

510: Bioinstrumentation. 0-4-4. Preq., Graduate standing and consent of instructor. Introduction to medical instrument systems, biosensors, biopotentials, signal conditioning, analog-to-digital conversion, and signal processing. Graduate core course.

515: Biosensors and Their Applications. 4-2-3. Permission of instructor. Introduction to biosensors in general with special emphasis on oxygen biosensors and their development. Surgical techniques and laboratory procedures for animal experimentation.

540: System Analysis and Mathematical Modeling of Physiological Phenomena. 0-3-3. Preq., permission of instructor. The course deals with the analysis of biological systems and the theory behind the development and solution of mathematical models for the description of biological system behavior.

550: Special Topics. 3 hours credit. Preq., Permission of instructor. May be repeated for credit. Selected topics dealing with advanced subjects in Biomedical Engineering.

551: Research and Thesis in Biomedical Engineering. 0-0-3. Preq., open to M.S. Graduate Students in Biomedical Engineering. Registration in any quarter may be for 3 semester hours credit or multiple thereof. Maximum credit allowed is six semester hours.

555: Practicum. 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research techniques. (Pass/Fail).

556: Biomedical Engineering Internship. 20-0-6. Preq., permission of instructor. Graduate level internship emphasizing application of engineering design principles in a research, health care or rehabilitation setting.

557: Special Topics: Biomedical Engineering. 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of biomedical engineering. May be repeated as topics change.

560: Review of Assistive Technology in Rehabilitation. 0-3-3. Preq., permission of instructor. Study of physical disabilities and the rehabilitation process.


570: Artificial Intelligence Applications in Biomedical Engineering. 0-3-3. Preq., Prior introduction to artificial intelligence fundamentals. Artificial intelligence and expert systems application in medical and biomedical problems. Fundamental contributions of medical expert systems.

571: Graduate 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.

575: Artificial Neural Networks. 0-3-3. Presentation of foundational concepts and constructs used to analyze and characterize artificial neural network paradigms, their attributes, their applications and their implementations.

599: Graduate Seminar. 0-1-1. (Pass/Fail). Issues in graduate education. Presentations of current topics in research, teaching, and practice. May be repeated for credit.

651: Special Topics: Research. 0-0-3. Preq., open to Ph.D. candidates in Biomedical Engineering who have not completed their academic language and General Comprehensive Examination requirements. This course represents a limited research project, which will lead to a comprehensive and well-designed dissertation research proposal. A grade will be submitted at the end of each quarter for this course.

**BUSINESS COMMUNICATION (BSCM)**


520: Directed Research and Readings. 0-3-3. 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.

475: Business Communication. 0-2-2. (Pass/Fail). Non-degree credit. A course designed for improving communication skills, both oral and written, when communicating in a business environment.

620: Business Research Methods. 0-1-1. 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.)

**BUSINESS LAW (BLAW)**

255: Legal Environment of Business. 0-3-3. 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.

356: Commercial Law. 0-3-3. 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.

410: Business Law for Accountants. 0-3-3. 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. (G)


445: Legal Aspects of Government and Business. 0-3-3. 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.

**CHEMICAL ENGINEERING (CMEN)**


213: Unit Operations-Design I. 0-3-3. 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.

254: Laboratory Measurements and Report Writing. 5-1-2. A study of chemical process variables and material balances with an introduction to technical report writing.

304: Transport Phenomena. 0-3-3. Preq., CMEN 213, 313, 413, MATH 245. Fundamental principles of energy, mass, and momentum transfer and transport processes.

313: Unit Operations-Design II. 0-3-3. Preq., CMEN 213. Design procedures for equipment and processes involving heat transfer, with emphasis on computer assisted design techniques.


353: Chemical Engineering Junior Laboratory. 3-0-1. Preq., CMEN 254, 313. Laboratory study of fluid phenomena, heat transfer processes and equipment, and evaporation.

402: Chemical Reaction Engineering. 0-3-3. Homogeneous and heterogeneous chemical reaction kinetics, applications to ideal and real reactor types. (G)

407: Instrumentation and Automatic Process Control. 3-2-3. Survey of process instrumentation methods, and the analysis and design of feedback, feed forward, and cascade control systems. (G)

408: Pulp and Paper Processes. 0-3-3. Preq., senior standing in CMEN. Introduction to the pulp and paper industry, its terminology, technology and economics. Conversion of various cellulosic materials into unbleached pulp and paper products. (G)

411: Environmental Chemodynamics. 0-3-3. Preq., CMEN 413 and senior standing in CMEN. A study of the modeling and prediction of the

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*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.*
movement and fate of synthetic chemicals in the air-water-earth environments. Cross-listed with CVEN 411. (G)

413: Unit Operations-Design III. 0-3-3. Preq., CMEN 313. Application of design procedures for equipment and processes involving evaporation, distillation, leaching, extraction, gas absorption and desorption, with emphasis on computer assisted design techniques. (G)

415: Theory and Practice of Radiation Protection and Shielding. 0-3-3. Preq., senior standing. An introduction to principles of dosimetry. The concepts of probability of causation, risk assessment, and methods of establishing exposure limits will be discussed. (G)

430: Chemical Plant Design I. 0-2-2. Preq., senior standing in CMEN. An introduction to applied process economies and to process hazards, their identification and reduction. (G)

432: Chemical Plant Design II. 0-2-2. Preq., senior standing in CMEN and CMEN 430. Comprehensive problems are assigned, the solution of which enables one to calculate dimensions and capacities of required plant equipment. Computer applications. (G)


435: Polymer Engineering. 0-3-3. Polymer technology and processes including polymer structure, states, and transitions; kinetics of polymerization; molecular weight determination; viscous flow; mechanical properties; polymer degradation; analysis and identification. (G)

442: Process Optimization. 0-3-3. An objective study of the present status of optimization methodology as applied to the chemical process industries. Both deterministic and non-deterministic problems are considered. (G)

443: Air Pollution Control Design. 0-3-3. An overview of the air pollution problem. Design of devices to control emissions (VOCs, NOx, SO2, particulates, etc.) Cost estimation of air pollution control systems. (G)

450: Special Problems. 1-4 semester hours credit. Problems covering selected topics of current importance or special interest or need. (G)

451: Senior Chemical Engineering Laboratory. 4-5-0-1. Laboratory study and report writing in reactor design and mass transfer operations.

452: Special Projects Laboratory. 1 hour credit. Selected comprehensive problems. Study and/or laboratory development of: industrial unit operations; new chemical processes; improvement of established processes; economic evaluations. Theoretical studies.

455: Biochemical Engineering. 0-3-3. Preq., CMEN 402. Introduction to biotechnology and bioprocesses. Microbiology and biochemical processes are reviewed. Enzyme kinetics, microbial growth transport phenomena, and design of biochemical reactors are studied. Cross-listed with BIEN 455. (G)

456: Hazardous Waste Management. 0-3-3. A study of the legislation, regulation, technology, and business matters relating to hazardous waste management. (G)

475: Combustion, Fires and Explosions. 0-3-3. Nature of combustion, controlled and free burning fires, and evaluation of explosion hazards. (G)

501: Advanced Unit Operations. 0-3-3. Design calculations applicable to various unit operations including drying, humidification, absorption, adsorption, distillation, heat exchangers, ion exchange, cooling towers and filtration.


513: Transport Phenomena. 0-3-3. A course in which advanced concepts on momentum, energy, and mass transport is explored. Emphasis is placed on unsteady state behavior, turbulence, and recent developments in the literature.

521: Energy Analysis of Industrial Processes. 0-3-3. Preq., An undergraduate course in thermodynamics. The application of the concept of exergy, or energy availability, to the systematic analysis of processes and plants to make most efficient use of limited energy resources.

522: Advanced Thermodynamics. 0-3-3. The relations of thermodynamic properties are developed. Problems on the expansion and compression of non-gases, liquefaction, low temperature separation are studied.

524: Seminar. 0-1-1 each. Surveys, investigations, and discussions of current problems in Chemical Engineering.

550: Special Problems. 1-4 semester hours. Preq., consent of instructor. Selected topics dealing with advanced problems in chemical engineering and design of equipment. The problems and projects will be treated by current methods used in professional practice.

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

555: Practicum. 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research techniques. (Pass/Fail)

557: Special Topics: Chemical Engineering. 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of chemical engineering. May be repeated as topics change.

CHEMISTRY (CHEM)

100: General Chemistry. 0-2-2. Preq., MATH 101. Fundamental principles of chemistry: Chemistry and measurement, atomic symbols and chemical formulas, stoichiometry, gases and thermochemistry. Statewide Transfer Agreement Course*.

101: General Chemistry. 0-2-2. Preq., CHEM 100. Continuation of CHEM 100: Atomic and molecular structure, theories of molecular bonding, liquids, solids and solutions. Statewide Transfer Agreement Course*.

102: General Chemistry. 0-2-2. Preq., CHEM 101. Continuation of CHEM 101: Introduction to chemical equilibria including those involving acids, bases, sparingly soluble salts and complex ions, thermodynamics of equilibrium and introductory electrochemistry. Statewide Transfer Agreement Course*.

103: General Chemistry Laboratory. 4 1/4-0-1. Coreq., CHEM 101. Laboratory practice in general chemistry. Statewide Transfer Agreement Course*.

104: General Chemistry Laboratory. 4 1/4-0-1. Preq., CHEM 103. Continuation of CHEM 103. Statewide Transfer Agreement Course*.

107: General Chemistry. 0-3-3. Preq., MATH 101. Fundamental principles of chemistry; chemistry and measurement, atomic symbols and chemical formulas, stoichiometry, gases and thermochemistry. Atomic and molecular structure, theories of molecular bonding.


120: An Introduction to Inorganic Chemistry. 0-3-3. Topics covered will include scientific units, states of matter, the electronic structure of atoms, the chemical bond, solutions, reaction kinetics, acid-base theory, and buffers. Statewide Transfer Agreement Course*.

121: An Introduction to Organic Chemistry and Biochemistry. 0-3-3. Preq., CHEM 120 or 102. Survey of hydrocarbons and their derivatives; biomolecules including proteins, sugars, lipids, and nucleic acids. Not to be used as a prerequisite for advanced chemistry courses.

122: Chemistry Laboratory. 4-0-1. Preq., CHEM 120. Basic laboratory experiments in inorganic, organic, and biochemistry.

205: Analytical Chemistry. 4 1/4-3-4. Preq., CHEM 102. Theory and practice of analytical chemistry.

250: Organic Chemistry. 0-2-2. Preq., CHEM 102. Introduction to organic chemistry with emphasis on structure and reactivity of aliphatic hydrocarbons and alkyl halides. Statewide Transfer Agreement Course*.

251: Organic Chemistry. 0-2-2. Preq., CHEM 250; Coreq., CHEM 253. Continuation of CHEM 250 with emphasis on aromatic hydrocarbons, alcohols, aldehydes, ketones, and related reaction mechanisms and spectroscopy. Statewide Transfer Agreement Course*.

252: Organic Chemistry. 0-2-2. Preq., CHEM 251; Coreq., CHEM 254. Continuation of CHEM 251 with emphasis on carbonyl compounds, aliphatic and aromatic amines, phenols, carbohydrates and related reaction mechanisms. Statewide Transfer Agreement Course*.

253: Organic Chemistry Laboratory. 4 1/4-0-1. Preq., CHEM 102; Coreq., CHEM 253. Selected experiments emphasizing both laboratory operations and related basic principles and mechanisms.

254: Organic Chemistry Laboratory. 4 1/4-0-1. Preq., CHEM 251; Coreq., CHEM 252. Introduction to multi-step organic syntheses and related reaction mechanisms.

281: Inorganic Chemistry. 4 1/2-2-3. Preq., CHEM 102 and 104. Introduction to inorganic chemistry, including a systematic study of the periodic table with emphasis on structure, properties and reactivity of the elements of inorganic chemistry.

301: Introductory Physical Chemistry. 0-3-3. Preq., CHEM 102 and MATH 112 or 241. An introduction to physical chemistry, with emphasis on
properties of gases, thermodynamics, chemical equilibria, ionic equilibria, chemical kinetics, and molecular spectroscopy.

311: Physical Chemistry. 0-3-3. Preq., CHEM 102 and 252, MATH 242 and PHYS 202 or 209. Basic theories of chemistry with emphasis on gases, chemical thermodynamics and phase equilibria.

312: Physical Chemistry. 0-3-3. Preq., CHEM 311. Basic theories of chemistry with emphasis on chemical kinetics, quantum theory, statistical thermodynamics and molecular spectroscopy.

313: Physical Chemistry Laboratory. 4 1/4-0-1. Coreq., CHEM 311. Laboratory experiments in physical chemistry.

314: Physical Chemistry Laboratory. 4 1/4-0-1. Preq., CHEM 311; Coreq., CHEM 314. Continuation of CHEM 313.

351: Biochemistry. 0-3-3. Preq., CHEM 252, 254. The chemistry of biologically important compounds including fats, carbohydrates, proteins, enzymes, vitamins, and hormones.


353: Biochemistry Laboratory. 4 1/4-0-1. Coreq., CHEM 351. Techniques applicable to current biochemistry with emphasis on basic research procedures.

354: Biochemistry Laboratory. 4 1/4-0-1. Preq., CHEM 351 and CHEM 353. Techniques applicable to current biochemistry with emphasis on metabolism and molecular biology.

390: Chemical Literature. 0-1-1 (2). A survey of chemical information sources and strategies for choosing appropriate sources to solve specific chemical information problems.

409: Advanced Organic Chemistry. 0-3-3. Preq., CHEM 312. Introduction to theoretical organic chemistry with emphasis on carbonation chemistry and pericyclic reactions.

420: Chemical Thermodynamics. 0-3-3. Preq., CHEM 312. An introduction to chemical thermodynamics.

424: Advanced Physical Chemistry. 0-3-3. CHEM 312 or PHYS 410 and MATH 245. A continuation of CHEM 311-312, including an introduction to quantum chemistry, and a quantum-mechanical approach to the study of the structure of atoms and molecules.

450: Chemical Topics. 1-4 hour(s) (credit). Preq., CHEM 312 and consent of instructor. An opportunity to observe and discuss topics of current interest in the chemical sciences. Offered on demand.

466: Instrumental Analysis. 8 1/2-2-4. Preq., CHEM 312. Theory and practice of optical methods of analysis, advanced electrical techniques, and modern separation methods. (G)

470: Methods, Materials and Activities for Teaching Chemistry. 0-3-3. Preq., CHEM 102 and instructor permission. A course especially designed for the high school chemistry instructor.

471: Methods, Materials and Activities for Teaching Chemistry. 4 1/2-3-4. Preq., CHEM 102 and instructor's permission. A continuation of CHEM 470.

481: Advanced Inorganic Chemistry. 4 1/2-2-3. Preq., CHEM 252, 312. An advanced study of the periodic classification of elements, their reactions, and other inorganic principles. (G)

490: Chemistry Seminar. 0-1-1 (3). Preq., Senior or graduate standing. Required of chemistry graduate students. Supervised organization and presentation of topics from the chemical literature. (G)

498: Undergraduate Research. 1-3 hours credit (6). Preq., consent of instructor. Introduction to methods of research and completion of a basic research problem.


502: Selected Topics in Organic Chemistry. 0-3-3 (6). Preq., CHEM 409. Areas covered will vary; however they will generally include advanced organic synthesis and related structure identification with emphasis on spectroscopic techniques.

503: Topics in Chemistry. 1-3 hours credit (6). Independent study. Topics arranged to meet the needs of the student.


523: Special Topics in Physical Chemistry. 0-3-3. Preq., CHEM 312. Topics will vary and will include kinetic theory of gases, molecular structure, phase transitions, photochemistry, nuclear chemistry, chemical kinetics, or statistical thermodynamics.

524: Quantum Chemistry. 0-3-3. Preq., CHEM 312. Physical and chemical applications of quantum theory.

549: Practicum in Chemistry. 0-3-3 (6). Preq., 12 semester hours of graduate work. Experimental or computational study of a problem in chemistry. A survey of the relevant literature and a formal written report are required. (Pass/Fail)

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

555: Special Topics in Biochemistry. 0-3-3 (9). Preq., CHEM 352. Topics covered will vary and may include toxicology and clinical biochemistry.

560: Protein Chemistry. 0-3-3. Preq., CHEM 351. The chemical nature and physiology of both structural and metabolic proteins.

563: Advanced Analytical Chemistry. 0-3-3. Preq., CHEM 466. Theoretical aspects of the optical, chemical, and separation techniques of analytical chemistry.

564: Selected Topics in Analytical Chemistry. 0-3-3. The topic or topics will be selected in the general areas of chemical separations or spectroscopy by the instructor. (TECH-NLU Collaborative).

584: Chemistry of Coordination Compounds. 0-3-3. Preq., CHEM 481. A study of the structure, preparation, and properties of coordination compounds.

586: Special Topics in Inorganic Chemistry. 0-3-3. Preq. CHEM 584 or instructor's permission. A topic will be selected on a rotating basis from the following: magnetic and electric properties, solid state structures, catalysis, and group theory applications of inorganic materials.

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**CIVIL ENGINEERING (CVEN)**

202: Civil Engineering Materials Laboratory. 4-0-1. Coreq., MGMT 201. Introduction to laboratory testing of aggregates, concrete, asphalt, steel, and other materials used by civil engineers.

254: Plane Surveying. 4-2-3. Preq., MATH 112 or 240. Theory, field measurements, and computation and error analysis associated with land, traverse, and topographic surveys.

300: The Civil Engineering Profession. 0-3-3. Preq., sophomore standing. Open only to civil engineering students. The civil engineering profession and its effect on society. History and heritage, current professional practices and techniques, concepts and challenges for the future.


324: An Introduction to Soils Engineering. 4-1-2. Preq., ENGL 303, MEMT 211. Introduction to soil mechanics and its application to civil engineering. A presentation of soil properties and characteristics pertinent to an evaluation of various engineering situations, problems and designs.

325: Introduction to Foundation Engineering. 0-3-3. Preq., CVEN 324. Consideration of bearing capacity, settlement of structures, slope stability, foundation design requirements, subsurface exploration, regional soil conditions, footings, and retaining walls.

332: Transportation Engineering I. 0-3-3. Preq., ENGR 122. Introduction to transportation facilities; urban transportation planning; traffic, design, safety, and the environment.


357: Engineering and Transportation Surveying. 4-1-2. Preq., CVEN 254. Horizontal/vertical curves; earthwork; topographic/planimetric surveys for map/drawing construction; engineering use of State Plane Coordinate System; surveys for buildings, pipelines, and others.

414: Bituminous Mixture Design. 3-2-3. Preq., senior standing. Selection of binders and aggregates for mixture design processes. Methods include Marshall, Hveem and SUPERPAVE. Laboratory mixes will be designated and tested. (G)

417: Groundwater Hydrology. 0-3-3. Preq., CVEN 310. Groundwater occurrence, movement and quality, well hydraulics, basin development, and model studies. (G)

421: Portland Cement Concrete. 0-3-3. Production, testing, uses, and performance of Portland cement and Portland cement concrete (PCC). Detailed investigation into PCC components. Admixtures and special concretes. (G)

423: Introduction to Asphalt Technology. 3-2-3. Preq., senior standing. Production and uses of asphalt; measurement and significance of laboratory properties including viscosity, penetration, flash point, ductility, softening point, thin film oven test and specific gravity. (G)

425: Traffic Engineering. 0-3-3. Preq., CVEN 332. Traffic characteristics, vehicle operating characteristics, traffic control, and design of traffic facilities. Basic traffic studies, capacity, signing and signalization, speed regulation and parking. (G)

427: Design of Highway Pavements. 0-3-3. Preq., CVEN 324. Flexible and rigid pavement types. Factors affecting stresses and strains in pavement layers. Design criteria and structural design methods for highway pavements. (G)

436: Construction Equipment and Methods. 0-3-3. Preq., Junior standing, and ENGR 122 or INEN 300. Study of economics and functional applications of construction equipment. Operation characteristics are identified for selected equipment items, and are applied to typical construction situations. (G)


439: Construction Planning, Contracts and Specifications. 0-2-2. Preq., INEN 300 or ENGR 122, and junior standing. Introduction to methods for planning and scheduling construction projects and specifications. Team efforts on problems and case studies.

440: Foundation Engineering. 0-3-3. Preq., CVEN 325 or consent of instructor. Theory and applications in foundation engineering design; application of soil mechanics. (G)

450: Special Problems. 1-4 hours credit. Preq., senior standing and consent of instructor. Planning, organization, and solution of problems in Civil Engineering.


457: Practical Surveying. 40-0-3. Preq., CVEN 355, 357, or 456. An on-the-job training program; student is employed by registered professional surveyor for 300 working hours (minimum), work to be approved by program chair.

459: Introduction to Infrastructure Management. 0-3-3. Preq., junior standing. Lifecycle approach to planning, designing, and managing infrastructure (highways, streets, utilities); infrastructure decision support systems; performance measures and prediction; computer applications; case studies. (G)

464: Advanced Design of Concrete Structures. 0-3-3. Preq., CVEN 341. Advanced topics in the design of reinforced and prestressed concrete structures. (G)

466: Advanced Structural Design. 0-3-3. Preq., CVEN 341. Advanced topics in the design of steel and timber structures. Load and resistance factor design. (G)

480: Introduction to Trenchless Technology. 0-3-3. Preq., CVTE 210 or MEMT 313. Basic technologies, design considerations and construction practices for underground infrastructure construction and rehabilitation with minimal ground surface disturbance.

492: Civil Engineering Design I. 3-0-1. Preq., senior standing and within 3 quarters of graduation. Open-ended design problems typical of those encountered in the Civil Engineering profession and calling for the integration of geometrical, structures, transportation and water resources.


519: Techniques for Pavement Rehabilitation. 0-3-3. Evaluation of roadway distress, roughness, friction, drainage and structural surveys will be discussed. Survey results used to identify cost-effective techniques for pavement rehabilitation.

522: Design of Temporary Structures. 0-3-3. Advanced topics in the design of temporary structures required for complex construction projects.


550: Special Problems. 1-4 hours credit. Advanced problems in Civil Engineering will be assigned according to the ability and requirements of the student. An opportunity will be afforded to plan, organize, and complete solutions in problems of considerable magnitude with a view toward developing confidence and self-reliance.

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

555: Research and Communications Seminar. 0-3-3. Preq., 12 semester hours of graduate work. Oral and written communication of literature search.

557: Special Topics: Civil Engineering. 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of civil engineering. May be repeated as topics change.

560: Transportation Systems Planning. 4-2-3. Preq., CVEN 332. A study of transportation systems as they affect travel behavior of a populace and the location of economic activities.

561: Traffic Engineering Characteristics. 0-3-3. Traffic laws, ordinances, and control devices; intersection characteristics, pretimed control, traffic actuated control, arterial and network progression.

564: Feasibility Analysis of Transportation Systems. 0-3-3. Goals, objectives and criteria used for decision making for transportation investments; economic analysis and treatment of intangibles and risk; non-users impact analysis.

578: Applications of Nonlinear Finite Element Analysis to Civil Engineering Problems. 0-3-3. Preq., MEMT 508 Application of the theory of the finite element method to nonlinear problems in Civil Engineering.

579: Advanced Structural Dynamics. 0-3-3. Advanced studies of the dynamic response of structures including experimental, analytical and computational procedures. Particular emphasis is given to Civil
Engineering applications with a consideration of multiple degrees-of-freedom and continuous systems.

580: Trenchless Technology. 0-3-3. Preq., MEMT 313 and CVEN 324. Survey of trenchless technologies, underground infrastructure management, cased-in-place, slip lining and fold and form rehabilitation, horizontal directional drilling, pipe jacking and microtunneling. Credit will not be given for both CVEN 480 and 580.

599: Graduate Seminar. 0-1-1. Issues in graduate education. Presentations of current topics in research, teaching and practice. May be repeated for credit. (Pass/Fail).

**CIVIL TECHNOLOGY (CVTE)**

100: Introduction to Construction. 3-2-3. An introduction to the construction industry, the work of professional construction managers and technologies, the curriculum, and the reading of building and highway plans.


424: Seminar. 3-0-1. Preq., senior status. Reading and discussion of assigned papers, presentation of current issues in construction, and discussions with professional construction personnel.


492: Construction Project Bid Planning. 6-0-2. Preq., CVEN 439 and senior standing. Capstone construction experience that includes planning the sequence of construction operations, creating a bill of materials, and estimating the cost of a small construction project by student teams.

**CLINICAL LABORATORY SCIENCE (CLAB)**

450: Pathophysiology. 0-3-3. A case history approach is taken in the correlation of laboratory data with clinical observation to diagnose disease.

451: Laboratory Studies in Pathophysiology. 4 1/4-0-1. Preq., or Coreq., CLAB 450. Student application of modern laboratory techniques used in the clinical pathology laboratory with emphasis on clinical hematology, clinical chemistry, urodynamics and clinical immunology.

457: Professional Practices. 0-2-2. Healthcare administration, educational techniques, career opportunities/development, QA/QA, ethics, interview techniques, plus credentialing and accreditation in medical technology are discussed.

460: Clinical Hematology. 2-6 semester credit hours. Preq., consent of instructor. Advanced concepts in the theory, application and medical interpretation of hematological and hemostatic mechanisms and methods.

461: Clinical Hematology Laboratory. 1-5 semester credit hours. Preq., consent of instructor. Instruction and laboratory practice in the development and use of advanced analytical procedures and instrumentation in clinical hematology and hemostasis.

462: Clinical Serology and Immunology. 1-4 semester credit hours. Preq., consent of instructor. Advanced concepts in the theory, application and medical interpretation of serological and immunological mechanisms and methods.

463: Clinical Serology and Immunology Laboratory. 1-4 semester hours credit. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of serological and immunological procedures.

464: Clinical Bacteriology. 2-5 semester credit hours. Preq., consent of the instructor. Advanced concepts in the use and interpretation of medical bacteriological procedures and data.

465: Clinical Bacteriology Laboratory. 3-6 semester credit hours. Preq., consent of the instructor. Instruction and laboratory practice in the development and use of advanced analytical procedures and instrumentation in clinical bacteriology.

466: Clinical Immunohematology. 1-4 semester credit hours. Preq., consent of the instructor. An advanced study of the principles of immunohematology necessary to provide a patient with a safe blood transfusion.

467: Clinical Immunohematology Laboratory. 1-4 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in immunohematological procedures utilized in a hospital blood bank.

468: Clinical Chemistry and Toxicology. 3-6 semester credit hours. Preq., consent of the instructor. Advanced concepts in the theory, application, and medical interpretation of clinical biochemical mechanisms and methods.

474: Clinical Urinalysis. 1-3 semester credit hours. Preq., consent of instructor. Advanced concepts in the use and interpretation of urinalysis procedures and data.

475: Clinical Urinalysis Laboratory. 1-3 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of urinalysis procedures.

476: Critical Care. 1-2 semester credit hours. Preq., consent of instructor. Advanced concepts in the use and interpretation of procedures and data in clinical parasitology, mycology, and mycobacteriology.

477: Clinical Parasitology, Mycology and Mycobacteriology Laboratory. 1-2 semester credit hours. Preq., consent of instructor. Instruction in laboratory practice in the development and use of advanced analytical procedures in clinical mycology, parasitology, and mycobacteriology.

478: Critical Laboratory Administration. 1-2 semester credit hours. Preq., consent of instructor. Modern management concepts for the clinical laboratory.

479: Clinical Histopathology. 1-5 semester credit hours. Preq., consent of instructor. Introduction to emerging medical technologies.

483: Clinical Parasitology. 1-2 semester credit hours. Identification, clinical significance, and methods of prevention of parasitic infections.

484: Clinical Parasitology Laboratory. 1-2 semester credit hours. Instruction and laboratory practice in the development and application of medical parasitology laboratory methods.

485: Clinical Mycology. 1-2 semester credit hours. Identification, clinical significance and methods of prevention of mycotic infection.

486: Clinical Phlebotomy and Specimen Procurement. 1-3 semester credit hours. Preq., consent of instructor. Instruction and laboratory practice in phlebotomy and the collection of other specimens for clinical analysis. Specimen preservation and safe lab practices are included.

487: Clinical Hemostasis. 1-4 semester hours credit. Preq., consent of instructor. The theory of the coagulation cascade, analytical procedures that monitor this process and the clinical significance of coagulopathies are discussed.

488: Clinical Hemostasis Laboratory. 1-4 semester hours credit. Laboratory procedures which assess the coagulation cascade and related processes.

489: Clinical Chemistry and Toxicology Laboratory. 3-8 semester hours credit. Practical instruction and laboratory practice in clinical chemistry procedures, including associated instrumental analysis.

**COMPUTATIONAL ANALYSIS & MODELING (CAM)**

610: Current Topics in Research. 0-3-3. May be repeated. Required for ACAM doctoral students each quarter. Non-degree credit. Research Methodology, current research of doctoral candidates, faculty, invited lecturers.

620: Special Topics in Computational Science and Engineering. 1-3 hours credit. May be repeated for 1-3 hours credit each time.

690: Dissertation Research. 0-3-3. Doctoral students only. Registration in any quarter may be for three semester hours credit or multiples thereof, up to a maximum of nine semester hours credit per quarter. Maximum total credit allowed is thirty hours.

*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.*

310: Principles of Information Systems. 0-3-3. Preq., CIS 110, junior standing. Introduction to concepts and principles of information system resources, analysis, development, management, and applications.


335: Application Development for the Internet. 0-3-3. Preq., CIS 310, 339. Programming for Internet- and Intranet-based business applications. The principles of good software engineering and program clarity will be stressed.


401: Internship in CIS I. 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.

402: Internship in CIS II. 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.

444: Network Design & Implementation. 0-3-3. Preq., CIS 310, 339. Issues of designing, implementing, and managing computer networks, including both Local Area Networks (LANs) and Wide Area Networks (WANs).

510: Information Resource Management. 0-3-3. Preq., CIS 310. Attention is given to strategic implementation of technology, secure and effective systems, externally focused systems, along with the historical and social environment of information systems.

515: Decision Support Systems. 0-3-3. Information technology in the firm and non-profit organization with a focus on using computers, data bases, knowledge bases, graphics, and models to support decision making.


540: Topics in Information Technology Management. 0-3-3. Information technology management issues addressed include: virtual teams, knowledge management, IT investments, business process change, Web systems, software project management, outsourcing, IT management roles. Course may be repeated for up to 9 hours credit with change of title/subject matter.

550: Directed Study in Computer Information Systems. 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of computer information systems.

615: Decision Support Systems. 0-3-3. Requires Doctoral standing. May require additional class meetings. Information technology in the firm and non-profit organization with a focus on using computers, data bases, knowledge bases, graphics, and models to support decision making. Credit will not be given for CIS 615 if credit is given for CIS 515.

625: Information Systems Project Management. 0-3-3. Preq., DBA student or consent of instructor. Intensive review of theories and literature on information systems (IS) project development and management. IS project management techniques and managerial issues will be examined. A research project proposal in IS management will be developed and completed.

630: Seminar in Computer Information Systems. 0-3-3. Study of current topics in the discipline of Computer Information Systems. In-depth analysis of a specialized research field along with an investigation of the literature.

635: Advanced Computer Applications. 0-3-3. Requires Doctoral standing. May require additional class meetings. Study of the development and application of Expert Systems and use of development shells. Topics include: Knowledge Acquisition, System Development, and Validation/Verification. Credit will not be given for CIS 635 is credit is given for CIS 535.

650: Directed Study in Computer Information Systems. 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of computer information systems.

685: Comprehensive Exam in Computer Information Systems. No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in CIS. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in CIS. Requires consent of graduate director.

100: Overview of Computer Science. 0-3-3. Preq., MATH 101 or equivalent. An overview of the field of computing; history, impact on society, and current trends; together with an introduction to operating systems, editors, and rudimentary programming.

120: Introduction to Computer Programming. 0-3-3. Preq., CSC 120 and MATH 241. An overview of the mathematical foundations of computing. Topics include sets, symbolic logic, relations, functions, combinatorics, induction, trees, graphs, and Boolean algebra.

220: Data Structures. 0-3-3. Preq., CSC 120. The definition, representation, and manipulation of basic data structures such as arrays, stacks, queues, trees, and graphs. Practical applications of these structures will be emphasized.

230: Software Design. 0-3-3. Preq., CSC 220. Design, construction and maintenance of large software systems. Topics include project planning, requirements analysis, software design methodologies, software implementation and testing, maintenance, and debugging.


251: Computer Organization & Assembly Language. 0-3-3. Preq., CSC 220. Introduction to computer organization and operation, data representation and manipulation, assembly language programming, and instruction set architecture (G).

265: Introduction to Digital Design. 0-2-2. Preq., CSC 251; Coreq., CSC 269. Introduction to digital design techniques, Boolean algebra, combinational logic, minimization techniques, simple arithmetic circuits, combinable, and sequential logic design, and other digital design techniques.

269: Digital Design Lab. 3-0-1. Coreq., CSC 265. Laboratory for digital design techniques, combinational and sequential logic design, registers and arithmetic unit design.


310: Theory of Computing. 0-3-3. Preq., CSC 220 and MATH 311. An overview of formal languages, the abstract models of computing capable of recognizing those languages, and the grammar used to generate them.

325: Advanced Data Structures and Algorithms. 0-3-3. Preq., CSC 220. Advanced data structures and algorithm design. Topics include specialized trees, graphs, sets and tables, advanced searching and sorting, complexity analysis, and algorithm design techniques.

330: Programming Languages. 0-3-3. Preq., CSC 240, 325. Techniques for specifying the syntax and semantics of programming languages. Language concepts; execution environments; comparative analysis of programming languages.

345: Operating Systems. 0-3-3. Preq., CSC 240 & 265. An introduction to operating systems concepts. Topics include processor management, storage management, device management, performance, security, and case studies of common operating systems.

364: Computer Architecture. 0-3-3. Preq., CSC 265 & 269. Architecture and organization of computer systems. Topics include the processor, control unit and microprogramming, computer arithmetic, memory hierarchy and memory management, input/output, instruction sets.

404: Senior Capstone. 0-3-3. Preq., CSC 325 & senior standing. This course provides a forum for discussion of the social and ethical aspects of
computing. Communication skills will be emphasized through professional presentations and formal written essays.

418: Computer Architecture and Operating Systems. 0-3-3. Preq., consent of instructor. Computer organization, and hardware design, digital logic, CPU structure, control unit, memory, and input/output; operating systems, process scheduling, memory management, and file-system interface. (G)

419: Special Topics in Theory of Computing. 0-3-3. Preq., consent of instructor. Selected topics in the area of computing theory that are of current importance or special interest.

420: Design and Analysis of Algorithms. 0-3-3. Preq., CSC 325. Design and analysis of efficient algorithms. Topics include complex data structures, advanced searching and sorting, algorithm design techniques, and complexity analysis.

425: Discrete Mathematics, Data Structures and Algorithms. 0-4-4. Preq., Consent of instructor (cannot be applied for credit toward any Computer Science degree). Mathematical foundations of computer science; definition, application and implementation of abstract data types; algorithm design and analysis techniques. (G)

428: Object Oriented Programming and Data Structures. 0-3-3. Preq., consent of instructor. Programming paradigms, syntax, semantics, data types, expression, control statements, and subprograms; object oriented concepts, abstract data types, recursion, queues, and trees. (G)

429: Special Topics in Software Development. 0-3-3. Preq., consent of instructor. Selected topics in the area of software development that are of current importance or special interest.

430: Database Management Systems. 0-3-3. Preq., CSC 325. Database concepts, organizations and applications; database management systems; implementation of a simple database. (G)

436: Compiler Design. 0-3-3. Preq., CSC 310, 330. Principles of compiler design; assembler design; lexical analysis; syntax analysis; automatic parser generations; error detection and recovery. (G)

437: Programming Language Paradigms and Software Development. 0-4-4. Preq., CSC 425 and consent of instructor (cannot be applied for credit toward any Computer Science degree). Imperative, functional, logical and object-oriented paradigms; programming language semantics and language translation; specification, design, implementation, validation, and maintenance of large software systems. (G)

438: Advanced Data Structures and Algorithm Design. (0-3-3). Preq., consent of instructor. Algorithm analysis and design, sorting algorithms, hashing, search trees, disjoint sets, graph algorithms, divide and conquer, greedy algorithms, dynamic programming, backtracking, and NP completeness. (G)

439: Special Topics in Programming Environments. 0-3-3. Preq., consent of instructor. Selected topics in the area of programming environments that are of current importance or special interest.

445: Architecture and Operating Systems; Parallel Computing. 0-4-4. Preq., CSC 425 and consent of instructor (cannot be applied for credit toward any Computer Science degree). Digital logic, instruction set architectures, microprocessor design; storage management, process synchronization and communications, device management; introduction to parallel architectures, languages and algorithms. (G)

449: Special Topics in Operating Systems. 0-3-3. Preq., consent of instructor. Selected topics in the area of operating systems that are of current importance or special interest.

450: Computer Networks. 0-3-3. Preq., CSC 345. An overview of computer networks. Topics include network topologies, layers, local area networks, and performance measurement and analysis. (G)

464: Advanced Digital Design. 0-3-3. Preq., CSC 265. Synchronous sequential circuits, FSM optimization and implementation, testing, level-mode sequential design, race and hazards, advanced ALU, programmable logic devices, CAD tools and HDLs.

466: Microprocessor Systems Design. 0-3-3. Preq., CSC 364. Microprocessor-based system design, bus design, memory systems, input/output interfacing and DMA, microprocessor-based laboratory project.

468: Introduction to VLSI. 0-3-3. Preq., CSC 265. VLSI design methodologies, fabrication and layout, combinational and sequential design in VLSI, subcell design, system design, advanced design techniques and methodologies. (G)

469: Special Topics in Computer Architecture. 0-3-3. Preq., consent of instructor. Selected topics in the area of computer architecture that are of current importance or special interest.
systems, natural language understanding, intelligent tutoring systems, learning and neural networks.

579: Data Mining for Bioinformatics, 0-3-3. Preq., CSC 325 equivalent or consent of instructor. Topics include: Introduction to Data Mining (DM), data warehousing, OLAP for DM, data preprocessing, DM primitive languages and system architecture, mining association rules in large DBMS, Introduction to Computational Bioinformatics (BI), DM for multi-dimensional BI data, image mining and CBIR.

580: Advanced Data Mining for Bioinformatics, 0-3-3. Preq., CSC 579 or equivalent or consent of instructor. Topics include: data mining (dm) concept description, classification, clustering, predictive analysis, anomaly detection in data marts, computational analysis of DNAs, DNA sequence analysis using DM techniques, pair-wise alignment techniques, multiple alignment techniques, secondary database searching using multi-dimensional indexing, future trends in DM.


582: Parallel Computational Methods, 0-3-3. Preq., CSC 240, MATH 415. Parallel implementations of FFT, interpolation, integration, Eigensystems, matrix maximization, ODES, PDES.


584: Computational Solutions for PDE II, 0-3-3. Preq., CSC 583 or MATH 574. Finite difference schemes for elliptic PDEs, iterative methods, and introduction to finite element methods and multigrid methods. Emphasis on program implementation.

COUNSELING (COUN)

400: Introduction to Counseling, 0-3-3. Introductory course for professional workers. Includes purposes and scope of counseling service, concepts, principles and techniques of counseling. (G)

401: Student Personnel Services, 0-3-3. A study of student personnel programs in colleges and universities. This course may not be taken for graduate credit.

460: Behavioral Counseling, 0-3-3. A non-cognitive approach to counseling that presents the necessary attitudes, concepts, principles, and skills for individual counseling.

500: Principles and Administration of Guidance Services, 0-3-3. An overview of the current principles and practices involved in various types of guidance and counseling services.

505: Analysis of the Individual, 3-2-3. Preq., PSYC 542 or equivalent. This course offers students an orientation to psychological testing procedures, their interpretation, evaluations and use in the understanding of clients.

506: Introduction to Rehabilitation Counseling, 0-3-3. Philosophical, social, psychological and legislative bases of rehabilitation; nature and scope of the process and functions of rehabilitation counselors.

507: Case Management in Rehabilitation Counseling, 0-3-3. Development of case management in procedures and skills: integration of theory and practice.

508: Introduction to Counseling Theories, 0-3-3. A detailed study of a selection of the best known schools of counseling theory.

510: Counseling the Elderly, 0-3-3. Dynamic and therapeutic models for counseling the aged and their families; focus on matching interventions to lifestyles.

512: Counseling the College Student, 0-3-3. An emphasis on development in young adulthood; historical, philosophical, and practical aspects of personnel services for college students.

513: Career Information and Career/Life Style Development, 0-3-3. Provides an understanding of career development; occupational/educational information sources and systems; career and lifestyle counseling; career decision-making and instruments relevant to career planning.

514: Career Education: Vocational Guidance, 0-3-3. A course in career guidance designed to provide an overview of career development and its applications within the high school setting.

515: Career Education: Orientation of the World of Work, 0-3-3. A course in career guidance designed to provide an overview of career development and its applications within the elementary school setting.

516: An Introduction to Group Processes, 0-3-3. Preq., COUN 508. Emphasis is on providing students with a knowledge of group dynamics, and learning basic group counseling techniques under supervision.


520: Case Studies in Counseling, 1-3 hours credit. Preq., COUN 508 and consent of instructor. Preparation and use of case studies in counseling.

521: Seminar: Current Psychological Literature, 1-3 hours credit. May be repeated. Preq., COUN 508 and consent of instructor. Students are required to do extensive reading on selected topics in psychology.

522: Field Work in Counseling, 3 hours credit (6). Preq., COUN 518 and consent of instructor. Supervised study, observation, and practice in selected employment settings.

523: Elementary School Guidance, 0-3-3. A review of the principles and organizational patterns of guidance services at the elementary school level.

525: Advanced Techniques of Counseling, 3-2-3. Preq., COUN 518 and consent of instructor. Further experiences in advanced counseling techniques appropriate to various counseling theories.

526: Problems in Guidance, 3 hours credit (6). Special conferences, workshops, and seminars as requested by elementary and secondary school personnel. May be repeated for a maximum of 6 hours credit.

527: Addiction Counseling, 0-3-3. An introduction to the field of Addiction Counseling. Emphasis is placed on recognition and identification of the addicted as well as basic treatment techniques.

528: Advanced Addiction Counseling, 3-2-3. Preq., COUN 527. A methods course intended to equip the student with a basic conception of various therapeutic modalities.

529: Cross-cultural Counseling, 0-3-3. Investigation of the development of cultural identity and techniques for appropriate interactions with clients from different cultural groups.

530: Practicum, 5-1-3. Open only by application. Supervised professional experience in the student's major field. (Minimum 3.0 GPA required)

531: Internship, 20-1-3 (6). Preq., COUN 530 or equivalent and permission of adviser. Advanced supervised counseling practice in a setting appropriate to the student's professional development.

532: School Counseling Practicum, 5-1-3. Open only by application. Supervised professional activity in a school setting. (Minimum 3.0 GPA is required)

590: Ethics and Professional Practice, 0-3-3. Preq., COUN 508. An in-depth investigation of ethical and legal issues, as well as technical concerns, related to the professional practice of counseling.

ECONOMICS (ECON)

201: Economic Principles and Problems, 0-3-3 each. A study of basic economic principles and problems, with particular reference to the operation and social implications of the American economic system. (201-Macro). Statewide Transfer Agreement Course. *

202: Economic Principles and Problems, 0-3-3 each. A study of basic economic principles and problems, with particular reference to the operation and social implications of the American economic system. (202-Micro). Statewide Transfer Agreement Course. *

215: Fundamentals of Economics, 0-3-3. (Not open to students who have had ECON 201-202.) A survey of the major principles of economics designed for the student whose curriculum requires only one quarter of economic principles. Statewide Transfer Agreement Course. *

312: Monetary Economics, 0-3-3. Preq., ECON 202 or 215. A study of the causes of changes in the supply of money and rate of spending and the effects of these changes on production, employment and the price level.

344: International Economics, 0-3-3. Preq., ECON 201 or 215 or consent of instructor. Introduction to modes of business operations and the economic factors which affect international trade. Study of principles, practices, and theory of how and why nations trade.

401: Internship in Economics I, 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.

402: Internship in Economics II, 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.

403: Economics of Industrial Organization, 0-3-3. Preq., ECON 202 or 215. Relationships between conduct and performance of industries using theoretical and empirical material: Antitrust and environmental regulation, R&D, product advertising and pricing are examined. (G)