

Prerequisites: 12 hours of biology and 8 hours of chemistry or approval of department head.

- 598-3 Research Design and Analysis. (3-0)** Statistical principles and techniques applicable to the procurement, analysis, and evaluation of quantitative data. Prerequisite: MATH 107 or approval by the department head.
- 599-3 Practicum, Field Problem, or Internship. (3-0)** Supervised practice in specialized laboratory or professional settings. Prerequisites: 12 hours of biology and 8 hours chemistry or approval of department head.

CHEMISTRY (CHEM)

- 101-3 Introductory Applied Chemistry. (3-2)** (TCCNS = CHEM 1405) A brief introduction to the basic principles of chemistry with emphasis on applications in our society: energy, pollution and the environment, food, health, and drugs. Designed for non-science majors. Lab fee \$10. Course fee \$5.
- 102-3 Essential Elements of Chemistry. (2-3)** An introduction to the science of chemistry with a broad overview of the essential elements of chemistry and real-life applications. Req PHYS 102 or consent of instructor. Enrollment in this course is restricted to Interdisciplinary Studies majors. Lab Fee \$10, Course Fee \$10
- 103-4 Fundamentals of Chemistry. (3-2)** (TCCNS = CHEM 1407) A beginning chemistry course for students in applied sciences who need only one semester of general chemistry. The course includes the structure, properties and changes in matter, quantitative relationships in reactions, solutions, equilibrium, pH, buffers and nuclear chemistry. Not recommended for science majors or pre-professional students in health related fields. Does not meet prerequisite for CHEM 108 or 201. Lab fee \$10. Course fee \$5.
- 105-4 College Chemistry I. (3-3)** (TCCNS = CHEM 1411) Topics to be covered include an introduction to fundamental chemical laws, atomic structure and its relationship to chemical bonding and the periodic properties of elements and compounds, stoichiometry, states of matter, and solutions. Suggested for science majors and pre-professional students who meet requirements for enrollment in MATH 107 or higher. Lab fee \$10. Course fee \$5.
- 108-4 College Chemistry II. (3-3)** (TCCNS = CHEM 1412) Topics to be covered include a study of the chemical and physical properties of selected families of elements, an introduction to energy changes in chemical reactions, chemical equilibria, electrochemistry, rates of chemical reactions, nuclear chemistry, and semi-micro qualitative analysis. This course is a prerequisite for CHEM 201. Prerequisite: CHEM 105. Lab fee \$10. Course fee \$5.
- 201-4 Organic Chemistry I. (3-4)** (TCCNS = CHEM 2423) The first semester of a year sequence in the chemistry of carbon compounds involving their synthesis, reaction mechanisms, nomenclature, physical and spectral properties. Includes compounds of theoretical, biological, agricultural, and industrial importance. Prerequisite: CHEM 108. Lab fee \$10. Course fee \$10.
- 202-4 Organic Chemistry II. (3-4)** (TCCNS = CHEM 2425) A continuation of CHEM 201. The laboratory includes an introduction to qualitative organic analysis. This course is a prerequisite to all organic chemistry courses at the junior or higher level. Prerequisite CHEM 201. Lab fee \$10. Course fee \$10.
- 307-4 Quantitative Analysis. (2-6)** A study of the experimental and theoretical principles concerning gravimetric and volumetric analysis. Topics include data treatment, equilibrium, precipitation, neutralization, oxidation, reduction, potentiometry, and introduction to spectroscopy. Prerequisites: A grade of C

or better in 8 hours of freshman CHEM; junior classification or approval of department head. Lab fee \$10.

- 314-3 Geochemistry. (2-3)** A survey of the application of chemical principles to problems of geology. Topics include the origin and distribution of the elements in addition to exploring the behavior and distribution of various elements in igneous, metamorphic, and sedimentary rocks. Basic concepts of thermodynamics, solution chemistry, and isotope geochemistry will be discussed. Credit for both CHEM 314 and GEOL 314 will not be awarded. Prerequisite: CHEM 108. Lab fee \$10.
- 323-4 Physical Chemistry I. (3-4)** A study of chemical thermodynamics and its application to chemical equilibrium; the macroscopic properties of matter including real gases, solutions, and phase changes; chemical kinetics. Prerequisites: MATH 209; PHYS 105 or 242 or approval of department head. Lab fee \$10.
- 324-4 Physical Chemistry II. (3-4)** An introduction to the microscopic properties of nature, including an introduction to quantum mechanics and its applications to atomic and molecular spectroscopy. Prerequisite: CHEM 323 or approval of department head. Lab fee \$10.
- 408-4 Instrumental Analysis. (2-6)** A study of the theory and use of instruments for chemical analysis. Techniques include absorption spectroscopy, nuclear magnetic resonance, atomic absorption, flame emission, mass spectroscopy, chromatography, potentiometry, and polarography. Prerequisites: CHEM 307 and 1 semester of organic chemistry or approval of department head. Lab fee \$10.
- 427-3 Qualitative Organic Analysis. (1-6)** The identification of the principal classes of organic compounds. Prerequisite: CHEM 202. Lab fee \$10.
- 428-3 Inorganic Chemistry. (3-0)** Discussion of the models of inorganic chemistry including atomic structure, chemical bonding, periodic properties, stereochemistry, reaction mechanisms, and coordination chemistry. Properties of specific elements and families are also presented. Prerequisites: CHEM 202 and junior classification or approval of department head.
- 429-3 Polymers. (3-0)** A basic study of polymer chemistry, with special emphasis on the effect of the structure of monomers upon the structure of the polymers, is presented. Prerequisite: CHEM 202.
- 445-3 Medicinal Chemistry. (3-0)** An examination of the principles of drug action including receptor-effector theories and the effects of physico-chemical properties on biological activity. The principles of drug design, synthesis, and metabolism will be presented. Prerequisites: CHEM 202 and BIOL 121.
- 474-3 Biochemistry I. (3-0)** An introduction to the basic principles of biological chemistry and to fundamental processes of plants, animals, and microorganisms. Credit for both BIOL 474 and CHEM 474 will not be awarded. Prerequisites: One semester of organic chemistry (2 semesters recommended), and 8 hours of biological science or approval of department head.
- 475-3 Biochemistry II. (3-0)** A detailed survey of intermediary metabolism. The metabolism of carbohydrates, lipids, proteins and nucleic acids, and the regulation of metabolism are emphasized. Credit for both BIOL 475 and CHEM 475 will not be awarded. Prerequisites: BIOL/CHEM 474, or approval of department head.
- 478-3 Biochemistry Lab. (1-5)** Principles and applications of basic methodology for the isolation, purification, characterization, and quantitative determination of biologically important compounds. Credit for both BIOL 478 and CHEM

478 will not be awarded. Prerequisite: BIOL 474 or CHEM 474 or concurrent enrollment, or approval of the department head. Lab fee \$15.

- 486-v Chemistry Problems. (Credit variable)** Introduction to library and laboratory research. May be repeated for credit. A maximum of four hours may be applied toward degree requirements in chemistry. Prerequisite: Approval of department head.
- 510-3 Environmental Chemistry. (3-0)** Study of the impact of chemistry on the environment to include topics on air, water, and soil pollution, with special emphasis on water. Beneficial chemical modification of the environment will be covered.
- 586-v Chemical Problems. (Credit variable)** Independent research in the laboratory or in the library under the guidance of a member of the graduate faculty. Up to 6 hours may be taken.

CLINICAL LABORATORY SCIENCE (CLS)

- 414-1 Urinalysis and Renal Physiology. (1-0)** A study of renal physiology, the formation of urine, and the relationship to renal and other systemic diseases. Requires concurrent enrollment in CLS 415 or approval of department head.
- 415-1 Urinalysis Laboratory. (0-5)** Supervised learning experiences using microscopic, chemical, and automated techniques in analysis of urine. Requires concurrent enrollment in CLS 414 or approval of department head. Lab fee \$15.
- 416-1 Body Fluids Analysis. (1-1)** Advanced concepts related to the biochemical and cellular analysis of body fluids. Includes normal physiologic function and pathophysiology of synovial, seminal, cerebrospinal, serous, and amniotic fluid.
- 424-2 Hematology I Lecture. (2-0)** Studies on the formation, function, and identification of normal cellular blood elements are discussed. Emphasis is placed on normal physiology and characteristics of blood cells in all ages. Requires concurrent enrollment in CLS 425 or approval of department head.
- 425-1 Hematology I Laboratory. (0-5)** Supervised experiences with emphasis placed on the enumeration, morphology and staining characteristics of normal blood cells. Manual and automated techniques will be used. Emphasis will be placed on specimen collection, processing, and generation and evaluation of diagnostic data. Requires concurrent enrollment in CLS 424 or approval of department head. Lab fee \$15.
- 426-2 Hematology II Lecture. (2-0)** Studies on the formation and identification of abnormal cellular blood elements are discussed. Emphasis is placed on abnormal physiology and hematologic manifestations of disease. Requires concurrent enrollment in CLS 427 or approval of department head. Prerequisite: CLS 424 or approval of department head.
- 427-1 Hematology II Laboratory. (0-5)** Supervised experiences with emphasis placed on the enumeration, morphology, and staining characteristics of abnormal blood cells. Emphasis will be placed on specimen processing and generation and evaluation of diagnostic data. Requires concurrent enrollment in CLS 426 or approval of department head. Prerequisite: CLS 425 or approval of department head. Lab fee \$15.
- 428-1 Hemostasis. (1-2)** Discussion and comparison of the hemostatic coagulation and fibrinolytic systems with emphasis on normal and abnormal physiology. Supervised learning experiences with emphasis on analytes to evaluate coagulation and fibrinolysis. Manual and automated techniques will be discussed and used. Prerequisites: CLS 425 and CLS 424 or approval of department head.

- 434-2 Medical Microbiology I Lecture. (2-0)** Discussion of growth characteristics, morphology, physiology, and identification criteria of human pathogenic microorganisms and normal flora. Concurrent enrollment in CLS 435 or approval of department head.
- 435-1 Medical Microbiology I Lab. (0-5)** Supervised experience with emphasis on isolation by staining, cultural, and differential biochemical characteristics of pathogenic microorganisms. Concurrent enrollment in CLS 434 or approval of department head. Lab fee \$15.
- 436-2 Medical Microbiology II Lecture. (2-0)** Discussion of antimicrobial susceptibility, anaerobic bacteria, mycobacteria, chlamydia, rickettsia, and an overview of infections by organ system. Emphasis is on epidemiology, pathogenesis, source of isolation, and conventional and molecular methods of diagnosis of human pathogenic organisms. Requires concurrent enrollment in CLS 437 or approval of department head. Prerequisite: CLS 434 or approval of department head.
- 437-1 Medical Microbiology II Lab. (0-5)** Supervised experience with emphasis on staining, isolation, identification, and antimicrobial susceptibility testing of microorganisms isolated from clinical specimens. Emphasis is also placed on specimen processing and generation and evaluation of diagnostic data. Requires concurrent enrollment in CLS 436 or approval of department head. Prerequisite: CLS 435 or approval of department head. Lab fee \$15.
- 438-1 Medical Mycology and Virology. (1-1)** Discussion of the epidemiology and pathogenesis of fungi and viruses implicated in human disease. Emphasis will be placed upon diagnostic tools used in the clinical laboratory to isolate, culture, and identify these microorganisms.
- 444-2 Immunohematology I Lecture. (2-0)** Discussion of the principles of immunohematology in relation to blood grouping, typing, compatibility testing, and antibody detection and identification. Concurrent enrollment in CLS 445 or approval of department head.
- 445-1 Immunohematology I Lab. (0-4)** Supervised experiences related to blood grouping and typing and compatibility testing. Emphasis is placed on specimen processing and generation and evaluation of diagnostic data. Requires concurrent enrollment in CLS 444 or approval of department head. Lab fee \$15.
- 446-2 Immunohematology II Lecture. (2-0)** Discussion of the principles of immunohematology in relation to transfusion and transplant medicine, donor processing, and component preparation and storage. Concurrent enrollment in CLS 447 or approval of department head. Prerequisite: CLS 444 or approval of department head.
- 447-1 Immunohematology II Lab. (0-4)** Supervised experiences related to antibody detection and identification, incompatibility and transfusion reaction resolution; component processing and storage; and selection for therapy. Emphasis is placed on specimen processing, laboratory techniques, and generation and evaluation of diagnostic data. Requires concurrent enrollment in CLS 446 or approval of department head. Prerequisite: CLS 445 or approval of department head. Lab fee \$15.
- 448-1 Introduction to Medical Genetics. (1-0)** An introduction to the concepts of gene structure and inheritance patterns. Emphasis will be placed on the types of inheritance patterns associated with different disease conditions in which clinical diagnostics plays a valuable role in disease diagnosis or patient counseling.
- 451-1 Clinical Parasitology Lecture. (1-0)** Discussion of parasites causing disease in humans and their life cycles, identification, and pathology in

humans. Opportunistic parasites in the immunocompromised host will also be addressed.

- 452-1 Clinical Parasitology Laboratory. (0-5)** Supervised experiences in the identification of human parasites. Specimen collection, processing and criteria for rejection will also be addressed. Emphasis will be placed on deriving diagnostic laboratory results and evaluation of those results. Lab fee \$15.
- 464-1 Immunology and Serology I Lecture. (1-0)** Discussion of immunological mechanisms fundamental to resistance to disease with emphasis on basic humoral and cellular immune response and resistance to microbial disease. Concurrent enrollment in CLS 465 or approval of department head.
- 465-1 Immunology and Serology I Laboratory. (0-3)** Supervised laboratory experience with emphasis on the detection, identification, and characterization of antigens and antibodies of infectious etiology using serologic techniques. Emphasis is placed on specimen processing and generation and evaluation of diagnostic data. Concurrent enrollment in CLS 464 or approval of department head. Lab fee \$15.
- 466-1 Immunology and Serology II Lecture. (1-0)** Discussion of immunologic mechanisms and pathogenesis involved in autoimmune, allergic, and immunodeficient diseases. Prerequisite: CLS 464 or approval of department head. Concurrent enrollment in CLS 467 or approval of department head.
- 467-1 Immunology and Serology II Laboratory. (0-3)** Supervised learning experience with emphasis on the detection, identification, and characterization of antigens and antibodies involved in autoimmune disease. Also emphasis on cells involved in cellular immunity using immunologic techniques. Emphasis is placed on specimen processing and generation and evaluation of diagnostic data. Prerequisite: CLS 465 or approval of department head. Concurrent enrollment in CLS 466 or approval of department head. Lab fee \$15.
- 474-1 Introduction to Laboratory Safety and Instrumentation. (1-2)** Introduction to the theories and principles of instrument operation and safety practices commonly used in the clinical laboratory. Supervised learning experience in instrument operation and troubleshooting. Course fee \$15.
- 475-1 Advanced Laboratory Automation, Statistics, and Quality Assurance Concepts. (1-2)** Discussion and comparison of operating principles of automated analyzers, complex laboratory techniques, statistical methods and quality assurance concepts applicable to the clinical laboratory. Supervised learning experience in instrument operation, troubleshooting, electrophoresis and chromatography. Application of statistics to quality assurance and evaluation of laboratory results will be discussed.
- 476-2 Clinical Chemistry I Lecture. (2-0)** An introduction to the theories and principles of diagnostic methods used to measure common analytes involved in water and acid base balance, mineral and metabolic homeostasis in serum and other body fluids. Normal physiology and biochemical manifestation of disease are emphasized. Requires concurrent enrollment in CLS 477 or permission of department head.
- 477-1 Clinical Chemistry I Laboratory. (0-5)** Supervised learning experiences with emphasis on manual, semi-automated, and automated procedures for assaying electrolytes, blood gases, carbohydrates, lipids, proteins, and drugs. Emphasis is placed on specimen processing and generation and evaluation of diagnostic data. Requires concurrent enrollment in CLS 476 or approval of department head. Prerequisite: CLS 474 or approval of department head. Lab fee \$15.

- 478-2 Clinical Chemistry II Lecture. (2-0)** Discussion and comparison of diagnostic methods employed in the clinical chemistry laboratory. Emphasis is placed on diagnostic metabolites, enzymology, endocrinology, and tumor markers. Normal physiology and biochemical manifestations of disease are discussed. Requires concurrent enrollment in CLS 479 or approval of department head. Prerequisite: CLS 476 or approval of department head.
- 479-1 Clinical Chemistry II Laboratory. (0-5)** Supervised learning experiences with emphasis on manual, semi-automated, and automated procedures for assaying metabolites, drugs, enzymes, hormones, and tumor markers. Emphasis is placed on specimen selection, processing, analyses, and evaluation of diagnostic data. Requires concurrent enrollment in CLS 478 or approval of department head. Prerequisite: CLS 477 or approval of department head. Lab fee \$15.
- 482-1 Computer Applications in Science and Medicine. (1-1)** Use of computers in the scientific and medical fields. Emphasis is placed on using word processing and spread sheets; charting and graphing of data; presentation packages; tools for literature search; information search using the internet; and description and evaluation of current laboratory information systems. Course fee \$10.
- 486-v Clinical Laboratory Science Problems. (Credit variable)** A course open by invitation to capable Clinical Laboratory Science students who wish to pursue a selected problem study. Students are permitted and encouraged to work independently under the guidance of an instructor. May be repeated for credit, subject to the approval of the department head. Prerequisites: Admission to the Clinical Laboratory Science program, the ability to do independent work, and approval of the department head. Lab fee \$10.
- 491-v Integrated Clinical Laboratory Practice and Research. (Credit variable)** An integrated clinical laboratory course designed to introduce the concepts of specimen tracking and processing using a laboratory information system, test result utilization, utilization review, and clinical research. Emphasis will be placed on workload organization; quality control evaluation accuracy; consistency; validity of results generated; and appropriate reporting of results. Lab fee \$15.
- 492-v Clinical Laboratory Practicum I. (Credit variable 1-5)** Structured clinical experience directed toward development of laboratory skills, organizing work, and solving problems in hematology, hemostasis, and body fluid analysis. Emphasis is placed on the analysis of quality assurance data and application of laboratory information systems and automation. Grading in this course is satisfactory/unsatisfactory. Field experience fee \$75.
- 493-v Clinical Laboratory Practicum II. (Credit variable 1-5)** Structured clinical experience directed toward development of laboratory skills, organizing work, and solving problems in medical microbiology and parasitology. Emphasis is placed on the analysis of quality assurance data and application of laboratory information systems and automation. Grading in this course is satisfactory/unsatisfactory. Field experience fee \$75.
- 494-v Clinical Laboratory Practicum III. (Credit variable 1-5)** Structured clinical experience directed toward development of laboratory skills, organizing work, and solving problems in immunology, serology, and blood banking. Emphasis is placed on the analysis of quality assurance data and application of laboratory information systems and automation. Grading in this course is satisfactory/unsatisfactory. Field experience fee \$75.
- 495-v Clinical Laboratory Practicum IV. (Credit variable 1-5)** Structured clinical experience directed toward development of laboratory skills, organizing

work and solving problems in clinical chemistry, toxicology, and molecular pathology. Emphasis is placed on the analysis of quality assurance data and application of laboratory information systems and automation. Grading in this course is satisfactory/unsatisfactory. Field experience fee \$75.

496-v Advanced Clinical Practicum. (Credit variable; 1-8 for each hour)

Structured clinical experience directed toward development of laboratory skills, organizing work, and solving problems in the clinical laboratory. Emphasis is given to high complexity testing. Prerequisites: completion of NAACLS-accredited MLT-AD program, MLT (CLT) certification, and 2 years of approved work experience, or approval by department head. Grading in this course is satisfactory/unsatisfactory. Field experience fee \$75.

501-1 CLS Literature Review Seminar. (1-0) Review of current literature topics in the medical laboratory sciences. Emphasis is placed on critique of methods, research design and value to the current body of knowledge. May be repeated for credit for a maximum of 6 credit hours.

502-2 Molecular Diagnostics. (2-1) An overview of molecular mechanisms including replication, transcription, and translation. Emphasis is placed on the principles of molecular methods and their application in diagnosis of microbiologic, immunologic, genetic, endocrine, hematopoietic, and metabolic disease.

504-2 Clinical Correlations and Capstone Review. (2-0) Course employs an integrative approach to laboratory medicine with emphasis on the review of patient cases and appropriate utilization of laboratory tests in diagnosis and case management. A comprehensive review and assessment of the concepts in clinical laboratory medicine.

506-2 Laboratory Management. (2-0) Designed to acquaint students with the principles of operating a clinical laboratory. Emphasis is on personnel, financial, marketing, and general administrative management. Also, the student is introduced to writing instructional objectives, constructing evaluation instruments, and planning instructional strategies and establishing a professional development program. Ethical issues in laboratory medicine are also discussed.

520-2 Medical Genetics. (2-0) Study of human genetics including chromosome structure, principles of inheritance, anatomy and physiology of a gene, genetic expression and regulation, cytogenetics, immunogenetics, molecular genetics, with an emphasis on diagnostic testing for human genetic diseases and the genetic basis of cancer. Prerequisite: BIOL 303 or CLS 448 or approval of department head.

521-2 Immunopathology. (2-0) Principles of innate and adaptive immunity including antigen recognition, signal transduction, lymphocyte development and homeostasis of lymphocyte populations, cytokine effects, failure of host defense mechanisms such as autoimmunity, immunodeficiencies, immunoproliferative diseases, analysis of the immune response in intact and manipulated organisms, and tumor immunobiology, with emphasis on clinical induction, measurement and manipulation of the human immune response. Prerequisite: BIOL 385 or CLS 466 or approval of department head.

525-3 Clinical Molecular Microbiology. (3-0) Studies of the genetics and physiology of microbes, including fundamental processes of gene regulation, genome structure, and protein synthesis and processing. Emphasis is placed on the clinical molecular identification of bacteria, viral, fungal and parasitic organisms including real-time PCR techniques,

quality assurance practices, and interpretation of results in a clinical setting.

- 530-3 Medical Biochemistry. (3-0)** A review of the major biochemical processes in the human body, their physiology role and their relationship to human disease. Emphasis will be placed upon emerging diagnostic testing and clinical correlations in the areas of endocrinology, tumor biology, lipoprotein structure and function, diabetes case management, protein structure and function, and toxicology. Prerequisite: BIOL (or CHEM) 474 or CLS 478 or approval of department head.
- 531-3 Molecular & Cellular Pathology. (3-0)** A study of the molecular and cellular aspects of human disease. Emphasis will be placed on microarrays and other emerging diagnostic testing as applied to the regulation of the eukaryotic cell cycle, signal transduction pathways, molecular mechanisms, receptor/membrane function and their relationship to tumor biology, endocrine dysfunction, dyslipidemia and other pathophysiologic conditions. Prerequisite: BIOL 509 or CLS 502 or approval of department head.
- 550-2 Molecular Diagnostics Techniques I. (1-5)** This course provides an introduction to the basic genetic techniques used in a clinical molecular genetics laboratory. Laboratory technique instruction, skill development and practice in isolation of DNA and RNA from clinical samples, preparation of nucleic acid probes, molecular hybridization techniques, amplification techniques and hybridization analysis will be addressed. Emphasis will be placed on laboratory design issues, prevention of product contamination, quality assurance and regulatory issues, safety, and interpretation and application of test results. Course Fee \$50, Lab Fee \$30.
- 551-2 Molecular Diagnostics Techniques II. (1-5)** This course provides a continuation of the basic genetic techniques covered in Molecular Diagnostics Techniques I, which may be used in a clinical molecular genetics laboratory. Laboratory technique instruction, skill development and practice in real-time PCR, reverse transcriptase PCR, nested PCR and single nucleotide polymorphism (SNP) detection will be emphasized. Emphasis will be placed on laboratory design issues, prevention of product contamination, quality assurance and regulatory issues, safety, and interpretation and application of test results. Course Fee \$50, Lab Fee \$30.
- 572-2 Clinical Laboratory Administration. (2-0)** Principles and practices of administration of the clinical laboratory. Emphasis is placed on administrative issues unique to the clinical laboratory including coding, billing, reimbursement, government regulation, accreditation and information management processes. Prerequisite: CLS 506 or approval of department head.
- 586-v Clinical Laboratory Science Problems. (variable)** Independent research under the supervision of an instructor. A formal report will be submitted to the instructor. A maximum of six hours may be taken.
- 588-3 Thesis. (3-0)** Scheduled when the student is ready to begin thesis. No credit until thesis is completed. Prerequisite: Approved research course and consent of major professor.
- 590-3 Special Topics. (3-0)** Study of selected topic(s) directly related to medical laboratory science. May be repeated once for credit as topic varies.
- 599-v Practicum, Field Problem, or Internship. (variable)** Supervised professional activities in specialized laboratory settings. A maximum of six hours may be taken. Field experience fee \$75.

COMMUNICATIONS (COMS)

- 101-3 Fundamentals of Speech Communication. (3-0)** (TCCNS = SPCH 1311)
This course is designed to improve the individual's understanding of the human communication process. Classroom exercises involve the student in interpersonal, small group, and presentational speaking situations. Special emphasis on developing communication skills needed to check and validate perceptions, control language usage, and analyze and improve reasoning processes.
- 102-3 Public Speaking. (3-0)** (TCCNS = SPCH 1315) An introduction to the principles and practice of presentational communication. Methods of topic analysis, research, evidence evaluation, organization, and delivery are covered. Students participate in several classroom presentations.
- 110-3 Mass Communication and Society (3-0)** Places mass media in historical perspective; explores the relationships among media; examines the structure of the American communications system and compares it to international communications systems. Analyzes the social, economic, and political implications of modern society's reliance on mass communications. Explores the ways in which the mass media provides images of our world.
- 201-3 Voice and Performance. (3-0)** (TCCNS = SPCH 1342) Oral presentation of literary forms with emphasis on the vocal mechanism and phonetics. Interpretative readings in prose, poetry, and drama are directed to help students gain a sensitivity to literary genre and develop effective speech habits through vocal analysis, guided practice, and class drills emphasizing pronunciation, enunciation, and articulation. Credit for both COMS 201 and THEA 201 will not be awarded.
- 203-3 Persuasive Speaking. (3-0)** An advanced study of the theory and practice of persuasive public speaking. Emphasis placed on topic development, organization, style, and delivery with the intent of influencing an audience to change attitudes, beliefs, and actions. Students will be involved in several in-class presentations. Prerequisite: COMS 102 or permission of the department head.
- 207-3 Audio Production. (2-2)** The course fee will cover the cost of required materials, upgrades, and lab maintenance. Materials include tapes, batteries, cables (USB 2.0 and Firewire) and audio recorders. Equipment related to the audio recorders may include mini-disks, format or flash media cards, and computer software (e.g., Adobe Audition). Course Fee \$10. Lab Fee \$5.
- 211-3 Media Writing (3-0)** Fundamentals of news writing and reporting. Students will learn basic newspaper style and compose stories using traditional stylebook techniques. Students will learn how to write stories for both print, broadcast and online media. Prerequisites: ENGL111, 112
- 214-3 Photography. (2-2)** (TCCNS = COMM 1311) Fundamentals of camera operation, film development and printing. Study in the use and layout of photography in newspaper and magazines. Students will learn new photographic technology as well as traditional applications. Course fee \$10. Lab fee \$10.
- 215-3 Broadcast Journalism. (3-0)** A study of broadcast news practices. The basic rules of broadcast news writing will be reviewed and stories will be written and delivered for both radio and television. Studio and newsroom procedures will be examined.

- 301-3 Business and Professional Speech. (3-0)** A study of verbal and nonverbal communication as it functions in business and professional organizations. Special emphasis will be given to developing oral language proficiency, interviewing, small decision-making groups, oral reporting, and organizational communication.
- 303-3 Debate. (3-0)** An introduction to the principles of argumentation and debate. Subject material will include research, evidence, reasoning, case construction, refutation, and delivery. Classroom debating will provide students with opportunities to observe and participate in competitive debating. This course is particularly applicable to those anticipating study in pre-law. Prerequisites: COMS 101, 102 or permission of the department head.
- 304-3 Interpersonal Communication. (3-0)** A course designed to improve individual communication skills relevant to human relationships. The development and maintenance of interpersonal (one-to-one) relations are examined, with special emphasis on identifying and correcting communication breakdown. A portion of the course will be devoted to exercises designed to improve interpersonal skills. Prerequisite: COMS 101 or 301 or permission of the department head.
- 308-3 Digital Video Production. (2-2)** Introduces students to the collaborative process of narrative and non-narrative production while fostering the creation of an individual voice. Students learn the basic techniques and aesthetics of single-camera production, including shot composition, lighting and graphic effects. Students also learn techniques of digital post-production editing. Course Fee \$20. Lab Fee \$5.
- 309-3 Interviewing. (3-0)** This class teaches communication skills essential for a professional career. It integrates theoretical principles from the text with in-class practice of interviewing and being interviewed. Students learn to identify, explain, and apply essential elements of successful interviews to several types of interviews.
- 310-3 Communication Law. (3-0)** Examines First Amendment case law and state and federal regulations of speech and media. Provides historical and contemporary analyses of the laws of defamation; obscenity; fighting words; and time, place and manner restrictions. Issues such as copyright, privacy, and freedom of information will also be covered. Prerequisite: 3 hours of COMS or approval of department head.
- 311-3 Writing for Publication. (3-0)** Study and practice in the techniques of writing contemporary nonfiction for publication, with special attention given to methods of research and markets for literary material. Numerous private conferences. Prerequisite: 12 hours of ENGL or approval of department head.
- 312-3 Public Relations. (3-0)** A study of the techniques used in planning public relations programs for businesses, schools, churches, and civic associations. Topics will include: press relations, crisis management, advertising, speech writing, and campaign activities. Prerequisite: 3 hours of COMS.
- 318-3 News and Magazine Editing. (3-0)** The basics of story placement and layout, copy and style editing. This course would emphasize the role and responsibilities of different editorial departments as well as the overall responsibility of editorial management. Prerequisites: COMS 131, COMS 3113 and ENGL 310 or consent of the instructor.
- 340-3 Persuasion. (3-0)** A study of persuasive communication theory in interpersonal, small group, and public settings. Emphasis on audience

analysis, ethics, motivational factors, source credibility, compliance gaining and theories of attitude change. Prerequisites: COMS 101, 102 or 301.

- 401-3 Advertising. (3-0)** Analysis of advertising in modern media. Study of the history, design, and effects of advertising. Students will also study the uses of different media for advertising purposes. Credit for both COMS 401 and MKTG 401 will not be awarded.
- 404-3 Organizational Communication. (3-0)** An advanced study of communication as it takes place in business and industrial settings. Special attention will be given to managerial communication, communicator style, channels and networks, and organizational communication consulting. Prerequisite: COMS 301.
- 406-3 Group Process and Decision Making. (3-0)** A study of small group theory and process. Special attention will be given to leadership, organization, group analysis, and interaction. Students will observe and participate in small group discussions on contemporary issues. Prerequisite: COMS 101 or 301 or 304 or permission of the department head.
- 409-3 Advanced Reporting. (3-0)** A capstone course for Journalism students. This course will provide advanced studies for reporting, news writing, newsgathering, interviewing, records evaluation and investigative techniques. Students will be required to submit articles for publication and provide evidence of superior writing skills. Prerequisites: COMS 131, 213, 310, 311, and 318.
- 412-3. Rhetorical and Communication Theory. (3-0)** A general survey of classical through contemporary rhetorical and communication theory. Emphasis on how theories have been and are being applied in criticism of public address and rhetorical movements and in contemporary communication research. Prerequisites: COMS 101, 102 or permission of the department head.
- 484-3. Communications Internship. (3-0)** Approved and supervised work experience in communications related positions. May be repeated once for a total of 6 hours of academic credit. Prerequisites: Junior standing and 12 hours COMS or approval of department head. Field experience fee \$75.
- 485-v Communications Seminar. (Credit variable)** Content varies according to the needs and desires of the students. When topic varies, course may be taken for credit more than once. Prerequisite: Junior classification or approval of department head.
- 486-v Communications Problems. (Credit variable)** A course featuring independent reading, research, and discussion under personal direction of instructor, topics vary according to student need. Open to students of senior classification with department head approval.
- 540-3 Organizational and Administrative Communication. (3-0)** This course is a seminar in communication flow, design, and effect in industrial, administrative, and institutional contexts. Relevant communication theory, measurement, analysis, evaluation, and control of communication related to organizational and administrative function will be the emphases.

COMPUTER INFORMATION SYSTEMS (CIS)

- 101-1 Proficiencies in Computer Technologies. (1-3)** (TCCNS = COSC 1301 or BCIS 1301) This course involves a variety of different modules each offering specific exploration and skills development in different areas of computer proficiency. Topics will be offered that address important computer skills and knowledge for college students. The student may enroll for up to three instances of the course under different topics, either

simultaneously or in different semesters. Enrollment will be by the semester, but the modules will be sequenced and taught in one of three five-week segments in the semester. Course Fee: \$15 per hour; Lab fee \$5 per hour.

- 103-3 Computer Concepts and Applications. (3-2)** An overview of computer concepts and applications, including popular productivity software. Students will acquire skills in the use of personal computers and software applicable to the management of information and delivery of services in a wide variety of fields. Lab fee \$15. Course fee \$15.
- 106-3 Network Fundamentals. (3-2)** A study of the Open Systems Interconnect (OSI) model, network adapters, cabling, network topologies, and basic network design. Includes Internet Protocol addressing and subnetting, network layer protocols, and computer configuration for network applications. Router configurations and routing protocols are also introduced. This course is designed to provide in-depth knowledge and experience in the principles and applications of computer networking. This course includes preparatory information for CCNA certification testing. Prerequisite: CIS 103 or equivalent background in personal computer operations. Lab fee \$15. Networking Program fee \$175.
- 107-3 Network Configuration and Routing. (3-2)** In-depth study of the Open Systems Interconnect (OSI) model and related network protocols. Includes TCP/IP fundamentals, subnetting at multiple levels, LAN and WAN design. This course is designed to provide in-depth knowledge and experience in the applications of computer networking protocols and router configuration. This course includes preparatory information for CCNA certification testing. Prerequisite: CIS 106 or completion of semester one from a certified Cisco Networking Academy. Lab fee \$15. Networking Program fee \$175.
- 110-3 Intro to Programming Logic and Design. (3-2)** Introduction to theory and practice of programming logic and design, development, and problem solving. Emphasis will be on typical business processing. The utilization of logic and design tools, including but not limited to, flowcharts and pseudocode. This course will be centered primarily on problem solving using the tools and techniques learned and does not count as a programming language. Prerequisite: CIS 103 or concurrent enrollment, Math 107 or higher or concurrent enrollment, or approval of department head. Lab fee \$15. Course fee \$15.
- 116-3 Personal Computer Technology, Maintenance and Repair (3-2)** A study of the functional technology and hardware operations of the personal computer to include memory, processors, integrated circuits (chips), peripheral components (input/output devices), operating system software, utility/maintenance software, and basic communication/networking. This includes hardware selection, configuration, installation and test procedures. Also includes routine system maintenance procedures and investigates the use of utility maintenance software. Prerequisites: Solid working knowledge of computer applications and CIS 103 or approval of department head. Lab fee \$15.
- 206-3 Local Area Network (LAN) Management and Design. (3-2)** Introduction to local area network design, operating systems, directory services, and administrative services. This will include Windows NT, Windows 2000, and Novell Netware in LAN and WAN implementation. This course is designed to provide extensive, advanced knowledge and experience in router configuration and network design and management. This course includes preparatory information for CCNA certification testing. Prerequisites: CIS

107 or completion of semester two from a certified Cisco Networking Academy. Lab fee \$15. Networking Program fee \$175.

- 207-3 Wide Area Network (WAN) Management and Design. (3-2)** In-depth study of wide area network planning, system security, hardware resources, and fault tolerance. This includes routine network maintenance, upgrades, modifications, and troubleshooting. A cumulative course, applying concepts and applications learned during prerequisite courses for a final large-scale design and implementation project. The final course preparatory for CCNA certification testing. Prerequisites: CIS 206 or completion of semesters three from a certified CISCO Networking Academy. Lab fee \$15. Networking Program fee \$175.
- 212-3 Introduction to COBOL Programming. (3-2)** (TCCNS = BCIS 1332) A first course in the COBOL programming language. Covers the basic structure of COBOL, all standard features, data representation, procedures, and simple I/O. Students will analyze and program several representative business-oriented problems. Prerequisite: CIS 110 or approval of department head. Lab fee \$15.
- 240-3 Intro to C++ Programming. (3-2)** A first course in the C++ programming language. Covers the basic structure of C++, all standard features, data representation, procedures, simple I/O, and object-oriented programming techniques. Students will analyze and program several representative problems. Prerequisite: CIS 110 or approval of department head. Lab fee \$15.
- 241-3 Intro to Visual Basic Programming. (3-2)** An introduction to event-driven, visual application development using Visual Basic. Covers the fundamental structure of Visual Basic, standard features, and simple I/O. Students will analyze and program several representative problems. Prerequisite: CIS 110 or approval of department head. Lab fee \$15.
- 242-3 Intro to JAVA Programming. (3-2)** A first course in the JAVA programming language. Covers the basic structure of JAVA, all standard features, data representation, simple I/O, object-oriented programming techniques, such as classes and objects, JAVA applets, and Visual JAVA programming techniques. Students will analyze and program several representative problems. Prerequisite: CIS 110 or approval of department head. Lab fee \$15.
- 300-3 Computer Technology and Impact. (3-2)** Explores today and tomorrow's technology with special attention to the impact on real people at home, work, and school. Many topics are presented: hardware and software fundamentals, essential applications, telecommunications, internet, artificial intelligence, programming, and the future of these technologies. Students work with word processing, spreadsheet, database, and presentation software, other applications, and a programming language. The course is designed those students with little or no experience with personal computers and/or the applications presented. Lab fee \$15.
- 301-3 Microcomputer Applications in Accounting and Finance. (3-1)** Theory and application of microcomputer technology in the practice of accounting. Emphasis on the utilization of basic spreadsheet and general ledger software. Intended to stimulate creative initiative in performing accounting tasks and to develop the basic skills necessary to efficiently and effectively utilize the microcomputer. Credit for both CIS 301 and ACC 301 will not be awarded. Prerequisite: ACC 203. Lab fee \$15.
- 302-3 Database and Data Management for Small Businesses. (3-2)** Studies relational and object oriented database packages. In addition, students

improve their knowledge and skill with a current personal computer operating system. Prerequisites: CIS 103 or 300 or approval of department head. Lab fee \$15.

- 303-3 Programming Logic and Design. (3-2)** Emphasis is on typical business processing. Covers the logic of decision making, nested looping, multidimensional arrays, implementation of the structure theorem and Boolean Algebra. The tools taught for documenting logical problem solutions include structured flowcharts, structured pseudo code, hierarchy charts and decision tables. The course focuses on business problem solving and does not count as a programming language. Prerequisite: CIS 300 or approval of department head. Lab fee \$15.
- 304-3 Topics in Computer Information Systems. (3-2)** A study of selected topics in programming languages, programming techniques, or job control languages. Normally only one major topic will be considered per offering. May be repeated once for credit as topics vary. Prerequisite: Varies with topic. Lab fee \$15.
- 305-3 Operating Systems Theory and Practice. (3-2)** A study of the history, development, and principles of computer operating systems and their variants in mainframe, minicomputer, server, and microcomputer application environments. Topics will include related software issues, programming capabilities, and job control languages. Selected operating systems representing various hardware environments will be studied. Prerequisite: One course from CIS 212, 240, 241, 242, 330, 331, 332, or other introductory programming language. Lab fee \$15. Course fee \$30.
- 307-3 Applications Project with Laboratory. (1-5)** Strengthens interests or corrects deficiencies in specific areas of computer information systems. Students will develop and document a software product using a formal software development process. Where possible, projects of value are actively sought from local businesses, governments, or nonprofit organizations. May be repeated for credit when topics change. Course may be taught as an independent study or in a classroom environment. Prerequisites: Based on topic. Lab fee \$15.
- 312-3 Technical Support Management and Operations. (3-2)** A study of the technical support industry, which will include its scope, significance, job skills, training, software availability, support problems, and place in the information technology industry. Specific tech supports skills will be practiced in laboratories, to include use of resources, troubleshooting, and customer relation skills. Prerequisites: Solid working knowledge of computer applications and technology and CIS 103 or 300 or approval of department head. Lab fee \$15. Course fee \$15.
- 313-3 Advanced COBOL Programming. (3-2)** A study of advanced COBOL programming techniques, including multi-file and indexed file processing, advanced table handling, and interactive programming, as applied to complex business programming problems. Prerequisite: CIS 212 or approval of department head. Lab fee \$15. Course fee \$15.
- 315-3 Web Site Development & Design. (3-2)** A study of the principles of web authoring including planning, design, and production of interactive web pages. Exploration and implementation of a variety of current web authoring tools and web-based scripting languages. Prerequisite: CIS 103 or 300 or approval of department head. Course fee \$50. Lab fee \$15.
- 317-3 Special Topics. (3-2)** A study of various issues, products, and technology current to computer information systems. This course may be repeated once

for credit. Prerequisites: Approval of instructor or department head. Lab fee \$15.

- 330-3 C++ Programming. (3-2)** An accelerated study of structured C++ programming using microcomputers. Covers syntax, operators, functions, standard input/output, arrays, pointers, and structures in C++. Primarily offered on the Central Texas campus. Prerequisite: CIS 241 or CIS 331 or approval of department head. Lab fee \$15.
- 331-3 Visual Basic Programming. (3-2)** An enhanced coverage of visual application development using Visual Basic and the native integrated development environment. Covers logic, working with forms, sequential and direct file access, scope and visibility rules, and numerous additional Visual Basic topics. The student will analyze and program several problems. Primarily offered on the Central Texas campus. Prerequisite: CIS 103 or 300, and CIS 110 or 303 or concurrent enrollment or approval of department head. Lab fee \$15.
- 332-3 Java Programming. (3-2)** An in-depth study of applications development using Java. Covers identifiers and reserved words, objects and primitive data, program statements, arrays and vectors, exceptions and I/O streams, graphical user interfaces and numerous additional JAVA topics. Students will analyze and program several problems. Primarily offered at the Central Texas Campus. Prerequisite: CIS 331 or approval of department head. Lab fee \$15.
- 340-3 Advanced C++ Programming. (3-2)** An advanced course in the C++ programming language. Covers the advanced features of C++ such as classes, friends, abstraction, operator overloading, inheritance, polymorphism, templates, and object oriented programming techniques. Students will analyze and program several representative problems. Prerequisite: CIS 240 or 330 or approval of department head. Lab fee \$15.
- 341-3 Advanced Visual Basic Programming. (3-2)** A study of advanced Visual Basic programming techniques, including declaration and manipulation of arrays, accessing database files, and advanced data handling techniques. Students will analyze and program several representative problems. Prerequisite: CIS 241 or 331 or approval of department head. Lab fee \$15.
- 342-3 Advanced Java Programming. (3-2)** An advanced course in the Java programming language. Covers advanced Java capabilities such as class features, error handling, and security techniques, Java streams JavaBeans, database connectivity, Java servlets, and Java Server pages, and advanced object-oriented programming techniques. Students will analyze and program several representative problems. Prerequisite: CIS 242 or 332 or approval of department head. Lab fee \$15.
- 343-3 C# for Windows and Web-Programming. (3-2)** Advanced programming using the C# programming language to create Windows applications in an Internet and intra-network environment. Explores object-oriented design, client-server interaction, event-driven programming, graphical user interfaces, distributed data, and distributed applications. Prerequisite: CIS 240 or 330 or approval of department head. Lab fee \$15.
- 345-3 Topics in PC Software & Applications. (3-2)** A study of selected personal computer applications and software packages. Students will explore the operation and usefulness of commonly available personal computing software solutions. May be repeated once for credit as topics vary. Prerequisite: Varies with topic. Lab fee \$15.
- 346-3 Personal Computer Technology. (3-2)** An enhanced study of the technology and hardware operation of microcomputers, their peripherals,

and operating system software. Also considered are hardware configuration and selection, installation and test procedures, and routine maintenance. Primarily offered on the Central Texas campus. Prerequisite: CIS 103 or 300 or approval of department head. Lab fee \$30. Course fee \$50.

- 347-3 Data Communications. (3-2)** A study of voice and data communications technologies, concepts and applications, including communications terminology, hardware, software, protocols, and managerial issues in data and voice communications. Topics will include alternatives available in hardware, software, and transmission facilities, design integration, selection and implementation of communications solutions. In addition, students will explore the current and future impact and directions of these technologies. Prerequisite: CIS 103 or 300 or approval of department head. Lab fee \$15. Course fee \$15.
- 351-3 Data Structures. (3-2)** Theory and applications of commonly used computer data structures, files, file organization and access methods, databases, and other storage and retrieval methods. Prerequisite: CIS 340 or 3 hours from 331, 332, and CIS 330 or approval of department head. Course fee \$15. Lab fee \$15.
- 389-3 System Analysis and Design. (3-2).** A study of the systematic analysis, design, and implementation of software systems with special emphasis on the processes and skills used in the first four stages of the System Development Life Cycle. Traditional and current methodologies, including computer aided analysis and design tools will be considered. Topics will be approached through project-oriented cases and projects, which integrate theory and practical application. Prerequisite: 1 course from CIS 313, 330, 331, 332, 340, 341, 342, 343 or approval of department head. Course fee \$15. Lab fee \$15.
- 399-3 Cooperative Education. (1-8)** Experiential learning and application of relevant CIS concepts in an actual work environment. The student must be employed in an approved professional CIS setting for approximately 300 hours before credit will be granted. To remain in the program, the student must remain in good standing with the university and employer. Enrollment in the course must be preceded by consultation between the student and the co-op coordinator, formal application by the student to the program, and departmental approval for admission to the program. May be repeated once for credit. Prerequisites: Approval of co-op coordinator or department head. Field experience fee \$75.
- 401-3 Database Theory and Practice. (3-2)** Database concepts and structures. File and data management principles underlying database construction. Fundamental types of database models, with emphasis on relational databases as well as on major non-relational forms. Practice in analysis, design, development, and optimization of working database applications on a variety of problems. Small and large system databases will be considered. Prerequisite: One course from CIS 313, 330, 331, 332, 340, 341, 342, 343, C S 241 or approval of department head. Course fee \$15. Lab fee \$15.
- 405-3 Management Issues for Computer Information Systems. (3-2)** This course emphasizes an essential core of guiding information systems principles. Also studies information technology concepts and various types of business information systems. The concepts of systems development, and security, privacy and ethical issues associated with information systems are stressed. Prerequisite: 6 hours of CIS courses or approval of department head. Course fee \$15. Lab fee \$15.

- 407-3 Topics in Networking. (3-2)** Provides an introduction and study of various alternative or innovative network software packages, to include network focused tools, utilities, and operating systems. The course materials are selected from contemporary tools and products with emphasis on those gaining widespread commercial and institutional acceptance. The focus of the course will be an exploration of the usefulness and operation of the topic of study. May be repeated once for credit as topics vary. Prerequisite: Varies with topic. Lab fee \$15.
- 408-3 Advanced Programming Language. (3-0)** Develops the programming proficiency in a modern programming language. Students complete many programming assignments to achieve necessary knowledge and skills. May be repeated as topics vary. Prerequisite Approval of instructor or department head. Lab fee \$15.
- 409-3 Decision Support Methods. (3-3)** Using computer-based decision, analysis, planning, and presentation methods in the context of management strategy and policy problem solving. Application of software tools such as databases, spreadsheets, statistical graphics, and presentation programs for extracting, organizing and presenting information in support of management decision making. Prerequisites: CIS 103 or 300, ACC 204, MGMT 301, FIN 301, MKTG 314, G B 311, or approval of department head. Lab fee \$15.
- 415-3 Interactive and Applied Multimedia. (3-2)** An exploration of multimedia tools and their relationship to various disciplines of study. A review of the principles of multimedia and the effective uses of multimedia will be conducted. The production and design of multimedia systems will culminate the course of study. Prerequisite: CIS 315 or approval of department head. Lab fee \$15.
- 435-3 UNIX Systems Admin & Pro. (3-2)** Examines in detail the underlying conceptual considerations of UNIX operating system and its variants in mainframe, minicomputer, server and microcomputer application environments. Topics will include memory and process management, multi-programming and processing, interrupt structure, and parallel processing mechanisms and procedures. Will include practical laboratories in the configuration and programming of one or more UNIX operating systems. Prerequisite: CIS 305 or 12 hours CIS courses or approval of department head.. Lab fee \$30. Course fee \$50.
- 440-3 Algorithm Design and Analysis. (3-2)** Introduces the modern study of computer algorithms with emphasis on how to select the best algorithm for a task considering the specific computing environment. Students extensively study searching and sorting algorithms for their importance in computing. Other topics include: efficiency, readability, maintainability, advanced design and analysis techniques, advanced data structures, and graph algorithms. Prerequisites: CIS 351 or approval of department head. Lab fee \$15.
- 443-3 Advanced Systems Analysis. (3-2)** This course concentrates on advanced systems analysis concepts with an emphasis in data and process decomposition and modeling. CASE tools support both the models and the interaction analysis of processes and data. The enterprise-wide view of system analysis stresses the theory behind and the generation of normalized relational database tables. Course includes material on user-centered requirements gathering and analysis. Prerequisites: CIS 389, and 401 or approval of department head. Lab fee \$15.
- 444-3 Advanced System Design and Development. (3-2)** This capstone course places a strong emphasis on combining the best practices of system design, including the professional, interpersonal, and technical skills required to

analyze, propose, develop, and build modern large-scale business information software systems. The student will apply information engineering principles and theory to the design and development of a complex interactive system using software engineering and data management tools. This approach will involve all the stages of the full system development life cycle, through construction and implementation. This course serves to integrate the skills of the senior CIS student. Prerequisite: CIS 443 or approval of department head. Lab fee \$15.

- 445-3 Network and Systems Security. (3-2)** Studies the issues of Network and Systems Security as a continuous process involving analysis, implementation, evaluation and maintenance. Topics will include addressing computer-related risks, case analysis, and future trends. The course will provide approaches, techniques, and best practices for securing modern electronic data systems. Areas covered include electronic information and message security, database and file integrity, physical security, security management, security risk analysis, and encryption. Prerequisites: CIS 107 or 347 or approval of department head. Lab fee \$15.
- 447-3 Advanced Database Systems. (3-2)** Studies the theory and practice in the analysis, design, development, implementation, and optimization of working database applications on a variety of problems focusing on topics such as database administration. Prerequisite: CIS 401 or approval of department head. Lab fee \$15. Course fee \$30.
- 452-3 Structured Query Language (SQL). (3-2)** A study of SQL, including relational database schema in SQL, formulating SQL queries and sub queries of varying complexity, embedding SQL statements in a "host" language, defining and querying data views in SQL, and other related topics. Prerequisites: CIS 401 or approval of department head. Course fee \$15. Lab fee \$15.
- 476-3 Network Administration. (3-2)** Studies communications architectures, protocols, and interfaces as they relate to network operating systems. Topics will include communications networking techniques such as circuit switching, packet switching, broadcast networking and internetworking. Also included will be installation, configuration, client handling, basic security, and troubleshooting of a network operating system. A modern network operating system will be used to provide extensive hands-on experience in configuring and administrating a network. Prerequisites: CIS 107 or 347 or approval of department head. Lab fee \$15. Networking program fee \$175.
- 478-3 Comprehensive Networking. (3-2)** A comprehensive course requiring the student to plan, analyze, design, install, and configure a working computer network. Application exercises include the installation and configuration of a network operating system, the creation of required user interfaces, establishing network security, and establishing print services for a network. A modern network operating system will be used for extensive hands-on computer exercises to practice and demonstrate network skills. Prerequisites: CIS 476 or approval of department head. Lab fee \$15. Networking program fee \$175.
- 479-3 The Technology of E-Business. (3-2)** This course examines the linkage of organizational strategy and electronic methods of delivering products, services and exchanges in inter-organizational, national, and global environments. Information technology strategy and technological solutions for enabling effective business processes within and between organizations in a global environment are considered. Credit for both CIS 479 and MKT 479 will not be awarded. Prerequisites: CIS 103 or 300. Lab fee \$15.

- 480-3 Software Engineering. (3-2)** Emphasizes the production of high quality software for medium and larger scale projects. Theoretical software engineering research is the basis for a practical approach to developing quality software. Students study a software life-cycle model, fundamental software engineering principles, and documentation standards in detail. A significant team project is required. Prerequisite: CIS 340 or 343, 440. Lab fee \$15. Course fee \$50.
- 484-3 Internship in Computer Information Systems. (1-8)** This course is designed to provide the student with actual work experience as a programmer/ programmer analyst. The student will have the opportunity to apply the principles, concepts, and skills learned during the first three years of collegiate training. May be repeated for credit. Prerequisite: Approval of internship coordinator or department head. Field experience fee \$75.
- 485-3 Professional Development Seminar. (3-2)** Professional-level enrichment for CIS majors with activities which may include participation in professional organizations, current events, research and presentations, job market analysis, interviewing, resume preparation, preparation and sitting for professional certification exam. Prerequisite: 24 hours of CIS courses. Lab fee \$15.
- 486-v Problems. (Credit variable).** Selected individual topics in business on technical computer applications, practicum, field project, or other suitable computer studies. May be repeated for a maximum of 6 semester hours credit. Prerequisite: Approval of department head.
- 501-3 Computer Based Information Systems. (3-2)** Survey of concepts and applications of computers and information systems. Practice in use of modern productivity applications on personal computers. Lab fee \$15.
- 502-3 Procedural Language Programming and Design. (3-2)** A study of the design and programming of business systems. Students will become familiar with the primary program design tools such as hierarchy charts, flowcharts, and pseudocode. A standard modular design becomes the crux of the programming experience. Topics include comparison, data validation, control breaks, and tables. Prerequisite: CIS 501 or department head approval. Lab fee \$15.
- 503-3 Foundations of Computer Programming. (3-2)** Provides concepts and tools of computer programming that underlie the principles of computer systems. Emphasizes concepts that assist in the creation and support of Management Information Systems. Prerequisite: CIS 502 or approval of department head. Lab fee \$15.
- 504-3 Telecommunications for Managers. (3-2)** Examines the management and utilization of data communication technologies including technical components, configurations, applications, protocols, legal issues, software and management issues, Local Area Network (LAN) technologies, and security issues. Prerequisite: CIS 501 or approval of department head. Lab fee \$15.
- 505-3 Productivity Application Automation. (3-2)** Theory and application of the programming and scripting techniques to automate various tasks that need to be accomplished using productivity software. A review of the principles of task automation and the effective uses of programming and scripting techniques for conducting this automation will be conducted. An exploration of programming and scripting tools and their use in the creation of programs, scripts, and macros. Prerequisite: CIS 501 or approval of department head. Lab fee \$15.

- 507-3 Systems Analysis for Managers. (3-2)** Investigates and compares various analysis approaches for application automation while highlighting management considerations for planning and developing automated systems. Systems life cycle models and case studies are used. Prerequisite: CIS 503 and 516 or approval of department head. Lab fee \$15.
- 510-3 Technology Planning for Educators. (3-2)** Designed to provide educational leaders with an understanding of the technology planning process. An examination of the theories, practices, and competencies required to effectively design, implement, and evaluate a technology plan for instructional and administrative purposes within a school district. The development of a comprehensive technology plan will culminate the course of study. Prerequisite: CIS 501 or department head approval. Lab fee \$15.
- 511-3 Managing Information Systems. (3-2)** Studies the management and use of information and technology as a resource to create competitive businesses, manage global operations, provide useful products and provide quality services to customers, whether public or private. Examines information systems management, intellectual property, privacy, organizational and societal impact, legal issues, ethics, security issues, decision making, strategic information systems, and organizational support systems. Prerequisite: CIS 501 or approval of department head. Lab fee \$15.
- 512-3 Technical Support Management and Operations. (3-2)** Students study issues of organizing and staffing a technical support help desk. Students explore the numerous management techniques and operational concepts that businesses and governmental organizations use to manage successful technical support activities. Students survey the wide array of commercially available technical support software. In addition, students experience working with the public to deliver technical support in an operational environment. Prerequisite: CIS 501 or approval of department head. Lab fee \$15.
- 515-3 Principles of Database Design and Development. (3-2)** Survey of concepts and practices underlying the development of database systems. Included in the study are a historical review of database systems, development and normalization of database systems, and methods to query database systems. Prerequisite: CIS 501 or approval of department head. Lab fee \$15.
- 516-3 Applied Database Management. (3-2)** Examines the objectives and methodologies of database management. Topics include data models, database design, data dictionaries, fourth generation programming languages, data integrity, security, and privacy. Students use a commercial database. Prerequisite: CIS 515 or approval of department head. Lab fee \$15.
- 517-3 Special Topics. (3-2).** A study of various issues, products, and technology current to computer information systems. May be repeated once for credit as topics vary. Prerequisites: Varies with topic. Lab fee \$15.
- 518-3 Quantitative Concepts in Computing. (3-2)** An examination of measurements related to software projects and applying measurement techniques to information technology related problems. Analyses of programs and selected algorithms are performed. A statistical program will be used to analyze data. Prerequisite: CIS 502 or approval of department head. Lab fee \$15.

- 519-3 Decision Support Systems. (3-2)** An examination of the fundamentals of management support systems. Includes an examination of Decision Support Systems and other collaborative systems, Executive Support Systems, Expert Systems and Intelligent Systems. Lab fee \$15.
- 520-3 Seminar on Computer Based Systems. (3-0)** Topics will vary according to timeliness and special needs. May be repeated once for credit as topics vary.
- 525-3 Unified Modeling Language (UML). (3-2)** A study of the Systems Development Life Cycle using the Unified Modeling Language (UML) in an object-oriented software system environment. Students will model the elements, structure, and behaviors of object-oriented software systems using UML. Students will learn how to use UML to identify objects and classes, to capture requirements and define use cases, to extend and enhance visual models, and to model the details of object behavior with activity and state-chart diagrams. Students will also learn how to implement the UML models in a software system. Prerequisites: CIS 503 and 515 or department head approval. Lab fee \$15.
- 527-3 Object Role Modeling. (3-2)** The ORM methodology is suited to describing the relationships that exist in a system. The concept of a system includes any set of objects that interact to solve a problem, thus creating a business process model. The class is team structured, and the teams are given a set of problems to solve that require a system level solution. Prerequisites: CIS 503 and 515 or approval of department head. Lab fee \$15.
- 545-3 Extensible Markup Language (XML). (3-2)** This course studies well-formed XML and validated XML documents and the language facilities for working with hierarchical data. The class is composed of teams that are given life-like problems to describe with XML as well as transforming the XML data to an external presentation. Prerequisite: CIS 503 or approval of department head. Lab fee \$15.
- 549-3 Topics in Programming. (3-2)** Develops programming proficiency in a modern programming language. Students complete many programming assignments to achieve necessary knowledge and skills. May be repeated once for credit as topics vary. Prerequisite: Approval of instructor. Lab fee \$15.
- 551-3 IT Project Management. (3-0)** Studies the genesis of project management and its importance to improving the success of information technology projects. Project management concepts and techniques are emphasized, and students are required to apply these concepts by working on a group project as a project manager or active team member. Prerequisites: CIS 511 or approval of Department Head/Instructor.
- 552-3 Decision Analysis Tools. (3-2)** The application of advanced decision analysis tools in solving financial, statistical, and managerial decision-making problems. The learning outcomes from this course will include mastery in applying spreadsheet-based functions to a variety of organizational problems. Prerequisite: CIS 511 and knowledge of basic spreadsheet functions. Lab Fee: \$15
- 560-3 Multimedia Application Development. (3-2)** Theory and application of the multimedia application development process. A review of the principles of user interface, design, graphic design, and interactivity including the appropriate application of these principles to multimedia will be conducted. Students will explore computer-based multimedia development tools and their use in the creation of various types of multimedia applications. The

planning, design, production, and evaluation of interactive multimedia projects for delivery through a variety of media will culminate the course of study. Prerequisite: CIS 501 or department head approval. Lab fee \$15.

- 561-3 Multimedia: Desktop Publishing. (3-2)** Theory and application of the multimedia application development process to desktop publishing. A review of the principles of typography and design including the appropriate application of these principles to desktop publishing will be conducted. An exploration of computer-based desktop publishing tools and their use in the creation of various types of products. The planning, design, production, and evaluation of desktop publishing projects for delivery through a variety of media will culminate the course of study. Prerequisite: CIS 560 or approval of department head. Lab fee \$15.
- 562-3 Multimedia: Audio and Video. (3-2)** Theory and application of the multimedia application development process to the creation of video projects. A review of the principles of design and video-related equipment operation including the appropriate application of these principles to video projects will be conducted. An exploration of computer-based audio and video editing tools and their use in the creation of various types of products. The planning, design, production, and evaluations of video projects for delivery through a variety of media will culminate the course of study. Prerequisite: CIS 560 or approval of department head. Lab fee \$15.
- 563-3 Multimedia: Graphics and Animation. (3-2)** Theory and application of the multimedia application development process to creation of graphics-related projects. A review of the principles of graphic design and the appropriate application of these principles to motion and still graphics projects will be conducted. An exploration of computer-based graphics and animation editing tools including their use in the creation of various types of graphics-related products. The planning, design, projection, and evaluation of graphics-related projects for delivery through a variety of media will culminate the course of study. Prerequisite: CIS 560 or approval of department head. Lab fee \$15.
- 564-3 Multimedia: Authoring. (3-2)** Theory and application of the multimedia application development process to the creation of interactive multimedia-based projects. A review of the principles of user interface design and interactivity and the appropriate application of these principles to interactive multimedia-based projects will be conducted. An exploration of computer-based multimedia authoring and scripting tools and their use in the creation of various types of interactive multimedia-based projects. The planning, design, production, and evaluation of interactive multimedia-based projects for delivery through a variety of media will culminate the course of study. Prerequisite: CIS 560 or approval of department head. Lab fee \$15.
- 565-3 Multimedia: Web Development. (3-2)** Theory and application of the multimedia application development process of the creation of web-based authoring and scripting tools and their use in the creation of various types of web-based projects. The planning, design, projection, and evaluation of interactive web-based projects for delivery through a variety of media will culminate the course of study. Prerequisites: CIS 560 or approval of department head. Lab fee \$15.
- 566-3 Computer-Based Training. (3-2)** Theory and application of the multimedia application development process to the creation of computer-based training. A review of the principles of instructional design and the appropriate application of these principles to interactive computer-based

training will be conducted. An exploration of computer-based multimedia authoring and scripting tools and their use in the creation of various types of computer-based training projects. The planning, design, and production, and evaluation of computer-based training projects for delivery through a variety of media will culminate the course of study. Prerequisite: CIS 560 or approval of department head. Lab fee \$15.

- 569-3 Multimedia: Project Management. (3-2)** Theory and application of project management techniques to multimedia application development. A review of the principles of project management and the appropriate application of these principles to multimedia-based projects. An exploration of computer-based project management tools and their use in the management of multimedia-based projects. The planning, design, projection, and evaluation of complex interactive multimedia-based projects for delivery through a variety of media will culminate the course of study. Prerequisites: CIS 560 and six hours from CIS 561, 562, 563, 5643, 565, 566 or approval of department head. Lab fee \$15.
- 576-3 Network Administration and Design (LAN). (3-2)** Studies of communications architectures, protocols and interfaces. Communications networking techniques such as circuit switching, message switching, packet switching, broadcast network and inter-networking are explored. Prerequisites: CIS 5043 or approval of department. Lab fee \$15.
- 578-3 Network Design and Administration (WAN). (3-2)** Studies network installation planning, preparing the hardware, installing a network operating system, configuring the user environment, creating the user interface, establishing network security, establishing printing services, network administration, network utilities, maintenance techniques, monitoring performance, trouble shooting and configuring the network for maximum efficiency. Prerequisite: CIS 576. Lab fee \$15.
- 579-3 The Technology of E-Business. (3-2)** A study of the technical and business considerations for creating and operating an electronically based business. Students will study the environment from an operational and legal perspective, analyze the technologies available and implement an e-commerce project integrating database, web pages, and script languages. Prerequisite: CIS 501, or approval of department head. Lab fee \$15.
- 580-3 E-Business Application Development. (3-2)** This course examines issues related to supporting a business that uses the Internet and other on-line implementations. The course operates in a team environment simulating a business organization and requires the team develop and implement database and Internet technologies. Prerequisites: CIS 503 and 516 or approval of department head. Lab fee \$15.
- 586-v Problems. (Credit variable)** This course offers students the opportunity to study CIS topics and perform research within the student's area of interest as directed by the responsible professor. May be repeated as topics vary for a maximum of 6 semester hours. Prerequisite: Approval of the department head.
- 588-3 Thesis. (3-0)** Scheduled when the student is ready to begin the thesis. No credit until the thesis is accepted. Prerequisites: CIS 518, 598, consent of major advisor or approval of department head.
- 590-v Selected Topics in CIS. (Credit variable)** An examination of various topics in the Computer Information Systems area with focus on current and recent developments. May be repeated as topics vary for a maximum of 6 semester hours. Prerequisite: Approval of department head.

- 595-3 Research Project with Laboratory. (1-5)** Independent study course in specific areas of Information Systems. May be repeated for credit once when topics change. Prerequisites: Approval of department head. Lab fee \$15.
- 598-3 Research Methods in Information Systems. (3-2)** This course examines timely topics related to computer-based systems. The course develops research skills, problem-solving skills, applies the scientific method, refines presentation skills, and promotes team involvement. The course operates in a distributed team environment using the Internet as its communication vehicle. Prerequisite: CIS 501 or approval of department head. Lab fee \$15.
- 599-3 Internship. (1-8)** Supervised work experience in an information technology-related position with a public or private organization. May be repeated for a total of 6 hours credit. Prerequisite: 6 semester hours of prefix CIS courses or equivalent and approval of internship coordinator or department head. Field experiences fee \$75.

COMPUTER SCIENCE (C S)

- 102-3 Introduction to Computer Science. (3-2)** History of computers and of their applications in a variety of fields, both as PCs and as embedded systems. Overview of programming paradigms. Overview of today's most dynamic computer-related technologies, including communication networks and the Internet. A modern programming language is used to present types of problems that can be solved with computers, the underlying algorithms, and the fundamental limitations. We adopt early in this course the information-centric viewpoint, exploring the role of computers in all stages of the information life-cycle. Students apply their newly-acquired programming skills to performing basic information-processing tasks. Course fee \$30. Lab fee \$15.
- 110-3 Procedural Programming. (3-2)** Introduces the fundamental concepts of structured programming. Topics include software development and methodology, data types, control structures, functions, arrays, and the mechanics of running, testing, and debugging. Prerequisite: two years of high school algebra or MATH 107. Lab fee \$15, Course fee \$30.
- 221-3 Object Oriented Programming. (3-2)** Applies the object-oriented programming paradigm using one or more object oriented programming languages, focusing on the definition and use of classes, interfaces, data encapsulation, inheritance, and polymorphism. An introduction to object-oriented design is presented. Prerequisite: C S 110. Lab fee \$15. Course fee \$15.
- 230-3 GUI Development. (3-2)** The principles and techniques used to develop GUI based applications are covered. These include such topics as window creation, dialog boxes, menus, and the use of controls. An introduction to basic graphic techniques will be presented. Prerequisites: C S 221. Course fee \$15, Lab fee \$15.
- 241-3 Data Structures. (3-2)** Application of programming techniques, introducing the fundamental concepts of data structures and algorithms. Topics include recursion, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), and algorithmic analysis. Prerequisites: 3 hours of programming language and concurrent enrollment in MATH 310. Lab fee \$15. Course fee \$15.
- 248-4 Introduction to Digital System Design. (3-3)** Combinational and sequential digital system design techniques; design of practical digital

systems. Prerequisite: PHYS 242 or concurrent registration. Credit for both C S 248 and ENPH 248 will not be awarded. Course fee \$15. Lab fee \$15.

- 304-3 Topics in Computer Systems. (3-2)** A study of selected topics in computer systems including programming languages, programming techniques, or other specialized topics. Normally only one major topic will be considered per offering. May be repeated once for credit as topics vary. Prerequisite: 6 hours of C S or approval of department head. Lab fee \$15. Course fee \$15.
- 343-4 Computer Architecture. (3-3)** Hardware and software structures found in modern digital computers. Instruction set architecture, hardwired design of the processor, assembly language programming, microprogramming, I/O and memory units, analysis of instruction usage, and hardware complexity. Credit for both C S 343 and ENPH 343 will not be awarded. Prerequisite: C S 248 or ENPH 248. Course fee \$15. Lab fee \$15.
- 344-3 Computer Applications in Analysis. (3-2)** Introduction to FORTRAN computer language, solutions to specific and general polynomial equations, iteration techniques, evaluation and approximation of limits, approximate integration, series, differential equations, error analysis, linear systems, or other selected numerical solution techniques. Prerequisite: MATH 209. Lab fee \$15.
- 345-3 Computer Graphics (3-2)** Graphics architectures and data structures, color, matrix-based geometry in 2 and 3 dimensions, clipping, segmentation, interaction handling, visible surface determination, scene modeling and animation. Prerequisite: C S 241; Co-requisite: MATH 332. Lab fee \$15.
- 361-3 Analysis of Algorithms. (3-2)** Mathematical tools for algorithm analysis, stacks, queues, lists, trees, heaps, dictionaries, sorting, sets, greedy method, divide-and-conquer, dynamic programming, graphs, network flow, distributed algorithms for networking, pattern matching. Prerequisites: C S 241, MATH 209. Lab fee \$15.
- 380-3 Operating Systems (3-2)** Introduction to the design and development of operating systems. Analysis of current system software technology, including process management, memory organization, security, and file systems. Prerequisites: C S 241, 343. Lab fee \$15.
- 389-3 Introduction to Software Engineering. (3-2)** Object oriented software development process, requirements analysis, software design concepts and methodologies, object oriented programming, and debugging. Prerequisites: C S 230, 241. Lab fee \$15.
- 401-3 Database Theory and Practice. (3-2)** Database concepts and structures. File and data management principles underlying database construction. Fundamental types of database models, with emphasis on relational databases as well as on major nonrelational forms. Practice in analysis, design, development, and optimization of working database applications on a variety of problems. Small and large system databases will be considered. Credit for both CIS 401 and C S 401 will not be awarded. Prerequisite: 3 hours programming language or approval of department head. Lab fee \$15.
- 441-4 Microprocessor System Design. (3-3)** Introduction to microprocessors; 8/16 bit single board computer hardware and software designs; chip select equations for memory board design, serial and parallel I/O interfacing; ROM, static and dynamic RAM circuits for no wait-state design; assembly language programming, stack models, subroutines and I/O processing. Credit for both C S 441 and ENPH 441 will not be awarded. Prerequisite: ENPH 248 or C S 248. Course fee \$15. Lab fee \$15.

- 451-3 Distributed Applications (3-2)** A study of the architecture and design of distributed applications. N-tier application and supporting technologies are investigated including client/server architecture, supporting languages, transaction processing, and distribution of processes. Prerequisites: C S 389, 401. Lab fee \$15.
- 478-4 Computer Networks. (3-2)** Bottom-up presentation of computer network hardware and protocols, going through the five main layers: physical, data link, network, transport, and application. Special emphasis is placed on the medium access control sub-layer for local area networks, IP routing, security and modern wireless access technologies. Prerequisite: C S 221, 241, and MATH 209. Lab fee \$15. Course fee \$50.
- 486-v Computer Science Problems. (1/3-0/2)** Special problems in computer science. Work may be either theory or laboratory. May be repeated with the approval of the department head for additional credit when fewer than four credits have been earned. Prerequisite: 9 hours of computer science.
- 490-3 Advanced Topics in Computer Science. (3-2)** Special topics in computer science, such as artificial intelligence, security, robotics, human-computer interaction. May be repeated for additional credit with approval of the department head. Prerequisites: 9 hours of computer science. Lab fee \$15.
- 530-3 Simulation. (3-2)** Introduction to simulation with emphasis on simulation methodology, random number generation, time flow mechanisms, sampling techniques, and validation and analysis of simulation models and results. Simulation languages and their applications will be investigated. Prerequisites: MATH 131, C S 241, and Graduate standing. Lab fee \$15.
- 560-3 Artificial Intelligence. (3-2)** Introduces representations, algorithms and architectures used to build intelligent systems. Predicate calculus, state-space representation and search, heuristic search, knowledge-based problem-solving, symbol-based and connectionist machine learning, intelligent agents, robotics. Prerequisites: MATH 131, C S 241. Lab fee \$15.

COUNSELING (CNLS)

- 552-3 Seminar in School Counseling. (3-0)** An in-depth study of a comprehensive school counseling and guidance program. The course will address the theoretical foundation, knowledge, and skills to prepare the student to implement a counseling and guidance program in an educational (K-12) setting. Covers related ethical concerns. Prerequisite: CPSY 550 or approval of department head.
- 559-3 Brief Therapy. (3-0)** An in-depth examination of brief therapy including history, philosophy, theory, and techniques. Stresses application of learning through experiential methods. Covers related ethical concerns. Prerequisite: CPSY 550 or approval of department head.
- 586-v Problems. (Credit variable)** Open to graduate students in counseling who are independently capable of developing a problem in the area of counseling and guidance. Problems chosen by the student must be approved in advance by the instructor.
- 590-v Selected Topics in Counseling. (Credit variable)** An examination of different topics each semester with a focus on contemporary issues in counseling. This course may be repeated for credit as the topic changes.
- 591-3 Ethical Foundations of Counseling. (3-0)** An exploration of the ethical principles of counselors and related codes of ethics. Covers models for

ethical decision making and how to apply to counseling practice. Prerequisite: CNSL 550 or PSY 506 or approval of department head.

- 593-3 Play Therapy. (3-0)** An introduction to play therapy with an emphasis on developing counseling skills using play as the means of communication and understanding. Includes background, history, and various play techniques. Covers related ethical concerns. Prerequisite: CPSY 550 or approval of department head.
- 595-3 Internship in Counseling I. (3-0)** Supervised professional activities in guidance and counseling. Major emphasis is placed on the student's involvement in successful practices at the educational level of interest. Students must have met all academic and professional standards of practice before placement. Lab experiences are included. Prerequisites: CPSY 550, 551, 553, 554, 557, and PSY 581. Field experience fee \$75.
- 596-3 Internship in Counseling II. (3-0)** Continued supervised experience of professional activities in counseling and guidance in the student's area of interest. Major emphasis is placed on the integration of theoretical and conceptual principles, as well as professional and personal skill development. Covers related ethical concerns. Prerequisites: CNSL 595 and the application for internship. Field experience fee \$75.

COUNSELING PSYCHOLOGY (CPSY)

- 509-3 Assessment & Treatment in Marital & Family Therapy. (3-0)** Presents evaluative methods and assessment techniques as well as treatment plans and strategies for examining and treating problematic and dysfunctional marital and family systems. Emphasis is placed on case analysis, management and treatment. Prerequisites: CPSY 550 and 556 or approval of department head.
- 510-3 Family Relationships and Development. (3-0)** Study of family systems in relation to life-cycle stages, cultural issues and influences, gender issues, family functions and structural changes. Divorce, post-divorce, remarried, single parent and other alternative family systems are examined in relation to assessment and intervention.
- 520-3 Advanced Family Systems Theory. (3-0)** Comprehensive examination of theory in family studies, with particular focus on family systems in relation to internal functioning and the external environment, including concepts of multi-generational transmission, fusion, emotional cutoff, differentiation, family projection and triangulation among others.
- 524-3 Human Sexuality and Sexual Dysfunction. (3-0)** Detailed examination of sexuality, including reproductive physiology, sexual development and the etiology and treatment of sexual dysfunction. Focus is on the role of sexuality in marital and family dynamics and on treatment planning for sexual dysfunction. Prerequisite: CPSY 550 and 556 or approval of department head.
- 550-3 Foundations of Counseling and Psychology. (3-0)** Overview of counseling and psychology services commonly found in a variety of settings. Includes individual and group counseling, testing, career planning and placement, referral, and consultation. Examines related theories and concepts with emphasis on counseling skills, as well as history and ethical and professional issues. Prerequisite: Graduate Record Examination and application to the program by specified deadlines.
- 551-3 Career Counseling and Guidance. (3-0)** An in-depth study of career counseling and guidance services that focuses on occupational, educational, and personal/social issues for general and special populations.

Includes examination of theoretical bases for career counseling and guidance, study of organization and delivery of information through individual and group activities. Covers related ethical concerns. Students will be required to purchase occupational and educational information materials. Prerequisite: CPSY 550 or approval of department head.

- 553-3 Personality and Counseling Theories and Applications. (3-0)** Surveys and investigates personality and counseling theories with an emphasis on how theories influence practice. Special emphasis on applications to various populations. Includes role plays and other experiential methods. Videotaped counseling sessions are critiqued. Covers related ethical concerns. Prerequisites: CPSY 550 or approval of department head.
- 554-3 Group Procedures for Counselors. (3-0)** An introduction to group therapy and group procedures with special emphasis on the development of group counseling skills with children adolescents, adults, and special populations. Supervised experience in group memberships is included. Covers related ethical concerns. Prerequisite: CPSY 550 or approval of department head.
- 556-3 Introduction to Family Counseling and Therapy. (3-0)** Familiarizes the student with family systems theory as applied to the study of family dynamics, family development, and the resolution of both family and ethical concerns. Prerequisite: CPSY 550 or approval of department head.
- 557-3 Methods and Practices in Counseling and Psychology. (3-0)** The course is designed to introduce Counseling and Psychology pre-interns to methodology that goes beyond building basic counseling skills and techniques. The course will also teach students the basics of professional documentation and treatment planning. It will also include legal issues related to counseling and psychological services and introduce basic business practices. Prerequisite: CPSY 550 or PSY 560 or approval of department head.
- 558-3 Counseling Perspectives on Psychopathology. (3-0)** An overview of psychopathology that includes the history of abnormal behavior and an in-depth study of the specific diagnostic psychological disorders. Emphasis will be on classification systems currently used in clinical settings and treatment alternatives from a counseling perspective. Covers related ethical concerns. Prerequisites: CPSY 550 or approval of department head.
- 590-3 Special Topics. (3-0)** Presentation of advanced study material on a specialized topic of interest to counseling and psychology. Course may be repeated for credit as topics vary. (Course will be offered not more than one semester each year.)
- 594-3 Substance Abuse. (3-0)** An introduction to addiction counseling. Special attention is given to models of addiction, chemical dependence, process addictions, and co-dependence. An experiential component is included as well. Covers related ethical concerns. Prerequisites: CPSY 550, or approval of department head.

CRIMINAL JUSTICE (C J)

- 131-3 Introduction to Criminal Justice. (3-0)** (TCCNS = CRIJ 1301) A survey of the history, philosophy, and operations of the American criminal justice system. Topics include the nature of crime and justice, the history and development of the modern criminal justice system and the role of police, judiciary, and corrections in society.
- 232-3 Criminal Procedure. (3-0)** (TCCNS = CRIJ 1306) This course is an introduction to the role of the judiciary in the criminal justice system.

Topics include right to counsel, pre-trial release, grand juries, adjudication process, and sentencing. Prerequisites: CJ 131 or approval of department head.

- 234-3 Police Systems and Practices. (3-0)** (TCCNS = CRIJ 2328) This course is an introduction to the police profession. Topics include organization of law enforcement agencies, the police role in society, police operations, discretion, corruption, and current and emerging issues. Prerequisite: CJ 131 or approval of instructor.
- 235-3 Criminal Investigation. (3-0)** (TCCNS = CRIJ 2314) Investigative theory, collection and preservation of evidence, sources of information, interview and interrogation, uses of forensic sciences, and case and trial preparation. Prerequisites: C J 131 and 133, or approval of department head.
- 237-3 Fundamentals of Criminal Law. (3-0)** (TCCNS = CRIJ 1310) A study of the nature of criminal law, philosophical and historical development, major definitions and concepts, classification of crime, elements of crimes and penalties using Texas statutes as illustrations, and criminal responsibility. Prerequisites: C J 131 and 133, or approval of department head.
- 238-3 Correctional Systems and Practices. (3-0)** (TCCNS = CRIJ 2313) An introduction to corrections as a profession. Topics include organization of correctional agencies, the role of corrections in society, correctional philosophies and agency operations, and current and emerging issues. Prerequisite: CJ 131 or approval of instructor.
- 300-3 Juvenile Delinquency. (3-0)** A study of the nature, extent, causation, treatment, and prevention of juvenile delinquency. A survey of the procedures and operations of the juvenile justice agencies will also be considered.
- 301-3 Survey of Forensic Science. (3-0)** Introduces the scientific methods that currently play a major role in solving crimes. It provides background information on various forensic disciplines together with the basic techniques utilized by forensic scientists in analyzing common types of physical evidence.
- 305-3 Criminology. (3-0)** Study and critical appraisal of various theories of crime causation, including an examination of classical, biological, psychological, and sociological perspectives on the etiology of crime. Prerequisites: C J 131 or approval of instructor.
- 308-3 Comparative Criminal Justice. (3-0)** A study of criminal justice systems around the world. The organization, administration, and philosophy of various criminal systems will be examined, along with the cultural and historical environment in which they developed and exist. Prerequisite: 18 hours C J or approval of department head.
- 310-3 Criminal Justice Supervision and Management. (3-0)** A study of theories and principles of supervision as applied to criminal justice agencies. Topics include organization, leadership, motivation, human resources flow, and managerial ethics. Prerequisite: Junior classification or approval of instructor.
- 311-3 Techniques of Interviewing. (3-0)** A study of interview and interrogation techniques. Topics include preparation, environmental and psychological factors, legal issues, and ethics.
- 315-3 Criminal Evidence. (3-0)** An analysis of the procedures and rules of evidence applied to the acquisition, offering, admissibility, and presentation of evidence from the crime scene, courtroom, and appellate court perspectives. Prerequisites: CJ 131 and CJ 232 or approval of instructor.

- 330-3 Community Corrections. (3-0)** A study of the philosophy, administrative procedures, and operational techniques used in the community based treatment and supervision of offenders. Prerequisites: SOC 201, CJ 131, or approval of instructor.
- 340-3 Homeland Security. (3-0)** An in-depth study of strategic, legal, policy, operational, and organizational issues associated with the defense of the U.S. homeland from foreign and domestic terrorist threats. Topics include psychology of mass movements, terrorists' ideology, religion and terror, legal issues in homeland security, weapons of mass destruction, effective interfacing between local, state, and federal agencies, emergency management operations and dealing with mass casualties.
- 412-3 Criminal Justice Ethics. (3-0)** This course presents an analysis of contemporary ethical issues in crime and justice. Classical and contemporary ethical theories will be applied to the discussion of such issues as discretion, corruption, use of force, racism, deception, professionalism, and the nature and meaning of justice. Prerequisite: junior classification or approval of instructor.
- 416-3 Methods of Criminal Justice Research. (3-0-WI)** This course is an introduction to the methods of criminological and criminal justice research, with emphasis on research ethics, research design, and methods of data collection and analysis.
- 424-3 Penology. (3-0)** A study of the structure and function of correctional systems and how various philosophies of correctional treatment affect the operation of confinement institutions. Prerequisite: C J 310 or approval of the department head. Course fee \$25.
- 425-3 Advanced Investigation. (3-0)** Advanced criminal and civil investigation topics will be covered. An examination of frequently used, yet special investigative techniques will also be introduced. Emphasis will be placed on crime scene processing, crime scene analysis, forensic evaluations, investigative techniques, and investigative surveys. Prerequisite: C J 235.
- 431-3 Criminal Justice Field Experience. (0-8)** Application and integration of academic content and development of skills within a criminal justice setting. Entry into this course will be arranged with the internship coordinator. May be taken more than once for credit. Prerequisite: At least 18 hours of C J or approval of the department head. Course graded satisfactory/unsatisfactory. Field experience fee \$75.
- 485-3 Seminar: Special Topics in Criminal Justice. (3-0)** Topics will vary according to timeliness and special needs. May be taken more than once for credit. Prerequisites: C J 131 and 133 or approval of the department head.
- 486-v Problems in Criminal Justice. (Credit variable)** Independent reading, research and discussion. Entry into this course will be arranged with the department head.
- 498-3 Senior Seminar. (3-0)** This is a capstone course that will assist the student in completing their knowledge of the criminal justice system through a study of current practice related to operations, recruitment, testing, training, law, and other issues to prepare the student for entry into the criminal justice profession. Prerequisite: Senior Year. Restricted to Criminal Justice majors.
- 500-3 Statistical Methods for Criminal Justice. (3-0)** The study of basic and advanced descriptive and inferential statistics, with an emphasis on applications in the criminal justice system. An emphasis will be placed on the various multivariate statistical procedures.

- 501-3 Theories of Criminology and Deviancy. (3-0)** In-depth examination of major theoretical perspectives of crime and deviancy. Theories will be analyzed for their logical and empirical adequacy in light of what is known about the distribution of crime and deviant behavior.
- 504-3 The American Judiciary. (3-0)** A critical evaluation of the role courts play in the American criminal justice system. Topics include the structure, function, and operations of the courts at the state and federal level.
- 505-3 The Juvenile Justice System. (3-0)** A critical analysis of the policies and practices of the juvenile justice system.
- 508-3 Corrections. (3-0)** A critical analysis of the issues, problems, trends, and prospects faced by the administration of the American correctional system to include the impact of legal and social change on the correctional agencies and an evaluation of current research in the field.
- 510-3 The Criminal Justice System. (3-0)** A study of the criminal justice system in the United States. This course includes a systems approach to the study of criminal justice and the interrelationships of the various components. The social and political issues related to the criminal justice system are examined in depth.
- 514-3 Directed Study in Criminal Justice. (0-0)** Demonstration of competency in a specialized area of criminal justice through completion of a substantial research project incorporating independent study and critical analysis of the topic area. This is the capstone course for non-thesis students. Prerequisite: permission of instructor.
- 515-3 Special Topics in Criminal Justice. (3-0)** Study of selected topic(s) directly related to criminal justice. May be repeated for credit as topic varies. (Course will be offered not more than one semester each year.)
- 520-3 Policing. (3-0)** An in depth study of the philosophical, operational, and social aspects of law enforcement.
- 521-3 Management of Criminal Justice Personnel. (3-0)** An investigation of the personnel decision-making process used within criminal justice agencies. Areas to be investigated include recruitment, training, continuing education requirements, performance evaluation, fair employment practices, termination, and allocation of personnel.
- 522-3 Advanced Criminal Justice Ethics. (3-0)** The practical implications of moral philosophy and ethics in a free society during the day-to-day administration of a criminal justice agency will be discussed.
- 540-3 Legal Aspects of Criminal Justice Administration. (3-0)** A consideration of the major legal issues of criminal justice management and the effect of constitutional provisions, statutes, ordinances, and judicial decisions in justice administrations. A discussion of the legal aspects of selection, promotion, assignment, and termination of justice employees. Emphasis is on the possible liabilities of managers and agencies for failure to adhere to legal requirements.
- 586-v Problems in Criminal Justice. (variable)** Independent reading, research, and discussion. Entry into this course will be arranged with the department head. Students may repeat this course for a total of 6 hours credit.
- 598-3 Research Methods for Criminal Justice. (3-0)** The study of scientific research methods used in the criminal justice system. Includes a review and critique of research on crime causation, law enforcement, courts, and corrections.

DAIRY SCIENCE (D S)

202-3 Dairying. (2-2) (TCCNS = AGRI 1311) A survey of the dairy industry, dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance. The food value, composition and quality, utilization, and processing of market milk and dairy products will be discussed. Credit for both D S 202 and ANSC 202 will not be awarded. Lab fee \$8.

302-3 Feeding and Management of Dairy Cattle. (2-2) Fundamental principles of scientific dairying and the practical application of these principles in the feeding and management of dairy cattle. Requirements for economical dairying, herd improvement through selection, feeding for milk production, development of replacement stock and disease control. Prerequisite: D S 202. Lab fee \$8.

DIVISION OF GENERAL STUDIES (DGS)

100-1 Succeeding in College and Beyond. (1-1) Designed to develop academic skills, including note-taking, using college-level materials, and preparing for college examinations. Enrollment is selective. Does not count for degree credit. Course fee \$10. Lab fee \$5.

101-1 University Seminar. (2-0) A seminar course designed to introduce students to the nature and purpose of a university education, and to assist students in establishing and utilizing skills, resources, and strategies necessary for success in college.

102-1 University Seminar II. (1-1) A continuation of DGS 101 with emphasis on service learning, career development, or writing processes. This course cannot be repeated for credit. Prerequisite: DGS 101 or approval of department head.

EARTH SCIENCE (E S)

220-3 Geographic Information Systems for the Sciences. (2-3) Applications of geographic information systems in the geological, environmental, earth, and other sciences. Laboratory exercises will apply GIS programs to geological and environmental problems. Course fee \$15.

320-3 Astronomy. (3-0) A study of astronomical instrumentation and methodologies, a survey of the solar system, star evolution, cosmology and the origins of the universe, and a review of galactic types and histories. Theory reinforced by field experience. Prerequisite: Junior level standing. Course fee \$15.

330-3 Meteorology. (3-0) A study of the Earth's atmosphere and the basic principles of weather analysis, climate and climatic controls, with emphasis on climatic effects on man. Theory reinforced by practical field experience. Prerequisite: Junior level standing. Course fee \$10.

340-3 Oceanography. (3-0) A study of our oceans from the physical, chemical, biological, and geological aspects. Theory reinforced by practical field experience. Prerequisite: Junior classification or approval of department head. Course fee \$40.

350-3 Environmental Science. (3-0) Integration of existing knowledge of geological, hydrological, and environmental processes associated with environmental management and land-use planning issues; including discussions of surface and subsurface water quality and quantity, soil erosion, solid and liquid waste disposal and flooding. Case studies involving environmental impact analysis. Prerequisites: GEOL 105, 107; CHEM 105, or approval of department head. Course fee \$10.