**ASTR205: Introduction to Radio Astronomy**  
3 cr.  
Prerequisite: ASTR105 or PHYS252 or PHYS262. An introduction to the radio universe and the tools and techniques used to explore it. Three hours of lecture/lab.

**ASTR305: Introduction to Radio Astronomy**  
4 cr.  
Prerequisite: Consent of the department. An introduction to the radio universe and the tools and techniques used to explore it. Four hours of lecture/lab.

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### BIOCHEMISTRY AND MOLECULAR BIOLOGY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BCHM210</td>
<td>Vistas in Biochemistry</td>
<td>1 cr.</td>
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<td></td>
<td>Prerequisite: CHEM124. An elementary introduction to Biochemistry. Topics include biomolecular structure, intermediary metabolism, and molecular genetics. One hour of lecture.</td>
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<tr>
<td>BCHM410</td>
<td>Biochemistry I</td>
<td>3 cr.</td>
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<td></td>
<td>Prerequisite: CHEM266. The chemical structure and biological properties of proteins, lipids and carbohydrates and their contribution to cellular chemistry in terms of enzyme kinetics, bioenergetics and common metabolic chemistries. Three hours of lecture. [LCCN:CBI03403/Biochemistry I (Upper Level)]</td>
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<tr>
<td>BCHM410L</td>
<td>Biochemistry I Laboratory</td>
<td>1 cr.</td>
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<td></td>
<td>Prerequisite: credit for or registration in BCHM410. An introduction to lipid, protein and carbohydrate biochemistry through the experimental investigation of their structures and functional properties. One hour lecture and two hours of lab. [LCCN:CBI03401/Biochemistry I Lab (Upper Level)]</td>
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<tr>
<td>BCHM412</td>
<td>Biochemistry II</td>
<td>3 cr.</td>
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<td></td>
<td>Prerequisite: BCHM410. Structure, function, and biosynthesis of cellular macromolecules and macromolecular structures. A biochemical description of the genetic apparatus of procaryotic and eukaryotic cells will be emphasized. Three hours of lecture. [LCCN:CBI04413/Biochemistry II (Upper Level)]</td>
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<tr>
<td>BCHM412L</td>
<td>Biochemistry II Laboratory</td>
<td>1 cr.</td>
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<td></td>
<td>Prerequisite: BCHM410L and registration in BCHM412. Isolation and characterization of proteins and nucleic acids using centrifugation, ion exchange and gel permeation chromatography, gel electrophoresis, spectrophotometry, enzymology, radiochemistry and gene cloning. One hour of lecture and two hours of lab. [LCCN:CBI04411/Biochemistry II Lab (Upper Level)]</td>
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<tr>
<td>BCHM430</td>
<td>Biophysical Chemistry</td>
<td>3 cr.</td>
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<td></td>
<td>Prerequisites: CHEM266, PHYS252 or PHYS262, BIOS120, and MATH221. An introduction to chemical thermodynamics and kinetics, binding phenomena and spectroscopy with emphasis on applications in biology. Three hours of lecture.</td>
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<tr>
<td>BCHM460</td>
<td>Clinical Biochemistry</td>
<td>3 cr.</td>
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<td></td>
<td>Prerequisite: BCHM410 with a grade of C or better and credit or concurrent enrollment in BCHM412, or consent of the department. Clinical Biochemistry is an advanced study of biochemistry applied to the diagnosis of human disease. Measurement of the concentration of specific biomolecules in human blood, urine, and cerebrospinal fluid provides important information to the practicing physician for the diagnosis and monitoring of a wide variety of pathological conditions. This course is designed to present the biochemical causes, effects, and clinical utility of measurements of those biomolecules. Three hours of lecture.</td>
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<tr>
<td>BCHM490</td>
<td>Special Topics in Biochemistry</td>
<td>1-3 cr.</td>
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<td>Prerequisite: Consent of the department. In-depth study of special areas in biochemistry. May be repeated when topic varies. One to three hours of lecture.</td>
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<tr>
<td>BCHM495</td>
<td>Independent Study in Biochemistry</td>
<td>1-3 cr.</td>
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<td>Prerequisite: Consent of the department. Laboratory and/or library research in biochemistry. Three hours of laboratory per credit hour. May be repeated for credit for a maximum of 6 credit hours.</td>
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<tr>
<td>BCHM610</td>
<td>Biochemistry and Molecular Biology I</td>
<td>3 cr.</td>
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<td>Comprehensive overview of the relationship between the chemical structure and biological properties of proteins, lipids and carbohydrates and their contribution to cellular chemistry in terms of enzyme kinetics, bioenergetics, and metabolism. Students are also required to perform critical analyses of assigned biochemical case studies and submit a written report. Three hours of lecture.</td>
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**BCHM610L: Biochemistry and Molecular Biology I Laboratory**  
2 cr.  
Experimental investigations on lipid, protein, and carbohydrate biochemistry, including detailed analysis of structural and functional properties of important biomolecules. Students are also required to submit one formal written lab report and make an oral presentation. One hour of lecture and three hours of lab.

**BCHM612: Biochemistry and Molecular Biology II**  
3 cr.  
Comprehensive overview of the structure, function, and biosynthesis of biomolecules and macromolecular structures. Biochemical descriptions of the genetic apparatus in both procaryotic and eukaryotic cells will be emphasized. Students are also required to perform critical analysis of relevant case studies and submit a written report. Three hours of lecture.

**BCHM612L: Biochemistry and Molecular Biology II Laboratory**  
2 cr.  
Isolation and characterization of proteins and nucleic acids using centrifugation, ion exchange and gel permeation chromatography, gel electrophoresis, Spectrophotometry, and enzymology. Students are required to submit one formal written lab report and make an oral presentation. One hour of lecture and three hours of lab.

**BCHM630: Biophysical Chemistry**  
3 cr.  
A comprehensive overview of chemical thermodynamics, kinetics, binding phenomena, and chemical spectroscopy, with an emphasis on the practical applications of modern biological and physical principles. Critical analysis of the modern chemical literature and an oral report are required. Three hours of lecture.

**BCHM722: Experimental Methods**  
3 cr.  
Prerequisite: Consent of the department. A study of the processes associated with the scientific method of hypothesis testing. Primary emphasis will be placed on how to formulate hypotheses, design experiments to generate the data necessary to test the hypotheses, use one or a series of instruments and research techniques to generate data, analyze the data statistically, and use the data to draw conclusions related to the initial hypotheses. A variety of state-of-the art research methodologies will be covered. One hour of lecture and six hours of laboratory per week.

**BCHM740: Plant Biochemistry**  
3 cr.  
Prerequisite: Consent of the department. A study of metabolism with emphasis on those metabolic pathways restricted to C3, C4, and CAM photosynthetic plants. Particular emphasis will be placed on the synthesis and breakdown of the major groups of macromolecules as well as secondary plant metabolites. Will also include material regarding the ecological roles of natural plant products. Three hours of lecture per week.

**BIOLOGICAL SCIENCES**

Corequisites: Unless the student obtains approval of the Chairman of the Department, he or she may not continue in a course if the co-requisite course is dropped. Credits in BIOS110, BIOS110L, BIOS120, BIOS120L, and BIOS210 are prerequisites for all courses in Biological Sciences numbered 300 and above unless otherwise stated.

**BIOS101: General Biology**  
3 cr.  
Introduction to general biological principles for the non-science student. Three hours lecture.  
[LCCN:CBIO1013/General Biology I]

**BIOS101L: General Biology Laboratory**  
1 cr.  
Prerequisite: Credit or registration for credit in BIOS101. Supplementary to BIOS101 by means of student observations, experimentation, and analyses. Three hours of lab.  
[LCCN:CBIO1011/General Biology I Lab]

**BIOS104: Marine Environment**  
3 cr.  
Prerequisite: BIOS101 or consent of the department. This introductory course in marine biology explores marine organisms, the habitats and physical environment in which they live, and natural and anthropogenic stressors that affect the marine environment. Credit will not be allowed for use in any curricula offered by the Department of Biological Sciences. Designed for the non-science student. Three hours of lecture.  
[LCCN:CBIO1023/General Biology II]

**BIOS105: Plants and Society**  
3 cr.  
Prerequisite: BIOS101 or BIOS120 or consent of the department. A study of the significance of plants and similar organisms to human life with emphasis on how plants have affected the development of culture and society through agriculture, drugs, and medicine. Three hours of lecture.  
[LCCN:CBIO1023/General Biology II]
BIOS106: Human Heredity and Society* 3 cr.
Prerequisite: BIOS101 or BIOS120 or consent of the department. Introduction to the impact of genetics and biological research on man and his society. Includes the social, ethical, and legal implications of genetic disorders and research. Designed for the non-science student. Credit will not be allowed for use in any curricula offered by the Department of Biological Sciences. Three hours of lecture and/or seminar. [LCCN:CBIO1023/General Biology II]

BIOS107: Humans and Their Environment* 3 cr.
Prerequisite: BIOS101 or BIOS120 or consent of the department. A study of the effects of humankind's activity upon the physical and biological environment. Designed for the non-science student. Credit will not be allowed for use in any curricula offered by the Department of Biological Sciences. Three hours of lecture and/or seminar. Students receiving credit for BIOS107 cannot receive credit for ENSC101. [LCCN:CBIO1023/General Biology II]

BIOS108: Sociobiology* 3 cr.
Prerequisite: BIOS101 or BIOS120 or consent of the department. A biological approach to social awareness. Emphasis placed on the implications of a biological basis to social issues such as parenting, sexism, racism, eugenics, human diversity, man's antecedents, origin of life, and the bioethics of such practices as recombinant DNA technology, and genetic engineering. Designed for the non-science student. Credit will not be allowed for use in any curricula offered by the Department of Biological Sciences. Three hours of lecture. [LCCN:CBIO1023/General Biology II]

BIOS109: Animal Diversity* 3 cr.
Prerequisite: BIOS101 or BIOS120 or consent of the department. A study of the significance of animals to human life with emphasis on human health, agriculture, culture and societies. Credit will not be allowed for use in any curricula offered by the Department of Biological Sciences. Designed for the non-science student. Three hours of lecture. [LCCN:CBIO1023/General Biology II]

BIOS110: Biology Principles I* 3 cr.
First course in a two-part Introduction to basic biological principles for the science major. Topics include ecosystems, evolution, systematics, and basic physiology. Three hours of lecture. [LCCN:CBIO1043/General Biology II (Science Majors)]

BIOS110L: Biology Principles I Laboratory 1 cr.
Laboratory supplement to BIOS110 involving utilization of the scientific method to investigate the principles of ecosystem dynamics, evolution, plant and animal systematics, and basic physiology. Three hours of lab. [LCCN:CBIO1041/General Biology II Lab (Science Majors)]

BIOS120: Biology Principles II* 3 cr.
Prerequisite: BIOS110 and MATH121, or consent of the department. Second course in a two-part introduction to the basic biological principles for the science major. Topics include molecular structure-function, cellular metabolism, genetics, and gene expression. Three hours of lecture. [LCCN:CBIO1033/General Biology I (Science Majors)]

BIOS120L: Biological Principles II Laboratory 1 cr.
Prerequisite: Credit or registration in BIOS120. Laboratory supplement to BIOS120 involving utilization of the scientific method to investigate the principles of biochemistry, metabolism, genetics, and cell biology. Three hours of lecture. [LCCN:CBIO1031/General Biology I Lab (Science Majors)]

BIOS190: Health Science Seminar 1 cr.
Prerequisite. Permission of department chair. Seminar for undergraduate students anticipating medical studies. One hour seminar.

BIOS210: Introduction to Biological Inquiry 3 cr.
Prerequisite: BIOS120, BIOS120L. Development of the skills and attitudes necessary for understanding and conducting biological inquiry. A problem-solving approach will be used to train students to make critical observations, to formulate hypotheses, to design experiments, and to choose appropriate analyses. Three hours of lecture.
BIOS222: General Zoology  
Prerequisite: BIOS120, BIOS120L and credit or registration for credit in BIOS222L. A study of the central facts and principles needed to understand the form, function, and evolution of animals. Three hours of lecture.  
[LCCN:CBIO2603/Introduction to Zoology]

BIOS222L: General Zoology Laboratory  
Prerequisite: Credit or registration for credit in BIOS222. Laboratory study of the form and function of animals. This course is designed to correlate with and supplement BIOS222. Three hours of lab.  
[LCCN:CBIO2601/Introduction to Zoology Lab]

BIOS224: General Botany  
Prerequisite: BIOS120, BIOS120L, and credit or registration for credit in BIOS224L. A study of the concepts, facts and principles central to understanding the form, function, classification, and evolution of photosynthetic protists, higher plants and fungi. Three hours of lecture.  
[LCCN:CBIO2313/Botany I]

BIOS224L: General Botany Laboratory  
Prerequisite: Credit or registration for credit in BIOS224. Laboratory study of the form and function of plants and fungi. This course is designed to correlate with and supplement BIOS224. Three hours of lab.  
[LCCN:CBIO2311/Botany I Lab]

BIOS226: Field Zoology  
Prerequisites: BIOS222. A basic course in field collecting techniques of all major animal phyla. Topics will include collecting techniques, specimen preparation, storage and cataloging. Five hours of lecture-lab.

BIOS231: Histological Technique  
Prerequisites: BIOS222, BIOS224, and credit or registration in BIOS231L. Study of the methods and principles of preparation of animal and plant material for microscopic examination, histochemical techniques, staining, microscopy, photomicrography, and isolation of cells and organelles. Two hours of lecture.

BIOS231L: Histological Technique Laboratory  
Prerequisite: Credit or registration in BIOS231. The practice of histochemical techniques including staining, microscopy, photomicrography, and isolation of cells and organelles. Six hours of lab.

BIOS277: Dendrology  
Prerequisite: BIOS224. An identification classification, characteristics, and distribution of the principal forest trees of the United States with particular emphasis on coniferous species. One hour of lecture and three hours of lab.

BIOS278: Dendrology  
Prerequisite: BIOS277. A continuation of BIOS277 with particular emphasis on hardwood species with spring and summer characteristics of forest vegetation. One hour of lecture and three hours of lab.

BIOS284: Human Anatomy and Physiology I  
Prerequisite: BIOS120 and BIOS120L. The elements of human anatomy and physiology, a study of the structure and function of the major organ systems in humans, with emphasis on cells and tissues, and on the integumentary, skeletal, muscular, and nervous systems. Three hours of lecture.

BIOS284L: Human Anatomy and Physiology I Laboratory  
Prerequisite: Credit or registration for credit in BIOS284. Experiments designed to impart a basic understanding of human anatomy and physiology using demonstrations of physiological response, human skeletons, preserved organs, slides, and dissection as needed to supplement Human Anatomy and Physiology I. One hour of Lab.

BIOS285: Human Anatomy and Physiology II  
Prerequisite: BIOS284. The elements of human anatomy and physiology, a study of the structure and function of the major organ systems in humans, with emphasis on the endocrine, circulatory, respiratory, lymphatic, digestive, excretory, and reproductive systems. Three hours of lecture.

BIOS285L: Human Anatomy and Physiology II Laboratory  
Prerequisite: Credit or registration for credit in BIOS285. Experiments designed to impart a basic understanding of human anatomy and physiology using demonstrations of physiological responses, human skeletons, preserved organs, slides, and dissection as needed to supplement Human Anatomy and Physiology II. One hour of Lab.
BIOS291: Field Course in Biology 3 cr.
Prerequisite: Consent of the department. Study of the flora and fauna and community characteristics of different biotic environments, including developing skills in the collection and preservation of organisms for scientific study. Field work will be done during a two-week (approximate) field trip. One hour laboratory instruction and six hours laboratory. May be repeated for credit.

BIOS293: Independent Study 1 cr.
Prerequisite: BIOS120, or BIOS120L and consent of the department. Introduction to laboratory and library research. Grading in this course is on a pass/no credit basis. May be repeated. One hour conference and two hours independent research.

BIOS295: Systematics Internship 1 cr.
Prerequisites: BIOS222 or BIOS224 and consent of department. Practical experience in the curation and management of biological collections in the Museum of Life Sciences. May be repeated. One hour conference and two hours of curatorial work in the museum.

All courses numbered 300 or above require BIOS110, BIOS110L, BIOS120, BIOS120L, and BIOS210 (or approval of the department chair) as prerequisites unless otherwise noted.

BIOS320: General Microbiology 3 cr.
Prerequisite: BIOS120, BIOS120L. A basic study of viruses, rickettsiae, chlamydians, bacteria, algae, fungi, and protozoa, with emphasis on form, structure, reproduction, physiology, metabolism, and identification of microorganisms. Three hours of lecture.

BIOS320L: General Microbiology Laboratory 1 cr.
Prerequisite: Credit or registration in BIOS320. The experiments in the laboratory are integrated with lecture for an introductory course in microbiology. Emphasis will be on microscopy, microbial morphology, staining methods, use of various microbial media, pure culture techniques, biochemical activities of various microbes, characterization of unknown bacteria cultures, and bacterial and animal virus propagation. One hour of laboratory instruction, and two hours of lab.

BIOS340: Vascular Plant Morphology 3 cr.
Prerequisite: BIOS224 and credit or registration in BIOS340L. A survey of vascular plants, combining the basic concepts of vascular plant morphology with organography, anatomy, life histories, and evolutionary relationships. Three hours of lecture.

BIOS340L: Vascular Plant Morphology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS340. Provides the opportunity to examine living, preserved and fossil specimens of all major vascular plant groups. It is designed to both correlate and supplement BIOS340. Three hours of lab.

BIOS341: Introduction to Marine Zoology 4 cr.
Prerequisites: BIOS222 and permission of instructor. Survey of marine animals, particularly those of the LA Gulf Coast, including classification, morphology, and ecology. Offered summers only at the LA Universities Marine Consortium (LUMCON) facility.

BIOS345: Plant Physiology 3 cr.
Prerequisite: BIOS224, CHEM265, and credit or registration for credit in BIOS345L. The study of plant function, including soil and water relationships, plant biochemistry, development and environmental physiology. Three hours of lecture.

BIOS345L: Plant Physiology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS345. Introduction to laboratory techniques of investigation of plant physiological function. Three hours of laboratory per week.

BIOS350: Plant Pathology 3 cr.
Prerequisite: BIOS224. A study of diseases in plants, the role of environment in disease development, the genetic and biochemical nature of host-parasite interactions, and the methods of disease control. Emphasis will be placed on diseases affecting crops and ornamentals in Louisiana. Three hours of lecture.
BIOS350L: Plant Pathology Laboratory 1 cr.
Prerequisite: Credit or registration in BIOS350. A course designed to provide the laboratory training necessary to study disease in plants, the role of the environment in disease development, the genetic and biochemical nature of host-parasite interactions, and the methods of disease control. Three hours of lab.

BIOS351: Medical Microbiology 3 cr.
Prerequisite: BIOS320. An introduction to the essentials of Medical Microbiology with emphasis on antimicrobial agents, immunology, bacteria, fungi, viruses, and medical parasitology. Three hours of lecture.

BIOS351L: Medical Microbiology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS351. A comprehensive course in identification of medically important bacteria, fungi, viruses, protozoans, helminths and arthropod vectors. One hour of laboratory instruction and two hours of laboratory.

BIOS355: Dinosaurs 3 cr.
Prerequisite: Twelve semester hours of biology or consent of the department. A broad study of the major groups of dinosaurs and related reptiles of the world, including the biology, morphology, taxonomy, and ecology of each group. Three hours of lecture.

BIOS360: General Entomology 3 cr.
Prerequisite: BIOS222 and credit or registration for credit in BIOS360L. A systematic study of the biology of insects and related arthropods including their anatomy, morphology, physiology, development, taxonomy, ecology, and life histories. Additional emphasis will be placed on the relation of insects to humans in agriculture and medicine. Three hours of lecture.

BIOS360L: General Entomology Laboratory 2 cr.
Prerequisite: Credit or registration for credit in BIOS360. Field and laboratory study of the characteristics, ecology, life histories, collection, and preservation of insects. Six hours of lab.

BIOS363: Principles of Genetics 3 cr.
Prerequisite: Credit or registration for credit in BIOS363L. Fundamental laws of heredity as applied to both plants and animals. A basic course for the student concentrating in biological sciences, medicine, allied health fields, agriculture, psychology, or secondary education. Three hours of lecture. [LCCN:CBIO3523/Genetics (Upper Level)]

BIOS363L: Principles of Genetics Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS363. The laboratory course provides the opportunity to apply basic genetic principles in analyses of various experiments. It is designed to both correlate and be a supplement to BIOS 363. Three hours of lab. [LCCN:CBIO3521/Genetics Lab (Upper Level)]

BIOS365: Herpetology 3 cr.
Prerequisite: BIOS222 and credit or registration for credit in BIOS365L. A systematic study of the major groups of reptiles and amphibians of the world, including the biology, taxonomy, and ecology of species occurring in the Ark-La-Tex. Three hours of lecture.

BIOS365L: Herpetology Laboratory 1 cr.
Prerequisite: BIOS222 and credit or registration for credit in BIOS365. Identification of major groups of reptiles and amphibians of the world with emphasis on the species found in the Ark-La-Tex. Field work will involve taxonomy, systematics, and ecology of local species. Three hours of lab.

BIOS370: Animal Behavior 3 cr.
Prerequisite: BIOS222 and credit or registration for credit in BIOS370L. A study of the observable activity of organisms in response to internal and environmental stimuli. Included will be discussions of the genetic, anatomical, environmental, and evolutionary influences on the behavioral repertoires of motile organisms. Three hours of lecture.

BIOS370L: Animal Behavior Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS370. The laboratory enables the student to conduct experiments in both the field and laboratory and discuss the behavior patterns observed. Opportunity will be provided for individual work through a required field or laboratory investigation of some behavioral problem. Three hours of lab.
BIOS 371: Plant Systematics 2 cr.
Prerequisite: BIOS 224 and credit or registration for credit in BIOS 371L. The identification, classification, and nomenclature of the vascular plants with an emphasis on the native spring wild flowers of the Ark-La-Tex. Family characteristics, phylogenetic relationships, terminology, and economic importance will be stressed. Two hours of lecture.

BIOS 371L: Plant Systematics Laboratory 2 cr.
Prerequisite: Credit or registration for credit in BIOS 371. Laboratory study emphasizing plant identification by use of dichotomous keys and recognition to the generic and family levels. Current techniques, including molecular techniques, will be examined. Field study will be various plant communities in northwest Louisiana and one weekend trip to Arkansas. Six hours of lab.

BIOS 372: Comparative Anatomy of Vertebrates 2 cr.
Prerequisite: BIOS 222 and credit or registration for credit in BIOS 372L. A study of vertebrate anatomy based on recent representatives of the living vertebrate classes. Emphasis is on anatomy and anatomical evidence for current concepts of evolutionary relationships of vertebrates. Two hours of lecture. [LCCN:CBIO3231/Comparative Anatomy (Upper Level)]

BIOS 372L: Comparative Anatomy of Vertebrates Laboratory 2 cr.
Prerequisite: Credit or registration for credit in BIOS 372. Individual study and dissection of selected representatives of the recent vertebrate classes. Six hours of lab. [LCCN:CBIO3231/Comparative Anatomy Lab (Upper Level)]

BIOS 374: Invertebrate Zoology 3 cr.
Prerequisite: Twelve hours of biological sciences including BIOS 222 and credit or registration for credit in BIOS 374L or consent of the department. Focuses on taxonomy, morphology, physiology, embryology, ecology, and life histories of the invertebrates, protozoa through protochordates. Three hours of lecture.

BIOS 374L: Invertebrate Zoology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS 374. Laboratory investigation of taxonomy, morphology, physiology, embryology, ecology, and life histories of invertebrates, protozoa through protochordates. Three hours of lab.

BIOS 376: Vertebrate Natural History 3 cr.
Prerequisite: BIOS 222 and credit or registration for credit in BIOS 376L. A study of the characteristics, life histories, and evolution of representatives of all vertebrate classes. Three hours of lecture.

BIOS 376L: Vertebrate Natural History Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS 376. Field and laboratory study of the characteristics, ecology, and life histories of local species of vertebrates. Three hours of lab.

BIOS 380: Animal Parasitology 3 cr.
Prerequisite: BIOS 222 and credit or registration for credit in BIOS 380L. The general principles of parasitology: morphology, life history, and classification of parasites, and their host relationships. Recommended for students pursuing allied health professions. Three hours of lecture.

BIOS 380L: Animal Parasitology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS 380. Laboratory investigations of the morphology, life history, and classification of parasites with emphasis on techniques of collecting and examining parasites. Three hours of lab.

BIOS 387: General Physiology 3 cr.
Prerequisite: CHEM 124, CHEM 124L, and credit or registration for credit in BIOS 387L. Introduction to the study of homeostatic principles in plants and animals. Integration of chemical and physical processes in biological systems will be presented. Three hours of lecture.

BIOS 387L: General Physiology Laboratory 1 cr.
Prerequisite: Credit or registration in BIOS 387. Introduction to laboratory techniques of investigation and observation of physiological functions of plants and animals. One hour laboratory instruction and two hours of lab.
BIOS420: Cell Biology 3 cr.
Prerequisites: BIOS363, CHEM265. A study of the structure and function of eukaryotic cells, including ultrastructure, biochemical components, membranes, metabolism and organelles, cytoskeleton, signaling, motility, chromosome structure, and cell divisions. Three hours of lecture. [LCCN:CBIO4143/Cell Biology (Upper Level)]

BIOS420L: Cell Biology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS420. Modern techniques of investigation of cell structure and function, including microscopy, isolation of cell organelles, cytochemistry, and biochemical methodology. Three hours of lab. [LCCN:CBIO4141/Cell Biology Lab (Upper Level)]

BIOS421: Immunology 3 cr.
Prerequisite: Credit or registration for credit in BIOS363. A study of the molecular and cellular processes of immune system function. Topics include innate immunity, recognition of antigen and antigen receptor structure, lymphocyte development, antigen presentation, effector functions, immunodeficiency, allergy, and autoimmune diseases. Three hours of lecture.

BIOS421L: Immunology Laboratory 1 cr.
Prerequisite: Credit or registration in BIOS421. An introduction to molecular concepts and techniques used in basic immunology research and in biomedical applications. Includes investigation of the structures of immunoglobulins, T-cell receptors, and major histocompatibility complex molecules. Basic immunological techniques include immunoprecipitation and agglutination, ELISA, hybridoma preparation, immunoaffinity chromatography, and flow cytometry. One hour of laboratory instruction, and two hours of lab.

BIOS430: Molecular Biology 3 cr.
Prerequisite: BIOS330 and CHEM265. Study of the relationship between the three-dimensional structure and function of proteins and nucleic acids. Topics will include the following: physical methods for the study of macromolecules; protein folding motifs and mechanisms of folding; molecular recognition; DNA topology, replication, repair and recombination; RNA synthesis and processing; genetic code and translation; and molecular mechanisms for regulation of gene expression. Three hours of lecture.

BIOS430L: Molecular Biology Laboratory 2 cr.
Prerequisite: Credit or registration for credit in BIOS430. Training in the experimental techniques of molecular biology. Methods taught will include macromolecular purification, electrophoretic analysis, recombinant DNA and cloning techniques, DNA sequencing, polymerase chain reaction, and the use of computers and national databases for the analysis of DNA and protein sequences. One hour of lecture and three hours of lab.

BIOS434: Histology 3 cr.
Microscopic structure and biochemistry of mammalian tissues, stressing relationship of form to function. Three hours of lecture.

BIOS434L: Histology Laboratory 1 cr.
Prerequisite: Credit or registration for credit in BIOS434. Microscopic structure and biochemistry of mammalian tissues, stressing relationship of form to function. Three hours of laboratory.

BIOS435: Ornithology 3 cr.
Prerequisites: BIOS222 and credit or registration for credit in BIOS435L. A systematic study of the major groups of birds of the world, including the biology, taxonomy, and ecology, of species occurring in the Ark-La-Tex. Three hours of lecture.

BIOS435L: Ornithology Lab 1 cr.
Prerequisites: Credit or registration for credit in BIOS435. Identification of the major groups of birds of the world, including the biology, taxonomy, and ecology, of species occurring in the Ark-La-Tex. Fieldwork will involve the identification, behavior and ecology of local species. Three hours of lab.

BIOS440: Principles of Ecology 3 cr.
Prerequisite: Credit or registration for credit in BIOS440L, or consent of the department. Fundamental interrelationships between living organisms and the nonliving environments with stress on ecosystem dynamics. Three hours of lecture. [LCCN:CECO4123/Principles of Ecology (Upper Level)]
BIOS440L: Principles of Ecology Laboratory 1 cr.
Prerequisite: Credit or registration in BIOS440. Techniques in ecological interpretation and mensuration. One hour of laboratory instruction, and two hours of lab. [LCCN:CECO4121/Principles of Ecology Lab (Upper Level)]

BIOS446: Aquatic Biology 3 cr.
Prerequisite: Credit or registration for credit in BIOS446L. A study of the physical, chemical, and biological systems of fresh, estuaries, and marine waters. Three hours of lecture.

BIOS446L: Aquatic Biology Laboratory 1 cr.
Prerequisites: Credit or registration for credit in BIOS446. Practical application of the principles discussed in BIOS446 with emphasis on field work and identification of the biota of various aquatic habitats. Three hours of lab.

BIOS450: Marine Ecology 4 cr.
Prerequisites: BIOS222, introductory chemistry and consent of the department. Study of the relationships of marine and estuaries organisms to environmental factors, the interactions among organisms, and ecological processes of energy and materials flow. Emphasis will be on the communities and ecosystems of the Louisiana coastal zone. Offered summers only at the Louisiana University Marine Consortium (LUMCON) facility.

BIOS451: Marine Microbiology 4 cr.
Prerequisite: Twelve term hours of biology and consent of the department. Introduction to estuaries and marine microbes with emphasis on bacteria and fungi. Topics include classification, methodology. Roles in marine ecosystems, biogeochemical cycles and diseases of marine animals. Offered summers only at the Louisiana University Marine Consortium (LUMCON) facility.

BIOS452: Marine Botany 4 cr.
Prerequisites: Twelve term hours of biology, including some botany and consent of the department. Study of marine and coastal algae and vascular plants, including classification, morphology, life cycles, and ecology. Offered summers only at the Louisiana University Marine Consortium (LUMCON) facility.

BIOS454: Coastal Marine Geology 4 cr.
Prerequisite: GEOL105 and consent of the department. Geomorphologic features of estuaries, coastal and continental shelf environments, erosional, depositional and geochemical processes, and field and laboratory methods. Offered summers only at the Louisiana University Marine Consortium (LUMCON) facility.

BIOS455: Marine Vertebrate Zoology 4 cr.
Prerequisites: Sixteen term hours of biology, including some zoology and consent of department. General study of the marine chordates with particular emphasis on the fishes, including classification, structure, function and ecology. Offered summers only at the Louisiana University Marine Consortium (LUMCON) facility.

BIOS456: Marine Biology 3 cr.
Prerequisite: BIOS210. An introduction to marine biology which covers the physical environment, how organisms are influenced by abiotic and biotic factors, different types of marine organisms and habitats, and applied aspects of marine biology. Three hours of lecture.

BIOS456L: Marine Biology Laboratory 3 cr.
Prerequisite: BIOS210 and credit or registration for credit in BIOS456. An introduction to factors and processes that influence marine organisms and ecosystems through hands-on experience in the lab and field and through computer simulation. Students will engage in data collection, analysis, interpretation, and presentation. Three hours of lab.

BIOS460: Microbial Genetics 3 cr.
Prerequisite: BIOS363 and one of the following: BIOS320, BIOS330, or BCHM410. Biochemical description of genetic processes in microorganisms. Topics include transformation, conjugation, transduction, replication, recombination, genome organization, gene regulation, and recombinant DNA. Three hours of lecture.

BIOS462: Astrobiology 3 cr.
Prerequisite: CHEM265. A multidisciplinary study of the origin and search for life in the universe. Topics include the chemical origin of life, planetary evolution, search for extra-solar planetary systems and habitable worlds, search for life in the solar system, and search for intelligent life in the universe.
BIOS463: Medical Genetics
Prerequisite: BIOS363. An integration of the central principles of classical, molecular, and population genetics, with emphasis on their clinical application. This course is intended to provide a comprehensive understanding of Mendelian disorders, cancer genetics, multifactorial inheritance, and clinical cytogenetics and is designed for students preparing for careers in Biological Sciences, medicine, allied health fields, Agriculture, Psychology, or Secondary Education. Three hours of lecture.

BIOS465: Applied Biotechnology
Prerequisites: BIOS330 and BIOS330L. A laboratory based course in which students will gain experience in the principal techniques of recombinant DNA technology. One hour of lecture and six hours of lab per week.

BIOS470: Evolution
A study of the theories and mechanisms of evolution. Three hours of lecture.

BIOS471: Biogeography
The geographical distributions of major groups of plants and animals will be studied with regard to mechanisms and routes of dispersal, centers of origin, environmental factors, continental drift, and paleontology. Three hours of lecture.

BIOS472: Ecosystems Interactions
Prerequisites: BIOS224, or consent of the department. Ecosystems Interactions focuses on the interactions of biotic and abiotic factors, particularly climate, soils, and vegetation, which characterize the world’s biomes. An emphasis will be placed on how these factors influence the predictable patterns found in the distribution and characteristics of the world’s biota. Three hours of lecture.

BIOS475: Developmental Biology
A study of the molecular mechanisms that regulate development from the zygote to the whole organism in vertebrate and invertebrate animal models. Topics include formation of early body plan, cell type determination, organogenesis, morphogenesis, evolutionary mechanisms, and genetic and environmental contribution to developmental disorders. Three hours of lecture.

BIOS475L: Developmental Biology Laboratory
Prerequisite: Credit or registration for credit in BIOS475. Investigation of development using several animal model systems. Topics include gametes and fertilization, cleavage, gastrulation, and morphogenesis of sea urchin, amphibian, and avian embryos. Three hours of laboratory.

BIOS480: Endocrinology
Prerequisite: BIOS330. The nature of hormones, hormonal mechanisms, feedback processes, and hormonal functions. Some clinical applications will be presented. Three hours of lecture.

BIOS485: Comparative Animal Physiology
Prerequisite: CHEM266, CHEM266L, BIOS330, or consent of the department and credit or registration for credit in BIOS485L. A comparative study of physiological mechanisms and specialization in animals; ways in which diverse animals perform similar functions. Three hours of lecture.

BIOS485L: Comparative Animal Physiology Laboratory
Prerequisite: Credit or registration for credit in BIOS485. Investigative study of physiological mechanisms of animals. One hour of laboratory instruction and two hours of lab.

BIOS486: Clinical Anatomy
Prerequisites: BIOS285 and BIOS285L. An overview of the anatomy of the human body using a regional approach, emphasizing anatomy of the thorax, abdomenopelvic cavity, back, head and neck, and upper and lower limbs, while providing information on gross anatomic structures and clinical significance. Three hours of lecture.

BIOS487: Medical Physiology
Prerequisite: BIOS285 and BIOS285L. The basic concepts of cellular and subcellular structure and function, biological membranes, signal transduction, metabolism, normal physiology of all major organ systems with emphasis on medical application, and pathophysiology of conditions such as shock, heart disease, and renal disease. Three hours of lecture.
BIOS490: Special Topics in Biological Sciences 1-3 cr.
Prerequisite: Consent of the department. In depth study of special areas in the biological sciences. May be repeated when the topics vary. If the course contains a laboratory component, students must participate in both lecture and lab to earn credit for the course. One to three hours of lecture and/or zero to four hours of lab.

BIOS491: Research 1 cr.
Prerequisite: Consent of the department. Laboratory and/or research. Grading in this course is on pass/no credit basis. May be repeated. Three hours per week.

BIOS492: Honors Thesis 2 cr.
Prerequisites: Twenty-four hours credit in biological sciences and an invitation from the department chairman. The student must also make a commitment to enroll in BIOS493. The student will initiate a research project by selecting a specific area of study, conducting a thorough survey of the literature of the topic and presenting a written outline of the objectives and methods, with a bibliography of the proposed research. The proposed research will not duplicate previously published studies. One hour of conference and five hours of library and/or laboratory per week.

BIOS493: Honors Thesis 2 cr.
Prerequisite: Credit for BIOS492. The student will complete a research project initiated in BIOS492. A finished report in the format and style of a manuscript publishable in a professional scientific journal will be submitted to the advisor, reviewed by the student and advisor and revised by the student. The student will present the results and conclusion of his/her research in a style appropriate for a scientific meeting. One hour of conference and five hours of laboratory per week.

BIOS494: Advanced Field Biology 3 cr.
Prerequisite: BIOS291 and consent of the department. Advanced training in field techniques required to study the flora and/or fauna and community characteristics of a particular biotic environment. Participants will be expected to work on a group research project as well as specialize in the collection and proper handling and curation of a specific group of organisms. Field work will be completed during a two- or three-week field trip. May be repeated for credit.

BIOS495: Seminar 1 cr.
Prerequisite: Senior standing. Must have credit for, or be currently enrolled in BIOS363/363L and BIOS440/440L. An in depth study of a particular topic in biology. One hour of recitation/discussion. Fifty percent (50%) of the grade for the class is derived from the student’s performance on the Biology Major Field Test. The Biology Major Field Test is required of all graduating biology majors. May be repeated for credit two times.

BIOS620: Molecular Biology 3 cr.
A study of the relationship between the three-dimensional structure and function of proteins and nucleic acids. Topics will include the following: physical methods for the study of macromolecules; protein folding motifs and mechanisms of folding; molecular recognition; DNA topology, replication, repair, and recombination; RNA synthesis and processing; genetic code and translation; and molecular mechanisms for regulation of gene expression. Assesses critical thinking skills through scholarly readings and written analysis. Three hours of lecture.
BIOS630L: Molecular Biology Laboratory 1 cr.
Training in the experimental techniques of molecular biology. Methods taught will include macromolecular purification, electrophoretic analysis, recombinant DNA and cloning techniques, DNA sequencing, polymerase chain reaction, and the use of computers and national databases for the analysis of DNA and protein sequences. Assesses critical thinking skills through scholarly readings and written analysis. One hour of lecture and three hours of lab.

BIOS640: Principles of Ecology 3 cr.
Rigorous background in population and community analyses covering growth and regulation, species interactions, life-history theory, and viability analysis including process-based modeling of biological systems.

BIOS640L: Principles of Ecology Laboratory 1 cr.
Exploration of applied and quantitative methods to explore biotic and abiotic patterns in populations, communities and ecosystems.

BIOS646: Aquatic Biology 3 cr.
A critical study of physical, chemical, and biological characteristics of freshwater and inland aquatic ecosystems, addressing both natural processes and anthropogenic impacts. Topics to be covered include characteristics of different types of inland bodies of water, typical organisms found in them, and factors responsible for influencing community structure and ecosystem function. Three hours of lecture.

BIOS646L: Aquatic Biology Laboratory 1 cr.
Practical application of the principles of aquatic biology with emphasis on the critical analysis of field work, the identification of the biota found in aquatic habitats, techniques and equipment used in sample collection, and data collection, analysis, and presentation. Three hours of lab.

BIOS660: Microbial Genetics 3 cr.
Biochemical description of genetic processes in microorganisms. Topics include transformation, conjugation, transduction, replication, recombination, genome organization, gene regulation, and recombinant DNA. Assesses critical thinking skills through scholarly readings and written analysis. Three hours of lecture.

BIOS663: Medical Genetics 3 cr.
An integration of the central principles of classical, molecular, and population genetics with their clinical application to genetic disorder. An advanced course for the graduate student concentrating in Biological Sciences, medicine, allied health fields, Psychology, or Secondary Education. Critical thinking skills and problem solving exercises will be assessed through case studies, analysis, and review of primary literature.

BIOS665: Applied Biotechnology 3 cr.
A laboratory based course that will enable students to gain experience in the basic techniques of molecular biology. The graduate course also requires students to demonstrate their ability to write a grant proposal describing molecular biology investigations.

BIOS670: Evolution 3 cr.
Prerequisite: Consent of the department. A study of the theories and mechanisms of organic evolution. This course will have particular value for those students who wish to pursue a graduate degree in Biological Science Education. Three hours of lecture.

BIOS671: Biogeography 3 cr.
Prerequisite: Consent of the department. The geographic distribution of major groups of plants and animals will be studied with regard to mechanisms and routes of dispersal centers of origin, environmental factors, continental drift, and paleontology. This course will have particular value for those students who wish to pursue a graduate degree in Biological Science Education. Three hours of lecture.

BIOS686: Clinical Anatomy 3 cr.
An in depth study of the anatomy of the human body using a regional approach, emphasizing anatomy of the thorax, abdominopelvic cavity, back, head and neck, and upper and lower limbs, with emphasis on clinical applications as required by the medical professional. A full body virtual cadaver dissection is included. Three hours of lecture.
BIOS687: Medical Physiology 3 cr.
An in depth study of cellular and subcellular structure and function, biological membranes, signal transduction, and metabolism in all major organ systems with emphasis on clinical application for the advanced medical professional. Pathophysiology of conditions such as shock, heart disease, renal disease, neuromuscular disease, and diabetes will also be included, with critical analysis of case-based learning modules for these and other pathologies. Three hours of lecture.

BIOS690: Special Topics in Biological Sciences 1-3 cr.
Prerequisite: Consent of the department. In-depth study of special areas in the biological sciences. May be repeated for credit when the topics vary. One to three hours of lecture.

BIOS701: Introduction to Molecular Biology I 3 cr.
This course is intended to provide master's degree-seeking students in System Technology a solid foundation in molecular biology in preparation for their pursuit of a bioinformatics concentration. Topics covered include cellular biochemistry, metabolic pathways responsible for energy generation and biosynthesis, protein structure, enzymes, and metabolic regulation. Three hours of lecture.

BIOS703: Introduction to Molecular Biology II 3 cr.
Prerequisite: BIOS701 or consent of the department. This course is the second in a molecular biology series intended to provide master's degree-seeking students in System Technology a solid foundation in molecular biology in preparation for their pursuit of a bioinformatics concentration. Topics covered include structure and function of the genetic apparatus of the cell, including DNA replication, repair, and recombination, transcription and RNA processing, protein synthesis, gene regulation, and recombinant DNA technology. Three hours of lecture.

BIOS720: History of Science 3 cr.
Prerequisite: Consent of the department. Covers the growth of science from ancient Greece to the 20th Century and its impact on the development of western civilization. Emphasis is placed on the biological and chemical sciences. Three hours of lecture. Also listed as HIST720.

BIOS735: Biology Seminar 1 cr.
Prerequisite: Consent of the department. Selected topics from current issues and problems in modern biology based on the primary literature. This course is designed to help the student read, understand, interpret and qualify scientific texts. This course will help train students to find and select essential texts using both literature references from an initial text), and computer-based databases and to present the material in an oral and written format. One hour of recitation and discussion.

BIOS740: Ecological Methodology 3 cr.
Prerequisites: BIOS440 or equivalent or consent of the department. BIOS740 will emphasize the methodology for estimating abundance in animal and plant populations, sampling and experimental design, estimating community parameters, and life tables and survivorship estimations. Three hours of lecture.

BIOS745: Plant Molecular Biology 3 cr.
Prerequisites: Previous course work in plant physiology, biochemistry and molecular biology. The impact of genetic engineering on agriculture. Methods of transformation, antisense technology, gene regulation, plant tissue culture, the chloroplast genome, transposable elements, and the prospects for crop improvement. The course will include the critical reading of relevant research papers. Three hours of lecture.

BIOS750: Ecotoxicology 3 cr.
Prerequisite: Consent of the department. A study of the chemical properties, mode of action, detection and environmental fate of the major pesticides. Three hours of lecture.

BIOS760: Human Genetics for Teachers 3 cr.
Prerequisite. Consent of the department. Study of human inheritance patterns, genetic disorders, genetic screening and counseling, social impact of genetics, and current research. Three hours of lecture.
### BIOS 785: Selected Topics in Biology
3 cr.
May be repeated for credit when the topics vary. Special topics to be selected from areas such as botany, genetics, microbiology, or zoology. Three hours of lecture.

### BIOS 786: Independent Research
1-3 cr.
Prerequisite: Consent of the department. Library, laboratory, or field research under the guidance of a departmental advisor. May be repeated for credit for a maximum of six term hours. Three hours of research per credit.

### BIOS 790: Special Topics in Biology
3 cr.
Special topics in Biology which may be repeated as topics vary from term to term.

### BIOS 795: Independent Study in Biology
3 cr.
Independent study in biology. An independent project or study directed by an assigned faculty member.

### BIOS 799: Thesis
1-3 cr.
Thesis. Research project carried out under the supervision of assigned faculty member. Grading on this course is a pass/no credit basis. May be repeated.

### BUSINESS ADMINISTRATION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BADM700</td>
<td>Fundamentals of Accounting and Finance</td>
<td>3 cr.</td>
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<tr>
<td></td>
<td>Prerequisite: Proficiency in College Algebra. An introduction to the foundations of Accounting and Finance.</td>
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</tr>
<tr>
<td>BADM701</td>
<td>Fundamentals of Economics and Statistics</td>
<td>3 cr.</td>
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<tr>
<td></td>
<td>Prerequisite: Proficiency in College Algebra. An introduction to the foundations of economic analysis and applied statistics.</td>
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<tr>
<td>BADM775</td>
<td>Graduate Internship in Business</td>
<td>3 cr.</td>
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<td></td>
<td>Prerequisites: Regular standing in the MBA program, maintenance of a minimum 3.0 overall GPA, and approval of the business internship director. The director works with the student to find an internship experience that matches the student’s professional interests. Students will not receive credit for an existing job. Requires a graduate faculty mentor and written reports detailing the objectives, progress, and completion of internship goals. Three hours of credit on a pass / no credit basis. Three hours of laboratory per credit hour.</td>
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<tr>
<td>BADM790</td>
<td>Graduate Seminar in Business</td>
<td>3 cr.</td>
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<td></td>
<td>Prerequisite: Consent of the MBA director. Exploration and analysis of selected problems and issues in Business Administration. Course content necessarily changes with each term as current issues in different areas are discussed. Three hours of seminar.</td>
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<tr>
<td>BADM791</td>
<td>Graduate Executive Special Topics in Strategy</td>
<td>1 cr.</td>
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<td>Prerequisite: Admitted to the MBA ET program. Exploration and analysis of current strategy topics appropriate for the executive role and position of General Manager (i.e. business unit manager, company CEO or President, or other applicable title). Course content can change with each term as current issues in strategy change.</td>
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<tr>
<td>BADM792</td>
<td>Graduate Executive Special Topics in Management</td>
<td>1 cr.</td>
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<td></td>
<td>Prerequisite: Admitted to the MBA ET program. Exploration and analysis of current management topics appropriate for the executive role and position of General Manager (i.e. business unit manager, company CEO or President, or other applicable title). Course content can change with each term as current issues in management change.</td>
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<tr>
<td>BADM793</td>
<td>Graduate Executive Special Topics in Marketing and Value Creation</td>
<td>1 cr.</td>
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<td></td>
<td>Prerequisite: Admitted to the MBA ET program. Exploration and analysis of current marketing topics appropriate for the executive role and position of General Manager (i.e. business unit manager, company CEO or President, or other applicable title). Course content can change with each term as current issues in marketing change.</td>
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<tr>
<td>BADM794</td>
<td>Graduate Executive Special Topics in Finance</td>
<td>1 cr.</td>
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<tr>
<td></td>
<td>Prerequisite: Admitted to the MBA ET program. Exploration and analysis of current finance topics appropriate for the executive role and position of General Manager (i.e. business unit manager, company CEO or President, or other applicable title). Course content can change with each term as current issues in finance change.</td>
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