

Course Descriptions

Course Numbers

Courses numbered 01-09 are courses for developmental preparatory studies. The credits earned in these courses are not applicable toward any programs at the College.

Courses numbered 100-199 are freshman courses and courses numbered 200-299 are sophomore courses all applicable toward an associate degree and/or certificate and diploma programs.

Course Credits

The credit for each course is indicated after the title in the course description. One credit is equivalent to one collegiate semester credit hour.

Course Hours

The number of lecture hours in class each week (including lecture, seminar and discussion hours) and/or the number of laboratory hours in class each week (including laboratory, shop, supervised practice, and cooperative work experiences) are indicated for each course in the description. The number of lecture and laboratory hours in class each week is also called "contact hours" because it is time spent under the direct supervision of a faculty member. In addition to the lecture and laboratory hours in class each week, students must also spend time on out-of-class assignments.

Course Prerequisites

If any prerequisites are established for a course, these prerequisites will be identified in the course description. Courses in special sequences (usually identified by numerals I-II-III) require that prior courses or their equivalent be completed before enrolling in the advanced courses in that sequence. When Roman numerals are separated by a comma, the courses can be taken in any order. When corequisites are required for a course usually the corequisites must be taken at the same time. The prerequisites or their equivalent must be satisfied before enrolling in any specified course unless special permission is obtained from the instructor.

General Usage Courses

The following "General Usage Courses" apply to multiple curricula and all prefix sections. The titles and descriptions are generally applicable for such use. However, colleges may elect to substitute different, but essentially equivalent, titles (e.g. Field Experiences in lieu of Coordinated Internship) to satisfy the preferences of respective professional fields or disciplines. Similarly, the course description may be restructured for adaptation to appropriate context

or to a more specialized application (e.g. health agencies/facilities or hospitals in lieu of business, industrial and service firms).

(Insert Appropriate Prefix) **90, 190, 290 Coordinated Internship in** (Insert Appropriate Discipline) (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the College. Credit/Practice ratio maximum 1:5 hours. May be repeated for credit. Variable hours.

(Insert Appropriate Prefix) **93, 193, 293 Studies in:** (Insert appropriate topic) (1-5 cr.) Covers new content not covered in existing courses in the discipline. Allows instructor to explore content and instructional methods to assess the course's viability as a permanent offering. Variable hours.

(Insert Appropriate Prefix) **95, 195, 295 Topics in:** (Insert appropriate topic) (1-5 cr.) Provides an opportunity to explore topical areas of interest to or needed by students. May be used also for special honors courses. May be repeated for credit. Variable hours.

(Insert Appropriate Prefix) **96, 196, 296 On-site Training in** (Insert appropriate discipline) (1-5 cr.) Specializes in career orientation and training programs without pay in selected businesses and industry, supervised and coordinated by the College. Credit/work ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

(Insert Appropriate Prefix) **97, 197, 297 Cooperative Education in** (Insert Appropriate Discipline) (1-5 cr.) Supervises in on-the-job training for pay in approved business, industrial and service firms coordinated by the College's Cooperative Education Office. Is applicable to all occupational-technical curricula at the discretion of the College. Credit/work ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

(Insert Appropriate Prefix) **98, 198, 298 Seminar and Project in** (Insert Appropriate Discipline) (1-5 cr.) Requires completion of a project or research report related to the student's occupational objective and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

(Insert Appropriate Prefix) **99, 199, 299 Supervised Study in** (Insert Appropriate Discipline) (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.

■ Accounting (ACC)

ACC 105 Office Accounting (3 cr.) Presents practical accounting. Covers the accounting cycle—journals, ledgers, working papers, closing of books—payrolls, financial statements, accounting forms and practical procedures. Lecture 3 hours per week.

ACC 124 Payroll Accounting (3 cr.) Presents accounting systems and methods used in computing and recording payroll to include payroll taxes and compliance with federal and state legislation. Lecture 3 hours per week.

ACC 211 Principles of Accounting I (4 cr.) Presents accounting principles and their application to various businesses. Covers the accounting cycle, income determination, and financial reporting. Studies services, merchandising, and includes internal controls. Lecture 4 hours per week.

ACC 212 Principles of Accounting II (4 cr.) Continues Accounting Principles 211 with emphasis on the application to partnerships, corporations and the study of financial analysis. Includes an introduction to cost and managerial accounting. *Prerequisite:* ACC 211. Lecture 4 hours per week.

ACC 215 Computerized Accounting (3 cr.) Introduces the computer in solving accounting problems. Focuses on operation of computers. Presents the accounting cycle and financial statement preparation in a computerized system and other applications for financial and managerial accounting. *Prerequisites or co-requisite:* ACC 211 or equivalent. Lecture 3 hours per week.

ACC 221 Intermediate Accounting I (4 cr.) Covers accounting principles and theory, including a review of the accounting cycle and accounting for current assets, current liabilities and investments. Introduces various accounting approaches and demonstrates the effect of these approaches on the financial statement users. *Prerequisite:* ACC 212 or equivalent. Lecture 4 hours per week.

ACC 222 Intermediate Accounting II (4 cr.) Continues accounting principles and theory with emphasis on accounting for fixed assets, intangibles, corporate capital structure, long-term liabilities, and investments. A payroll accounting module is included. *Prerequisite:* ACC 221 or equivalent. Lecture 4 hours per week.

ACC 231 Cost Accounting I (4 cr.) Studies cost accounting methods and reporting as applied to job order, process, and standard cost accounting systems. Includes cost control and other topics. *Prerequisite:* ACC 212 or equivalent. Lecture 4 hours per week.

ACC 241 Auditing I (3 cr.) Presents techniques of investigating, interpreting, and appraising accounting records and assertions. Studies internal control design and evaluation, evidence gathering techniques and other topics. *Co-requisite:* ACC 221 or permission of instructor. Lecture 3 hours per week.

ACC 261 Principles of Federal Taxation I (3 cr.) Presents the study of federal taxation as it relates to individuals and related entities such as partnerships, corporations, and other tax entities. Includes tax planning, compliance, and reporting. Lecture 3 hours per week.

ACC 262 Principles of Federal Taxation II (3 cr.) Presents the study of federal taxation as it relates to partnerships, corporations, and other tax entities. Includes tax planning, compliance, and reporting. Lecture 3 hours per week.

■ Administration of Justice (ADJ)

ADJ 100 Survey of Criminal Justice (3 cr.) Presents an overview of the United States criminal justice system; introduces the major system components—law enforcement, judiciary, and corrections. Lecture 3 hours per week.

ADJ 105 The Juvenile Justice System (3 cr.) Presents the evolution, philosophy, structures and processes of the American juvenile delinquency system; surveys the rights of juveniles, dispositional alternatives, rehabilitation methods and current trends. Lecture 3 hours per week.

ADJ 107 Survey of Criminology (3 cr.) Surveys the volume and scope of crime; considers a variety of theories developed to explain the causation of crime and criminality. Lecture 3 hours per week.

ADJ 116 Special Enforcement Topics (3 cr.) Considers contemporary issues, problems, and controversies in modern law enforcement. Examines principles of justice and ethics in criminal justice. Lecture 3 hours per week.

ADJ 128 Patrol Administration and Operations (3 cr.) Studies the goals, methods and techniques of police patrol with focus on the norms which govern work behavior in a police career. Examines the responsibilities of administrators and field supervisors of patrol in the local and state law enforcement agencies. Lecture 3 hours per week.

ADJ 139 Private Detectives/Investigators (4 cr.) Instructs the student in investigative techniques, criminal law and procedure, rules of evidence, the techniques and mechanics of arrest. Meets state certification requirements for private investigator's licensing. Lecture and practical exercises 4 hours per week.

ADJ 140 Introduction to Corrections (3 cr.) Focuses on societal responses to the offender. Traces the evolution of practices based on philosophies of retribution, deterrence, and rehabilitation. Reviews contemporary correctional activities and their relationships to other aspects of the criminal justice system. Lecture 3 hours per week.

ADJ 171-172 Forensic Science I-II (3 cr.) (3 cr.) Introduces student to crime scene technology, procedures for sketching, diagramming and using casting materials. Surveys the concepts of forensic chemistry, fingerprint classification/identification and latent techniques, drug identification, hair and fiber evidence, death investigation techniques, thin-layer chromatographic methods, and arson materials examination. Lecture 3 hours per week.

ADJ 195 Unarmed/Armed Security Officer (2 cr.) Includes training in unarmed security and armed security. Meets DCJS requirements for Unarmed Security Officer and Alarm Respondent. Meets DCJS requirement for Armed Arrest Authority when taken with Topics in Firearms: Entry Handgun and Shotgun. Lecture and practical exercises 2 hours per week.

ADJ 195 Topics in Firearms: Entry Handgun and Shotgun (2 cr.) Studies firearms and their use, their safety, and the use of deadly force. Includes entry level and shot gun instruction. Meets requirements for qualification with both handgun and shotgun on a DCJS Firearms Endorsement Card. Lecture and range exercises 2 hours per week.

ADJ 195 Bail Bondsman Entry (2 cr.) Instructs the student in DCJS orientation, ethical standards, the Code of Virginia and regulations relating to Bail Bondsman, Basic Law, Surety and Property Law, the Court Systems, Fugitive Recovery and Documentation. Meets the DCJS requirement to become a Licensed Bail Bondsman. Lecture 2 hours per week.

ADJ 195 Bail Enforcement Agent Entry (3 cr.) Includes Ethics, Code of Virginia, Basic Law, the Court System, the US Constitution, Limitations and Liabilities, Fugitive Recovery, Investigative Techniques, Recovery Procedures, Agent Survival, Fugitive Apprehension and Remanding to Custody. Meets DCJS for License as a Bail Enforcement Agent. Lecture 3 hours per week.

ADJ 196 On-Site Training (Internship Education) (3 cr.) Bridges the gap between theory and practice by allowing students to apply skills learned in the classroom to practical on-the-job learning situations. A minimum of 120 contact hours (approximately 10 hours of voluntary work per week for 15 weeks) with a criminal justice agency is required. *Prerequisite: Must meet requirements specified by the ADJ Program Head.*

ADJ 211-212 Criminal Law, Evidence and Procedures I-II (3 cr.) (3 cr.) Teaches the elements of proof for major and common crimes and the legal classification of offenses. Studies the kinds, degrees, and admissibility of evidence and its presentation in criminal proceedings with emphasis on legal guidelines for methods and techniques of evidence acquisition. Surveys the procedural requirements from arrest to final disposition in the various American court systems with focus on the Virginia jurisdiction. *Prerequisite: ADJ 100.* Lecture 3 hours per week.

ADJ 229 Law Enforcement and the Community (3 cr.) Considers current efforts by law enforcement personnel to achieve an effective working relationship with the community. Surveys and analyzes various interactive approaches of law enforcement agencies and the citizenry they serve. *Prerequisite: ADJ 100 or ADJ 111 or permission of instructor.* Lecture 3 hours per week.

ADJ 236 Principles of Criminal Investigation (3 cr.) Surveys the fundamentals of criminal investigation procedures and techniques. Examines crime scene search, collecting, handling and preserving of evidence. *Prerequisite: ADJ 100 or permission of instructor.* Lecture 3 hours per week.

ADJ 237 Advanced Criminal Investigation (3 cr.) Introduces specialized tools and scientific aids used in criminal investigation. Applies investigative techniques to specific situations and preparation of trial evidence. *Prerequisite: ADJ 236 or permission of instructor.* Lecture 3 hours per week.

■ Administrative Support Technology (AST)

AST 101 Keyboarding I (3 cr.) Teaches the alpha/numeric keyboard with emphasis on correct techniques, speed, and accuracy. Teaches formatting of basic personal and business correspondence, reports, and tabulation. Lecture 3 hours per week.

AST 102 Keyboarding II (3 cr.) Develops keyboarding and document production skills with emphasis on preparation of specialized business documents. Continues skill-building for speed and accuracy. *Prerequisite: AST 101.* Lecture 3 hours per week.

AST 107 Editing/Proofreading Skills (3 cr.) Develops skills essential to creating and editing business documents. Covers grammar, spelling, diction, punctuation, capitalization, and other usage problems. Lecture 3 hours per week.

AST 132 Word Processing I (1 cr.) Introduces students to a word processing program to create, edit, save, and print documents. Lecture 1 hour per week.

AST 137 Records Management (3 cr.) Teaches filing and records management procedures for hard copy, electronic, and micrographic systems. Identifies equipment, supplies, and solutions to records management problems. Lecture 3 hours per week.

AST 141 Word Processing I (3 cr.) Teaches creating and editing documents, including line and page layouts, columns, fonts, search/replace, cut/paste, spell/thesaurus, and advanced editing and formatting features of word processing software. *Prerequisite: AST 101 or Instructor's permission.* Lecture 3 hours per week.

AST 171 Introduction to Call Center Services (3 cr.) Introduces concepts and skills needed to be an effective customer service representative for a telephone service operation. Covers call center theory and technology, interpersonal communication skills, customer relations attitudes, telecommunications techniques, and professional procedures to handle a variety of customer service sales requests. Lecture 3 hours per week.

AST 205 Business Communications (3 cr.) Teaches techniques of oral and written communications. Emphasizes writing and presenting business-related materials. *Prerequisite:* AST 107. Lecture 3 hours per week.

AST 230 Introduction to Office Technology (3 cr.) Introduces principles, methods, and techniques involved in office technology. Emphasizes the use of microcomputer equipment and software. *Prerequisite:* AST 101 or instructor's permission. Lecture 3 hours per week.

AST 240 Machine Transcription (3 cr.) Develops proficiency in the use of transcribing equipment to produce business documents. Emphasizes listening techniques, business English, and proper formatting. Includes production rate and mailable copy requirements. *Prerequisite:* AST 107. *Co-requisite:* AST 102 or equivalent. Lecture 3 hours per week.

AST 243 Office Administration I (3 cr.) Develops an understanding of the administrative support role and the skills necessary to provide organizational and technical support in a contemporary office setting. Emphasizes the development of critical thinking, problem-solving, and job performance skills in a business office environment. *Prerequisite:* AST 102. Lecture 3 hour per week.

AST 244 Office Administration II (3 cr.) Enhances skills necessary to provide organizational and technical support in a contemporary office setting. Emphasizes administrative and supervisory role of the office professional. Includes travel and meeting planning, office budgeting and financial procedures, international issues, and career development. Teaches management and the management functions of planning, leading, and controlling. *Prerequisite:* AST 243 or equivalent. Lecture 3 hours per week.

AST 245 Medical Machine Transcription (3 cr.) Develops machine transcription skills, integrating operation of transcribing equipment with understanding of medical terminology. Emphasizes dictation techniques and accurate transcription of medical documents in prescribed formats. *Prerequisites:* AST 102 or equivalent, AST 107 and HLT 141. Lecture 3 hours per week.

AST 253 Advanced Desktop Publishing I (3 cr.) Introduces specific desktop publishing software. Teaches document layout and design, fonts, type styles, style sheets, and graphics. *Prerequisite:* AST 101 or equivalent and experience in using a word processing package. Lecture 3 hours per week.

■ Air Conditioning and Refrigeration (AIR)

AIR 121 Air Conditioning and Refrigeration I (3 cr.) Studies refrigeration theory, characteristics of refrigerants, temperature, and pressure, tools and equipment, soldering, brazing, refrigeration systems, system components, compressors, evaporators, metering devices. Presents charging and evaluation of systems and leak detection, explores servicing the basic system. Explains use of care of oils and additives and troubleshooting of small commercial systems. Lecture 2 hours. Laboratory 2 hours. Totals 4 hours per week.

AIR 134, 135 Circuits and Controls I, II (4 cr.) (4 cr.) Presents circuit diagrams for air conditioning units, reading and drawing of circuit diagrams, types of electrical controls. Includes and analysis of air conditioning circuits, components, analysis and characteristics of circuits and controls, testing and servicing. Introduces electricity for air conditioning which includes circuit elements, direct current circuits and motors, single and three-phase circuits and motors, power distribution systems, and protective devices. Studies the electron and its behavior in passive and active circuits and components. Demonstrates electronic components and circuits as applied to air conditioning system. Lecture 3 hours. laboratory 3 hours. Total 6 hours per week.

AIR 154, 155 Heating Systems I, II (3 cr.) (3 cr.) Introduces types of fuels and their characteristics of combustion; types, components and characteristics of burners, and burner efficiency analyzers. Studies forced air heating systems including troubleshooting, preventive maintenance and servicing. *AIR 154* lecture 2 hours. Laboratory 3 hours. Total 5 hours per week. *AIR 155* lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

AIR 158 Mechanical Codes (2 cr.) Presents mechanical code requirements for installation, service, and inspection procedures. Uses the BOCA code in preparation for the Journeyman and master's card. Lecture 2 hours per week.

AIR 165 Air Conditioning Systems I (4 cr.) Introduces comfort survey, house construction, load calculations, types of distribution systems, and equipment selection. Introduces designing, layout, installing and adjusting of duct systems, job costs, and bidding of job. Lecture 4 hours per week.

AIR 205 Hydronics and Zoning (3 cr.) Presents installation servicing, troubleshooting, and repair of hydronic systems for heating and cooling. Includes hot water and chilled water systems using forced circulation as the transfer medium. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

AIR 235 Heat Pumps (3 cr.) Studies theory and operation of reverse cycle refrigeration systems as applied to air conditioning, including supplementary heat as applied to heat pump systems including service, installation and maintenance. *Prerequisites:* AIR 121 and AIR 134. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

■ Agriculture (AGR)

AGR 100 Forage and Pasture Crop Management (3 cr.) Covers fundamental principles of production and the nutritive values of forage and pasture crops, with management for profitable animal production. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

■ American Sign Language (ASL)

ASL 101-102 American Sign Language I-II (3 cr.) (3 cr.) Introduces the fundamentals of American Sign Language (ASL) used by the Deaf Community, including basic vocabulary, syntax, finger spelling, and grammatical non-manual signals. Focuses on communicative competence. Develops gestural skills as a foundation for ASL enhancement. Introduces cultural knowledge and increases understanding of the Deaf Community. Lecture 3 hours per week.

ASL 201-202 American Sign Language III-IV (3 cr.) (3 cr.) Develops vocabulary, conversational competence, and grammatical knowledge with a total immersion approach. Introduces increasingly complex grammatical aspects including those unique to ASL. Discusses culture and literature. Contact with the Deaf Community is encouraged to enhance linguistic and cultural knowledge. Lecture 3 hours per week.

■ Architecture (ARC)

ARC 212 Architectural Drafting III (3 cr.) Provides fundamental knowledge of the principles and techniques of architectural drawings, procedures. Familiarizes students with design process to provide a better understanding of the relationship between architectural design and structural systems. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

ARC 233 Advanced Architectural Drafting III (3 cr.) Introduces the procedures involved in architectural design and construction document processing. Requires preparation of set of working drawings for a residential design project. *Prerequisite:* ARC 212. Lecture 1 hour. Laboratory 4 hours. Total 5 hours per week.

ARC 234 Advanced Architectural Drafting IV (3 cr.) A continuation of Architectural Drafting III. Requires preparation of complete set of working drawings for a commercial design project. *Prerequisite:* ARC 233. Lecture 1 hour. Laboratory 4 hours. Total 5 hours per week.

■ Art (ART)

ART 100 Art Appreciation (3 cr.) Introduces art from prehistoric times to the present day. Describes architectural styles, sculpture, photography, print-making, and painting techniques. Students may not receive credit for both Art 100 and Art 101 or Art 100 and Art 102. Lecture 3 hours per week.

ART 101, 102 History and Appreciation of Art I, II (3 cr.) (3 cr.) Presents the history and interpretation of architecture, sculpture, and painting. Begins with prehistoric art and follows the development of western civilization to the present. Lecture 3 hours per week.

ART 121-122 Drawing I-II (3 cr.) (3 cr.) Develops basic drawing skills and understanding of visual language through studio instruction/lecture. Introduces concepts such as proportion, space, perspective, tone and composition as applied to still life, landscape and the figure. Uses drawing media such as pencil, charcoal, ink wash and color media. Includes field trips and gallery assignments as appropriate. Lecture 1 hour. Studio instruction 4 hours. Total 5 hours per week.

ART 131-132 Fundamentals of Design I-II (3 cr.) (3 cr.) Explores the concepts of two- and three-dimensional design and color. May include field trips as required. Lecture 1 hour. Studio instruction 4 hours. Total 5 hours per week. *For ART 132: Prerequisite or Co-requisite is ART 180.*

ART 153-154 Ceramics I-II (3 cr.) (3 cr.) Presents problems in the design and production of functional and non-functional ceramic works. Includes handbuilding the potter's wheel and clays and glazes. Lecture 1 hour. Studio instruction 4 hours. Total 5 hours per week.

ART 180 Introduction to Computer Graphics (3 cr.) Provides a working introduction to computer-based electronics technology used by visual artists and designers. Presents the basics of operating platforms and standard industry software. Introduces problems in which students can explore creative potential of the new electronic media environment. Includes instruction in basic computing concepts, components, and operations and in the use of an integrated software packages. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

ART 241-242 Painting I-II (3 cr.) (3 cr.) Introduces abstract and representational painting in acrylic and/or oil with emphasis on color composition and value. *Prerequisites:* ART 122 or divisional approval. Lecture 1 hour. Studio instruction 4 hours. Total 5 hours per week.

ART 251-252 Communication Design I-II (3 cr.) (3 cr.) Studies the principles of visual communications as applied to advertising in newspapers, magazines, direct mail advertising, house organs, etc. Analyzes the influence of contemporary art on design. *Prerequisites:* ART 131, ART 132, ART 180. Lecture 2 hours. Studio instruction 3 hours. Total 5 hours per week.

ART 283-284 Computer Graphics I-II (4 cr.) (4 cr.) Utilizes microcomputers and software used to produce computer graphics for communication. Employs techniques learned to solve studio projects which reinforce instruction and are suitable for portfolio use. *Pre-requisite* ART 180 for either ART 283 or for ART 284. Lecture 2 hours. Studio instruction 4 hours. Total 6 hours per week.

ART 287 Portfolio and Resume' Preparation (1 cr.) Focuses on portfolio preparation, resume writing, and job interviewing for students. Recommended for final semester program students. Requires instructor's approval. Lecture 1 hour per week.

■ Biology (BIO)

BIO 100 Basic Human Biology (3 cr.) Presents basic principles of human anatomy and physiology. Discusses cells, tissues, and selected human systems. Lecture 3 hours per week.

BIO 101-102 General Biology I-II (4 cr.) (4 cr.) Explores fundamental characteristics of living matter from the molecular level to the ecological community with emphasis on general biological principles. Introduces the diversity of living organisms, their structure, function and evolution. Lecture 3 hours. Recitation and laboratory 3 hours. Total 6 hours per week.

BIO 107 Biology of the Environment (4 cr.) Presents the basic concepts of environmental science through a topical approach. Includes the scientific method, population growth and migration, use of natural resources and waste management, ecosystem simplification recovery, evolution, biogeochemical cycles, photosynthesis and global warming, geological formations, atmosphere and climate, and ozone depletion and acid deposition. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

BIO 141-142 Human Anatomy and Physiology I-II (4 cr.) (4 cr.) Integrates anatomy and physiology of cells, tissues, organs, and systems of the human body. Integrates concepts of chemistry, physics, and pathology. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

BIO 205 General Microbiology (4 cr.) Examines morphology, genetics, physiology, ecology, and control of microorganisms. Emphasizes application of microbiological techniques to selected fields. Recommended for students transferring to four year colleges/universities. *Prerequisites* one year of college biology and one year of college chemistry or divisional approval. Lecture 3 hours. Recitation and laboratory 3 hours. Total 6 hours per week.

■ Building (BLD)

BLD 111 Blueprint Reading and the Building Code (3 cr.) Introduces reading and interpreting various kinds of blueprints and working drawings with reference to local, state, and national building codes. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

BLD 115 Building Materials (2 cr.) Discusses the use, size, and specification of materials used in light commercial construction. Examines masonry, wood, steel, building materials and related hardware. Lecture 2 hours per week.

BLD 129 Site Preparation (3 cr.) Introduces the student to the proper terminology and definitions of site preparation, as well as the tools required when pinpointing the proper location of a structure on a site. *Prerequisite:* BLD 149. Lecture 3 hours per week.

BLD 140 Principles of Plumbing Trade I (3 cr.) Studies the plumbing trade, the structure of the plumbing trade, apprenticeship standards, job safety, tools of the trade, the approved installation of plumbing materials, types of sanitary drainage pipe and piping layout of sanitary piping. Lecture 3 hours per week.

BLD 141 Principles of Plumbing Trade II (3 cr.) Studies the sizing of sanitary drainage and vent piping for single family dwelling, two-story single-family dwellings, duplex residence, apartment building, and multi-story building. Lecture 3 hours per week.

BLD 142 Principles of Plumbing Trade III (3 cr.) Studies sizing of water piping and control valves, piping materials, piping layout, and the proper installation of water piping. Explains how to identify cross control and the critical levels of contamination, means of protection against back flow, installing back flow preventers, and back flow preventive test. Lecture 3 hours per week.

BLD 143 Plumbing Blueprint Reading (3 cr.) Focuses on blueprint reading, plan reviews, schematic drawing, isometric view drawing and architectural blueprint reading on single-, two-family and multi-story dwelling for drainage, vents and water piping design. Lecture 3 hours per week.

BLD 144 Plumbing Code and Certification Preparation (3 cr.) Teaches the use of the plumbing code standard book (BOCA), references standards, the reading and use of charts and tables, and preparation for the journeyman's certification and the cross-connection control certification test. Lecture 3 hours per week.

BLD 146 Form Work and Concrete Theory (3 cr.) Introduces the proper terminology and jargon of form construction, the installation of reinforcement material, and the make-up and placement of concrete. *Prerequisite:* BLD 126 or BLD 149. Lecture 3 hours per week.

BLD 149 Carpentry I (3 cr.) Presents an introduction to carpentry, with an emphasis on residential/light construction. Introduces basic carpentry terminology. Covers identification and proper use of hand and power tools common to the industry, construction materials, construction techniques, safety precautions, working drawings and the team approach to construction. Lecture 3 hours per week.

BLD 249 Carpentry II (3 cr.) Presents advanced concepts of carpentry as they relate to residential/light construction, including theoretical and practical applications. Covers advanced framing techniques, finish and trim systems, and calculations commonly required in all phases of light construction. *Prerequisite:* BLD 149. Lecture 3 hours per week.

■ Business Management and Administration (BUS)

BUS 100 Introduction to Business (3 cr.) Presents a broad introduction to the functioning of business enterprise within the U.S. economic framework. Introduces economic systems, essential elements of business organization, production, human resource management, marketing, finance, and risk management. Develops business vocabulary. Lecture 3 hours per week.

BUS 111 Principles of Supervision I (3 cr.) Teaches the fundamentals of supervision, including the primary responsibilities of the supervisor. Introduces factors relating to the work of supervisor and subordinates. Covers aspects of leadership, job management, work improvement, training and orientation, performance evaluation, and effective employee/supervisor relationships. Lecture 3 hours per week.

BUS 121 Business Mathematics I (3 cr.) Applies mathematical operations to business processes and problems. Reviews operations, equations, percents, sales and property taxes, insurance, checkbook and cash records, wage and payroll computations, depreciation, overhead, inventory turnover and valuation, financial statements, ratio analysis, commercial discounts, markup, and markdown. Lecture 3 hours per week.

BUS 156 Introduction to Operating Management (3 cr.) Introduces quantitative methods to control cost. Analyzes cost concepts and behavior from a managerial viewpoint. Applies quantitative tools such as PERT, linear programming, transportation models, and queuing theory. Encourages use of microcomputer. Lecture 3 hours per week.

BUS 165 Small Business Management (3 cr.) Identifies management concerns unique to small businesses. Introduces the requirements necessary to initiate a small business and identifies the elements comprising a business plan. Presents information establishing financial and administrative controls, developing a marketing strategy, managing business operations, and the legal and government relationships specific to small businesses. Lecture 3 hours per week.

BUS 195 Essentials of Human Resource Management (1 cr.) Examines the fundamentals of Human Resource Management. Focuses on several core areas of human resources to include employment law, recruitment and selection, compensation, training, and performance management. Lecture 1 hour per week.

BUS 200 Principles of Management (3 cr.) Teaches management and the management functions of planning, organizing, leading, and controlling. Focuses on application of management principles to realistic situations managers encounter as they attempt to achieve organizational objectives. Lecture 3 hours per week.

BUS 204 Project Management (3 cr.) Provides students with knowledge of essential skills and techniques necessary to lead or participate in projects assigned to managerial personnel. Covers time and task scheduling, resource management, problem solving strategies and other areas related to managing a project. Lecture 3 hours per week.

BUS 205 Human Resource Management (3 cr.) Introduces employment, selection, and placement of personnel, usage levels and methods, job descriptions, training methods and programs, and employee evaluation systems, compensation and labor relations. Includes procedures for management of human resources and uses case studies and problems to demonstrate implementation of these techniques. Lecture 3 hours per week.

BUS 220 Introduction to Business Statistics (3 cr.) Introduces statistics as a tool in decision-making. Emphasizes ability to collect, present, and analyze data. Employs measures of central tendency and dispersion, statistical inference, index numbers, probability theory, and time series analysis. *Prerequisite:* Working knowledge of Microsoft Excel. Lecture 3 hours per week.

BUS 221 Business Statistics I (3 cr.) Focuses on statistical methodology in the collection, organization, presentation, and analysis of data; concentrates on measures of central tendency, dispersion, probability concepts and distribution, sampling, statistical estimation, normal and T distribution and hypotheses for means and proportions. *Prerequisite:* MTH 163 or divisional approval. Lecture 3 hours per week.

BUS 222 Business Statistics II (3 cr.) Continues study of inferential statistics and application of statistical techniques and methodology in business. Includes analysis of variance, regression and correlation measurement of business and economic activity through the use of index numbers, trend, cyclical, and seasonal effects and the Chi-Square distribution and other non-parametric techniques. *Prerequisite:* BUS 221 or divisional approval. Lecture 3 hours per week.

BUS 226 Computer Business Applications (3 cr.) Provides a practical application of software packages, including spreadsheets, word processing, database management, and presentation graphics. Includes the use of programs in accounting techniques, word processing, and management science application. *Prerequisite* keyboarding competence. **Students may not get credit for both BUS 226 and ITE 115.** Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

BUS 241 Business Law I (3 cr.) Presents a broad introduction to legal environment of U.S. business. Develops a basic understanding of contract law and agency and government regulation. Lecture 3 hours per week.

BUS 295 PHR/SPHR Certification Study (3 cr.) Assists students in preparing for the PHR or SPHR exam by covering the six key functional areas of the HR body of knowledge as defined by the Human Resource Certification Institute. The six areas are: Strategic Management; Workforce Planning and Employment; Human Resource Development; Compensation and Benefits; Employee and Labor Relations; and Occupational Health, Safety, and Security. Lecture 3 hours per week.

BUS 295 Employee Recruitment, Selection, and Retention (3 cr.) Examines the fundamentals of successful recruitment, staffing, and retention. Focuses on job analysis, behavioral interviewing, assessing candidates, background investigations, legislative compliance, equal employment opportunity and Affirmative Action requirements, economic conditions that impact staffing, short-term and long-term strategy and planning, internal and external recruiting, and career planning. Lecture 3 hours per week.

BUS 295 Compensation Management (3 cr.) Introduces the various components of employee compensation systems and their role in attracting and retaining good employees. Teaches how to develop and evaluate employee compensation systems that serve the needs of the workforce and the organization. Covers strategic perspectives, internal alignment and consistency, external competitiveness, employee contributions, and compliance. Lecture 3 hours per week.

BUS 295 Human Resource Development (3 cr.) Teaches the fundamentals of human resource development (HRD) theory and practice in the organization. Examines adult learning theory, the concept of the learning organization, the role of training and development in the workplace and adult learning models. Focuses on applications of HRD principles to develop effective training programs for technical skills and management development. Lecture 3 hours per week.

BUS 295 Employee and Labor Relations (3 cr.) Provides students with knowledge of essential skills needed to manage the employee relations process where issues with employee performance, job satisfaction and compliance with organizational policies exist. Covers the current federal, state and local regulations applicable to the workforce. Lecture 3 hours per week.

BUS 295 Strategic Human Resource Management/Consulting (3 cr.) Examines how human resources can formulate and implement unified, comprehensive and integrated decisions to attain organizational goals and effectiveness in partnership with top management. Provides an understanding of the business connections between corporate strategy and the human resource functions and covers the role internal and external consultants play in understanding organizations and enhancing organizational performance. Lecture 3 hours per week.

■ Chemistry (CHM)

CHM 111-112 College Chemistry I-II (4 cr.) (4 cr.) Explores the fundamental laws, theories, and mathematical concepts of chemistry. Designed primarily for science and engineering majors. Requires a strong background in mathematics. *Prerequisite:* two years of high school algebra or equivalent placement test scores. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

CHM 241-242 Organic Chemistry I-II (3 cr.) (3 cr.) Introduces fundamental chemistry of carbon compounds, including structures, physical properties, syntheses, and typical reactions. Emphasizes reaction mechanisms. *Corequisite* CHM 243-244. Lecture 3 hours per week.

CHM 243-244 Organic Chemistry Laboratory I-II (1 cr.) (1 cr.) Is taken concurrently with CHM 241 and CHM 242. Laboratory 3 hours per week.

■ Childhood Development (CHD)

CHD 117 Introduction to Reading Methods (3 cr.) Introduces current practices of teaching reading in the elementary school. Familiarizes students with materials currently in use, emphasizes observation of various reading techniques and trends in the classroom. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

CHD 118 Methods and Materials in the Language Arts for Children (3 cr.) Presents techniques and methods for encouraging the development of language and perceptual skills in young children. Stresses improvement of vocabulary, speech and methods to stimulate discussion. Surveys children's literature, examines elements of quality story telling and story reading, and stresses the use of audiovisual materials. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

CHD 120 Introduction to Early Childhood Education (3 cr.) Introduces early childhood development through activities and experiences in nursery, pre-kindergarten, kindergarten, and primary programs. Investigates classroom organization and procedures, and use of classroom time and materials, approaches to education for young children, professionalism, and curricular procedures. Lecture 3 hours per week.

CHD 121 Childhood Educational Development I (3 cr.) Focuses attention on the observable characteristics of children from birth through adolescence. Concentrates on cognitive, physical, social, and emotional changes that occur. Emphasizes the relationship between development and child's interactions with parents, siblings, peers, and teachers. Lecture 3 hours per week.

CHD 125 Creative Activities for Children (3 cr.) Prepares individuals to work with young children in the arts and other creative age-appropriate activities. Investigates affective classroom experiences and open-ended activities. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

CHD 126 Methods and Materials for Developing Science and Mathematical Concepts in Children (3 cr.) Teaches selecting developmentally appropriate learning activities using materials to develop logical thinking skills in the child. Lecture 3 hours per week.

CHD 165 Observation and Participation in Early Childhood/Primary Settings (3 cr.) Observes and participates in early childhood settings such as child care centers, preschools, Montessori schools or public schools in kindergarten through 3rd grade levels. Students spend one hour each week in a seminar session in addition to 60 clock hours in the field. May be taken again for credit. *Prerequisite:* CHD 121. Lecture 1 hour. Laboratory 6 hours. Total 7 hours per week.

CHD 205 Guiding the Behavior of Children (3 cr.) Explores positive ways to build self-esteem in children and help them develop self-control. Presents practical ideas for encouraging pro-social behavior in children and emphasizes basic skills and techniques in classroom management. Lecture 3 hours per week.

■ Civil Engineering Technology (CIV)

CIV 171 Surveying I (3 cr.) Introduces surveying equipment, procedures and computations including adjustment of instruments, distance measurement, leveling, angle measurement, traversing, traverse adjustments, area computations and introduction to topography. *Prerequisite:* MTH 115 or trigonometry. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

CIV 172 Surveying II (3 cr.) Introduces surveys for transportation systems including the preparation and analysis of topographic maps, horizontal and vertical curves, earth work and other topics related to transportation construction. *Prerequisite:* CIV 171 or divisional approval. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

CIV 210 Structural Systems (5 cr.) Introduces the application of the principles of mechanics and strength of materials to the analysis and design of civil engineering structures, specifically in the areas of building and highway construction, timber, steel and concrete structures. *Prerequisite:* EGR 135 and 136. Lecture 5 hours per week.

CIV 220 Structural Analysis (3 cr.) Focuses on the analysis of statically determinate and indeterminate structures based on principles of statics and strength of materials and geometric conditions. *Prerequisite:* EGR 135 and 136. Lecture 3 hours per week.

CIV 227 Concrete and Soil Technology (3 cr.) Teaches properties of Portland cement concrete, methods of mix design, use and placement of concrete, soil and its relationship to engineering construction. Teaches engineering properties of soil with introduction to retaining walls, piles, underground conduits, and earth dams. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

CIV 240 Fluid Mechanics and Hydraulics (3 cr.) Introduces the principles of fluid flow and development of practical hydraulics resulting from study of fluid statics, flow of real fluid in pipes, multiple pipe lines, liquid flow in open channels, and fluid measurement techniques. *Prerequisite:* EGR 135 and 136. Lecture 3 hours per week.

CIV 246 Water Resource Technology (2 cr.) Introduces the elements of hydrology and hydraulic systems. *Prerequisite:* CIV 240. Lecture 2 hours per week.

■ Cosmetology (COS)

COS 81 Cosmetology Theory I (4 cr.) The following topics will be covered; bacteriology, finger waving, sterilization and sanitation, wet hair styling, thermal hair styling, draping, shampooing and rinsing, permanent waving, haircutting, and properties of the scalp and hair. Lecture 4 hours per week.

COS 82 Cosmetology Theory II (5 cr.) The following topics will be covered; hair coloring, theory of massage, the salon business, chemical hair relaxing and soft curl permanent, facial and facial make-up, hair pressing, skin and its disorders, artistry and artificial nails, cells, anatomy and physiology, manicuring and pedicure, electricity and light therapy, nail and its disorders, chemistry, and the State Board Review. *Prerequisite:* COS 81 or permission of instructor. Lecture 5 hours per week.

■ Drafting (DRF)

DRF 112 Technical Drafting II (3 cr.) Introduces technical drafting techniques from the fundamentals through advanced drafting practices. Teaches lettering, geometric construction, technical sketching, orthographic projection, visualization, sections, intersections, development, threads and fasteners, theory and applications of dimensioning and tolerances, and assembly drawings. Includes pictorial drawing and preparation of working and detailed drawings using 2-D CAD drafting techniques. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

DRF 128 Geometric Dimensioning and Tolerancing (2 cr.) Teaches use of a positional tolerance system, its relationship to coordinate tolerance systems, and other aspects of industry standard drafting practices. Lecture 2 hours per week.

DRF 161 Blueprint Reading I (2 cr.) Teaches the application of basic principles, visualization, orthographic projection, detail of drafting shop processes and terminology, assembly drawings and exploded views. Considers dimensioning, changes and corrections, classes of fits, tolerances and allowances, sections and convention in blueprint reading. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

DRF 166 Welding Blueprint Reading (2 cr.) Teaches welding nomenclature and applications. Stresses structural steel, design, layout. Explains industrial symbols. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

DRF 175 Schematics and Mechanical Diagrams (2 cr.) Covers interpretation of basic shop drawings, conventional symbols, common electrical and electronics symbols, wiring diagrams, hydraulic and pneumatic symbols, schematic drawings, and piping diagrams. Lecture 2 hours per week.

DRF 200 Survey of Computer Aided Drafting (3 cr.) Surveys computer-aided drafting equipment and concepts. Develops general understanding of components, operations and use of a typical CAD system. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

DRF 201 Computer Aided Drafting and Design I (3 cr.) Teaches computer aided drafting concepts and equipment designed to develop a general understanding of components of a typical CAD system and its operation. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

DRF 202 Computer Aided Drafting and Design II (3 cr.) Teaches production drawings and advanced operations in computer aided drafting. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.



DRF 211 Advanced Technical Drafting I (3 cr.) Teaches use of drafting equipment and applications, with possible CAD applications, emphasizing knowledge and skill required for industrial drawing. Includes piping, gearing, geometric and positional tolerances, and 2D/3D drawing layout and lettering of all types. *Prerequisite:* DRF 112. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

DRF 212 Advanced Technical Drafting II (3 cr.) Teaches concepts of sheet metal fabrication including radii, fillets and tolerances, electrical and electronics symbols and drawing, and advanced design drafting techniques. *Prerequisite:* DRF 211. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

DRF 241 Parametric Solid Modeling I (3 cr.) Focuses on teaching students the design of parts by parametric solid modeling. Topics covered will include, but not limited to, sketch profiles; geometric and dimensional constraints; 3-D features; model generation by extrusion, revolution and sweep; and the creation of 2-D drawing views that include sections, details and auxiliary. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

DRF 262 Computer-Aided-Civil Design and Hydrology (3 cr.) Introduces computer-aided-design for civil/surveying as applied to highway design, site layout, advanced highway design, hydrology tools, watershed analysis, and pipe sizing. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

DRF 280 Design Capstone Project (3 cr.) Focuses on design projects developed in independently and in consultation with the Instructor. Topics covered but not limited to parametric modeling, civil, mechanical piping, architectural applications, structural, electro-mechanical, 3-D solids, exploration of application software and the integration of CAD/CAM. *Prerequisites:* DRF 211 or 212 and DRF 201. Lecture 3 hours per week.

■ Economics (ECO)

ECO 120 Survey of Economics (3 cr.) Presents a broad overview of economic theory, history, development, and application. Introduces terms, definitions, policies, and philosophies of market economies. Provides some comparison with other economic systems. Includes basic microeconomic and macroeconomic concepts. Lecture 3 hours per week.

ECO 201 Principles of Macroeconomics (3 cr.) The study of aggregate economics activity. Topics include national income and output, unemployment, money, and inflation. Lecture 3 hours per week.

ECO 202 Principles Microeconomics (3 cr.) The study of economic behavior at the level of individual households and firms. Topics include scarcity and choice, demand and supply, production and cost, and product and factor markets. Lecture 3 hours per week.

■ Education (EDU)

EDU 200 Introduction to Teaching as a Profession (3 cr.) Provides an orientation to the teaching profession in Virginia, including historical perspectives, current issues, and future trends in education on the national and state levels. Emphasizes information about teacher licensure examinations, steps to certification, teacher preparation and induction programs, and attention to critical shortage areas in Virginia. Includes supervised field placement (recommended: 40 clock hours) in a K-12 school. *Prerequisite:* Successful completion of 24 credits of transfer courses. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

■ Electrical Technology (ELE)

ELE 111-112 Home Electric Power I-II (3 cr.) (3 cr.) Teaches fundamentals of residential power distribution, circuits, enclosures, protective devices, transformers. Studies various charts and tables of the national electrical code. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

ELE 113-114 Electricity I-II (3 cr.) (3 cr.) Teaches principles of electricity covering fundamentals, devices and components in both DC and AC circuits. *Prerequisite:* MTH 103 or equivalent placement test scores. *ELE 123 must be taken concurrently with ELE 113 and ELE 124 must be taken concurrently with ELE 114.* Lecture 3 hours per week.

ELE 118 Practical Electricity (2 cr.) Teaches fundamentals of electricity, terminology and symbols, diagrams, the principles essential to the understanding of general practices, safety and the practical aspects of residential and non-residential wiring, electrical installation. May require preparation of a report as an out-of-class activity. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

ELE 123-124 Electrical Applications I-II (1 cr.) (1 cr.) Provides laboratory and shop assignments/jobs as applied to fundamental principles of electricity with emphasis on measurements and evaluation of electrical components, devices and circuits. Laboratory 3 hours per week.

ELE 136 National Electrical Code-Commercial (3 cr.) Provides comprehensive study of the purposes and interpretations of national electrical wiring methods, including state and local regulations. *Prerequisite:* MTH 103 or equivalent placement test scores. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

ELE 137 National Electrical Code-Industrial (3 cr.) Provides comprehensive study of the purposes and interpretations of the National Electrical Code that deals primarily with industrial wiring methods, including state and local regulations. May include preparation of a report as an out-of-class activity. *Prerequisite:* MTH 103 or equivalent placement test scores. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

ELE 140 Basic Electricity and Machinery (4 cr.) Studies direct and alternating current principles, resistors, magnetism, capacitors, protection systems, switches, controls and power distribution for industrial machine shops. Emphasizes test procedures and safety. May require preparation of a report as an out-of-class activity. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

ELE 148 Conduit and Pipe Fitting (3 cr.) Studies raceway design, conductor fill, layout, cutting, reaming, bending, mounting, and fitting for various conduits, fluid, and air systems. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

ELE 156 Electrical Control Systems (3 cr.) Includes troubleshooting and servicing electrical controls, electric motors, motor controls, motor starters, relays, overloads, instruments and control circuits. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

ELE 211-212 Electrical Machines I-II (4 cr.) (4 cr.) Studies the construction, theory of operations and applications of DC and AC machines. *Prerequisites:* *ELE 114 is a prerequisite for ELE 211.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

ELE 233-234 Programmable Logic Controller Systems I-II (3 cr.) (3 cr.) Teaches operating and programming of programmable logic controllers. Covers analog and digital interfacing and communication schemes as they apply to system. *Prerequisite:* ETR 156 and ETR 211 or equivalent or permission of instructor. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

ELE 239 Programmable Controllers (2 cr.) Deals with installation, programming, interfacing, and concepts of troubleshooting programmable controllers. *Co/Prerequisite:* ETR 156 and ELE 211 or equivalent, or permission of instructor. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

■ Electronics Technology (ETR)

ETR 100 Electronic Problem Solving Laboratory (1 cr.) Focuses on enabling the student to improve skills in various areas of study. Includes electronic measurements, circuit assembly, troubleshooting circuits, and computer applications to problem solving. Laboratory 3 hours per week.

ETR 105 Video Techniques (3 cr.) Studies systems and hardware associated with electronic imaging. Includes video cameras, monitors, receivers, VCR's and T.V.R.O. May require preparation of a report as an out-of-class activity. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

ETR 106 Programming Methods for Electrical/Electronic Calculations (2 cr.) Teaches the application of a high-level language to electrical and electronic problem solving and circuit analysis. Introduces an operating system. Includes instruction in basic computing concepts, components, and operations and in the use of an integrated software package. Lecture 1 hours. Laboratory 3 hours. Total 4 hours per week.

ETR 113-114 D.C. and A.C. Fundamentals I-II (3 cr.) (3 cr.) Studies D.C. and A.C. circuits, basic electrical components, instruments, network theorems, and techniques used to predict, analyze and measure electrical quantities. *Co-requisite: MTH 163 or equivalent.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

ETR 115 D.C. and A.C. Circuits (3 cr.) Studies current flow in direct and alternating current circuits with emphasis upon practical problems. Reviews the mathematics used in circuit calculations. Introduces concepts of resistance, capacitance, inductance and magnetism. Focuses on electronics/circuits application. *Prerequisite: ETR 114.* Lecture 3 hours per week.

ETR 123-124 Electronic Applications I-II (2 cr.) (1 cr.) Provides laboratory and shop experience as applied to basic electronic devices, circuits and systems with emphasis on practical measurements. Laboratory 6 hours per week for ETR 123 and 3 hours per week for ETR 124.

ETR 141-142 Electronics I-II (3 cr.) (3 cr.) Introduces electronic devices as applied to basic electronic circuits and systems. *Prerequisites: ETR 114 is a prerequisite for ETR 141.* Lecture 3 hours per week.

ETR 146 Electronic Test and Measuring Equipment (4 cr.) Teaches fundamentals of test and measurement equipment. Includes the use of analog and digital meters, signal generators, oscilloscopes, bridges and other equipment currently in use. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

ETR 147 Amplifiers (4 cr.) Teaches design concepts of untuned voltage and power amplifiers, special amplifying circuits, audio distribution, and audio devices with correlated laboratory. *Corequisite: knowledge of D.C./A.C. theory, or permission of instructor.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

ETR 148 Amplifiers and Integrated Circuits (4 cr.) Studies devices and amplifiers, solid state and thermionic devices with emphasis on analysis and design of the time and frequency domain. Included also are linear and nonlinear op-amps circuits. May include summing and integrating amplifiers, choppers, modulators and other circuits and new devices. *Prerequisite: ETR 147 or instructor's approval.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

ETR 149 PC Repair (3 cr.) Teaches the maintenance, troubleshooting and repair of personal computer systems. Uses IBM or compatible computer systems to provide fault isolation drill and practice. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

ETR 151-152 Electronic Circuits and Troubleshooting I-II (2 cr.) (2 cr.) Studies analog and digital circuits and systems with standard circuit test and troubleshooting procedures. Lecture 2 hours per week.

ETR 214 Advanced Circuits and New Devices (2 cr.) Includes lectures and demonstrations on the latest developments in electronics with emphasis on operational amplifiers and pulse circuits. Lecture 2 hours per week.

ETR 223-224 Communications I-II (5 cr.) (5 cr.) Teaches techniques of modern communications consisting of broadcast communications, data communications, and transponder systems. Includes theory and laboratory analysis of audio, radio frequency, microwave and light devices and circuits. *Prerequisite for ETR 223: ETR 142.* Lecture 3 hours. Laboratory 6 hours. Total 9 hours per week.



ETR 233-234 Electronics Applications III-IV(1 cr.) (1 cr.) Provides laboratory and shop experiences related to advanced electronics systems and devices including microcomputers. Laboratory 3 hours per week.

ETR 263 Microprocessor Application (4 cr.) Provides an intensive study of fundamentals of microprocessors including architecture, internal operations, memory, I/O devices machine level programming and interfacing. *Prerequisite: ETR 106.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

ETR 265 Advanced Microprocessors (5 cr.) Provides an in-depth treatment of microprocessors including machine level programming, memory structure, serial and parallel I/O devices. *Prerequisite: ETR 263.* Lecture 4 hours. Laboratory 3 hours. Total 7 hours per week.

ETR 279 Digital Principles, Terminology and Applications (4 cr.) Studies digital principles, terminology and applications covering number systems, arithmetic, Boolean algebra, karnaugh maps and advanced logic circuits. Includes the study of registers, encoding and decoding, and multiplexing; such as A/D, D/A displays and others. *Prerequisite: ETR 114.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

ETR 285 Fundamentals of Microcomputer Repair (4 cr) Provides the student with an exposure to the various techniques and procedures used to troubleshoot a microcomputer. May include an overview of a particular microprocessor system, use of isolation flow charts, test point charts, prints, diagnostic routines, component testing and fault isolation labs. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

■ Emergency Medical Services (EMS)

EMS 100 CPR for Healthcare Providers (1 cr.) Provides instruction in Cardiopulmonary Resuscitation that meets current Emergency Cardiac Care (ECC) guidelines for Cardiopulmonary Resuscitation education for Healthcare Providers. Lecture 1 hour per week.

EMS 111 Emergency Medical Technician-Basic (6 cr.) Prepares student for certification as a Virginia and National Registry EMT-Basic. Includes all aspects of pre-hospital basic life support as defined by the Virginia Office of Emergency Medical Services curriculum for Emergency Medicine Technician Basic. *Prerequisite: CPR certification at the Health Care Provider level. Co-requisite: EMS 120.* Lecture 4 hours. Laboratory 4 hours. Total 8 hours per week.

EMS 112 Emergency Medical Technician-Basic I (3 cr.) Prepares student for certification as a Virginia and/or National Registry EMT-Basic. Includes all aspects of pre-hospital basic life support as defined by the Virginia office of Emergency Medical Services curriculum for Emergency Medicine Technician Basic. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

EMS 113 Emergency Medical Technician-Basic II (3 cr.) Continues preparation of student for certification as a Virginia and/or National Registry EMT-Basic. Includes all aspects of pre-hospital basic life support as defined by the Virginia Office of Emergency Medical Services curriculum for Emergency Medicine Technician Basic. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

EMS 120 Emergency Medical Technician - Basic Clinical (1 cr.) Observes in a program approved clinical/field setting. Includes topics for both EMS 111 and EMS 113, dependent upon the program in which the student is participating and is a co-requisite to both EMS 111 and EMS 113. Lecture 1 hour per week.

EMS 151 Introduction to Advanced Life Support (4 cr.) Prepares the student for Virginia Enhanced certification eligibility and begins the sequence for National Registry Intermediate and/or Paramedic certification. Includes the theory and application of the following: foundations, human systems, pharmacology, overview of shock, venous access, airway management, patient assessment, respiratory emergencies, allergic reaction, and assessment based management. Conforms at a minimum to the Virginia Office of Emergency Medical Services curriculum. *Co-requisite: EMS 170.* Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

EMS 153 Basic ECG Recognition (2 cr.) Focuses on the interpretation of basic electrocardiograms (ECG) and their significance. Includes an overview of anatomy and physiology of the cardiovascular system including structure, function and electrical conduction in the heart. Covers advanced concepts that build on the knowledge and skills of basic dysrhythmia determination and introduction to 12 lead ECG. Lecture 2 hours per week.

EMS 155 ALS - Medical Care (4 cr.) Continues the Virginia Office of Emergency Medical Services Intermediate and/or Paramedic curricula. Includes ALS pharmacology, drug and fluid administration with emphasis on patient assessment, differential diagnosis and management of multiple medical complaints. Includes, but are not limited to conditions relating to cardiac, diabetic, neurological, non-traumatic abdominal pain, environmental, behavioral, gynecology, and toxicological disease conditions. *Prerequisites: Current EMT-B certification, EMS 151 and EMS 153.* Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

EMS 157 ALS - Trauma Care (3 cr.) Continues the Virginia Office of Emergency Medical Services Intermediate and/or Paramedic curricula. Utilizes techniques which will allow the student to utilize the assessment findings to formulate a field impression and implement the treatment plan for the trauma patient. *Prerequisites: Current EMT-B certification and EMS 151.* Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

EMS 159 ALS - Special Populations (2 cr.) Continues the Virginia office of Emergency Medical Services Intermediate and/or Paramedic curricula. Focuses on the assessment and management of specialty patients including obstetrical, neonates, pediatric, and geriatrics. *Prerequisites:* EMS 151 and EMS 153. Pre or co-requisite: EMS 155. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

EMS 161 Basic Trauma Life Support (BTLS) (1 cr.) Offers instruction for students in current topics of care for trauma patients and offers certification as a Basic Trauma Life Support Provider (BTLS) as defined by the American College of Emergency Physicians. *Prerequisites:* Current certification/licensure as an EMS provider or other allied healthcare provider. Lecture 1 hour per week.

EMS 162 Pediatric Basic Trauma Life Support (PBTLs) (1 cr.) Offers instruction for students in current topics of care for trauma patients and offers certification as a Pediatric Basic Trauma Life Support Provider (PBTLs) as defined by the American College of Emergency Physicians. *Prerequisites:* Current certification/licensure as an EMS provider or other allied healthcare provider. Lecture 1 hour per week.

EMS 165 Advanced Cardiac Life Support (ACLS) (1 cr.) Prepares for certification as an Advanced Cardiac Life provider. Follows course as defined by the American Heart Association. *Prerequisites:* EMS 100, 153 or equivalent. Lecture 1 hour per week.

EMS 169 Pediatric Advanced Life Support (PALS) (1 cr.) Prepares the student for certification as a pediatric advanced life support provider as defined by the American Heart Association. Covers primary assessment and emergency care of infants and children. Lecture 1 hour per week.

EMS 170 ALS Internship I (2 cr.) Begins the first in a series of clinical experiences providing supervised direct patient contact in appropriate patient care facilities in and out of hospitals. Includes but not limited to patient care units such as the Emergency Department, Critical Care units, Pediatric, Labor and Delivery, Operating Room, Trauma centers and various advanced life support units. Internship 6 hours per week.

EMS 172 ALS Clinical Internship II (2 cr.) Continues with the second in a series of clinical experiences providing supervised direct patient contact in appropriate patient care facilities in and out of hospitals. Includes but not limited to patient care units such as the Emergency Department, Critical Care units, Pediatric, Labor and Delivery, Operating Room and Trauma Centers. *Co-requisite:* EMS 151. Internship 6 hours per week.

EMS 173 ALS Field Internship II (1 cr.) Continues with the second in a series of field experiences providing supervised direct patient care in out-of-hospital advanced life support units. Internship 3 hours per week.

EMS 201 EMS Professional Development (2 cr.) Prepares students for Paramedic certification at the National Registry Level by fulfilling community activism, personal wellness, resource management, ethical considerations in leadership and research objectives in the Virginia Office of Emergency Medical Services Paramedic curriculum. Lecture 2 hours per week.

EMS 205 Advanced Pathophysiology (3 cr.) Focuses on the pathological processes of disease with emphasis on the anatomical and physiological alterations of the human body by systems. Includes diagnosis and management appropriate to the advanced health care provider in and out of the hospital environment. Lecture 3 hours per week.

EMS 207 Advanced Patient Assessment (3 cr.) Focuses on the principles of normal and abnormal physical exam. Emphasizes the analysis and interpretation of physiological data to assist in patient assessment and management. Applies principles during the assessment and management of trauma, medical, and specialty patients in laboratory environment. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

EMS 209 Advanced Pharmacology (4 cr.) Focuses on the principles of pharmacokinetics, pharmacodynamics and drug administration. Includes drug legislation, techniques of medication administration, and principles of math calculations. Emphasizes drugs used to manage respiratory, cardiac, neurological, gastrointestinal, fluid and electrolyte and endocrine disorders and includes classification, mechanism of action, indications, contraindications, precautions, and patient education. Incorporates principles related to substance abuse and hazardous materials. Applies principles during the assessment and management of trauma, medical, and specialty patients in a laboratory environment. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

EMS 211 Operations (2 cr.) Prepares the student in the theory and application of the following: medical incident command, rescue awareness and operations, hazardous materials incidents, and crime scene awareness. (Conforms to the current Virginia Office of Emergency Medical Services curriculum for EMT-Paramedics.) Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

EMS 215 Registry Review (1 cr.) Reviews material covered in the intermediate/paramedic program. Prepares the student for National Registry testing. Lecture 1 hour per week.

EMS 216 Paramedic Review (1 cr.) Provides the student with intensive review for the practical and written portions of the National Registry Paramedic exam. May be repeated once, for credit. Lecture 1 hour per week.

EMS 242 ALS Clinical Internship III (2 cr.) Continues with the third in a series of clinical experiences providing supervised direct patient contact in appropriate patient care facilities in-and-out of hospitals. Includes, but not limited to patient care units such as the Emergency Department, Critical Care units, Pediatric, Labor and Delivery, Operating Room, Trauma Centers and various advanced life support units. Internship 6 hours per week.

EMS 243 ALS Field Internship III (2 cr.) Continues with the third in a series of field experiences providing supervised direct patient care in out-of-hospital advanced life support units. Internship 6 hours per week.

EMS 244 ALS Clinical Internship IV (1 cr.) The fourth in a series of clinical experiences providing direct patient contact in appropriate patient care facilities in-and-out of hospitals. Includes, but not limited to patient care units such as the Emergency Department, Critical Care units, Pediatric, Labor and Delivery, Operating Room and Trauma Centers. May be repeated as necessary. Internship 3 hours per week.

EMS 245 ALS Field Internship IV (1 cr.) Continues with the fourth in a series of field experiences providing supervised direct patient care in out-of-hospital advanced life support units. May be repeated as necessary. Internship 3 hours per week.

■ Engineering (EGR)

EGR 100 Engineering Technology Orientation (1 cr.) Focuses on the roles and responsibilities of the engineering team, professional ethics, problem solving with hand calculator and computer applications. Laboratory 2 hours per week.

EGR 120 Introduction to Engineering (1 cr.) Introduces the engineering profession, professional concepts, ethics, and responsibility. Reviews hand calculators, number systems, and unit conversions. Introduces the personal computer and operating systems. Includes engineering problem solving techniques using computer software. Lecture 1 hours. Total 1 hour per week.

EGR 126 Computer Programming for Engineers (3 cr.) Introduces computers, their architecture and software. Teaches program development using flowcharts. Solves engineering problems involving programming in languages such as FORTRAN, PASCAL, or C++. *Prerequisite: MTH 163.* Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

EGR 127 Introduction to Computer Programming (2 cr.) Introduces programming in a higher level language such as FORTRAN, BASIC or PASCAL, or C++ on the microcomputer. Uses the operating system, packaged software and peripheral devices. Emphasizes engineering program problem solving. Includes instruction in basic computing concepts, components, and operations and in the use of an integrated software package. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

EGR 135 Statics for Engineering Technology (3 cr.) Introduces Newton's Laws, resultants and equilibrium of force systems, analysis of trusses and frames. Teaches determination of centroids, distributed loads and moments of inertia. Covers dry friction and force systems in space. *Prerequisite: MATH 115.* Lecture 3 hours per week.

EGR 136 Strength of Materials for Engineering Technology (3 cr.) Presents concepts of stress and strain. Focuses on analysis of stresses and deformations in loaded members, connectors, shafts, beams, columns and combined stress. *Prerequisite: EGR 135.* Lecture 3 hours per week.

EGR 140 Engineering Mechanics - Statics (3 cr.) Introduces mechanics of vector forces and space, scalar mass and time, including S.I. and U.S. customary units. Teaches equilibrium, free-body diagrams, moments, couples, distributed forces, centroids, moments of inertia analysis of two-force and multi-force members and friction and internal forces. *Pre or Co-requisite: PHY 241.* Lecture 3 hours per week.

EGR 245 Engineering Mechanics - Dynamics (3 cr.) Presents approach to kinematics of particles in linear and curvilinear motion. Includes kinematics of rigid bodies in plane motion. Teaches Newton's second law, work-energy and power, impulse and momentum, and problem solving using computers. *Prerequisite: EGR 140.* Lecture 3 hours per week.

EGR 246 Mechanics of Materials (3 cr.) Teaches concepts of stress, strain, deformation, internal equilibrium, and basic properties of engineering materials. Analyzes axial loads, torsion, bending, shear and combined loading. Studies stress transformation and principle stresses, column analysis and energy principles. *Prerequisite: EGR 140.* Lecture 3 hours per week.

EGR 248 Thermodynamics for Engineering (3 cr.) Studies formulation of the first and second law of thermodynamics. Presents energy conversion, concepts of energy, temperature, entropy, and enthalpy, equations of state of fluids. Covers reversibility and irreversibility in processes, closed and open systems, cyclical processes and problem solving using computers. *Prerequisite: EGR 140.* Lecture 3 hours per week.

■ English (ENG)

ENG 01 Preparing for College Writing I (3 cr.) Helps students discover and develop writing processes needed to bring their proficiency to the level necessary for entrance into their respective curricula. Guides students through the process of starting, composing, revising, and editing. Lecture 3 hours per week.

ENG 02 Spelling and Vocabulary Study (4 cr.) Helps students to improve spelling and develop vocabulary. Reviews common spelling patterns. Familiarizes the student with basic prefixes, suffixes, root words, and other word formations. Teaches effective use of the dictionary and thesaurus. Stresses recognizing words in reading context and using them effectively in writing. Lecture 4 hours per week.

ENG 03 Preparing for College Writing II (3 cr.) Emphasizes strategies within the writing process to help students with specific writing situations. Develops techniques to improve clarity of writing and raise proficiency to the level necessary for entrance into particular curricula. Lecture 3 hours per week.

ENG 04 Reading Improvement I (4 cr.) Helps students improve their reading processes to increase their understanding of reading materials. Includes word forms and meanings, comprehension techniques, and ways to control reading pace. Lecture 4 hours per week.

ENG 05 Reading Improvement II (3 cr.) Helps students read critically and increase appreciation of reading. Guides students in making inferences, drawing conclusions, and detecting relationships between generalizations and supporting details. Includes interpreting graphic aids and basic library skills. Lecture 3 hours per week.

ENG 09 Individualized Instruction in Writing (1 cr.) Focuses on individual writing needs as determined by student and instructor. Provides support for students simultaneously enrolled in other courses or who want additional writing instruction in a tutorial setting. Co-requisite: ENG 111 and counselor approval. Variable hours per week.

ENG 100 Basic Occupational Communication (3 cr.) Develops ability to communicate in occupational situations. Involves writing, reading, speaking, and listening. Builds practical skills such as handling customer complaints, writing various types of letters, and preparing for a job interview. Includes instruction in networked information resources and in the use of telecommunication software. (Intended for certificate and diploma students.) *Prerequisite: Satisfactory score on placement test.* Lecture 3 hours per week.

ENG 111 College Composition I (3 cr.) Introduces students to critical thinking and the fundamentals of academic writing. Through the writing process, students refine topics: develop and support ideas; investigate, evaluate, and incorporate appropriate resources; edit for effective style and usage; and determine appropriate approaches for a variety of contexts, audiences, and purposes. Writing activities will include exposition and argumentation with at least one researched essay. Lecture 3 hours per week.

ENG 112 College Composition II (3 cr.) Continues to develop college writing with increased emphasis on critical essays, argumentation, and research, developing these competencies through the examination of a range of texts about the human experience. Requires students to locate, evaluate, integrate, and document sources and effectively edit for style and usage. Lecture 3 hours per week.

ENG 121-122 Introduction to Journalism I-II (3 cr.) (3 cr.) Introduces students to all news media, especially news gathering and preparation for print. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 131 Technical Report Writing I (3 cr.) Offers a review of organizational skills including paragraph writing and basic forms of technical communications, various forms of business correspondence, and basic procedures for research writing. Includes instruction and practice in oral communication skills. *Prerequisite: ENG 111.* Lecture 3 hours per week.

ENG 150 Children's Literature (3 cr.) Surveys the history of children's literature, considers learning theory and developmental factors influencing reading interests, and uses bibliographic tools in selecting books and materials for recreational interests and educational needs of children. Lecture 3 hours per week.

ENG 211-212 Creative Writing I-II (3 cr.) (3 cr.) Introduces the student to the fundamentals of writing imaginatively. Students write in forms to be selected from poetry, fiction, drama, and essays. Lecture 3 hours per week.

ENG 241, 242 Survey of American Literature I, II (3 cr.) (3 cr.) Examines American literary works from colonial times to the present, emphasizing the ideas and characteristics of our national literature. Involves critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 243, 244 Survey of English Literature I, II (3 cr.) (3 cr.) Studies major English works from the Anglo-Saxon period to the present, emphasizing ideas and characteristics of the British literary tradition. Involves critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 251, 252 Survey of World Literature I, II (3 cr.) (3 cr.) Examines major works of world literature. Involves critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 256 Literature of Science Fiction (3 cr.) Examines the literary and social aspects of science fiction, emphasizing development of ideas and techniques through the history of the genre. Involves critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 268 The Modern Drama (3) Studies the modern drama. Emphasizes the understanding and enjoyment of dramatic literature. Requires critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 278 Appalachian Literature (3 cr.) Examines selected works of outstanding authors of the Appalachian region. Involves critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

ENG 288 Appalachian Folklore (3 cr.) Examines folk culture and material lore representative of the southern mountain region. Highlights the importance of ballad, music, humor, and song associated with mountain life and demonstrates the legacy of folktale, legends, superstitions, and traditional storytelling found in these highlands. Includes the study of games, riddles, proverbs, customs, and rituals, beliefs and identifies handicrafts, structures, and art typical of this distinctive region. Involves field collections and critical reading and writing. *Prerequisite: ENG 112 or divisional approval.* Lecture 3 hours per week.

■ English as a Second Language (ESL)

ESL 11 English as a Second Language: Composition I (3 cr.) Provides instruction and practice in the writing process, emphasizing development of fluency writing and competence in structural and grammatical patterns of written English. Lecture 3 hours per week.

ESL 16 Oral and Written Communications III (3 cr.) Provides practice in the sound, stress, intonation, structural patterns, grammar, vocabulary, and idioms of advanced-level English with an emphasis on preparation for college-level English proficiency. Lecture 3 hours per week.

■ Environmental Science (ENV)

ENV 115 Water Purification (3 cr.) Explores principles of water purification including sedimentation, rapid sand filtration, chlorination, treatment, and prevention of disease. Studies fundamentals of bacteriology, mycology, and parasitology, emphasizing their relationships to community health. Includes soil, water, wastewater, and industrial microbiology. Lecture 2 hours. Laboratory 1 hour. Total 3 hours per week.

ENV 149 Wastewater Treatment Plant Operation (3 cr.) Teaches principles, practices and desired function and operation of a variety of wastewater treatment unity processes. Evaluates the operation of processes by determinations of the information and testing required for evaluation and performing the subsequent necessary calculations. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

ENV 170 Fundamentals of Energy Technology (2 cr.) Gives the student an overview of the field of energy conservation and use and provides descriptions of job functions typical to energy technicians. *Prerequisite: MTH 116 and ENG 111 or equivalents.* Lecture 2 hours per week.

■ Financial Services (FIN)

FIN 107 Personal Finance (3 cr.) Presents a framework of personal money management concepts, including establishing values and goals, determining sources of income, managing income, preparing a budget, developing consumer buying ability, using credit, understanding savings and insurance, providing for adequate retirement, and estate planning. Lecture 3 hours per week.

FIN 108 Principles of Securities Investment (3 cr.) Provides an introduction to the fundamentals of the security investment process. Reviews the investment strategy associated with various types of stock orders, discusses the fundamental and technical approaches to common stock analysis and examines bond and preferred stock pricing mechanisms. Also reviews the unique aspects of derivative security, mutual fund, real estate, and limited partnership investments. Lecture 3 hours per week.

FIN 215 Financial Management (3 cr.) Introduces basic financial management topics including statement analysis, working capital, capital budgeting, and long-term financing. Focuses on Net Present Value and Internal Rate of Return techniques, lease vs. buy analysis, and Cost of Capital computations. Uses problems and cases to enhance skills in financial planning and decision making. Lecture 3 hours per week.

■ French (FRE)

FRE 101-102 Beginning French I-II (4 cr.) (4 cr.) Introduces understanding, speaking, reading, and writing skills and emphasizes basic French sentence structure. Lecture 4 hours per week.

FRE 201-202 Intermediate French I-II (4 cr.) (4 cr.) Continues to develop understanding, speaking, reading, and writing skills. French is used in the classroom. *Prerequisite: FRE 102 or equivalent.* Lecture 4 hours per week.

■ Geography (GEO)

GEO 200 Introduction to Physical Geography (3 cr.) Studies major elements of the natural environment including earth sun relationship, land forms, weather and climate, natural vegetation and soils. Introduces the student to types and uses of maps. Lecture 3 hours per week.

GEO 210 People and the Land: Introduction to Cultural Geography (3 cr.) Focuses on the relationship between culture and geography. Presents a survey of modern demographics, landscape modification, material and non-material culture, language, races and ethnicity, religion, politics, and economic activities. Introduces the student to types and uses of maps. Lecture 3 hours per week.

GEO 220 World Regional Geography (3 cr.) Studies physical and cultural characteristics of selected geographical regions of the world. Focuses upon significant problems within each of the regions, and examines the geographical background of those problems. Introduces the student to types and uses of maps. Lecture 3 hours per week.

■ Geology (GOL)

GOL 110 Earth Science (4 cr.) Examines the dynamics of the earth and its relation to the solar system. Applies the principles of geology, oceanography, meteorology, and astronomy in a multi-disciplinary science environment. Stresses the effects of geologic processes on the environment. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

■ Health (HLT)

HLT 100 First Aid and Cardiopulmonary Resuscitation (2 cr.) Focuses on the principles and techniques of safety, first aid, and cardiopulmonary resuscitation. Lecture 2 hours per week.

HLT 110 Concepts of Personal and Community Health (3 cr.) Studies the concepts related to the maintenance of health, safety, and the prevention of illness at the personal and community level. Lecture 3 hours per week.

HLT 116 Introduction to Personal Wellness Concepts (2 cr.) Introduces students to the dimensions of wellness including the physical, emotional, environmental, spiritual, occupational, and social components. Lecture 2 hours per week.

HLT 121 Introduction to Drug Use and Abuse (3 cr.) Explores the use and abuse of drugs in contemporary society with emphasis upon sociological, physiological, and psychological effects of drugs. Lecture 3 hours per week.

HLT 135 Child Health and Nutrition (3 cr.) Focuses on the physical needs of the preschool child and the methods by which these are met. Emphasizes health routines, hygiene, nutrition, feeding and clothing habits, childhood diseases, and safety as related to health growth and development. Lecture 3 hours per week.

HLT 138 Principles of Nutrition (2 cr.) Studies nutrient components of food, including carbohydrates, fats, proteins, vitamins, minerals and water. Provides a behavioral approach to nutrient guidelines for the development and maintenance of optimum wellness. Lecture 2 hours per week.

HLT 141 Introduction to Medical Terminology (2 cr.) Focuses on medical terminology for students preparing for careers in the health professions. Lecture 2 hours per week.

HLT 250 General Pharmacology (3 cr) Emphasizes general pharmacology for the health related professions covering general principles of drug actions/reactions, major drug classes, specific agent within each class and routine mathematical calculations needed to determine desired dosages. Lecture 3 hours per week.

HLT 261-262 Basic Pharmacy I-II (3 cr.) (3 cr.) Explores the basics of general pharmacy, reading prescriptions, symbols, packages, pharmacy calculations. Teaches measuring compounds of drugs, dosage forms, drug laws, and drug classifications. Lecture 3 hours per week.

HLT 263-264 Basic Pharmacy Lab I-II (1 cr.) (1 cr.) Provides practical experience to supplement instruction in HLT 261-262. Should be taken concurrently with HLT 261-262, in appropriate curricula, as identified by the college. Laboratory 3 hours per week.

■ Health Information Technology (HIT)

HIT 150 Health Records Management (3 cr.) Presents documentation format and content of the medical record relevant to the coding function. Introduces application of standard techniques for filing, maintenance, and acquisition of health information. Examines the processes of collecting, computing, analyzing, interpreting, and presenting data related to health care services. Includes legal and regulatory guidelines for the control and use of health information data. Lecture 3 hours per week.

HIT 253 Health Records Coding (4 cr.) Examines the development of coding classification systems. Introduces ICD-9-CM coding classification system, its format and conventions. Stresses basic coding steps and guidelines according to body systems. Provides actual coding exercises in relation to each system covered. *Prerequisite: BIO 141 and 142 or permission of instructor.* Lecture 4 hours per week.

HIT 254 Advanced Coding and Reimbursement (4 cr.) Stresses advanced coding skills through practical exercises using actual medical records. Introduces CPT-4 coding system and guidelines for outpatient/ambulatory surgery coding. Introduce prospective payment system and its integration with ICD-9-CM coding. *Prerequisite: BIO 141 and 142 or permission of instructor.* Lecture 4 hours per week.

■ History (HIS)

HIS 101, 102 History of Western Civilization I, II (3 cr.) (3 cr.) Examines the development of western civilization from ancient times to the present. The first semester ends with the seventeenth century; the second semester continues through modern times. Lecture 3 hours per week.

HIS 111, 112 History of World Civilization I, II (3 cr.) (3 cr.) Surveys Asian, African, Latin American, and European civilizations from the ancient period to the present. Lecture 3 hours per week.

HIS 121, 122 United States History I, II (3 cr.) (3 cr.) Surveys United States history from its beginning to the present. Lecture 3 hours per week.

HIS 141, 142 African-American History I, II (3 cr.) (3 cr.) Surveys the history of black Americans from their African origins to the present. Offered alternate years. Lecture 3 hours per week.

HIS 255 History of Chinese Culture and Institutions (3 cr.) Examines traditional Chinese social, political, economic, and military institutions. Also examines major literary, artistic and intellectual achievements from pre-historic times to the present. Lecture 3 hours per week.

HIS 256 History of Japanese Culture and Institutions (3 cr.) Examines traditional Japanese social, political, economic, and military institutions. Also examines major literary, artistic and intellectual achievements from pre-historic times to the present. Lecture 3 hours per week.

HIS 269 Civil War and Reconstruction (3 cr.) Studies factors that led to the division between the States. Examines the war, the home fronts, and the era of Reconstruction. Lecture 3 hours per week.

HIS 281,282 History of Virginia I, II (3 cr.) (3 cr.) Examines the cultural, political, and economic history of the Commonwealth from its beginning to the present. Lecture 3 hours per week.

■ Horticulture (HRT)

HRT 108 Plant Identification (2 cr.) Studies the identification, culture and uses of common woody and herbaceous landscape plants. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

HRT 110 Principles of Horticulture (3 cr.) Introduces concepts of plant growth and development. Covers horticultural practices, crops and environmental factors affecting plant growth. Lecture 3 hours per week.

HRT 111 Landscape Horticulture (3 cr.) Teaches horticulture and landscaping for home planning and planting. Covers plant taxonomy, plant selection, soil testing, fertilizers, and pest control. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

HRT 205 Soils (3 cr.) Teaches theoretical and practical aspects of soils and other growing media. Examines media components, chemical and physical properties, and soil organisms. Discusses management and conservation. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

HRT 207 Plant Pest Management (3 cr.) Teaches principles of plant pest management. Covers morphology and life cycles of insects and other small animal pests and plant pathogens. Lab stresses diagnosis, chemical and non-chemical control of specific pests, and pesticide safety. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

HRT 225 Nursery and Garden Center Management (3 cr.) Covers aspects of nursery management, including culture, plant handling, and facilities layout. Discusses aspects of garden center management, including planning and layout, purchasing, product selection, marketing, merchandising, and display. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

HRT 227 Professional Landscape Management (3 cr.) Focuses on basic practices and techniques involving landscape management. Includes development of a year-round management calendar and preparation of bid and contract proposals. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

HRT 231 Planting Design I (3 cr.) Applies landscape theory and principles of drawing to the planning of residential and small scale commercial landscape designs. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

HRT 269 Professional Turf Care (3 cr.) Covers turfgrass identification selection, culture, propagation, and pest control. Surveys commercial turf care operations and use of common equipment. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

■ Human Services (HMS)

HMS 100 Introduction to Human Services (3 cr.) Introduces human service agencies, roles and careers. Presents an historical perspective of the field as it relates to human services today. Additional topics include values clarification and needs of target populations. Lecture 3 hours per week.

HMS 121 Basic Counseling Skills I (3 cr.) Develops skills needed to function in a helping relationship. Emphasizes skills in attending, listening and responding. Clarifies personal skill strengths, deficits and goals for skill improvement. Lecture 3 hours per week.

HMS 210 Marriage and Family Relationships (3 cr.) Provides an overview of several areas of research and theory related to marriage and family relationships over the life cycle. Lecture 3 hours per week.

HMS 231,232 Gerontology I,II (3 cr.) (3 cr.) Examines characteristics of the aging process and problems for the elderly. Considers both theoretical and applied perspectives on the following issues: biological, psychological, sociological, economic and political. Lecture 3 hours per week.

■ Humanities (HUM)

HUM 260 Survey of Twentieth-Century Culture (3 cr.) Explores literature, visual arts, philosophy, music, and history of our time from an interdisciplinary perspective. Lecture 3 hours per week.

■ Industrial Engineering Technology (IND)

IND 101-102 Quality Assurance Technology I-II (3 cr.) (3 cr.) Studies principles and techniques of quality engineering for the management, design engineering economics, production, and assurance of quality. Emphasizes fundamentals of total quality assurance for product and process control. May include design review, fundamentals of statistics procurement control, sampling and control chart systems, quality reporting, process capability analysis, tool and gauge control, document control, or troubleshooting quality control. Lecture 3 hours per week.

IND 103 Industrial Methods (1 cr.) Covers theoretical knowledge necessary for familiarization with common handtools, common power tools, measuring tools and techniques, fastening components and procedures, grinding operations, metal cutting operations, and other miscellaneous tasks. Lecture 1 hour per week.

IND 105 Nondestructive Inspection (NDI) and Testing (3 cr.) Studies nondestructive inspection and testing methods as they relate to industry. May include radiographic (RT), ultrasonic (UT), eddy current (ET), magnetic particle (MT), and liquid penetrant (PT) or other methods of testing. Lecture 3 hours per week.

IND 106 Industrial Engineering Technology (3 cr.) Introduces basic skills required for a career in industrial engineering technology. Includes basic statistics for engineering technicians, the SI system, graphic analysis, and careers as an industrial engineering technician. Lecture 3 hours per week.

IND 113 Materials and Processes in Manufacturing I (2 cr.) Studies materials and processes for the manufacture of products. Investigates the nature of various materials. Examines the manufacturing processes of industry and their effects on materials. Lecture 2 hours per week.

IND 126 Maintenance Scheduling and Planning (2 cr.) Studies organization of a maintenance department including planning, schedule, budgets, training, work measurement systems, labor standards, and preventive/predictive maintenance. Lecture 2 hours per week.

IND 137 Team Concepts & Problem Solving (3 cr.) Studies team concepts and problem solving techniques to assist project teams in improving quality and productivity. Provides knowledge of how to work as a team, plan and conduct good meetings, manage logistics and details, gather useful data, communicate the results and implement changes. Lecture 3 hours per week.

IND 138 Quality Improvement for Manufacturing (3 cr.) Provides instruction in the tools and methods for improving processes. Includes team organization and tools to gather, analyze, and display data. Lecture 3 hours per week.

IND 140 Quality Control (2 cr.) Studies history, structure, and organization of the quality control unit. May include incoming material control, product and process control, and cost control. Lecture 2 hours per week.

IND 145 Introduction to Metrology (3 cr.) Studies principles of measurement and calibration control, application of statistics to measurement processes, and standards of measurements in calibration. May include the use of gauges and instruments in modern production and dimensional control concepts. *Prerequisite:* IND 140. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

IND 146 Statistical Quality Control (3 cr.) Studies essentials and application of statistics in quality control function. May include definitions and uses of averages, standard deviations, ranges, and sampling plans. May discuss dependent and independent variables, and distribution probabilities. *Prerequisite:* IND 140. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

IND 148 Auditing Quality Assurance (2 cr.) Reviews quality audit principles relative to product and process reliability. Includes the design of an approach to the audit; fundamentals of an audit in terms of standards, procedures, methods, facilities control, and personnel; and reporting methods. *Prerequisite:* IND 140 or IND 146. Lecture 2 hours per week.

IND 165 Principles of Industrial Technology I (4 cr.) Introduces principle concepts of technology involving mechanical, fluid, electrical, and thermal power as they relate to force, work, and rate. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

IND 230 Applied Quality Control (3 cr.) Studies principles of inspection and quality assurance with emphasis on statistical process control. May include the setting up, maintaining, and interpreting of control charts, and review of basic metrology. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

IND 235 Statistical Quality Control (3 cr.) Gives overview of the quality control function within industry. May include the organization, cost, and techniques of quality control. Emphasizes essentials and applications of statistics in the quality control function. Lecture 3 hours per week.

IND 236 Total Quality Concepts (3 cr.) Discusses the fundamentals of Total Quality. Compares and contrasts the philosophies of the recognized experts on the subject. Discusses cultural change, continuous process improvement, and strategic planning. Introduces team skills and concepts. Emphasizes the systems approach to Total Quality philosophy. Lecture 3 hours per week.

IND 237 Fundamentals of ISO 9000 (3 cr.) Presents the basics of ISO 9000 standards. Focuses on the latest improvements of the standards and the redesigned quality concepts set forth by the International Organization for Standardization (ISO). Includes a historical overview of the evolution of quality systems and explains the purpose of ISO quality systems certification. Discusses implementation approaches. Lecture 3 hours per week.

■ Information Technology Database (ITD)

ITD 110 Web Page Design I (3 cr.) Stresses a working knowledge of web site designs, construction, and management using HTML or XHTML. Course content includes headings, lists, links, images, image maps, tables, forms and frames. *Prerequisite:* ITE 130. Lecture 3 hours per week.

ITD 136 Database Management Software (3 cr.) Covers an introduction to relational database theory and how to administer and query databases using multiple commercial database systems. *Prerequisite:* Recommended ITE 115. Lecture 3 hours per week.

ITD 210 Web Page Design II (3 cr.) Incorporates advanced techniques in web site planning, design, usability, accessibility, advanced site management, and maintenance utilizing web editor software(s). *Prerequisite:* ITD 110 and ITD 136 or instructor permission. Lecture 3 hours per week.

ITD 212 Interactive Web Design (3 cr.) Provides techniques in interactive design concepts to create cross-platform, low-bandwidth animations utilizing a vector based application. Emphasizes the importance of usability, accessibility, optimization and performance. *Prerequisite:* ITD 110. Lecture 3 hours per week.

■ Information Technology Essentials (ITE)

ITE 101 Introduction to Microcomputers (1 cr.) Examines concepts and terminology related to microcomputers and introduces specific uses of microcomputers. Lecture 1 hour per week.

ITE 102 Computers and Information Systems (2 cr.) Introduces terminology, concepts, and methods of using computers in information systems. This course teaches computer literacy, not intended for Information Technology majors. Lecture 2 hours per week.

ITE 115 Introduction to Computer Applications and Concepts (3 cr.) Covers computer concepts and internet skills, and uses a software suite which includes word processing, spreadsheet, database, and presentation software to demonstrate skills. *Recommended prerequisite keyboarding skills.* **Students may not get credit for both BUS 226 and ITE 115.** Lecture 3 hours per week.

ITE 127 Microcomputer Software: Beginning Windows (1 cr.) Imparts first-time users with sufficient information to make practical use of the Windows software package. This course also presents the basics of the features and applications included in the Windows operating system package. Lecture 1 hour per week.

ITE 130 Introduction to Internet Services (3 cr.) Provides students with a working knowledge of Internet terminology and services including e-mail, WWW browsing, search engines, ftp, file compression, and other services using a variety of software packages. Provides instruction for basic web page construction. Lecture 3 hours per week.

ITE 140 Spreadsheet Software (3 cr.) Covers the use of spreadsheet software to create spreadsheets with formatted cells and cell ranges, control pages, multiple sheets, charts, and macros. Topics include type and edit text in a cell, enter data on multiple worksheets, work with formulas and functions, create charts, pivot tables, and styles, insert headers and footers, and filter data. This course covers MOS Excel objectives. *Prerequisite:* BUS 226 or ITE 115. Lecture 3 hours per week.

ITE 141 Microcomputer Software: Spreadsheets (1 cr.) Provides first-time users with sufficient information to make practical use of spreadsheet software using the basic of building spreadsheets. Lecture 1 hour per week.

ITE 150 Desktop Database Software (3 cr.) Incorporates instruction in planning, defining, and using a database; performing queries; producing reports; working with multiple files; and concepts of database programming. Includes database concepts, principles of table design and table relationships, entering data, creating and using forms, using data from different sources, filtering, creating mailing labels. Covers MOS Access certification objectives. Lecture 3 hours per week.

ITE 151 Microcomputer Software: Database Management (1 cr.) Presents first-time users with sufficient information to make practical use of database management software using the basics of building databases. This course covers specific business applications. Lecture 1 hour per week.

ITE 170 Multimedia Software (3 cr.) Explores technical fundamentals of creating multimedia projects with related hardware and software. Students will learn to manage resources required for multimedia production and evaluation and techniques for selection of graphics and multimedia software. Lecture 3 hours per week.

ITE 215 Advanced Computer Applications and Integration (3 cr.) Incorporates advanced computer concepts including the integration of a software suite. *Prerequisite:* ITE 115. Lecture 3 hours per week.

ITE 221 PC Hardware and OS Architecture (4 cr.) Covers instruction about processors, internal functions, peripheral devices, computer organization, memory management, architecture, instruction format, and basic OS architecture. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

■ Information Technology Networking (ITN)

ITN 101 Introduction to Network Concepts (3 cr.) Provides instruction in networking media, physical and logical topologies, common networking standards and popular networking protocols. Emphasizes the TCP/IP protocol suite and related IP addressing schemes, including CIDR. Includes selected topics in network implementation, support and LAN/WAN connectivity. Lecture 3 hours per week.

ITN 154 Networking Fundamentals - Cisco (4 cr.) Provides introduction to networking using the OSI reference model. Includes data encapsulation, TCP/IP suite, routing, IP addressing, and structured cabling design and implementation. Lecture 4 hours per week.

ITN 155 Introductory Routing - Cisco (4 cr.) Features an introduction to basic router configuration using Cisco IOS software. Includes system components, interface configuration, IP network design, troubleshooting techniques, configuration and verification of IP addresses, and router protocols. Lecture 4 hours per week.

ITN 156 Basic Switching and Routing - Cisco (4 cr.) Centers instruction in LAN segmentation using bridges, routers, and switches. Includes fast Ethernet, access lists, routing protocols, spanning tree protocol, virtual LANS and network management. Lecture 4 hours per week.

ITN 157 WAN Technologies - Cisco (4 cr.) Concentrates on an introduction to Wide Area Networking (WANs). Includes WAN design, LAPB, Frame Relay, ISDN, HDLC, and PPP. Lecture 4 hours per week.

ITN 224 Web Server Management (3 cr.) Focuses on the Web Server as a workhorse of the World Wide Web (WWW). Teaches how to set up and maintain a Web server and provides in-depth instruction in Web server operations and provides hands-on experience in installation and maintenance of a Web server. *Prerequisites:* ITE 115, ITE 130 and ITP 112 or instructor approval. Lecture 3 hours per week.

■ Information Technology Programming (ITP)

ITP 100 Software Design (3 cr.) Introduces principles and practices of software development. Includes instruction in critical thinking, problem solving skills, and essential programming logic in structured and object-oriented design using contemporary tools. Lecture 3 hours per week.

ITP 112 Visual Basic.Net I (4 cr.) Concentrates instruction in fundamentals of object-oriented programming using Visual Basic.NET and the .NET framework. Emphasizes program construction algorithm development, coding debugging, and documentation of graphical user interface applications. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

ITP 120 Java Programming I (4 cr.) Entails instruction in fundamentals of object-oriented programming using Java. Emphasizes program construction, algorithm development, coding, debugging, and documentation of console and graphical user interface applications. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

ITP 212 Visual Basic.Net II (4 cr.) Includes instruction in application of advanced event-driven techniques to application development. Emphasizes database connectivity, advanced controls, web forms, and web services using Visual Basic.NET. *Prerequisite:* ITP 112. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

ITP 220 Java Programming II (4 cr.) Imparts instruction in application of advanced object-oriented techniques to application development using Java. Emphasizes database connectivity, inner classes, collection classes, networking, and threads. *Prerequisite:* ITP 120. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

ITP 225 Web Scripting Languages (3 cr.) Introduces students to the principles, systems, and tools used to implement Web applications. Provides students with a comprehensive introduction to the programming tools and skills required to build and maintain interactive Web sites. Students will develop Web applications utilizing client-side and server-side scripting languages along with auxiliary tools needed for complete applications. *Prerequisites:* ITD 110, ITP 100. Lecture 3 hours per week.

ITP 258 Systems Development Project (4 cr.) Provides instruction in application of life cycle system development methodologies using a case study which incorporates feasibility study system analysis, system design, program specification, and implementation planning. Course project assignment(s) will have students perform as members of system development teams. *Prerequisites:* ITD 110, ITD 136 and ITP 112 or instructor permission. Lecture 4 hours per week.

■ Instrumentation (INS)

INS 120 Introduction to Control Systems (2 cr.) Introduces types of control devices and systems including design, operation and function of components. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

■ Legal Administration (LGL)

LGL 110 Introduction to Law and the Legal Assistant (3 cr.) Introduces various areas of law in which a legal assistant may be employed. Includes study of court system (Virginia and federal) as well as a brief overview of criminal law, torts, domestic relations, evidence, ethics, the role of the legal assistant, and other areas of interest. Lecture 3 hours per week.

LGL 115 Real Estate Law for Legal Assistants (3 cr.) Studies law of real property and gives in-depth survey of the more common types of real estate transactions and conveyances such as deeds, contracts, leases, and deeds of trust. Focuses on drafting these various instruments and studies the system of recording and search of public documents. Lecture 3 hours per week.

LGL 117 Family Law (3 cr.) Studies elements of a valid marriage, grounds for divorce and annulment, separation, defenses, custody, support, adoptions, and applicable tax consequences. Includes property settlement, pre- and ante-nuptial agreements, pleadings, and rules of procedure. May include specific federal and Virginia consumer laws. *Prerequisite: LGL 110.* Lecture 3 hours per week.

LGL 125 Legal Research (3 cr.) Provides an understanding of various components of a law library, and emphasizes research skills through the use of digests, encyclopedias, reporter systems, codes, Shepard's Citations, ALR and other research tools. May include overview of computer applications and writing projects. Lecture 3 hours per week.

LGL 216 Trial Preparation and Discovery Practice (3 cr.) Examines the trial process, including the preparation of a trial notebook, pretrial motions, and orders. May include preparation of interrogatories, depositions, and other discovery tools used in assembling evidence in preparation for trial or an administrative hearing. Lecture 3 hours per week.

LGL 218 Criminal Law (3 cr.) Focuses on major crimes, including their classification, elements of proof, intent, conspiracy, responsibility, parties, and defenses. Emphasizes Virginia law. May include general principles of applicable constitutional law and criminal procedure. Lecture 3 hours per week.

LGL 220 Administrative Practice and Procedure (3 cr.) Surveys applicable administrative laws, including the Privacy Act, the Administrative Process Act, and Freedom of Information Act. Studies practice and procedure involving the ABC Commission, State Corporation Commission, Division of Workers' Compensation, Social Security Administration, the Virginia Employment Commission and other administrative agencies. Lecture 3 hours per week.

LGL 226 Real Estate Abstracting (3 cr.) Reviews aspects of abstracting title to real estate, recordation of land transactions, liens, grantor-grantee indices, warranties, covenants, restrictions and easements. *Prerequisite: LGL 115 or permission of instructor.* Lecture 3 hours per week.

■ Machine Technology (MAC)

MAC 116 Machinist Handbook (2 cr.) Uses the machinist handbook as a ready reference book of tabular data, formulas, designs and processes relating to machine technology. *Prerequisite: MTH 103.* Lecture 2 hours per week.

MAC 121-122-123 Numerical Control I-II-III (3 cr.) (3 cr.) (3 cr.) Focuses on numerical control techniques in metal forming and machine processes. Includes theory and practice in lathe and milling machine computer numerical control program writing, setup and operation. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MAC 146 Metals/Heat Treatment (2 cr.) Provides approach to metals and their structure. Gives working knowledge of methods of treating ferrous and non-ferrous metals. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

MAC 161-162 Machine Shop Practices I-II (3 cr.) (3 cr.) Introduces safety procedures, bench work, hand tools, precision measuring instruments, drill presses, cut-off saws, engine lathes, manual surface grinders, and milling machines. *Prerequisite: MAC 161 is a prerequisite or corequisite for MAC 162.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MAC 163-164 Machine Shop Practices III-IV (3 cr.) (3 cr.) Offers practice in the operation of the drill press, engine lathe, vertical milling machine, horizontal milling machine, and the surface grinder. Introduces practical heat treatment of directly hardenable steels commonly used in machine shops. *Prerequisite: MAC 161 and MAC 162.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MAC 181 Machine Blueprint Reading I (3 cr.) Introduces reading and interpreting blueprints and working drawings. Applies visualization of objects, sketching, and machine terminology. Lecture 3 hours per week.

MAC 231-232 Advanced Precision Machining I-II (3 cr.) (3 cr.) Teaches machining principles and calculations necessary for the precision required by the machinist. Emphasizes advanced lathe and mill work with concentration of fits, finishes, inspection, and quality control. Includes design and construction of specific projects to determine the student's operational knowledge of all equipment. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MAC 241-242 Advanced Machinery Procedures I-II (3 cr.) (3 cr.) Focuses on machining principles and calculations necessary for the precision required by the machinist. Emphasizes advanced lathe and mill work with concentration on fits, finishes, inspections, and quality control. Teaches design and construction of specific projects to determine the student's operational knowledge of all equipment. *Prerequisites:* MAC 163 and MAC 164. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

■ Marketing (MKT)

MKT 100 Principles of Marketing (3 cr.) Presents principles, methods and problems involved in the marketing of goods, services and ideas to consumers and organizational buyers. Discusses present-day problems and policies connected with distribution and sale of products, pricing, promotion, and buyer motivation. Examines variations of the marketing mix and market research, plus legal, social, and ethical, and international considerations in marketing. Lecture 3 hours per week.

MKT 110 Principles of Selling (3 cr.) Presents a fundamental, skills-based approach to the professional selling of products, services, and ideas. Emphasizes learning effective interpersonal communication skills in all areas of the sales process through skill-building activities. Examines entry-level sales careers in retailing, wholesaling, services and industrial selling. Focuses on building a positive self-image, following ethical behavior, understanding buyer needs, and appreciating the importance of a positive customer relationship strategy. Concludes in a professional sales presentation to buyers ranging from individual consumers to corporations. Lecture 3 hours per week.

MKT 228 Promotion (3 cr.) Presents an overview of promotion activities, including advertising, visual merchandising, publicity and sales promotion. Focuses on coordinating these activities into an effective campaign to promote sales for a particular product, business, institution or industry. Emphasizes budgets, selecting media, and analyzing the effectiveness of the campaign. Lecture 3 hours per week.

MKT 229 Marketing Research (3 cr.) Introduces the marketing research process to include methodology, data collection, sampling, and analysis. Focuses on planning basic research studies and applying the findings to marketing decisions. Lecture 3 hours per week.

MKT 275 International Marketing (3 cr.) Examines the role of the multinational firm, as well as the environments in which they operate. Covers such factors as exchange rates, government foreign trade policy, and social-cultural factors. Compares international marketing planning and domestic marketing strategies. Lecture 3 hours per week.



MKT 282 Principles of E-Commerce (3 cr.) Studies the culture and demographics of the Internet, on-line business strategies, and the hardware and software tools necessary for Internet commerce. Includes the identification of appropriate target segments, the development of product opportunities, pricing structures, distribution channels over the Internet, and the execution of marketing strategy in computer-mediated environments. Presents case histories of successful Web applications. Lecture 3 hours per week.

■ Mathematics (MTH)

CALCULATORS: *MTH 03 and above courses: the TI-83, TI-83 Plus, TI-84 or TI-86 calculators are recommended. Ask you instructor which calculator will be used for class demonstrations. Students will not be allowed to use calculators with symbolic logic such as the TI-89, TI-92, or HP programmable calculators during testing in any math course. Students in developmental courses are not required to purchase graphing calculators.*

MTH 01 Developmental Mathematics (1-5 cr.) Designed to bridge the gap between a weak mathematical foundation and the knowledge necessary for the study of mathematics courses in technical, professional, and transfer programs. Topics may include arithmetic, algebra, geometry, and trigonometry. Credits not applicable toward graduation. Variable hours per week.

MTH 02 Developmental Arithmetic (4 cr.) Covers arithmetical principles and computations including whole numbers, fractions, decimals, percents, measurement, graph interpretation, geometric forms, and applications. Develops the mathematical proficiency necessary for selected curriculum entrance. Credits not applicable toward graduation. Lecture 4 hours per week.

MTH 03 Developmental Algebra I (5 cr.) Covers the topics of Algebra I including, real numbers, equations and inequalities, Cartesian coordinate system, system of linear equations in two variables, exponents, polynomials, rational expressions, and applications. Develops the mathematical proficiency necessary for selected curriculum entrance. Credits not applicable toward graduation. *Prerequisites: a placement recommendation for MTH 03 and Arithmetic or equivalent.* Lecture 5 hours per week.

MTH 04 Developmental Algebra II (5 cr.) Expands upon the topics of Algebra I including rational expressions, radicals and exponents, quadratic equations, systems of equations, and applications. Develops the mathematical proficiency necessary for selected curriculum entrance. Credits not applicable toward graduation. *Prerequisites: a placement recommendation for MTH 04 and Algebra I or equivalent.* Lecture 5 hours per week.

MTH 06 Developmental Geometry (3 cr.) Covers topics in Euclidean geometry including similarity and congruence, plane and solid figures, right triangles, parallel and perpendicular lines, constructions, and applications. Develops the mathematical proficiency necessary for selected curriculum entrance. Credits not applicable toward graduation. *Prerequisites: a placement recommendation for MTH 06 and Algebra I or equivalent.* Lecture 3 hours per week.

MTH 07 Developmental Trigonometry (3 cr.) Covers topics including right triangles, oblique triangles, identities, graphs, and applications. Develops the mathematical proficiency necessary for selected curriculum entrance. Credits not applicable toward graduation. *Prerequisites: a placement recommendation for MTH 07 and Algebra I and Algebra II or equivalent.* Lecture 3 hours per week.

MTH 103-104 Applied Technical Mathematics I-II (3 cr.) (3 cr.) Presents a review of arithmetic, elements of algebra, geometry, and trigonometry. Directs applications to specialty areas. *Prerequisites: a placement recommendation for MTH 103 and Arithmetic or equivalent.* Lecture 3 hours per week.

MTH 115-116 Technical Mathematics I-II (3 cr.) (3 cr.) Presents algebra through exponential and logarithmic functions, trigonometry, vectors, analytic geometry, and complex numbers. Designed for the technical student. *Prerequisites: A placement recommendation for MTH 115 and Algebra I and Algebra II and geometry or equivalent.* Lecture 3 hours per week.

MTH 120 Introduction to Mathematics (3 cr.) Introduces number systems, logic, basic algebra, and descriptive statistics. *Prerequisites: a placement recommendation for MTH 120 and Arithmetic or equivalent.* One year of Algebra is recommended. (Intended for occupational/technical programs.) Lecture 3 hours per week.

MTH 121 Fundamentals of Mathematics I (3 cr.) Covers concepts of numbers, fundamental operations with numbers, formulas and equations, graphical analysis, binary numbers, Boolean and matrix algebra, linear programming, and elementary concepts of statistics. *Prerequisites: a placement recommendation for MTH 121 and Algebra I or equivalent.* (Intended for occupation/technical programs.) Lecture 3 hours per week.

MTH 146 Introduction to Elementary Statistics (3 cr.) Introduces the methods of statistics including sampling from normally distributed populations, estimation, regression, testing of hypotheses, point and interval estimation methods. *Prerequisites: A placement recommendation for MTH 146 and Algebra I or equivalent.* Lecture 3 hours per week.

MTH 151 Mathematics for the Liberal Arts I (3 cr.) Presents topics in sets, logic, numeration systems, geometric systems, and elementary computer concepts. *Prerequisites: a placement recommendation for MTH 151 and Algebra I and Algebra II and Geometry or equivalent.* Lecture 3 hours per week.

MTH 152 Mathematics for the Liberal Arts II (3 cr.) Presents topics in functions, combinatorics, probability, statistics and algebraic systems. *Prerequisites: a placement recommendation for MTH 152 and Algebra I and Algebra II and Geometry or equivalent.* Lecture 3 hours per week.

MTH 163 Precalculus I (3 cr.) Presents college algebra, matrices, and algebraic, exponential, and logarithmic functions. *Prerequisites: a placement recommendation for MTH 163 and Algebra I, Algebra II, and Geometry or equivalent.* Lecture 3 hours per week.

MTH 164 Precalculus II (3 cr.) Presents trigonometry, analytic geometry, and sequences and series. *Prerequisite: MTH 163 or equivalent.* Lecture 3 hours per week.

MTH 173 Calculus with Analytic Geometry I (5 cr.) Presents analytic geometry and the calculus of algebraic and transcendental functions including the study of limits, derivatives, differentials, and introduction to integration and separable differential equations along with their applications. Designed for mathematical, physical, and engineering science programs. *Prerequisites: a placement recommendation for MTH 173 and four years of high school mathematics including Algebra I, Algebra II, Geometry and Precalculus or equivalent.* (Credit will not be awarded for both MTH 173 and MTH 175.) Lecture 5 hours per week.

MTH 174 Calculus with Analytic Geometry II (5 cr.) Continues the study of analytic geometry and the calculus of algebraic and transcendental functions including rectangular, polar, and parametric graphing, indefinite and definite integrals, methods of integration, and power series along with applications. Designed for mathematical, physical, and engineering science programs. *Prerequisite: MTH 173 or equivalent.* (Credit will not be awarded for both MTH 174 and MTH 176.) Lecture 5 hours per week.

MTH 175 Calculus of One Variable I (3 cr.) Presents differential calculus of one variable including the theory of limits, derivatives, differentials, antiderivatives and applications to algebraic and transcendental functions. Designed for mathematical, physical, and engineering science programs. *Prerequisites: a placement recommendation for MTH 175 and four years of high school mathematics including Algebra I, Algebra II, Geometry and Trigonometry or equivalent.* (Credit will not be awarded for both MTH 173 and MTH 175 or MTH 273.) Lecture 3 hours per week.

MTH 176 Calculus of One Variable II (3 cr.) Continues the study of integral calculus of one variable including indefinite integral, definite integral, methods of integration with applications to algebraic and transcendental functions, Euler's Method, Taylor's series, separable differential equations and slope fields. Designed for mathematical, physical, and engineering science programs. *Prerequisite: MTH 175 or equivalent.* (Credit will not be awarded for more than one of MTH 174, MTH 176 or MTH 274.) Lecture 3 hours per week.

MTH 177 Introductory Linear Algebra (2 cr.) Covers matrices, vector spaces, determinants, solutions of systems of linear equations, and eigen values. Designed for mathematical, physical, and engineering science programs. *Corequisite: MTH 173.* Lecture 2 hours per week.

MTH 240 Statistics (3 cr.) Presents an overview of statistics, including descriptive statistics, elementary probability, probability distributions, estimation, hypothesis testing, and correlation and regression. *Prerequisites: a placement recommendation for MTH 240 and successful completion of MTH 163 or equivalent.* Lecture 3 hours per week.

MTH 271 Applied Calculus I (3 cr.) Presents limits, continuity, differentiation of algebraic and transcendental functions with applications, and an introduction to integration. *Prerequisite: MTH 163 or equivalent.* Lecture 3 hours per week.

MTH 272 Applied Calculus II (3 cr.) Covers techniques of integration, multivariable calculus, and an introduction to differential equations. *Prerequisites: MTH 271 and MTH 164 or equivalent.* Lecture 3 hours per week.

MTH 277 Vector Calculus (4 cr.) Presents vector valued functions, partial derivatives, multiple integrals, and topics from the calculus of vectors. Designed for mathematical, physical and engineering science programs. *Prerequisite: MTH 174 or equivalent.* Lecture 4 hours per week.

MTH 279 Ordinary Differential Equations (4 cr.) Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with application. Designed for mathematical, physical, and engineering science programs. *Prerequisite: MTH 174 or equivalent.* Lecture 4 hours per week.

MTH 285 Linear Algebra (3 cr.) Covers matrices, vector spaces, determinants, solutions of systems of linear equations, basis and dimension, eigen values, and eigen vectors. Designed for mathematical, physical and engineering science programs. *Prerequisite: MTH 174 or equivalent.* Lecture 3 hours per week.

■ Mechanical Engineering Technology (MEC)

MEC 113 Materials and Processes of Industry (3 cr.) Studies engineering materials and accompanying industrial manufacturing processes. Investigates nature of materials structure and properties from a design standpoint. Analyzes the effects of various processes on materials, and the processes themselves. Includes machining, casting, forming, molding, hot/cold working, chipless machining, and welding. Addresses quality assurance and inspection procedures. Lecture 3 hours per week.

MEC 116 Jig and Fixture Design (2 cr.) Focuses on fundamentals of the construction and design of various types of jigs and fixtures, including milling, reaming, tapping, and drilling fixtures. Studies preparation of complete working drawings from layouts, for interchangeable manufacture, computation of fits, limit dimensions, tolerances, tool drawing principles and methods, fundamentals of cutting tools and gauges. *Prerequisite: DRF 142 or equivalent.* Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

MEC 118 Automated Manufacturing Technology (2 cr.) Studies computer numerical control (CNC) systems and related software. Includes application of numerical control (NC) to standard machine tools, numerical control systems, NC coordinate systems, APT systems, two-dimensional machine process, flexible manufacturing role of robotics in automated manufacturing. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

MEC 125 Safety and Automated Manufacturing Technology (3 cr.) Describes the automated manufacturing environment, typical processes and automated components, and associated occupational hazards. Introduces fire prevention and mitigation, industrial safety regulations, employer accident and safety rules and regulations, Material Safety Data Sheets (MSDS), and hazardous material identification, management and control. Lecture 3 hours per week.

MEC 133 Mechanics III - Dynamics for Engineering Technology (2 cr.) Focuses on rigid body mechanics including Kinetics, Kinematics, and applications to machine elements. *Prerequisite:* EGR 135. Lecture 2 hours per week.

MEC 136 Advanced Machine Technology (3 cr.) Applies machine operations of boring, grinding and gear cutting to build simple machines and make the necessary tools for fabrication. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MEC 155 Mechanisms (2 cr.) Studies the purpose and actions of cams, gear trains, levers, and other mechanical devices used to transmit control. Focuses on motions, linkages, velocities, and acceleration of points within a link mechanism; layout method for designing cams and gear train. Requires preparation of weekly laboratory reports. *Prerequisite:* MTH 103. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

MEC 161 Basic Fluid Mechanics-Hydraulics/Pneumatics (3 cr.) Introduces theory, operation and maintenance of hydraulic/pneumatics devices and systems. Emphasizes the properties of fluids, fluid flow, fluid statics, and the application of Bernoulli's equation. *Prerequisite:* CIV 240. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MEC 210 Machine Design (3 cr.) Studies the design of machine elements for producing and transmitting power. Includes additional material in statics, strength of materials, dynamics, engineering materials and industrial processes, including lubrication and friction. Emphasizes graphical kinematics of mechanisms, and discusses analytical design of machine components. Requires preparation of weekly laboratory reports. *Prerequisites:* EGR 135 and 136 and MEC 133. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

MEC 266 Applications of Fluid Mechanics (4 cr.) Teaches theory of hydraulic and pneumatic circuits including motors, controls, actuators, valves, plumbing, accumulators, reservoirs, pumps, compressors, and filters. *Prerequisite:* MTH 103. Lecture 4 hours per week.

■ Medical Laboratory (MDL)

MDL 110 Urinalysis and Body Fluids (3 cr.) Studies the gross, chemical, and microscopic techniques used in the clinical laboratory. Emphasizes study of clinical specimens which include the urine, feces, cerebrospinal fluid, blood, and body exudates. Introduces specimen collection and preparation. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MDL 125 Clinical Hematology I (3 cr.) Teaches the cellular elements of blood including blood cell formation, and routine hematological procedures. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

MDL 215 Immunology (2 cr.) Presents the physiological basis of humoral and cell mediated immunity, including the medical and clinical laboratory application of immunological principles. Lecture 2 hours per week.

MDL 216 Blood Banking (4 cr.) Teaches fundamentals of blood grouping and typing, compatibility testing, antibody screening, component preparation, donor selection, and transfusion reactions and investigation. Lecture 2 hours. Laboratory 6 hours. Total 8 hours per week.

MDL 225 Clinical Hematology II (4 cr.) Teaches advanced study of blood to include coagulation, abnormal bloody formation, and changes seen in various diseases. Lecture 2 hours. Laboratory 6 hours. Total 8 hours per week.

MDL 235 Mycology (2 cr.) Studies pathogenic fungi and environmental contaminants, isolation and identification of commonly encountered genera with emphasis on morphologic criteria. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

MDL 236 Parasitology and Virology (2 cr.) Teaches identification of the common parasites affecting man. Stresses methods of isolation and identification. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

MDL 237 Clinical Bacteriology (4 cr.) Teaches handling, isolation, and identification of pathogenic bacteria. Emphasizes clinical techniques and associate bacteria with clinical symptoms. Lecture 2 hours. Laboratory 6 hours. Total 8 hours per week.

MDL 261-262 Clinical Chemistry and Instrumentation I-II (4 cr.) (4 cr.) Introduces methods of performing biochemical analysis of clinical specimens. Teaches instrumentation involved in a clinical chemistry laboratory, quality control, and the ability to recognize technical problems. Includes instruction and practice in oral communication skills. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

MDL 281 Clinical Correlations (1 cr.) Teaches students to apply knowledge gained in courses offered in the MDL curriculum using primarily a case history form of presentation. Emphasizes critical thinking skills in the practice of laboratory medicine. Includes instruction in basic computing concepts, components, and operations and in the use of an integrated software package. Lecture 1 hour.

■ Military Science (MSC)

MSC 111 - Military Science I (2 cr.) Covers the first year of general military science: organization of the army and ROTC, U.S. Army and national security, individual weapons, marksmanship, and leadership laboratory. Courses offered only in cooperation with four- year colleges authorized to offer Army ROTC programs. Part I of II. Lecture 2 hours per week.

MSC 112 - Military Science II (2 cr.) Covers the first year of general military science: organization of the army and ROTC, U.S. Army and national security, individual weapons, marksmanship, and leadership laboratory. Courses offered only in cooperation with four- year colleges authorized to offer Army ROTC programs. Part II of II. Lecture 2 hours per week.

MSC 211 - Military Science III (2 cr.) Focuses on the second year of general military science: American military history, introduction to operations and basic tactics, map and aerial photo reading, and leadership laboratory. Courses offered only in cooperation with four- year colleges authorized to offer Army ROTC programs. Part I of II. Lecture 2 hours per week.

MSC 212 - Military Science IV (2 cr.) Focuses on the second year of general military science: American military history, introduction to operations and basic tactics, map and aerial photo reading, and leadership laboratory. Courses offered only in cooperation with four- year colleges authorized to offer Army ROTC programs. Part II of II. Lecture 2 hours per week.

■ Music (MUS)

MUS 121, 122 Music Appreciation I, II (3 cr.) (3 cr.) Increases the variety and depth of the student's interest, knowledge, and involvement in music and related cultural activities. Acquaints the student with traditional and twentieth century music literature, emphasizing the relationship music has as an art form with man and society. Increases the student's awareness of the composers and performers of all eras through listening and concert experiences. Lecture 3 hours per week.

■ Natural Science (NAS)

NAS 131-132 Astronomy I-II (4 cr.) (4 cr) Studies the major and minor bodies of the solar system, stars and nebulae of the milky way, and extragalactic objects. Examines life and death of stars, origin of the universe, history of astronomy, and instruments and techniques of observation. Lecture 3 hours per week. Recitation and laboratory 3 hours per week. Total 6 hours per week.

■ Opticianry (OPT)

OPT 121 Optical Theory I (4 cr.) Introduces theory and application of ophthalmic lenses. Presents history, basic manufacturing and quality standards of ophthalmic lenses, propagation of light, refraction and dioptic measurements, true power, surface power, nominal lens formula. Explains lens makers' equation, boxing system, spherical lens design, fundamental aspects of cylindrical lenses, spherocylinder lens design, and flat and toric transportation. Lecture 4 hours per week.

OPT 122 Optical Theory II (4 cr.) Explores the development of multifocal lenses, application of the properties of spherocylinder lenses, and an in-depth analysis of the optics of ophthalmic prisms. Lecture 4 hours per week.

OPT 123 Optical Theory III (3 cr.) Teaches P. D. measurements, use of frames and lenses catalogs, construction and design of eyewear, frame nomenclature, zyl and metal frame selection and adjustment. Explains fitting of conventional multifocals and of progressives, general office, procedures, quality standards, effective patient communication, and professional salesmanship. Lecture 3 hours per week.

■ Philosophy (PHI)

PHI 100 Introduction to Philosophy (3 cr.) Presents an introduction to philosophical problems and perspectives with emphasis on systematic questioning of basic assumptions about meaning, knowledge, reality, and values. Lecture 3 hours per week.

PHI 111 Logic I (3 cr.) Introduces inductive and deductive reasoning, with an emphasis on common errors and fallacies. Lecture 3 hours per week.

PHI 220 Ethics (3 cr.) Provides a systematic study of representative ethical systems. Lecture 3 hours per week.

PHI 265 Philosophy of Religion (3 cr.) Examines problems raised by arguments for and against the existence of God and discusses such topics as the nature of God, the nature of religious experience, the problem of evil, religious truth and language, immortality, miracles, spirituality and the relation between philosophy and theology. Lecture 3 hours per week.

■ Photography (PHT)

PHT 101-102 Photography I-II (3 cr.) (3 cr.) Teaches principles of photography and fundamental camera techniques. Requires outside shooting and lab work. Begins with the historical ways in which we see western civilization and shows how photography complements Renaissance concepts of space and our relationship to nature. The course will also examine the role of photography in a consumer society including legal issues and moral concerns. Lecture 1 hour. Laboratory 4 hours. Total 5 hours per week.



PHT 106 Visual Literacy: The Photographic Image (3 cr.) Emphasizes photographic syntax, how it has evolved and how it relates to reading images. Examines psychological, perceptual and contextual issues relating to photographic images. Open to students of all disciplines. Lecture 3 hours per week.

PHT 135 Electronic Darkroom (3 cr.) Teaches students to create and manipulate digital photographs. Covers masking, color corrections, and merging of illustrations with photographs. Examines the ethical and property-rights issues which are raised in the manipulation of images. Lecture 1 hour. Studio instruction 4 hours. Total 5 hours per week.

PHT 201 Advanced Photography (3 cr.) Provides weekly critiques of students' work. Centers on specific problems found in critiques. Includes working procedures and critical skills in looking at photographs. *Prerequisite: PHT 101 or equivalent.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

PHT 206 Large Format Photography (3 cr.) Discusses 4x5 view camera techniques and controls, and sheet film processing. Demonstrates the image-making advantages of large format photography. *Prerequisite: PHT 101 or equivalent.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

PHT 211 Color Photography I (3 cr.) Introduces theory, materials, and processes of modern color images. Includes additive and subtractive theory, color filtration, and negative and positive printing techniques. *Prerequisite: PHT 101 or equivalent.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

PHT 231 Photojournalism I (3 cr.) Introduces equipment, techniques, skills, and concepts of photojournalism. Teaches photography for features, spot news, and photo essays. Emphasizes editing, captioning, and layout. May require individual projects. *Prerequisite: PHT 101 or equivalent.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

PHT 246 Advanced Photographic Printing (3 cr.) Examines advanced printing techniques and principles of archival processing and presentation. Emphasizes development of individual printing style. Requires a portfolio of high quality prints on subject of choice. *Prerequisite: PHT 102 or equivalent.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

PHT 247 Alternative Photographic Processes (3 cr.) Explores manipulated imagery including traditional and non-traditional processes such as non-silver and electronic imaging. Uses enlarged film negatives in order to investigate a variety of methods. *Prerequisite: PHT 102 or equivalent.* Lecture 1 hour. Laboratory 4 hours. Total 5 hours per week.

PHT 256 Communicating Through the Photographic Sequence (3 cr.) Using experiences of sequencing involves the student in creating a picture book composed of images that have been placed in a sequence that has special visual meaning. Lecture 1 hour. Laboratory 4 hours. Total 5 hours per week.

■ Physical Education (PED)

PED 101-102 Fundamentals of Physical Activity I-II (1 cr.) (1 cr.) Presents principles underlying the components of physical fitness. Utilizes conditioning activities involving cardiovascular strength and endurance, respiratory efficiency, muscular strength, and flexibility. May include fitness assessment, nutrition and weight control information, and concepts of wellness. Total 3 hours per week.

PED 103 Aerobic Fitness I (1 cr.) Develops cardiovascular fitness through activities designed to elevate and sustain heart rates appropriate to age and physical condition. Two hours per week.

PED 111-112 Weight Training I-II (1 cr.) (1 cr.) Focuses on muscular strength and endurance training through individualized workout programs. Teaches appropriate use of weight training equipment. Two hours per week.

PED 117 Fitness Walking (1 cr.) Teaches content and skills needed to design, implement, and evaluate an individualized program of walking, based upon fitness level. Laboratory 2 hours per week.

PED 123-124 Tennis I-II (1 cr.) (1 cr.) Teaches tennis skills with emphasis on stroke development and strategies for individual and team play. Includes rules, scoring, terminology, and etiquette. Lecture 1 hour per week.

PED 126 Archery (1 cr.) Teaches skills and techniques of target archery. Focuses on use and maintenance of equipment, terminology, and safety. Lecture 1 hour. Laboratory 1 hour. Total 2 hours per week.

PED 129 Self-Defense (1 cr.) Examines history, techniques, and movements associated with self-defense. Introduces the skills and methods of self-defense emphasizing mental and physical discipline. Two hours per week.

PED 135 Bowling I (1 cr.) Teaches basic bowling skills and techniques, scoring, rules, etiquette, and terminology. Two hours per week.

PED 141-142 Swimming I-II (1 cr.) (1 cr.) Introduces skills and methods of swimming strokes. Focuses on safety and physical conditioning. Two hours per week.

PED 143 Lifeguard Training (2 cr.) Teaches lifeguarding skills with emphasis on open water rescue, theory, personnel management and safety. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

PED 150 Soccer (1 cr.) Emphasizes soccer skills and techniques, strategies, rules, equipment, and physical conditioning. Lecture 1 hour. Laboratory 1 hour. Total 2 hours per week.

PED 154 Volleyball (1 cr.) Introduces skills, techniques, strategies, rules, and scoring. Lecture 1 hour. Laboratory 1 hour. Total 2 hours per week.

PED 160 Modern Dance (2 cr.) Teaches the basic techniques of reatie dance. Skills include self-expression, contemporary routines, dance forms, and basic choreography. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

PED 166 Ballet (2 cr.) Teaches ballet as a discipline with correct alignment and ballet form. Expresses movement through traditional dance form with choreographic emphasis. Lecture 1 hour. Laboratory 2 hours. Total 3 hours per week.

PED 174 Shooting and Firearm Safety (1 cr.) Teaches the basic techniques of shooting and firearm safety for both hunting and sport shooting. Emphasizes the selection and care of equipment, proper shooting forms, personal safety. Lecture 1 hour per week.

■ Physics (PHY)

PHY 100 Elements of Physics (4 cr.) Covers basic concepts of physics, including Newtonian mechanics, properties of matter, heat and sound, fundamental behavior of gases, ionizing radiation, and fundamentals of electricity. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

PHY 201-202 General College Physics I-II (4 cr.) (4 cr.) Teaches fundamental principles of physics. Covers mechanics, thermodynamics, wave phenomena, electricity and magnetism, and selected topics in modern physics. *Prerequisite: MTH 164 or equivalent.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

PHY 241-242 University Physics I-II (4 cr.) (4 cr.) Teaches principles of classical and modern physics. Includes mechanics, wave phenomena, heat, electricity, magnetism, relativity, and nuclear physics. *Prerequisite for PHY 241 - MTH 173 and PHY 242 - MTH 174 or divisional approval.* Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

■ Political Science (PLS)

PLS 135 American National Politics (3 cr.) Teaches political institutions and processes of the national government of the United States, focuses on the Congress, presidency, and the courts, and on their inter-relationships. Gives attention to public opinion, suffrage, elections, political parties, interest groups, civil rights, domestic policy, and foreign relations. Lecture 3 hours per week.

PLS 136 State and Local Politics (3 cr.) Teaches structure, powers and functions of state and local government in the United States. Lecture 3 hours per week.

PLS 211, 212 U.S. Government I, II (3 cr.) (3 cr.) Teaches structure, operation, and process of national, state, and local governments. Includes in-depth study of the three branches of the government and of public policy. Lecture 3 hours per week.

■ Psychology (PSY)

PSY 116 Psychology of Death and Dying (3 cr.) Focuses on psychological aspects of death and dying. Teaches the meaning of death and ways of handling its personal and social implications. Includes psychological, sociological, cultural, and religious views of death. Lecture 3 hours per week.

PSY 120 Human Relations (3 cr.) Introduces the theory and practice of effective human relations. Increases understanding of self and others and interpersonal skills needed to be a competent and cooperative communicator. Lecture 3 hours per week.

PSY 200 Principles of Psychology (3 cr.) Surveys the basic concepts of psychology. Covers the scientific study of behavior, behavioral research methods and analysis, and theoretical interpretations. Includes topics such as physiological mechanisms, sensation/perception, motivation, learning, personality, psychopathology, therapy, and social psychology. *Students may not receive credit for both PSY 200 and PSY 201 or PSY 200 and PSY 202.* Lecture 3 hours per week.

PSY 201, 202 Introduction to Psychology I, II (3 cr.) (3 cr.) Examines human and animal behavior, relating experimental studies to practical problems. Includes topics such as sensation/perception, learning, memory, motivation, emotion, stress, development, intelligence, personality, psychopathology, therapy, and social psychology. *Students may not receive credit for both PSY 200 and PSY 201 or PSY 200 and PSY 202.* Lecture 3 hours per week.

PSY 205 Personal Conflict and Crisis Management (3 cr.) Studies effective recognition and handling of personal and interpersonal conflicts. Discusses cooperative roles of public and private agencies, management of family disturbances, child abuse, rape, suicide and related cases. Lecture 3 hours per week.

PSY 215 Abnormal Psychology (3 cr.) Explores historical views and current perspectives of abnormal behavior. Emphasizes major diagnostic categories and criteria, individual and social factors of maladaptive behavior, and types of therapy. Includes methods of clinical assessment and research strategies. *Prerequisite:* PSY 200 or 201. Lecture 3 hours per week.

PSY 230 Developmental Psychology (3 cr.) Studies the development of the individual from conception to death. Follows a life-span perspective on the developmental tasks of the person's physical, cognitive, and psycho-social growth. Lecture 3 hours per week.

PSY 235 Child Psychology (3 cr.) Studies development of the child from conception to adolescence. Investigates physical, intellectual, social and emotional factors involved in the child's growth. Lecture 3 hours per week.

PSY 255 Psychological Aspects of Criminal Behavior (3 cr.) Studies psychology of criminal behavior. Includes topics such as violent and non-violent crime, sexual offenses, insanity, addiction, white collar crime, and other deviant behaviors. Provides a background for law enforcement occupations. *Prerequisites:* PSY 200, 201, 202 or divisional approval. Lecture 3 hours per week.

PSY 265 Psychology of Men and Women (3 cr.) Examines the major determinants of sex differences. Emphasizes psychosexual differentiation and gender identity from theoretical, biological, interpersonal, and sociocultural perspectives. Includes topics such as sex roles, socialization, rape, abuse, and androgyny. *Prerequisites:* PSY 200, 201 or 202. Lecture 3 hours per week.

■ Public Service (PBS)

PBS 120 Introduction to Community and Social Service (3 cr.) Examines the basic principles, scope, and functions of community and social service work including practices and current trends. Examines institutions to determine why they change, or fail to change. Introduces students to careers in community and social service work at federal, state, and municipal levels. Lecture 3 hours per week.

PBS 136 Grantsmanship (3 cr.) Examines development, sources, and purposes of grants in intergovernmental cash flow. Focuses on application procedures, applications management and financial reporting and development of management systems in accordance with grant pacing factors. Students develop written grant proposals, including objectives, plan of implementation, budget and evaluation. Lecture 3 hours per week.

■ Radiography (RAD)

RAD 105 Introduction to Radiology, Protection and Patient Care (2 cr.) Presents brief history of radiologic profession, code of ethics, conduct for radiologic students, and basic fundamentals of radiation protection. Teaches the care and handling of the sick and injured patient in the Radiology Department. Introduces the use of contrast media necessary in the investigation of the internal organs. Lecture 2 hours per week.

RAD 111-112 Radiologic Science I-II (4 cr.) (4 cr.) Teaches concepts of radiation, radiography physics, fundamentals of electromagnetic radiation, electricity and magnetism, and application of these principles to radiography. Focuses on X-ray production, emission, and X-ray interaction with matter. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

RAD 121 Radiographic Procedures I (4 cr.) Introduces procedures for positioning the patient's anatomical structures relative to X-ray beam and image receptor. Emphasizes procedures for routine examination of the chest, abdomen, extremities, and axial skeleton. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

RAD 131-132 Elementary Clinical Procedures I-II (3 cr.) (3 cr.) Develops advanced technical skills in fundamental radiographic procedures. Focuses on manipulation of equipment, patient care, osseous studies, skull procedures, and contrast studies. Provides clinical experience in cooperating health agencies. Clinical 15 hours per week.

RAD 205 Radiation Protection and Radiobiology (3 cr.) Studies methods and devices used for protection from ionizing radiation. Teaches theories of biological effects, cell and organism sensitivity, and the somatic and genetic effects of ionizing radiation. Presents current radiation protection philosophy for protecting the patient and technologist. Lecture 3 hours per week.

RAD 215 Correlated Radiographic Theory (2 cr.) Presents intensive correlation of all major radiologic technology subject areas. Studies interrelationships of biology, physics, principles of exposure, radiologic procedures, patient care, and radiation protection. Lecture 2 hours per week.

RAD 221 Radiographic Procedures II (4 cr.) Continues procedures for positioning the patient's anatomical structures relative to X-ray beam and image receptor. Emphasizes procedures for routine examination of the skull, contrast studies of internal organs, and special procedures employed in the more complicated investigation of the human body. *Prerequisite:* RAD 121. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

RAD 231-232 Advanced Clinical Procedures I-II (5 cr.) (5 cr.) Reinforces technical skills in fundamental radiographic procedures. Introduces more intricate contrast media procedures. Focuses on technical proficiency, application of radiation, protection, nursing skills, and exposure principles. Teaches advanced technical procedures and principles of imaging modalities, correlating previous radiographic theory, focusing on full responsibility for patients in technical areas, perfecting technical skills, and developing awareness of related areas utilizing ionizing radiation. Provides clinical experience in cooperating health agencies. Clinical 25 hours per week.

RAD 240 Radiographic Pathology (3 cr.) Presents a survey of common medical and surgical disorders that affect radiographic image. Discusses conditions related to different systems of the human body. Studies the correlation of these conditions with radiographs. Includes instruction and practice in oral communications skills. Lecture 3 hours per week.

RAD 255 Radiographic Equipment (3 cr.) Studies principles and operation of general and specialized X-ray equipment. Lecture 3 hours per week.

■ Real Estate (REA)

REA 100 Principles of Real Estate (4 cr.) Examines practical applications of real estate principles. Includes a study of titles, estates, land descriptions, contracts, legal instruments and concepts, real estate mathematics, financing, agency, appraisal, fair housing, and management of real estate. Lecture 4 hours per week.

REA 215 Real Estate Brokerage (3 cr.) Considers administrative principles and practices of real estate brokerage, financial control and marketing of real property. Lecture 3 hours per week.

REA 216 Real Estate Appraisal (3 cr.) Explores fundamentals of real estate evaluation. Introduces the Uniform Standards of Professional Appraisal Practice and the Uniform Residential Appraisal Report form. Lecture 3 hours per week.

REA 217 Real Estate Finance (3 cr.) Presents principles and practices of financing real estate. Analyzes various types of note contracts and mortgage and deed of trust instruments. Covers underwriting of conventional and government insured and guaranteed loans. Lecture 3 hours per week.

■ Religion (REL)

REL 200 Survey of the Old Testament (3 cr.) Surveys books of the Old Testament, with emphasis on prophetic historical books. Examines the historical and geographical setting and place of the Israelites in the ancient Middle East as background to the writings. Lecture 3 hours per week.

REL 210 Survey of the New Testament (3 cr.) Surveys books of the New Testament, with special attention upon placing the writings within their historical and geographical setting. Lecture 3 hours per week.

■ Respiratory Therapy (RTH)

RTH 101 Integrated Sciences for Respiratory Care I (3 cr.) (3 cr.) Integrates the application of mathematics, chemistry, microbiology, physics, and computer technology as these sciences apply to the practice of respiratory care. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

RTH 121 Cardiopulmonary Science I (3 cr.) Focuses on assessment, treatment, and evaluation of patients with cardiopulmonary disease. Explores cardiopulmonary, renal and neuromuscular physiology and pathophysiology. Lecture 3 hours per week.

RTH 131-132 Respiratory Care Theory and Procedures I-II (4 cr.) (4 cr.) Presents theory of equipment and procedures used for patients requiring general, acute and critical cardiopulmonary care. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

RTH 135 Diagnostic and Therapeutic Procedures I (2 cr.) (2 cr.) Focuses on purpose, implementation and evaluation of equipment, and procedures used in the diagnosis and therapeutic management of patients with cardiopulmonary disease. Lecture 1 hour. Laboratory 3 hours. Total 4 hours per week.

RTH 145 Pharmacology for Respiratory Care I (2 cr.) (2 cr.) Presents selection criteria for the use of, and detailed information on pharmacologic agents used in pulmonary care. Lecture 2 hour per week.

RTH 217 Pulmonary Rehabilitation, Home Care and Health Promotion (2 cr.) (2 cr.) Focuses on purpose and implementation of a comprehensive pulmonary rehabilitation program. Explores procedures and approaches used in pulmonary home care. Identifies and discusses major health and wellness programs applied to cardiopulmonary patients. Lecture 2 hours per week.

RTH 222 Cardiopulmonary Science II (3 cr.) (3 cr.) Focuses on assessment, treatment, and evaluation of patients with cardiopulmonary disease. Explores cardiopulmonary, renal, and neuromuscular physiology, and pathophysiology. Lecture 3 hours per week.

RTH 223 Cardiopulmonary Science III (2 cr.) (2 cr.) Continues the exploration of topics discussed in RTH 121 and 222. Lecture 2 hours per week.

RTH 224 Integrated Respiratory Therapy Skills (2 cr.) (2 cr.) Presents intensive correlation of all major respiratory therapy subject areas reflecting the entry-level and advanced practitioner matrix. Emphasis on assessment, implementation, and modification of therapy to patient response. Lecture 2 hours per week.

RTH 226 Theory of Neonatal and Pediatric Respiratory Care (2 cr.) (2 cr.) Focuses on cardiopulmonary physiology and pathology of the newborn and pediatric patient. Lecture 2 hours per week.

RTH 236 Critical Care Monitoring (3 cr.) Focuses on techniques and theory necessary for the evaluation and treatment of the critical care patient, especially arterial blood gases and hemodynamic measurements. Explores physiologic effects of advanced mechanical ventilation. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

■ Safety (SAF)

SAF 126 Principles of Industrial Safety (3 cr.) Teaches principles and practices of accident prevention, analysis of accident causes, mechanical safeguards, fire prevention, housekeeping, occupational diseases, first aid, safety organization, protection equipment and general safety principles and promotion. Lecture 3 hours per week.

■ Sociology (SOC)

SOC 200 Principles of Sociology (3 cr.) Introduces fundamentals of social life. Presents significant research and theory in areas such as culture, social structure, socialization, deviance, social stratification, and social institutions. Lecture 3 hours per week.

SOC 210 Survey of Physical and Cultural Anthropology (3 cr.) Examines physical characteristics and lifestyles of human ancestors and present populations. Explores cultures from around the world to study diverse adaptations made by humans. Lecture 3 hours per week.

SOC 215 Sociology of the Family (3 cr.) Studies topics such as marriage and family in social and cultural context. Addresses the single scene, dating and marriage styles, child-rearing, husband and wife interaction, single parent families, alternative lifestyles. Lecture 3 hours per week.

SOC 226 Human Sexuality (3 cr.) Studies sociological research and theory on sexuality. Includes anatomy and physiology, birth control, sexually transmitted diseases and sexual behavior. Lecture 3 hours per week.

SOC 268 Social Problems (3 cr.) Applies sociological concepts and methods to analysis of current social problems. Includes delinquency and crime, mental illness, drug addiction, alcoholism, sexual behavior, population crisis, race relations, family and community disorganization, poverty, automation, wars, and disarmament. Lecture 3 hours per week.

■ Spanish (SPA)

SPA 101-102 Beginning Spanish I-II (4 cr.) (4 cr.) Introduces understanding, speaking, reading, and writing skills and emphasizes basic Spanish sentence structure. Lecture 4 hours per week.

SPA 201-202 Intermediate Spanish I-II (4 cr.) (4 cr.) Continues to develop understanding, speaking, reading, and writing skills. *Prerequisite: SPA 102 or equivalent.* Lecture 4 hours per week.

■ Speech and Drama (SPD)

SPD 100 Principles of Public Speaking (3 cr.) Applies theory and principles of public address with emphasis on preparation and delivery. Lecture 3 hours per week.

SPD 110 Introduction to Speech Communication (3 cr.) Examines the elements affecting speech communication at the individual, small group, and public communication levels with emphasis on practice of communication at each level. Lecture 3 hours per week.

■ Student Development (SDV)

SDV 100 Orientation (1 cr.) Assists students in transition to colleges. Provides overviews of college policies, procedures, and curricular offerings. Encourages contacts with other students and staff. Assists students toward college success through information regarding effective study habits, career and academic planning, and other college resources available to students. Includes instruction in networked information resources and in the use of telecommunication software. May include English and math placement testing. Strongly recommended for beginning students. Required for graduation in degree programs. Lecture 1 hour per week.

■ Welding (WEL)

WEL 120 Introduction to Welding (3 cr.) Introduces history of welding processes. Covers types of equipment, and assembly of units, and includes oxy-acetylene, arc, inert gas (MIG and TIG) and flux core. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

WEL 123-124 Arc Welding I-II (3 cr.) (3 cr.) Teaches operation of AC transformers and DC motor generator arc welding sets, welding polarities, heats and electrodes for use in joining various metal alloys by the arc welding process. Deals with running beads, butt, and fillet welds in all positions. Emphasizes safety procedures. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

WEL 126 Pipe Welding I (3 cr.) Teaches metal arc welding processes including the welding of pressure piping in the horizontal, vertical, and horizontal-fixed positions in accordance with section IX of the ASME Code. *Prerequisite: WEL 124.* Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

WEL 127 Pipe Welding II (3 cr.) Provides practice in the welding of pressure piping in the horizontal, vertical, and fixed positions. Laboratory 9 hours per week.

WEL 130 Inert Gas Welding (3 cr.) Introduces practical operations in the uses of inert-gas-shield (MIG) arc welding. Discusses equipment, safety operations, welding practice in the various positions, process applications, and manual and semi-automatic welding. Lecture 2 hours. Laboratory 3 hours. Total 5 hours per week.

