH 342. Mathematical Models in Biology, 3 credits. Offered spring. Introduction to dynamical models (discrete and continuous time) applied to biology. Tools of mathematical analysis from linear and nonlinear dynamics will be taught, including stability analysis of equilibria, as well as appropriate use of software packages. Emphasis will be on model development and interpretation in the context of applications, including effective written and oral presentation. Prerequisites: MATH 232 or MATH 235 or equivalent.

BIO 345. Animal Field Biology, 3 credits. Offered fall. The course is designed to use the nutritional and energetic relationships between plants and animals to lead into the evolutionary relationship of members of the different animal phyla. Field study and lab specimens will be used to develop understanding of the ecological relationships of humans and local animals, insects, and plants. Prerequisites: BIO 114 or equivalent. BIO/GEOL 350. Invertebrate Paleontology (3, 2), 4 credits. Offered fall. The evolution and ecological structure of the biosphere from the origin of life to the present, emphasizing the evolution and paleobiology of animal life as shown by the fossil record. Lectures discuss methods used to interpret the fossil record and cover topics such as phylogeny and systematics, functional morphology, biostatigraphy, paleoecology, evolution, and extinction. Laboratories focus on the major groups of invertebrates that are common in the geologic record. Prerequisite: GEOL 230, BIO 114 or permission of the instructor.

BIO 353. Basic Ecology (3, 3), 4 credits. Offered fall. Ecological principles are presented in a context which will aid pre-college teachers to understand the background science of the subject and apply it
BIO 354. Global Climate Change and Life: Ecological and Biological Impacts of Climate Variability. 3 credits. Offered fall.

Global climate change is important to the distribution, diversity, health and survival of organisms. The biota have changed through evolution in part as a response to selection pressures from these variations. Living things can also adjust to change through phenotypic flexibility. This course examines, in a seminar/discussion format, the potential ecological impacts of past and current patterns of climate alteration on organisms. Prerequisites: BIO 124 or equivalent.

BIO 360. Plant Biology (3, 0). 3 credits. Offered spring.

An introduction to the biology of plants including evolution, diversity, form and function, ecology, and biotechnology. Prerequisites: BIO 124 and BIO 214. BIO/GEOL 361. Biochemistry I (3, 0). 3 credits. Offered fall.

An introduction to the molecules and chemical reactions of living systems. Structure and function of important classes of biomolecules are explored and the relationship of structure to function is stressed. Basic metabolic sequences are discussed. Prerequisites: CHEM 342 and permission of instructor.

BIO 364. Human Uses of Plants (3, 0). 3 credits. Offered fall.

A survey of past, present and future uses of plants with emphasis on economically important plant families. Issues of cultivated plant origins, biodiversity and germplasm preservation are considered. Prerequisite: BIO 124 or permission of the instructor.

BIO 365. Laboratory in Human Uses of Plants (0, 3). 1 credit. Offered fall.

An investigative examination of plants and their constituents with an emphasis on their physiological ecology, adaptations and economic utility by humans. Prerequisite or corequisite: BIO 364.

BIO 366. Plants and Environment (3, 3). 4 credits. Offered spring.

Students will engage in a systematic investigation of plant structure and function. Ecological roles of plants and economic utilization by humans will be explored. Prerequisites: Course is open only to IDLS majors and biology or biotechnology majors enrolled in the secondary education licensure pre-professional program. GSCI 166E or equivalent.

BIO 370. Animal Physiology (3, 3). 4 credits. Offered fall and spring.

Design and function of cellular and organ physiology will be explored in both non-human and human animals. Class activities will emphasize problem-solving, and collaborative and independent learning. The laboratories will utilize computer simulations and animal/human experiments to examine principles of both physiology and scientific investigation. Prerequisites: BIO 214 and CHEM 113 or permission of the instructor. Onesemesterexperienceof Calculus is recommended.

BIO 380. General Microbiology (2, 4). 4 credits. Offered fall and spring.

A study of the structure and function of microorganisms and their relationship to humans and to the environment. Credit may not be earned in both BIO 280 and BIO 380. Prerequisite: BIO 214 or permission of the instructor. BIO 386. Field Botany (3, 3). 4 credits. Offered spring odd years.

An in-depth survey of vascular plants in the field with emphasis on identification, diversity of form and function, and ecology. Laboratory topics will include techniques for sampling plant communities, identifying local flora and preserving botanical materials. Prerequisite: BIO 124.

BIO/PSYC 395. Comparative Animal Behavior (3, 0). 3 credits.

This course covers aspects of the development, function and evolution of the behavior of nonhuman animals. Topics include intraspecies communication, feeding, aggression, territoriality, reproductive behavior and social behavior. Prerequisite: PSYCH majors: PSYC 211 or PSYC 213; biology or biotechnology majors: BIO 114 and 124 and one of the following (C- or better): MATH 205, 220, 231, 235, 285, 318.

BIO/GEOL 400. Geology and Ecology of the Bahamas. 3 credits.

This course explores the geology and ecology of the shallow-water marine environment by examining the prehistoric modern example, the Bahamas platform. The Bahamas provide an excellent model for understanding modern and ancient carbonate and reef deposits and a variety of terrestrial/aquatic habitats. Biological processes are responsible for many of the geological features of the Bahamas, so the course considers the biology/ecology of marine organisms in addition to geological topics. Prerequisites: GEOL 110, GEOL 211 or a 200-level GEOL or BIO course, at least four hours of additional lab science, at least sophomore status, and permission of the instructor.

BIO 402. Forest Ecology. 4 credits. Offered fall.

A study of the function, structure, and composition of forested ecosystems.
BIO 430. Human Genetics (3, 0). 3 credits. Offered spring and summer.
Current topics in human genetics with emphasis on species and population variation, medical genetics and genetic applications that affect humans. Prerequisite: BIO 224.

BIO 432. Light Microscopy (2, 4). 4 credits.
This course covers the principles behind light microscopy, from the properties of light to the latest technologies in microscopy. Students will gain hands-on experience with the different kinds of microscopes, including the confocal microscope. The course also covers fluorescence probes, advanced fluorescence techniques, digital imaging, methods of quantification and figure preparation for publication, with an emphasis on biological applications. Prerequisites: BIO 222 or BIO 224.

BIO 440. Functional Neuroscience for Occupational Therapists. 3 credits. Offered fall.
This course will examine functional performance of all aspects of the human nervous system. Specific nervous system conditions will be introduced and their impact on occupational performance, performance components and environmental contexts discussed. Prerequisites: Admission to the Occupational Therapy program.

BIO 442. Immunology (3, 0). 3 credits. Offered spring.
A study of the molecular and cellular basis of the immune system. Topics include the properties of antigens and immunoglobulins, the development and regulation of humoral and cell-mediated immunity, resistance and immunization to infectious diseases, allergies, and autoimmune and immunodeficiency disorders. Credit may not be earned in both BIO 442 and BIO 542. Prerequisite: BIO 214 or permission of instructor.

BIO 443. Immunology Laboratory (0, 4). 1 credit. Offered spring.
This course will introduce students to the theory and application of many of the methods currently used in clinical and research immunology. Laboratory exercises will focus on identifying, quantifying and assessing functional activities of immune cells and molecules. Students will gain experience using experimental animals and in animal cell culture techniques. Corequisite: BIO 442.

BIO 444. Virology (3, 0). 3 credits. Offered fall.
A study of the fundamental aspects of both basic and medical virology. Credit may not be earned in both BIO 444 and BIO 544. Prerequisites: BIO 214 and BIO 224 or permission of instructor.

Molecular, cellular and network mechanisms underlying behavior will be studied using problem-solving, discussion, lecture and critical reading of the primary literature. Similarities and differences between nervous systems and computers will be explored. Laboratories will utilize contemporary electrophysiology and computer simulation to examine the neurobiology of simple animal model systems. Prerequisite: BIO 370. Physics recommended.

BIO 448. Medical Microbiology (3, 3). 4 credits. Offered spring.
This class focuses on microorganisms of medical importance, mainly bacteria and viruses. Lecture follows an organism-by-organism approach. Key topics for each organism include general cell structure, unique structures/functions, epidemiology of the disease that the organism causes, mechanisms of pathogenesis, isolation and identification of the organism, and treatment options. Prerequisite: BIO 380.

BIO 450. Evolutionary and Societal Impacts of Developmental Biology (3, 0). 3 credits. Offered spring.
Discussion-based course on topical issues in developmental biology and how they impact animal evolution, bioethics, human identity and environmental science. Prerequisite: BIO 224.

Ecosystems are examined as basic ecological units which are comprised of communities interacting with their environments and are themselves components of landscape. Credit may not be earned in both BIO 451 and 551. Prerequisites: BIO 124 and BIO 214.

Theoretical and applied aspects of distribution and abundance, population regulation, interactions between populations and conservation will be studied in selected organisms, including humans. Credit may not be earned in both BIO 452 and BIO 552. Prerequisite: BIO 124.

BIO 453. Microbial Ecology and Evolution (2, 4). 3 credits. Offered spring.
The ecology of microorganisms will be covered, including those important in human health and in natural environments. Emphasis will be placed on the study and critique of scientific literature. Credit may not be earned in both BIO 453 and 553. Prerequisites: BIO 124, and BIO 280 or BIO 380.

BIO 454. Introduction to Biometrics (3, 1). 4 credits. Offered spring even years.
The design of biological experiments and applications of statistical techniques in ecology, cell biology, physiology, behavior, systematics, genetics and evolution. Experiments and data from the biological literature will be emphasized. Statistical software packages will be used. Credit may not be earned in both BIO 454 and BIO 554. Prerequisite: MATH 220 or equivalent.

BIO 455. Plant Physiology (3, 3). 4 credits. Offered spring odd years.
Function and structure of plants including water relations, mineral nutrition, transport phenomena, metabolism, growth and development, and selected topics in physiological ecology. Credit may not be earned in both BIO 455 and BIO 555. Prerequisite: BIO 214. Prerequisite or corequisite: CHEM 342.

The functional and descriptive study of the interaction of the mosaic of ecosystems that comprise the landscape prevalent in a region. Prerequisite: BIO 124.

This course will explore the various ways that geographic information systems (GIS) can be used to answer biological questions. Students will use GIS software to study applications in ecology, conservation biology and environmental biology. No prior GIS experience is required. Prerequisites: BIO 124 or permission of the instructor.

BIO 458. Freshwater Ecology (2, 4). 4 credits. Offered fall.
Functional relationships and productivity of freshwater communities are examined as they are affected by their physical, chemical and biotic environment. Organisms inhabiting lakes, ponds, rivers, streams and estuaries are studied at the population, community and ecosystem levels. Credit may not be earned in both BIO 459 and BIO 559. Prerequisites: BIO 124, CHEM 131 and CHEM 132.

BIO 460. Plant Cell and Tissue Culture (2, 4). 4 credits. Offered spring even years.
Theory and practice of growing isolated plant cells, tissues and organs. Credit may not be earned in both BIO 460 and BIO 560. Prerequisites: BIO 114 and CHEM 132.

BIO 465. Environmental Toxicology (3, 3). 4 credits. Offered spring.
The study of types, sources and biological effects of environmental pollutants. Class activities will include discussions of foundational material covering the biological effects of a broad range of pollutants. Labs will focus on the use of simulation models, geographic information systems and other software currently used in environmental toxicology for the analysis of environmental data. Credit may not be earned in both BIO 465 and BIO 565. Prerequisite: BIO 224 or equivalent.

BIO 466. Toxicology Seminar (3, 0). 3 credits. Offered fall.
Readings and discussions of the primary scientific literature with a focus on the biological effects of toxicants at the genetic, cellular, physiological and ecological level. Prerequisite: BIO 224 or equivalent.

BIO 470. Morphology of Nonvascular Plants (2, 4). 4 credits. Offered fall odd years.
Comparative morphology, ecology and taxonomic representation of algae, fungi and bryophytes. Credit may not be earned in both BIO 470 and BIO 570. Prerequisite: BIO 124.

BIO 472. Human Metabolism (3, 0). 3 credits. Offered spring.
This course will focus on the cellular physiological mechanisms responsible for regulation of normal human metabolism and place them in the context of the development of chronic disease processes. Prerequisites: CHEM 341 and BIO 214 or permission of the instructor.

BIO 475. Advanced Cell Biology (3, 3). 3 credits. Offered spring.
This seminar-style course covers topics in advanced cell and molecular biology. Class format will be discussions from assigned review articles, followed by student-led presentations of assigned primary literature. Students write a research grant proposal and give an oral presentation of their proposal in class. Prerequisite: BIO 224.

BIO 480. Advanced Molecular Biology (2, 4). 4 credits. Offered fall.
Cellular constituents and genetics are emphasized at the molecular level. Credit may not be earned in both BIO 480 and BIO 580. Prerequisite: BIO 224. Prerequisite or corequisite: CHEM 342.

BIO 481. Genomics (3, 3). 4 credits. Offered spring.
An advanced biology course designed for students to learn about the structure and function of genomes, to develop facility in web-based tools and resources, and to appreciate the power and limitations of current resources and knowledge. Focus is on the biological questions that genomics can help to answer. Laboratory exercises will be sequencing and analyzing genomic DNA. Prerequisite: BIO 224.
BIO 482. Human Histology (3, 3). 4 credits. Offered fall.
Microscopic structure of cells, tissues and major organ systems of the body. Basic anatomical and physiological function is presented to emphasize the histological significance of the examined organ systems. Prerequisite: BIO 270, BIO 290 or equivalent.

BIO 486. Systematics of Vascular Plants (2, 4). 4 credits. Offered spring every year.
Study of systematic theory and an overview of the classification and evolution of higher plants with particular attention to flowering plant families. Techniques for plant identification and collection and for construction of phylogenies will be taught in lab. Prerequisite: BIO 124 or permission of the instructor.

BIO 490. Biomechanics (3, 3). 4 credits. Offered spring.
A study of the interactions of organisms with their physical environment. Concepts from fluid and solid mechanics are applied to biological form and function. Prerequisite: BIO 114 or permission of the instructor.

BIO 494. Internship in Biology (0-12). 6 credits.
Students participate in research or applied biology outside of this university. A proposal must be approved prior to registration, and a final paper will be completed. Prerequisites: Biology or Biotechnology major with minimum of eight biology credit hours and a GPA of 2.5 or greater.

BIO 495. Biotechniques (0, 4). 1 credit.
Emphasis is placed on theory, methodology and the development of manipulative abilities. Students must notify the biology office of their interest the semester before registration. May be repeated for a maximum of two credits when course content changes. Prerequisites: GPA of 2.5 or greater.

BIO 496. Research Literature (0, 4). 1 credit.
A systematic review and study of the research literature in a selected field of biology. Proposal for study should be approved by sponsor and department head the semester before registration. May be repeated for a maximum of 2 credits when course content changes. Prerequisites: GPA of 2.5 or greater.

BIO 497. Biological Research (0, 4-8). 1-3 credits.
Research in a selected area of biology as arranged with sponsor. Research outline must be approved by sponsor and department head the semester before registration. Course may be repeated. Prerequisites: GPA of 2.5 or greater.

BIO 499. Honors in Biology (0, 6). 6 credits.
Three semester course taken as parts A, B and C; 2 credits each.

Biotechnology

College of Science and Mathematics and College of Integrated Science and Technology
BIOT 260. Biotechnology Seminar. 1 credit. Offered fall.
An introduction to biotechnology. Topics will include research opportunities, careers and current topics in biotechnology. Not available for biology major or minor credit.

Business Law

College of Business
BLAW 314. Real Estate Law. 3 credits.
A study of the principles of law-governing interests in real estate including acquisition, encumbrance, transfer, rights and obligations of parties, and state and federal regulations thereof. Prerequisites: COB 218 and junior standing.

BLAW 470. Financial Products: Regulation and Protection. 3 credits.
Offered once a year.
An inquiry into the legal environment of the financial marketplace. Topics explored include the role of regulatory agencies, the design of contracts which minimize credit risk and maximize marketability, and methods of protecting the proprietary component of innovative financial products. Prerequisites: COB 218 and junior standing.

BLAW 494. White Collar Crime. 3 credits. Offered fall.
A study of white collar crime in America, a unique type of criminal activity that primarily affects businesses. The course will explore the substance of white collar crime and focus on the unique elements of various crimes through the study of actual cases. The course will also examine how white collar crimes are prosecuted and defended in state and federal courts. Students will be introduced to federal and state criminal procedure, substantive defenses, and the use of sentencing guidelines. Prerequisite: COB 300.

BLAW 495. Contract Law, Sales and Secured Transactions. 3 credits.
Offered fall and spring.
A study of the law of contracts, Article Two of the Uniform Commercial Code, product liability, legal liability of accountants, secured transactions and bankruptcy with emphasis on the role these play in professional and personal decision making. The courts, the legislature and the interaction of these two branches of government in responding to a changing society are studies throughout. Prerequisites: COB 218 and COB 300.

BLAW 496. The Law of Business Organizations, Negotiable Property Instruments and Property. 3 credits. Offered once a year.
A study of Article Three of the Uniform Commercial Code, agency, partnerships, corporations, securities regulations, real property, trusts and decedents estates with emphasis on the role these play in professional and personal decision making. Prerequisites: COB 218 and COB 300 or permission of the instructor.

BLAW 497. Legal Aspects of International Business. 3 credits. Offered fall.
Survey of legal implications of international business dealings including foreign direct sales, distributorship arrangements, licensing of technology and legal aspects of the multi-national corporation. The foreign legal environment, relevant conventions and trade regulations, and the transnational reach of regulatory law will be considered. Prerequisites: COB 218 and senior standing.

BLAW 498. Special Topics in Business Law. 3 credits. Offered fall and spring.
This course is designed to allow explorations of areas of current topics in business law. Course content will vary by semester and instructor. For current content, consult the advisor. Prerequisites: COB 300 and permission of the instructor.

Business and Marketing Education

College of Education
BMED 200. Introduction to Business and Marketing Education. 3 credits.
A general survey of business and marketing principles as they relate to preparation for teaching with emphasis on the history of business and marketing in America, the basic forms of business organizations, ownership, finance, management, taxes and wages, and labor relations.

BMED 230. Document Design and Production. 3 credits.
Experience in planning, designing and producing documents for the business office with focus on transferability of productivity among the genre of word processing software. Prerequisite: Keyboard in excess of 40 words per minute with at least 95 percent word accuracy without visual reference to the keyboard.

BMED 300. Data and Records Management. 3 credits.
Develops skills in managing the information of business by organizing data through the creation and use of computer spreadsheets and databases. Includes the management and organization of hard records.

BMED 376. Occupational Experience in Business. 3 credits.
Supervised internship providing business office experience for students seeking licensure as business education teachers in middle and secondary schools. A credit/no credit grade will be assigned. Prerequisite: Permission of the instructor.

BMED 377. Occupational Experience in Marketing. 3 credits.
Supervised internship providing marketing (retail, promotion, entertainment, merchandising, etc.) experience for students seeking licensure as marketing education teachers in middle and secondary schools. A credit/no credit grade will be assigned. Prerequisite: Permission of the instructor.

BMED 380. Demonstration Methods for Business and Marketing. 3 credits.
Development of an instructional model incorporating demonstrations and supervised walk-throughs in planning and directing the learning of computer-related and other complex business and marketing procedures and processes.

BMED 400. Business and Marketing Communications. 3 credits.
Develops skills in communicating effectively through formal and informal business reports, letters and memorandums. Emphasis on realistic problem solving involving collecting, organizing, analyzing, interpreting, and presenting data. Prerequisites: GWRIT 101, GWRIT 102 and BMED 230 or equivalent.

BMED 430. Desktop Publishing Design and Production. 3 credits.
Experience in planning, designing and producing the publications of business and education with focus on transferability of functions among the genre of desktop publishing software.

BMED 490. Independent Study in Business and Marketing Education. 1-3 credits. Offered fall and spring.
Provides opportunity to complete independent study or research on problems in business and marketing education. Prerequisite: Permission of the program coordinator.