579: Graduate Seminar in Graphic Design Education. 0-3-3 (6). Discussion and guided research concerning college classroom and computer laboratory instruction in graphic design education.

580: Master’s Thesis & Exhibition in Graphic Design. 0-3-3. Preparation of a thesis paper for submission to the Art Graduate Committee and a public exhibition of thesis visual works in graphic design.

---

**BIOLOGICAL SCIENCES (BISC)**

101: Fundamentals of Biology I. 0-3-3. Introduction to biological concepts of cell structure and physiology, genetics, evolution, and ecology. Statewide Transfer Agreement Course*.


131: Biological Principles Laboratory. 3-0-1. Coreq., BISC 130. Student-oriented experiments and demonstrations emphasizing biomolecules, cells, metabolism, genetics, evolution, and ecology.


133: Biological Diversity Laboratory. 3-0-1. Coreq., BISC 132.

134: Botany. 0-3-3. Introduction to botany, including the biology of plants, fungi, bacteria, and viruses.

150: Phlebotomy. 0-2-2. Principles of specimen collection, techniques, and processing with emphasis on related issues of patient relations, medical terminology, anatomy and physiology, quality assurance, safety and compliance.

151: Phlebotomy Laboratory. 10-0-2. Preq. or Coreq., BISC 150. A laboratory to accompany BISC 150. Instruction and practice concerning specimen collection techniques of both routine and special considerations.

199: The Biology Connection. 0-1-1. (Pass/Fail). Designed to inform sophomore biology majors about advanced study techniques, resume and portfolio construction, research opportunities, standardized test taking, application procedures, and post-graduate studies.

200: Principles of Genetics. 0-3-3. Fundamental laws of heredity as applied to plants, animals, and humans.

201: Scientific Principles. 0-3-3. A general course embracing the principles of the biological and physical sciences, incorporating teacher demonstration and laboratory activities.


211: Introduction to Environmental Sciences. 0-3-3. Basic laws, principles, and issues related to causes, effects, and controls of environmental problems including human-environment interactions. Credit will not be given for BISC 212 if credit is given for ENSC 221.

212: Conservation and Management of Natural Resources. 0-3-3. An introduction to the management of renewable resources including the use, conservation, and sustainability of these resources. Credit will not be given for BISC 212 if credit is given for ENSC 212.

214: Survey of Microbiology. 4-3-4. Fundamental concepts of microbiology, emphasizing techniques and laboratory procedures used in medically related studies.

216: Plant Biology. 0-3-3. Preq., BISC 130, 131. Introduction to the biology of plants including growth, morphology, physiology, genetics, diversity, and propagation.

217: Plant Biology Laboratory. 3-0-1. Preq. or Coreq., BISC 216. Exploration and application of plant biology concepts and processes.


222: Taxonomy and Morphology of Vascular Plants II. 3-2-3. Preq., BISC 221. Survey of taxonomy to include a local project. Additional common vascular plant families and identification of plants in winter condition will also be included.

224: Human Anatomy and Physiology. 0-3-3. Preq., Consult with your advisor. The structure and function of the organ systems of the human body, including anatomy of the vocal and hearing mechanisms.

225: Human Anatomy and Physiology. 0-3-3. Preq., Consult with your advisor. Introduction to human anatomy and physiology including structure and function of cells, tissues, organs and the integumentary, skeletal, muscular, and nervous systems.

226: Anatomy and Physiology Laboratory. 3-0-1. Preq., BISC 225, or concurrent enrollment. Specially designed exercises permitting students to observe the physiology and anatomy of humans.

227: Human Anatomy and Physiology. 0-3-3. Preq., BISC 225 or equivalent. A continuation of 225. Including structure and function of circulatory, respiratory, digestive, excretory, endocrine and reproductive systems.

228: Anatomy and Physiology Laboratory. 3-0-1. Preq., BISC 227, or concurrent enrollment. Additional laboratory exercises to illustrate the anatomy and physiology of animals.

242: Histological Sectioning. 8-1-2-0. Preq., 8 semester credits of BISC. Methods of preparing tissues for microscopic examination.

246: Instrumentation. 4-2-3. Preq., 8 semester hours of biological or chemical sciences. Emphasizes laboratory safety and the operational theory, use, and maintenance of instruments appropriate to biological, environmental, and medical investigations. Credit will not be given for BISC 246 if credit is given for ENSC 246.

250: Introduction to Clinical Laboratory Sciences. 4-1-2. Introduction to the curriculum and profession including computer utilization in problem solving, professional awareness, pre-clinical/clinical articulations, and information sources in medical technologies.

260: Microbiology. 4-3-4. Preq., CHEM 100, 101; BISC 130, 131. Designed for students majoring in science. Course will cover topics in clinical, applied, environmental, and eukaryotic microbiology. Statewide Transfer Agreement Course*.


275: Aquatic Bioassays. 0-1-1. Internet-based course centering on governmental regulations concerning bioassays to test for toxicity in waste effluents released into natural waters in the United States. Credit will not be given for BISC 275 if credit is given for ENSC 275.

284: Introduction to Marine Science. 8-3-4. Preq., BISC 132, 133. Introduction to chemical, geological, and biological processes in the oceans and coastal environments; interrelationships of humans and the marine environment. Five weeks spent at the Louisiana Universities Marine Consortium Coastal Laboratory.

285: Introduction to Marine Zoology. 8-3-4. Preq., BISC 132, 133. Survey of marine animals, particularly those of the Louisiana Gulf Coast, including classification, morphology, physiology, and ecology. Five weeks at the Louisiana Marine Consortium Coastal Laboratory.


301: Essentials of Exercise Physiology. 0-1-1. This on-line course will survey the central concepts of human exercise with regard to both theory and applications of fitness and performance enhancement.


313: Ecology. 4-1/2-3. Preq., BISC 132, 133. An overview of the interactions of plants, animals, and non-living factors as they influence individuals, populations, communities, and ecosystems. Credit will not be given for BISC 313 if credit is given for ENSC 313.

315: Cell Biology. 0-3-3. Preq., BISC 132, 133. Detailed study of the structural and functional organization of the cell and the interactions of the organelles with respect to metabolism and heredity.


320: Animal Physiology. 0-3-3. Preq., BISC 132, 133. (BISC 290 strongly recommended). A general and comparative approach to the principles and concepts of physiology which apply to animal systems.

321: Animal Physiology Laboratory. 4-0-1. Laboratory studies in animal physiology.


341: Hematology. 4 1/2-3. 8 semester credits of BISC. Quantitative and qualitative methods for determining the composition of cellular blood and a study of its histology, morphology and physiology.

343: Medical Microbiology and Immunology. 4-3-4. Lecture and laboratory exposure to principles of pathogenic bacteriology, immunology, virology, mycology, and parasitology with a diagnostic emphasis.

---

*This course will be accepted for general education transfer credit. A course MAY or MAY NOT be accepted as equivalent to or substitute for a course in a specific discipline or major. Please check the Board of Regents Web site at [http://www.regents.state.la.us/](http://www.regents.state.la.us/) and the school you are transferring to for additional information.
344: Clinical Chemistry and Toxicology. 4-3-4. Preq., CHEM 104. Study of the pathological and biochemical significance of analytes and toxic substances found in human body fluids, including methods of analysis and quality assurance.


360: Biological Problems. 1 - 3 hour(s) credit (6). Preq., Junior standing and written permission of instructor. An introduction to the principles of research.

361: Laboratory Assisting. 1-3 hour(s) credit (3). Preq., Junior standing and written permission of instructor. Experience in biological science laboratory assisting in student instruction and practice.

401: Parasitology. 3-2-3. Preq., BISC 132, 133. Protozoan and helminthic parasites of medical and veterinary importance to humans with emphasis on morphology, life cycles, pathogenesis, diagnosis, and control.


404: Immunology Laboratory. 3-0-1. Preq. or Coreq., BISC 402. Laboratory exercises in immunology to include precipitation, agglutination procedures, isotopic and nonisotopic immunnoassays, reagent preparation and validation.

405: Plant Physiology. 3-2-3. Preq., BISC 132, 133, CHEM 102 or 121. Study of the processes and functions of plants.

407: Histology. 8 1/2-1-3. Preq., BISC 320, 321, or equivalent. Microscopic study of animal tissues with emphasis on functional and structural interrelationships.

408: Bacterial Genetics. 3-2-3. Preq., BISC 260, 310. Topics include nucleic acid effectors in prokaryotes, mutations, phage genetics, and molecular methods of studying gene structure/function.


410: Advanced Genetics. 4 1/4-2-3. Preq., BISC 310 or consent of the instructor. Principles and methods for analyzing biochemical and chromosomal polymorphisms, metabolic pathways, pedigrees, and population differentiation with emphasis on humans.


412: Environmental Plant Physiology. 0-3-3. Preq., BISC 132 or equivalent. Study of the plant's response to the biotic and abiotic environment. Topics include the plant environment, phytoremediation, and the physiology of plant stress.

413: Advanced Ecology. 0-3-3. Preq., BISC 313 or FOR 301. An in-depth study of the interactions of the plant and animal communities with their environment.

414: Entomology. 3-2-3. Preq., BISC 101, or 102, or 130. Study of insect structure, classification, life cycles, and control practices, with emphasis on economic pests.


420: Environmental Animal Physiology. 0-3-3. Preq., BISC 320. Functional adaptations of animals to their environments, with emphasis on vertebrates.

421: Mycology. 4 1/4-2-3. Preq., BISC 132, 133. A survey of the Kingdom Fungi with emphasis on Ascomycete and Basidiomycete anatomy, morphology, and field identification.


426: Evolution. 0-3-3. Preq., BISC 130, 131, or equivalent. A study of the concepts, problems, and methods involved in the formulation of modern evolutionary theory.

428: Wetland Ecology. 0-3-3. Study of wetland characteristics and the ecological processes occurring within wetlands. Wetland delineation, restoration, construction and regulation will also be covered. Cannot be taken for credit if student has credit for FOR 428.


430: Herpetology. 4 1/4-2-3. Preq., BISC 132, 133. The taxonomy, distribution, life histories, and ecology of the herpetiles, with special emphasis on those species found in Louisiana.

432: Mammalogy. 4 1/4-2-3. Preq., BISC 132, 133. The identification, taxonomy, characteristics, and general biology of mammals with emphasis upon those of North America.

433: Ornithology. 4 1/4-2-3. Preq., BISC 132, 133. Identification, taxonomy, characteristics, and general biology of birds, with emphasis upon those of North America.

434: Limnology. 4 1/4-2-3. Preq., BISC 132, 133. The study of the chemical, physical, and biotic aspects of freshwater environments.


437: Field Zoology Problems. 30-0-3. Preq., Junior standing and permission of instructor. A field trip experience for studying the natural history of animal species. Offered on demand.

438: Marine Microbiology. 8-3-4. Preq., BISC 130, 131, 132, 133. Introduction to the marine and estuarine microbes, especially bacteria and fungi; covers classification, methodology, role in marine ecosystems, biogeochemical cycles and diseases of marine animals. Five weeks at a Louisiana Universities Marine Consortium coastal laboratory.

439: Marine Science for Teachers. 2-3-3. Survey of the marine sciences, techniques for teaching marine science at secondary and elementary school levels. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

441: Wildlife Management Internship. 3 hours credit, 40 hours per week. Work experience in the use of the equipment, materials, and procedures in wildlife management.

442: Wildlife Management Internship. 3 hours credit, 40 hours per week. Work experience in the use of the equipment, materials, and procedures in wildlife management.

443: Wildlife Management Internship. 3 hours credit, 40 hours per week. Work experience in the use of the equipment, materials, and procedures in wildlife management.

444: Environmental Microbiology. 4-2-3. Preq., BISC 260. Basic and contemporary aspects of soil, water, and industrial microbiology. Credit will not be given for BISC 444 if credit is given for ENSC 444.

445: Immunohematology. 3-1-2. Preq. BISC 341 or consent of instructor. Principles of donor screening, immunological testing for compatibility, tests for infectious agents and record keeping associated with transfusion medicine.

447: Principles of Pharmacology. 0-3-3. Preq. 8 credit hours of biological and/or chemical sciences. The classification, modes of action, and therapeutic utility of common pharmacological agents are described.

449: Biological and Clinical Applications of Radioisotopes. 3-1-2. Preq., CHEM 104. Intensive training in the use of specialized equipment for measuring ionizing radiations used in biological systems.

450: Biological Topics. 1-4 hour(s) credit (8). An opportunity to observe and discuss topics of current interest in the biological and/or medical sciences. Offered on demand.

454: Microbial Ecology and Diversity. 4-2-3. Preq., BISC 260. A contemporary approach to examining the evolution and interactions of prokaryotic and eukaryotic microbes in their natural environments.


458: Environmental Law. 0-3-3. Preq., BISC 130, 131, or approval instructor. A review and analysis of state and federal laws, conventions, and international treaties that influence natural resource management. Credit will not be given for BISC 458 if credit is given for ENSC 458.

459: Food and Dairy Microbiology. 3-3-4. Preq., BISC 260. Basic and contemporary aspects of soil, water, and industrial microbiology. Credit will not be given for BISC 459 if credit is given for ENSC 459.

459: Food and Dairy Microbiology. 3-3-4. Preq., BISC 260. Basic and contemporary aspects of soil, water, and industrial microbiology. Credit will not be given for BISC 459 if credit is given for ENSC 459.

466: Medical Anthropology. 0-3-3. Introduction to medical anthropology, including non-western perspectives on disease causation and curing.

466: Medical Anthropology. 0-3-3. Introduction to medical anthropology, including non-western perspectives on disease causation and curing.

*This course will be accepted for general education transfer credit. A course MAY or MAY NOT be accepted as equivalent to or substitute for a course in a specific discipline or major. Please check the Board of Regents Web site at http://www.regents.state.la.us/ and the school you are transferring to for additional information.
paleopathology, ethnomedicine, ethnopsychiatry, shamanism, alternative medicine and biocultural approaches to health problems.

467: Biological Anthropology. 0-3-3. Introduction to physical anthropology, including primate anatomy and behavior, human origins and evolution, human adaptation to variation, applied anthropology, and the interrelationship between biology and culture.

470: Medical Ethics. 0-3-3. Reading and discussions of the application of various principles of ethics to questions of medical practice.

471: Neuroscience and Neural Engineering. 0-3-3. Principles of neuroscience encompassing structure and function of the nervous system at the molecular, cellular, and system levels, including the visual, auditory, and motor systems.

472: Neuroscience Laboratory. 4-0-1. Laboratory studies in neuroscience with a concentration on standard histological, anatomical, and physiological techniques.

475: Scientific Inquiry. 0-2-2. Focus will be on the pursuit of scientific knowledge, emphasizing materials and methods employed. A chronological approach will correlate historical settings with the persons who experienced triumph and tragedy in their endeavors.

477: Practica/Internship/Cooperative Education in Biological Sciences. 1-3 hours credit. May be repeated once. (Pass/Fail). On site, supervised, structured work experiences located within a 100 mile radius of Ruston. Application and supervision fee required.

478: Practica/Internship/Cooperative Education in Biological Sciences. 1-3 hours credit. May be repeated once. (Pass/Fail). On site, supervised, structured work experiences located within a 101-200 mile radius of Ruston. Application and supervision fee required.

479: Practica/Internship/Cooperative Education in Biological Sciences. 1-3 hours credit. May be repeated once. (Pass/Fail). On site, supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and supervision fee required.

480: Undergraduate Seminar. 0-1-1. Preq., Senior standing. Required of all senior BISC majors. Supervised study, reports, and discussion of current biological literature. Credit will not be given for BISC 480 if credit is given for ENSC 400.

482: Introduction to the Human Brain. 0-2-2. This on-line course will provide an overview of the major structural and functional features of the human brain.


484: Marine Vertebrate Zoology. 8-3-4. Preq., BISC 132, 133, plus 8 additional hours of biology. General study of the marine chordates with particular emphasis on fishes, including classification, structure, function, and ecology. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

485: Marine Ecology. 8-3-4. Preq., BISC 132, 133; CHEM 102, 104. Relationships of marine estuarine organisms to environmental factors; interactions among organisms, communities and ecosystems of the Louisiana coastal zone. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

486: Marine Invertebrate Zoology. 8-3-4. Preq., BISC 132, 133. General study of the classification, structures, function, and ecology of marine and estuarine invertebrates, emphasizing those of the Louisiana Gulf Coast. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

487: Molecular Mechanisms of Bacterial Diseases. 4-3-4. Bacteria capable of causing infections and diseases in humans, including molecular and cellular interactions that occur between humans and bacteria during infections.

489: Microscopy Techniques. 0-3-3. An introduction to the theory and practice of microscopy and histological techniques.


492: Protein Analysis. 3-2-3. Introduction to laboratory methods used in the analysis of proteins, including extraction, determination of concentration, chromatography, and electrophoresis.

501: Graduate Parasitology. 3-2-3. Biology, physiology, morphology, and ecology of the major parasites of humans and domestic animals.

502: Research Methods in Biological Sciences. 0-3-3. Preq., graduate status. An introduction for graduate students to basic methods used in research in the biological sciences.

503: Graduate Immunology Laboratory. 3-0-1. Laboratory training in the preparation, titration, purification, and detection of antigens and antibodies.

504: Advanced Microbial Physiology. 3-3-4. Preq., BISC 335. An advanced course on the physiology of bacteria, including bacterial growth and variation, cytology, nutrition, respiration, and temperature effects.


508: Graduate Bacterial Genetics. 3-2-3. Regulation of gene expression, DNA transfer, mutations, and molecular tools in genome analysis.

509: Biological Sciences Seminar. 0-1-1 (2). Survey of literature on current topics in either Bacteriology, Botany, Microbiology, or Zoology, where appropriate.

511: Graduate Developmental Biology. 6-2-3. Study of the reproductive and developmental events in organisms emphasizing both observational and experimental methods.

512: Advanced Immunology. 6-1-3. Preq., consent of the instructor. An advanced study of the activities of antigens and antibodies.

513: Ecological Topics. 0-3-3 (6). Preq., BISC 313, or 413. An advanced study of selected ecological topics. Offered on demand.

515: Graduate Environmental Plant Physiology. 0-3-3. Fundamentals of biological environments and physiological responses of plants to their environment. Emphasis is placed on the mechanisms underlying physiological responses.

516: Contemporary Topics. 1-4 hour(s) credit. An opportunity to examine and discuss a variety of timely topics pertaining to the biological sciences. May be repeated with a change in subject matter.

517: Applied Biological Sciences Research. 6-1-3. Preq., BISC 502. Laboratory or field studies for non-thesis Master of Science students in the biological sciences. Provides graduate training in applied research skills.

519: Graduate Plant Pathology. 3-2-3. Intermediate and advanced concepts related to the interaction of plants with plant pathogens.

521: Principles of Cell and Molecular Biology. 0-3-3. Principles of cell and molecular biology, including molecular structure and function, cellular processes, bioenergetics, and regulation of metabolism.

522: Graduate Molecular Biology. 0-3-3. Emphasis on protein structure and function, DNA and RNA, replication, transcription, translation, and control of gene expression. Molecular techniques including transformation, plasmids, PCR, and blotting.


526: Graduate Histology. 8-½-1-3. Microscopic study of animal tissues with an emphasis on structural and functional relationships.

528: Advanced Wetland Ecology. 0-3-3. Study of wetland characteristics and the ecological processes occurring within wetlands. Wetland delineation, restoration, construction, and regulation will also be covered. Credit will not be given for BISC 528 if credit is given for ORS 528.

530: Biological Sciences Special Problems. 1-6 hours. Preq., written permission of instructor and Advisory Committee Chairperson. No more than 6 hours credit combined with BISC 540 and 541.

532: Graduate Mammalogy. 4 ½-2-3. Preq., BISC 132, 133. The biology of mammals with emphasis on taxonomy, evolution, distribution, identification, order, and family characteristics, plus emphasis on study techniques.

533: Graduate Ornithology. 4 ½-2-3. Preq., BISC 132, 133. The biology of birds with emphasis on taxonomy, evolution, distribution, identification, and study techniques.

535: Current Topics in Biological Sciences. 0-1-1 (4). Preq., graduate status. An interactive discussion of current issues and problems in the biological sciences. May be repeated for credit with change of course content.

540: Biological Sciences Internship. 40-0-3. Preq., Graduate standing, consent of Advisory Committee Chairperson and Instructor. Career-oriented job experiences. No more than 6 hours credit combined with BISC 530, 540, or 541.

541: Biological Sciences Internship. 40-0-3. Preq., Graduate standing, consent of Advisory Committee Chairperson and Instructor. Career-oriented job experiences. No more than 6 hours credit combined with BISC 530, 540, or 541.

*This course will be accepted for general education transfer credit. A course MAY or MAY NOT be accepted as equivalent to or substitute for a course in a specific discipline or major. Please check the Board of Regents Web site at http://www.regents.state.la.us/ and the school you are transferring to for additional information.
542: Graduate Mycology. 4 ¾-2-3. A detailed field and laboratory study of the Kingdom Fungi emphasizing diversity, ecology, and evolution.

543: Graduate Medical Mycology. 0-2-2. A study of the fungi that affect animals, emphasizing diagnoses and treatment of mycoses and allergies.

544: Graduate Environmental Microbiology. 4-2-3. Microecology in soil/water environments, industrial microbiology, and selected topics in symbiosis.

545: History of Zoology. 0-3-3. The historical development of the science of zoology, the persons who contributed to this development, and the nature of the times which produced them. Offered on demand.

551: Research and Thesis. Registration in any quarter may be for 3 semester hours credit or multiples thereof. Maximum credit allowed is six hours.

554: Graduate Microbial Ecology and Diversity. 4-2-3. A detailed study of the interactions of procaryotic and eukaryotic microbes and their evolution.

559: Graduate Food and Dairy Microbiology. 3-3-4. Emphasis on microbes used to manufacture foods, plus topics of food safety and the detection of spoilage and pathogenic organisms in food.

562: Graduate Virology. 3-2-3. Intermediate and advanced concepts related to virology, with emphasis on virus nomenclature, structure, taxonomy, replication, and the consequences of virus infections in organisms and populations.

565: Graduate Forensic Anthropology. 0-3-3. Introduction to forensic anthropology, including intensive study of human skeletal anatomy and variation, archaeological and taphonomic methods and techniques, and crime scene investigations.

566: Graduate Medical Anthropology. 0-3-3. Anthropology of medicine emphasizing non-western perspectives of disease causation and curing, ethnic psychoses, ethnobotany, human disease history, alternative medicine and biocultural approaches to health issues.

567: Graduate Biological Anthropology. 0-3-3. Biological anthropology emphasizing primate anatomy, behavior and systematics, the human fossil record, evolution of human behavior, human adaptation, and the relationship of biology to culture.

570: Graduate Medical Ethics. 0-3-3. Intensive discussions, presentations, and readings concerning the theories of ethics and their applications to the practices of the health professions.

590: Graduate Microscopy Techniques. 0-3-3. Theory and techniques necessary for microscopy and histological studies.

591: Graduate PCR – Methods and Applications. 0-3-3. DNA and RNA extraction and analysis techniques, including real-time approaches for gene expression studies.

592: Graduate Protein Analysis. 3-2-3. Laboratory methods used for protein analysis. Techniques include protein extraction and quantification, polyacrylamide electrophoresis, and blotting.

---

**BIOMEDICAL ENGINEERING (BIEN)**

**202:** BME Principles I. 0-1-1. Coreq., CHEM 102, BISC 225; Preq., MATH 240. Basic qualitative and quantitative principles of biomedical engineering are presented. The general field of biomedical engineering is reviewed with introduction of conservation and modeling concepts.

**203:** BME Principles II. 0-1-1. Coreq., BISC 227; Preq., BIEN 202. An introduction to the role of engineering in analyzing physiological systems and in designing devices and instrumentation to study and treat biomedical problems.

**204:** BME Principles III. 0-1-1. Preq., BIEN 203. A continued introduction to the role of engineering in analyzing physiological systems and in designing devices and instrumentation to study and treat biomedical problems.

**225:** Biomedical Systems. 0-3-3. Preq., ENGR 221 and credit or registration in MATH 243. Analysis techniques for frequency and time domain signals that occur in linear and non-linear physiological systems. Lumped modeling of physiological phenomena.

**230:** Biomedical Signals. 0-2-2. Preq., BIEN 203. Compatibility of materials for use in biomedical applications.

**301:** Biomedical Fluid Mechanics and Biomedical Energy Transport. 0-3-3. Preq., BIEN 202, MATH 245, PHYS 202, BISC 321, and ENGR 222. The principles of fluid mechanics and thermal energy exchange (momentum and energy balances) in biomedical systems. Analysis of engineering and physiological systems and incorporation of these techniques into design of such systems.

**310:** Introduction to Clinical Engineering. 3-2-3. Preq., BIEN 202. A foundation course in medical and clinical terminology, medical instrumentation, medical sciences, hospital procedure and medical practice from an engineering perspective.

**320:** Bioenergetics. 0-3-3. Preq., MATH 242, PHYS 201, BIEN 204. The student is introduced to the concept of bioenergetics: the thermodynamics of living systems. Principles of thermodynamics are emphasized and applied to biological systems.

**325:** Bioinstrumentation. 3-2-3. Preq., PHYS 202, BISC 227, Coreq. or credit for MATH 244. Analysis and design of biomedical instrumentation. Basic circuitry, electronics and laboratory techniques including transducers, biopotentials, amplifiers, measurement and safety.

**400:** Biomedical Engineering Seminar. 3-0-1. Preq., Senior standing. Instruction and practice in conference-type discussions of technical and professional matters of interest to biomedical engineers.

**401:** Biomedical Mass Transport. 0-3-3. Preq., BIEN 301. The principles of mass balances and transport phenomena in biomedical systems. Analysis of engineering and physiological systems and incorporation of these principles into the design of such systems.

**402:** Biomedical Engineering Design I. 0-2-2. Preq., BIEN 325, 400, 401, 430; ENGL 303. Individualized design projects requiring integration and synthesis of prior engineering, life science, design and analytical skills.

**403:** Analysis and Design of Physiological Control Systems. 0-3-3. Preq., BIEN 225, 401. Methods for analyzing and designing linear feedback systems. Physiological control mechanisms presented qualitatively and quantitatively. Design of systems involving physiological systems.

**404:** Biomedical Engineering Design II. 0-2-2. Preq., BIEN 402. A continuation of BIEN 402.

**410:** Clinical Engineering Internship. 20-20-6. Preq., BIEN 310 or equivalent and consent. A practical exposure to the health care delivery system. Application of engineering principles to problems unique to that system.


**425:** Advanced Biomedical Instrumentation Systems. 3-2-3. Preq., BIEN 325, or consent. Further analysis and design of biomedical instrumentation. Practical aspects of ideal and real operational amplifiers, and an introduction to microprocessor interfacing.

**430:** Biomechanics. 0-3-3. Preq., BIEN 230, 301. Mechanical properties and reactions of biological tissues and organs. Analysis of stress, strain and strain rate for biological and bio-artificial components.

**435:** Senior Biomedical Engineering Laboratory. 3-0-1. Preq., BIEN 401, 403, and 430. Laboratory experiments that demonstrate concepts and techniques in biofluid mechanics, biomechanics, biological mass transport and tissue engineering.

**450:** Special Topics. 1-4 semester hours credit. May be repeated for credit. Preq., senior standing and consent of instructor. Problems covering selected topics of current importance or special interest or need.

**455:** Biotechnology and Bioprocesses. 0-3-3. Preq., BIEN 301, 401. Introduction to biotechnology and bioprocesses. Microbiology and biochemical reactions are reviewed. Enzyme kinetics, microbial growth transport phenomena, and design of biochemical reactors are studied. Cross-listed with CMEN 455. (G)

**471:** Neuroscience and Neural Engineering. 0-3-3. Principles of neuroscience encompassing structure and function of the nervous system at the molecular, cellular, and system levels, including the visual, auditory, and motor systems.

**472:** Neuroscience Laboratory. 4-0-1. Laboratory studies in neuroscience with a concentration on standard histological, anatomical, and physiological techniques.

**500:** Systems Physiology for Biomedical Engineers. 0-4-4. Preq. Graduate standing and permission of the instructor. Principles of human physiology, including cellular physiology, and the nervous, muscular, cardiovascular, and respiratory systems for engineers. Graduate core course.

**501:** Physiological Modeling I. 0-4-4. Preq., BIEN 500 and Differential Equations, or consent of instructor. Principles and applications of transport phenomena and mathematical modeling to biomedical systems and devices. Distributed, lumped, and lumped-distributed modeling. Graduate core course.

---

*This course will be accepted for general education transfer credit. A course MAY or MAY NOT be accepted as equivalent to or substitute for a course in a specific discipline or major. Please check the Board of Regents Web site at [http://www.regents.state.la.us/](http://www.regents.state.la.us/) and the school you are transferring to for additional information.*
**BUSINESS COMMUNICATION (BSCM)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>305</td>
<td>Communication</td>
<td>3-0-3</td>
<td>Preq., ENGL 102. Theory and nature of communication in organizational settings, interpersonal communication, written business communication, listing, communications. Analysis of business problems and preparation of written/oral solutions.</td>
</tr>
<tr>
<td>520</td>
<td>Directed Research and Readings</td>
<td>0-3-3</td>
<td>Research methodology; problems requiring independent organization of research, implementation, outline of solution, and preparation of reports. Emphasis placed on problem solving for policy-making decisions.</td>
</tr>
<tr>
<td>475</td>
<td>Business Communication</td>
<td>0-2-2</td>
<td>(Pass/Fail). Non-degree credit. A course designed for improving communication skills, both oral and written, when communicating in a business environment.</td>
</tr>
<tr>
<td>620</td>
<td>Business Research Methods</td>
<td>0-1-1</td>
<td>A study of research methodology used in business administration, a review of research completed in respective DBA areas, and the development of a dissertation proposal. (May be repeated for a total of 3 hours credit.)</td>
</tr>
</tbody>
</table>

**BUSINESS LAW (BLAW)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>255</td>
<td>Legal Environment of Business</td>
<td>0-3-3</td>
<td>Studies relations and effect of law on business, society, and the individual, including ethical considerations, history, court system, torts, government regulation, contracts, and business organization.</td>
</tr>
<tr>
<td>356</td>
<td>Commercial Law</td>
<td>0-3-3</td>
<td>A study of specific topics of law essential to the business decision-making process. Areas of law covered include contracts, commercial paper, agency, and sales.</td>
</tr>
<tr>
<td>410</td>
<td>Business Law for Accountants</td>
<td>0-3-3</td>
<td>Preq., BLAW 255 and senior standing. A concentrated study of all topical areas of business law. Coverage includes contracts, credit transactions, governmental regulations, business organizations, bankruptcy, and property and related topics.</td>
</tr>
<tr>
<td>441</td>
<td>Real Property</td>
<td>0-3-3</td>
<td>Preq., BLAW 255. Estates in land, titles, deeds, mortgages, leases, land contracts, minerals, easements and surrenders.</td>
</tr>
<tr>
<td>445</td>
<td>Legal Aspects of Government and Business</td>
<td>0-3-3</td>
<td>Preq., BLAW 255 or special permission of the instructor. A study of landmark law cases with special emphasis placed on guideline interpretive decisions of significance to management.</td>
</tr>
</tbody>
</table>

**CHEMICAL ENGINEERING (CMEN)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>202</td>
<td>Chemical Engineering Calculations</td>
<td>3-2-3</td>
<td>Coreq., ENGR 122, MATH 242. Problems and recitation in material and heat balances involved in chemical processes. Application of Chemical Engineering and chemistry to manufacturing in chemical industries.</td>
</tr>
<tr>
<td>213</td>
<td>Unit Operations-Design I</td>
<td>0-3-3</td>
<td>Preq., CMEN 202, 254, MATH 244. Design procedures for equipment and processes involving fluid flow and fluid mixing, with emphasis on computer assisted design techniques.</td>
</tr>
<tr>
<td>254</td>
<td>Laboratory Measurements and Report Writing</td>
<td>5-1-2</td>
<td>A study of chemical process variables and material balances with an introduction to technical report writing.</td>
</tr>
<tr>
<td>304</td>
<td>Transport Phenomena</td>
<td>0-3-3</td>
<td>Preq., CMEN 213, 313, 413, MATH 245. Fundamental principles of energy, mass, and momentum transfer and transport processes.</td>
</tr>
<tr>
<td>313</td>
<td>Unit Operations-Design II</td>
<td>0-3-3</td>
<td>Preq., CMEN 213. Design procedures for equipment and processes involving heat transfer, with emphasis on computer assisted design techniques.</td>
</tr>
<tr>
<td>353</td>
<td>Chemical Engineering Junior Laboratory</td>
<td>3-0-1</td>
<td>Preq., CMEN 254, 313. Laboratory study of fluid phenomena, heat transfer processes and equipment, and evaporation.</td>
</tr>
<tr>
<td>402</td>
<td>Chemical Reaction Engineering</td>
<td>0-3-3</td>
<td>Homogenous and heterogeneous chemical reaction kinetics, applications to ideal and real reactor types.</td>
</tr>
<tr>
<td>407</td>
<td>Instrumentation and Automatic Process Control</td>
<td>3-2-3</td>
<td>Survey of process instrumentation methods, and the analysis and design of feedback, feed forward, and cascade control systems.</td>
</tr>
<tr>
<td>408</td>
<td>Pulp and Paper Processes</td>
<td>0-3-3</td>
<td>Preq., senior standing in CMEN. Introduction to the pulp and paper industry, its terminology, technology and economics. Conversion of various cellulose materials into unbleached pulp and paper products.</td>
</tr>
<tr>
<td>411</td>
<td>Environmental Chemodynamics</td>
<td>0-3-3</td>
<td>Preq., CMEN 413 and senior standing in CMEN. A study of the modeling and prediction of the</td>
</tr>
</tbody>
</table>