Course Descriptions

(ACC) ACCOUNTING

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.

ACC 110 - Introduction to Computerized Accounting (2 cr.) Introduces the computer in solving accounting problems. Focuses on the operation of computers. Presents the accounting cycle and financial statement preparation in a computerized system and other applications for financial and managerial accounting.

ACC 111 - Accounting I (3 cr.) Presents fundamental accounting concepts and principles governing the accounting cycle, journals, ledgers, working papers, and preparation of financial statements for sole proprietorships. A laboratory co-requisite (ACC 113) may be required.

ACC 112 - Accounting II (3 cr.) Covers fundamental accounting concepts and principles governing the accounting cycle, journals, ledgers, working papers, and preparation of financial statements for sole proprietorships. A laboratory co-requisite (ACC 114) may be required.

ACC 211 - Principles of Accounting I (3 cr.) Introduces accounting principles with respect to financial reporting. Demonstrates how decision makers use accounting information for reporting purposes. Focuses on the preparation of financial statements, interpreting and analysis of accounting information. A laboratory co-requisite (ACC 213) may be required.

ACC 212 - Principles of Accounting II (3 cr.) Introduces accounting principles with respect to cost and managerial accounting. Focuses on the application of accounting information with respect to product costing, as well as its use within the organization to provide direction and to judge performance. Pre-requisite: ACC 211; A laboratory co-requisite (ACC 214) may be required.

ACC 220 - Accounting for Small Business (3 cr.) Presents practical accounting procedures for small business operations including service occupations, retail stores, and manufacturing operations. Covers the accounting cycle, journals, ledgers, preparation of financial statements and payrolls, and checking account management. Includes regulations applicable to payroll, self-employment, social security and other taxes.

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 221 or equivalent.

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. Prerequisite ACC 221 or equivalent.

ACC 231 - Cost Accounting I (3 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.

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. Prerequisite or co-requisite ACC 212 or equivalent.

ACC 261 - Principles of Federal Taxation I (3 cr.) Presents the study of federal taxation as it relates to individuals and related entities. Includes tax planning, compliance, and reporting.

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.

(ADJ) ADMINISTRATION OF JUSTICE

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.

ADJ 116 - Special Enforcement Topics (3 cr.) Considers contemporary issues, problems, and controversies in modern law enforcement.

ADJ 118 - Crisis Intervention and Critical Issues (3 cr.) Addresses basic problems involved in crisis intervention and current critical issues in law enforcement and the administration of justice; emphasizes practical approaches to discover and implement solutions.

ADJ 130 - Introduction to Criminal Law (3 cr.) Surveys the general principles of American criminal law, the elements of major crimes, and the basic steps of prosecution procedure.

ADJ 131 - Legal Evidence (3 cr.) Surveys the identification, degrees, and admissibility of evidence for criminal prosecution; examines pre-trial and trial procedures as they pertain to the rules of evidence.

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.
ADJ 145 - Corrections and the Community (3 cr.) Studies and evaluates the relationships and interactions between correctional organizations and free society. Focuses on the shared responsibility of the community and corrections agencies to develop effective programs for management and treatment of criminal offenders.

ADJ 150 - Introduction to Security Administration (3 cr.) Introduces the student to the field of private security -- its history, structures, functions, and personnel; surveys the principles and practices of security administration.

ADJ 161 - Introduction to Computer Crime (3 cr.) Provides a basic introduction to the nature of computer crimes, computer criminals, relevant law, investigative techniques, and emerging trends.

ADJ 171 - Forensic Science I (4 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.

ADJ 215 - Report Writing (3 cr.) Introduces the basic mechanics and procedures of report writing; emphasizes clear, concise and accurate writing of communications as they relate to law enforcement records, investigations, and research.

ADJ 227 - Constitutional Law for Justice Personnel (3 cr.) Surveys the basic guarantees of liberty described in the U. S. Constitution and the historical development of these restrictions on government power, primarily through U. S. Supreme Court decisions. Reviews rights of free speech, press, assembly, as well as criminal procedure guarantees (to counsel, jury trial, habeas corpus, etc.) as they apply to the activities of those in the criminal justice system.

ADJ 234 - Terrorism and Counter-Terrorism (3 cr.) Surveys the historical and current practices of terrorism that are national, transnational, or domestic in origin. Includes biological, chemical, nuclear, and cyber-terrorism. Teaches the identification and classification of terrorist organizations, violent political groups and issue-oriented militant movements. Examines investigative methods and procedures utilized in counter terrorist efforts domestically and internationally.

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.

ADJ 257 - Loss Prevention (3 cr.) Studies internal and external theft that affects all private and public operations, with focus on retail businesses. Examines and evaluates major loss prevention programs used by security operations, again with focus on retail security.

ADJ 296 - On-Site Training (1-5 cr.) Specializes in career orientation and training program 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.

(AIR) Air Conditioning and Refrigeration

AIR 111-112 - Air Conditioning and Refrigeration Controls I-II (3 cr. each) Presents electron theory, magnetism, Ohm's Law, resistance, current flow, instruments for electrical measurement, A.C. motors, power distribution controls and their application. Part I and II of II.

AIR 117 - Metal Layout I (3 cr.) Presents measuring and gauging of sheet metal, types of metal, handling sheet metal, cutting and bending, layout. Teaches fundamentals of drafting, basic drawing instruments, lettering practices.

AIR 118 - Metal Layout II (3 cr.) Presents practice in the laying out of various sheet metal pieces on paper and transposing to metal.

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 and care of oils and additives and troubleshooting of small commercial systems. Part I of II.

AIR 122 - Air Conditioning and Refrigeration II (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 and care of oils and additives and troubleshooting of small commercial systems. Part II of II.

AIR 123-124 - Air Conditioning and Refrigeration III-IV (3 cr. each) Psychometric properties of air, heat load and gain calculation, heated and chilled water systems, duct, design, air distribution and air comfort requirements. Part I and II of II.

AIR 134 - Circuits and Controls I (3 cr.) Presents circuit diagrams for air conditioning units, reading and drawing of circuit diagrams, types of electrical controls. Includes 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. Part I of II.

AIR 135 - Circuits and Controls II (3 cr.) Presents circuit diagrams for air conditioning units, reading and drawing of circuit diagrams, types of electrical controls. Includes 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. Part II of II.

AIR 136 - Circuits and Controls III (3 cr.) Introduces types of circuits and controls used in home, commercial and industrial air conditioning systems. Includes servicing and installation procedures for electrical unloading of compressors, single- and two-stage thermostats, and electrical regulation of fan speed for air volume control. Explains operational and safety control and how schematic and pictorial diagrams are used in these systems.

AIR 137 - Air Conditioning Electronics Survey (2 cr.) Studies electronics and its applications in the HVAC field. Covers computers, programmable controllers, and microprocessors in the HVAC industry. Prerequisite: AIR 134 or approval.

AIR 154 - Heating Systems I (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. Part I of II.

AIR 155 - Heating Systems II (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. Part II of II.

AIR 156 - Heating Systems III (3 cr.) Introduces types of boilers, sizing boilers, sizing radiators and convectors, designing piping systems for steam, hot water and vacuum systems. Includes testing and servicing wet heat systems.

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

AIR 161 - Heating, Air Conditioning and Refrigeration Calculations I (3 cr.) Introduces fractions, decimals, sign of operations, equations, Ohm's Law, subtraction, multiplication and division of signed numbers. Teaches fundamentals of algebra, expression of stated problems in mathematical form, and solutions of equations.

AIR 165 - Air Conditioning Systems I (3 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. Part I of II.

AIR 166 - Air Conditioning Systems II (3 cr.) Introduces designing, layout, installation, and adjusting of duct systems, job costs, and bidding of job. Prerequisite: AIR 165 or approval. Part II of II.

AIR 167 - Air Conditioning Systems III (4 cr.) Introduces building survey, commercial load calculations, design conditions, solar heat gain, ventilation, internal heat gains, cooling, heating and humidification with water psychrometrics distribution systems, ice and water for air conditioning.

AIR 231 - Circuits and Controls IV (4 cr.) Applies controls and control circuits to air conditioning and refrigeration, including components, pilot devices and controls, and circuit diagrams.

AIR 232 - Circuits and Controls V (3 cr.) Presents application and design of wiring and schematic diagrams of commercial refrigeration systems. Teaches fundamentals of operation and applications of pneumatic controls including basic pneumatic control circuits.

AIR 254 - Air Conditioning Systems IV (3 cr.) Presents air balancing including taking duct pressure readings, finding register and grille CFM's, fans, laws and their applications. Explores instruments used for air balancing and proper procedures. Studies water-cooled and air-cooled condensers, refrigerant piping design, capacity control, air washers, water and steam piping arrangements.

AIR 255 - Air Conditioning Systems V (3 cr.) Studies water-cooled and air-cooled condensers, refrigerant piping design, capacity control, air washers, water and steam piping arrangements.

AIR 273 - Refrigeration III (3 cr.) Studies heat pumps, sizing, installation, and servicing, reciprocating screw and centrifugal chillers air conditioners.

AIR 276 - Refrigerant Usage EPA Certification (1 cr.) Prepares HVAC technicians for a refrigerant certification test mandated by the Environmental Protection Agency (EPA). Reviews refrigerant recovery, recycle, and reclamation procedures for service work associated with air conditioning and refrigeration. Examines environmental impact including ozone depletion resulting from refrigeration utilization. Students should have previous training and/or working knowledge of vapor-compression, common service equipment and procedures in HVAC/R.

AIR 295 - Topics In (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.

(ARC) Architecture

ARC 121 - Architectural Drafting I (3 cr.) Introduces techniques of architectural drafting, including lettering, dimensioning, and symbols. Requires production of plans, sections, and elevations of a simple building. Studies use of common reference material and the organization of architectural working drawings. Requires development of a limited set of working drawings, including a site plan, related details, and pictorial drawings. Part I of II. Credit will not be
awarded for both ARC 121 and ARC 123.

(Art) Arts

ART 95 - Topics In (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.

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

ART 105 - Art in World Culture (3 cr.) Approaches the visual arts conceptually rather than historically. Develops a non-technical understanding of spatial arts such as architecture and industrial design. Includes painting, sculpture, and graphics.

ART 116 - Design for the Web I (3 cr.) Introduces the basic elements of web page design: typography, imagery, and color, and examines how they are combined to create effective layouts. Teaches organization of materials, sketching and concept development, site planning and various methods of construction.

ART 121 - Drawing I (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. Part I of II.

ART 122 - Drawing II (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. Part II of II.

ART 130 - Introduction to Multimedia (4 cr.) Introduces the student to the basic components of multimedia: text, graphics, animation, sound, and video, and explores how they combine to create a multimedia product. Emphasizes the design aspects of multimedia projects and teaches the techniques required to develop a presentation. Computer literacy is suggested.

ART 131-132 - Fundamentals of Design I-II (3 cr. each) Explores the concepts of two- and three-dimensional design and color. May include field trips as required. Part I and II of II.

ART 153 - Ceramics I (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.

ART 180 - Introduction to Computer Graphics (3 cr.) Provides a working introduction to computer-based electronic 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.

ART 193 - Studies In (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 per week.

ART 201 - History of Art I (3 cr.) Studies the historical context of art of the ancient, medieval, Renaissance and modern worlds. Includes research project. Part I of II.

ART 202 - History of Art II (3 cr.) Studies the historical context of art of the ancient, medieval, Renaissance and modern worlds. Includes research project. Part II of II.

ART 208 - Video Techniques (4 cr.) Addresses the fundamentals of video technology and non-linear video editing. Focuses on the aesthetics of time-code editing using current industry software. Teaches a student to shoot and capture video and record and edit sound, and combine artwork, animation, video, and sound in the creation of professional-quality original video projects. Prerequisite is ART 130 Multimedia I.

ART 231 - Sculpture I (3 cr.) Introduces sculptural concepts and methods of production in traditional and contemporary media. Includes clay, plaster, wood, stone, metal, plastics and terra cotta. May include field trips. Prerequisite ART 131. Part I of II.

ART 241 - Painting I (3 cr.) Introduces abstract and representational painting in acrylic and/or oil with emphasis on color composition and value. Part I of II.

ART 242 - Painting II (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. Part II of II.

ART 243 - Watercolor I (3 cr.) Presents abstract and representational painting in watercolor with emphasis on design, color, composition, technique and value. Prerequisite ART 131, or divisional approval. Part I of II.

ART 244 - Watercolor II (3 cr.) Presents abstract and representational painting in watercolor with emphasis on design, color, composition, technique and value. Prerequisite ART 131, or divisional approval. Part II of II.

ART 248 - Painting III (3 cr.) Introduces advanced concepts and techniques of representational and abstract painting as applied to the head/figure, still-life, landscape and other subject matter including non-objective painting. Gives additional instruction in color, composition, modeling, space and perspective. Encourages individual approaches to painting. Prerequisite: ART 242 to ART 248.

ART 266 - Package Design (3 cr.) Studies the role of packaging in product identification, presentation, and production.
Investigates the unique challenges of typography, illustration, and design from 2D to 3D forms. Researches business goals, marketing objectives, packaging structure, and display aesthetics. Applies the principles of design and foundations of typography in final production of products.

ART 281 - Illustration for Designers (3 cr.) Explores the professional field of illustration, along with the different ways of producing illustrations for editorial, commercial, and technical clients using traditional and digital techniques. Build skills and knowledge through discussions, projects and exercises for positioning as an illustrator.

ART 283 - Computer Graphics I (4 cr.) Utilizes microcomputers and software to produce computer graphics. Employs techniques learned to solve studio projects which reinforce instruction and are appropriate for portfolio use.

ART 287 - Portfolio and Resume Preparation (3 cr.) Focuses on portfolio preparation, resume writing, and job interviewing for students. Recommended for final semester program students. Requires instructor's approval.

ART 295 - Topics In (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.

ART 298 - Seminar and Project (1-5 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

(ASL) American Sign Language

ASL 101-102 - American Sign Language I-II (3 cr. each) Introduces the fundamentals of American Sign Language (ASL) used by the Deaf Community, including basic vocabulary, syntax, fingerspelling, 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. Part I and II of II.

ASL 115 - Fingerspelling and Number Use in ASL (2 cr.) Provides intensive practice in comprehension and production of fingerspelled words and numbers with emphasis on clarity and accuracy. Focuses on lexicalized fingerspelling and numeral incorporation as used by native users of American Sign Language. Prerequisite ASL 101 or permission of instructor.

ASL 125 - History & Culture of the Deaf Community I (3 cr.) Presents an overview of various aspects of Deaf Culture, including educational and legal issues.

ASL 201-202 - American Sign Language III-IV (3 cr. each) 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. Part I and II of II.

(AST) Administrative Support Technology

AST 55 - Certification Preparation (1 cr.) Serves as a review of objectives for a specific Certification. Uses certification test preparation software, when available, in conjunction with a faculty resource person. May be repeated for credit.

AST 101 - Keyboarding I (2 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. A laboratory co-requisite (AST 103) may be required.

AST 102 - Keyboarding II (2 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. A laboratory co-requisite (AST 104) may be required.

AST 103 - Keyboarding I Laboratory (1 cr.) Provides supplemental instruction in AST 101. Should be taken concurrently with AST 101, in appropriate curricula.

AST 104 - Keyboarding II Laboratory (1 cr.) Provides supplemental instruction in AST 102. Should be taken concurrently with AST 102, in appropriate curricula.

AST 113 - Keyboarding for Speed and Accuracy (1 cr.) Focuses on improving keyboarding speed and accuracy through assigned exercises that diagnose problem areas. Emphasizes increased productivity through improved speed and accuracy. Prerequisite AST 101 or equivalent.

AST 114 - Keyboarding for Information Processing (2 cr.) Teaches the alphabetic and numeric keys: develops correct techniques and competency in the use of computer keyboards. May include basic correspondence and report formats. A laboratory co-requisite (AST 115) may be required.

AST 115 - Keyboarding for Information Processing Laboratory (1 cr.) Provides supplemental instruction in AST 114. Should be taken concurrently with AST 114, in appropriate curricula.

AST 117 - Keyboarding for Computer Usage (1 cr.) Teaches the alphabetic keyboard and 10-key pad. Develops correct keying techniques.

AST 201 - Keyboarding III (2 cr.) Develops decision-making skills, speed, and accuracy in production keying. Applies word processing skills in creating specialized business documents. Prerequisite AST 102. A laboratory co-requisite (AST 202) may be required.

AST 202 - Keyboarding III Laboratory (1 cr.) Provides supplemental instruction in AST 201. Should be taken concurrently with AST 201, in appropriate curricula.

AST 205 - Business Communications (3 cr.) Teaches techniques of oral and written communications. Emphasizes
writing and presenting business-related materials.

**AST 234 - Records and Database Management (3 cr.)**
Teaches filing and records management procedures using microcomputer database software. Incorporates both manual and electronic methods for managing information. A laboratory co-requisite (AST 235) may be required.

**AST 238 - Word Processing Advanced Operations (2 cr.)**
Teaches advanced word processing features including working with merge files, macros, and graphics; develops competence in the production of complex documents. A laboratory co-requisite (AST 239) may be required.

**AST 239 - Word Processing Advanced Operations Laboratory (1 cr.)** Provides supplemental instruction in AST 238. Should be taken concurrently with AST 238, in appropriate curricula, as identified by the college.

**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 101.

**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. Prerequisite AST 243 or equivalent.

**AST 253 - Advanced Desktop Publishing I (2 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. A laboratory co-requisite (AST 255) may be required.

**AST 255 - Desktop Publishing I Lab (1 cr.)** Provides supplemental instruction in AST 253. Should be taken concurrently with AST 253, in appropriate curricula, as identified by the college.

**AUB 115 - Damage Repair Estimating (2 cr.)** Teaches inspection and estimation of cost to repair collision damage. Emphasizes writing acceptable estimates for insurance companies. Studies practices used by repair shops and insurance adjusters.

**AUB 116 - Automotive Body Repair (4 cr.)** Teaches collision straightening procedures and use of equipment, planning repair procedures, disassembly techniques, body fastening systems, glass removal and replacement and panel repair and alignment.

**AUB 130 - Automotive Customizing (3 cr.)** Demonstrates stereo installation, custom wheels, headliners, upholstery, lighting, pin stripping, carpet, window tinting and other systems modified with aftermarket parts. Introduces electrical system modifications and upgrades.

**AUB 190 - Coordinated Internship (1-5 cr.)** Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

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

**AUB 206 - Automotive Body Component Service (2 cr.)** Teaches operating principles, adjustment and service of selected automotive body components.

**AUB 290 - Coordinated Internship (1-5 cr.)** Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

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

**(AUT) Automotive**

**AUT 111-112 - Automotive Engines I-II (4 cr. each)** Presents analysis of power, cylinder condition, valves and bearings in the automotive engine to establish the present condition, repairs or adjustments. Part I and II of II.

**AUT 121-122 - Automotive Fuel Systems I-II (4 cr. each)** Analyses major domestic and foreign automotive fuel systems to include carburetors and fuel injection systems. Includes detailed inspection and discussion of fuel tanks, connecting lines, instruments, filters, fuel pumps, superchargers, and turbo charger. Also includes complete diagnosis, troubleshooting, overhaul and factory adjustment procedures of all major carbureted and fuel injection systems. Part I and II of II.

**AUT 127 - Automotive Lubrication and Cooling Systems (3 cr.)** Analyzes lubrication systems to include lubricants, pumps,
lines, filters, and vents. Also analyzes cooling systems, coolants, pumps, fans, lines and connections. Teaches estimating repairs, adjustments needed and their costs.

AUT 130 - Introduction to Auto Mechanics (3 cr.) Introduces auto mechanics, covering auto shop safety, tool identification and use. Explains automobile system theory and function. Stresses quality work practices and job opportunities.

AUT 136 - Automotive Vehicle Inspection (2 cr.) Presents information on methods for performing automotive vehicle safety inspection.

AUT 178 - Automotive Final Drive and Manual Transmission Systems (4 cr.) Presents the operation, design, construction and repair of manual transmissions and final drive systems, for both front and rear drive vehicles, including clutches, synchronizers, torque multiplication/gear reduction, along with differentials, transmission/transaxles, drive axels, U-joints, CV joints, 4-wheel drive and all-wheel drive systems.

AUT 211-212 - Automotive Systems III-IV (4 cr. each) Presents advanced theory and detailed study of automobile systems. Provides laboratory periods for actual field practice in troubleshooting. Part I and II of II.

AUT 230 - Introduction to Alternative Fuels and Hybrid Vehicles (3 cr.) Introduces current trends in alternative fueled vehicles including current alternative fueled vehicles and the implication and safety precautions necessary for working on hybrid vehicles systems.

AUT 236 - Automotive Climate Control (4 cr.) Introduces principles of refrigeration, air conditioning controls, and adjustment and general servicing of automotive air conditioning systems.

AUT 237 - Automotive Accessories (2 cr.) Introduces the principles, design, construction, adjustment, and maintenance of all automobile equipment classed as an accessory which is not studied in other automotive courses.

AUT 241-242 - Automotive Electricity I-II (4 cr. each) Introduces electricity and magnetism, symbols and circuitry as applied to the alternators, regulators, starters, lighting systems, instruments and gauges and accessories. Part I and II of II.

AUT 251 - Automatic Transmissions I (4 cr.) Studies several types of automatic transmissions, torque converters, and their principles of operation. Includes adjustment, maintenance, and rebuilding.


AUT 266 - Auto Alignment, Suspension and Steering (4 cr.) Introduces use of alignment equipment in diagnosing, adjusting, and repairing front and rear suspensions. Deals with repair and servicing of power and standard steering systems.

(BIO) Biology

BIO 1 - Foundations of Biology (1-4 cr.) Develops a basic understanding of plant and animal form, function, and relationships. Prepares students who have a deficiency in high school biology May be repeated for credit.

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

BIO 101 - General Biology I (4 cr.) Focuses on foundations in cellular structure, metabolism, and genetics in an evolutionary context. Explores the core concepts of evolution; structure and function; information flow, storage and exchange; pathways and transformations of energy and matter; and systems biology. Emphasizes process of science, interdisciplinary approach, and relevance of biology to society. Part I of a two-course sequence. Readiness to enroll in ENG 111 plus completion of developmental math unit 3 required or placement in unit 4 or above.

BIO 102 - General Biology II (4 cr.) Focuses on diversity of life, anatomy and physiology of organisms, and ecosystem organization and processes in an evolutionary context. Explores the core concepts of evolution; structure and function; information flow, storage and exchange; pathways and transformations of energy and matter; and systems biology. Emphasizes process of science, interdisciplinary approach, and relevance of biology to society. Part II of a two-course sequence. Prerequisite is BIO 101.

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, bio-geochemical cycles, photosynthesis and global warming, geological formations, atmosphere and climate, and ozone depletion and acid deposition.

BIO 141-142 - Human Anatomy and Physiology I-II (4 cr. each) Integrates anatomy and physiology of cells, tissues, organs, and systems of the human body. Integrates concepts of chemistry, physics, and pathology. Part I and II of II.

BIO 150 - Introductory Microbiology (4 cr.) Studies the general characteristics of microorganisms. Emphasizes their relationships to individual and community health.

BIO 205 - General Microbiology (4 cr.) Examines morphology, genetics, physiology, ecology, and control of microorganisms. Emphasizes application of microbiological techniques to selected fields. Prerequisites one year of college biology and one year of college chemistry or divisional approval.

BIO 231-232 - Human Anatomy and Physiology I-II (4 cr. each) Integrates the study of gross and microscopic anatomy
with physiology, emphasizing the analysis and interpretation of physiological data. Prerequisites one year of college biology and one year of college chemistry or divisional approval. Part I and II of II

**BIO 256 - General Genetics (4 cr.)** Explores the principles of genetics ranging from classical Mendelian inheritance to the most recent advances in the biochemical nature and function of the gene. Includes experimental design and statistical analysis. Prerequisite BIO 101-102 or equivalent.

**BIO 270 - General Ecology (4 cr.)** Studies interrelationships between organisms and their natural and cultural environments with emphasis on populations, communities, and ecosystems. Prerequisite BIO 101-102 or divisional approval.

**(BLD) Building**

**BLD 20 - Introduction to Plumbing (2 cr.)** Presents an introduction to the principles and practices of plumbing as related to light construction. Enables students to plan, prepare for, and install supply and waste lines, and install kitchen and bath fixtures.

**BLD 103 - Principles of Residential Building Construction Inspection (3 cr.)** Introduces general principles of residential building inspection including materials, foundations, framing, finishing, and building codes. Use local pre/co-requisites.

**BLD 105 - Shop Practices and Procedures (2 cr.)** Introduces basic hand and power tools with emphasis on proper care and safety practices. Introduces materials used in building trades including metals, plastics, and woods with stress placed on the processing techniques of each. Emphasizes fasteners such as screws, rivets, and glues as well as brazed, soldered, and welded joints.

**BLD 110 - Introduction to Construction (3 cr.)** Covers basic knowledge and requirements needed in the construction trades. Introduces use of tools and equipment, with emphasis on construction safety, including personal and tool safety. Provides a working introduction to basic blueprint reading and fundamentals of construction mathematics.

**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.

**BLD 120 - Applied Construction Mathematics (3 cr.)** Presents a review of mathematic principles and concepts necessary for typical construction applications. Includes: whole numbers, order of operations, fractions, decimals, weights, measures and conversions, ratio and proportions, percentages, angles and perimeters, volume and surface area solids, board measure, lumber pricing, computations for preparing footing, foundations and slabs, beams and framing roofs systems and stairs. Covers basic estimation and working from construction plans. This course is not intended to satisfy general education requirements. Prerequisite: MTE 2.

**BLD 126 - Basic Carpentry Principles (3 cr.)** Introduces students to basic floor and wall construction. Prerequisite: BLD 125.

**BLD 131-132 - Carpentry Framing I-II (5 cr. each)** Presents an introduction to carpentry with emphasis on residential construction. Covers safety on the job, appropriate use of power tools, basic construction techniques, an introduction to working drawings, and the team approach to residential buildings. Presents an introduction to selection and use of ladders and scaffolds, basic form removal and demolition, and use of basic first aid. Includes the concepts of carpentry framing for floors, walls, ceilings, porches and decks. Includes theoretical and practical application as well as the concepts of carpentry framing for roof, truss installation and door and window installation. Part I and II of II.

**BLD 133-134 - Carpentry Framing III-IV (5 cr. each)** Continues the study of carpentry with emphasis on residential construction. Covers safety on the job, appropriate use of power tools, basic construction techniques, an introduction to working drawings, and the team approach to residential buildings. Continues the study of selection and use of ladders and scaffolds, basic form removal and demolition, and use of basic first aid. Includes the concepts of carpentry framing for floors, walls, ceilings, porches and decks. Includes theoretical and practical application as well as the concepts of carpentry framing for roof, truss installation and door and window installation. Part I and II of II.

**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.

**BLD 147 - Principles of Block and Bricklaying (3 cr.)** Presents fundamentals of masonry practices. Includes foundations, block laying skills, mortar mixing, measuring, and introduction to bricklaying techniques. Emphasizes hands-on applications of block and brick techniques.

**BLD 181 - Introduction to Concrete Construction (3 cr.)** Introduces basic form building, special floor systems, and tilt-up wall systems.

**BLD 184 - Interior and Exterior Finishes (3 cr.)** Introduces the student to interior wall framing with wood and/or metal studs, layout of walls, and the steps required to successfully complete interior framing. Also covers the steps used for exterior finishes, such as siding, cornice work, and gutters.

**BLD 195 - Topics In (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.

**BLD 196 - On-Site Training (1-5 cr.)** Specializes in career orientation and training program 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.
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.

BUS 108 - Business Etiquette (1 cr.) Presents basic etiquette for individuals desiring to succeed in a business environment. Topics include manners, business attire, networking, socializing, and meeting protocol. Includes tips on how to handle basic issues associated with diversity, pluralism, and cultural and family values. Discusses how contemporary displays of personal expressions may impact business relationships.

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.

BUS 122 - Business Mathematics II (3 cr.) Applies mathematical operations to business processes and problems. Reviews basic statistics, distribution of profit and loss in partnerships, distribution of corporate dividends, simple interest, present value, bank discount notes, multiple payment plans, compound interest, annuities, sinking funds, and amortization.

BUS 134 - Manufacturing Economics (1 cr.) Presents concepts of manufacturing economics and industrial accounting. Covers the major economic topics that pertain to precision machining manufacturing such as product costing, fixed/variable cost, allocation methods, and working capital management. Explains the impact of cash, inventory, and relative range.

BUS 147 - Introduction to Business Information Systems (3 cr.) Provides an overview of business information systems. Introduces computer hardware, software, procedures, systems, and human resources, and explores their integration and application in business. Discusses fundamentals and applications of computer problem-solving and programming.

BUS 149 - Workplace Ethics (1 cr.) Provides a broad overview of ethics in the modern day business world including workforce skill building and self awareness through group discussions. Discusses workplace topics such as diversity, substance abuse, hiring and firing and workplace practices, appropriate dress, communication, business ethics, and interviewing.

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.

BUS 199 - Supervised Study (1-3 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.

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.

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.

BUS 205 - Human Resource Management (3 cr.) Introduces employment, selection, and placement of personnel, forecasting, job analysis, job descriptions, training methods and programs, employee evaluation systems, compensation, benefits, and labor relations.

BUS 206 - Advanced Project Management (4 cr.) Provides students with in-depth knowledge and advanced skills and techniques necessary to lead projects assigned to project managers. Covers project initiating, project planning, project executing, project monitoring and controlling, and project closing.

BUS 209 - Continuous Quality Improvement (3 cr.) Presents the different philosophies in Quality Control. Introduces students to Process Improvement, Team Development, Consensus Building, and Problem-Solving strategies. Identifies methods for Process Improvement in manufacturing and service organizations which includes Statistical Process Control when used in the quality control function of business and industry.

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.

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 division approval.

BUS 223 - Distribution and Transportation (3 cr.) Examines the background and history of transportation, emphasizing the fundamental role and importance the industry plays in companies, society, and the environment in which transportation service is provided. Provides an overview of carrier operations, management, technology, and strategies including transportation regulations and public policy.

BUS 227 - Quantitative Methods (3 cr.) Includes overview of quantitative methods in business decision-making, simple and multiple regression and correlation analysis, time series analysis and business forecasting, decision analysis, linear programming, transportation and assignment methods, and network models. May include computer applications. Prerequisite MTH 163 or division approval.

BUS 235 - Business Letter Writing (3 cr.) Applies composition principles to business correspondence, employment documents, and reports (including presentation of data in various chart formats). Focuses on preparing effective communications with customers, suppliers, employees, the public, and other business contacts.

BUS 236 - Communication in Management (3 cr.) Introduces the functions of communication in management with emphasis on gathering, organizing, and transmitting facts and ideas. Teaches the basic techniques of effective oral and written communication.

BUS 240 - Introduction to Business Law (3 cr.) Presents an introduction to the American legal system, including an overview of the courts, civil and criminal law. Develops an in-depth understanding of contracts, agency law, and business organizations. Also includes an overview of property, UCC Sales, and Commercial Paper.

BUS 255 - Inventory and Warehouse Management (3 cr.) Emphasizes the relationships of inventory and warehouse management to customer service and profitability of the wholesale distributor. Focuses on the role of computerized systems and resulting information for effective management of inventory and the warehouse under various conditions.

BUS 295 - Topics In (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.

BUS 297 - Cooperative Education (1-6 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.

BUS 298 - Seminar and Project (3 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

BUS 299 - Supervised Study (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours

(CAD) Computer Aided Drafting and Design

CAD 116 - Drafting III (3 cr.) Teaches auxiliaries, basic concepts, terms of reference, choice of views, axis, proportioning distances and perspective drawings. (Credit will not be awarded for both CAD 116 and DRF 116.)

CAD 120 - Introduction to Graphic Representation (3 cr.) Teaches use of instruments, lettering, sketching, and drawing conventions. Emphasizes legible drawings and the value of presentation. (Credit will not be awarded for both CAD 120 and DRF 120.)

CAD 199 - Supervised Study In (discipline) (1-5 cr.) Assigns problems for independent study outside the normal classroom setting under the guidance and direction of an instructor. Incorporates prior experience and instruction in the discipline. Variable hours per week.

CAD 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. (Credit will not be awarded for both CAD 201 and DRF 201.)

CAD 202 - Computer Aided Drafting and Design II (3 cr.) Teaches production drawings and advanced operations in computer aided drafting. (Credit will not be awarded for both CAD 202 and DRF 202.)

CAD 210 - Advanced Technical Drafting (4 cr.) Presents intersections of plane surfaces, lines and planes, skew lines and surfaces. Covers intersections of prisms, pyramids and other shapes, developments, sheet metal drafting, screw threads and fasteners, and keys and springs. (Credit will not be awarded for both CAD 210 and DRF 210.)

CAD 233 - Computer Aided Drafting III (3 cr.) Exposes students to 3-D and modeling. Focuses on proficiency in Production drawing using a CAD system. (Credit will not be awarded for both CAD 233 and DRF 233)

CAD 298 - Seminar and Project in (discipline) (2 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.

(CHD) Childhood Development

CHD 118 - Language Arts for Young Children (3 cr.) Emphasizes the early development of children's language and literacy skills. Presents techniques and methods for supporting all aspects of early literacy. Surveys children's literature, and
examines elements of promoting oral literacy, print awareness, phonological awareness, alphabetic principle, quality storytelling and story reading. Addresses strategies for intervention and support for exceptional children and English Language Learners.

CHD 119 - Introduction to Reading Methods (3 cr.) Focuses on promoting language and literacy skills as the foundation for emergent reading. Emphasizes phonetic awareness and alphabetic principles, print awareness and concepts, comprehension and early reading and writing. Addresses strategies for intervention and support for exceptional children and English Language Learners.

CHD 120 - Introduction to Early Childhood Education (3 cr.) Introduces early childhood development through activities and experiences in early childhood, 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.

CHD 145 - Teaching Art, Music, and Movement to Children (3 cr.) Focuses on children's exploration, play, and creative expression in the areas of art, music, and movement. Emphasis will be on developing strategies for using various open-ended media representing a range of approaches in creative thinking. Addresses strategies for intervention and support for exceptional children and English Language Learners.

CHD 146 - Math, Science, and Social Studies for Children (3 cr.) Provides experiences in content, methods, and materials for the development of math, science, and social studies skills in children. Emphasis will be on developing strategies for using various resources to facilitate children's construction of knowledge. Addresses strategies for intervention and support for children with special needs and English Language Learners.

CHD 165 - Observation and Participation in Early Childhood/Primary Settings (3 cr.) Focuses on observation as the primary method for gathering information about children in early childhood settings. Emphasizes development of skills in the implementation of a range of observation techniques. May be taken again for credit.

CHD 166 - Infant and Toddler Programs (3 cr.) Examines child growth and development from birth to 36 months. Focuses on development in the physical, cognitive, social, emotional, and language domains. Emphasizes the importance of the environment and relationships for healthy brain development during the child's first three years of life. Investigates regulatory standards for infant/toddler care giving.

CHD 167 - CDA Theories and Applications: Resource File (3 cr.) Supports the student/CDA candidate in completing the Professional Resource File and all documentation required for the national CDA credential. This course is designed for students pursuing the Child Development Associate credential.

CHD 205 - Guiding the Behavior of Children (3 cr.) Explores the role of the early childhood educator in supporting emotional and social development of children, and in fostering a sense of community. Presents practical strategies for encouraging prosocial behavior, conflict resolution and problem solving. Emphasizes basic skills and techniques in child guidance.

CHD 210 - Introduction to Exceptional Children (3 cr.) Reviews the history of and legal requirements for providing intervention and educational services for young children with special needs. Studies the characteristics of children with a diverse array of needs and developmental abilities. Explores concepts of early intervention, inclusion, guiding behavior and adapting environments to meet children's needs.

CHD 215 - Models of Early Childhood Education Programs (3 cr.) Studies and discusses the various models and theories of early childhood education programs including current trends and issues. Presents state licensing and staff requirements.

CHD 216 - Early Childhood Programs, School, and Social Change (3 cr.) Explores methods of developing positive, effective relations with families to enhance their developmental goals for children. Considers culture and other diverse needs, perspectives, and abilities of families and educators. Emphasizes advocacy and public policy awareness as an important role of early childhood educators. Describes risk factors and identifies community resources.

CHD 265 - Advanced Observation and Participation in Early Childhood/Primary Settings (3 cr.) Focuses on implementation of activity planning and observation of children through participation in early childhood settings. Emphasizes responsive teaching practices and assessment of children's development. Reviews legal and ethical implications of working with children.

CHD 270 - Administration of Childcare Programs (3 cr.) Examines the skills needed for establishing and managing early childhood programs. Emphasizes professionalism and interpersonal skills, program planning, staff selection and development, creating policies, budgeting, and developing forms for recordkeeping.

CHD 298 - Seminar and Project (1 - 5 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

(CHM) Chemistry

CHM 101-102 - General Chemistry I-II (4 cr. each) Emphasizes experimental and theoretical aspects of inorganic, organic, and biological chemistry. Discusses general chemistry concepts as they apply to issues within our society and environment. Designed for the non-science major. Part I and II of II.
CHM 111-112 - College Chemistry I-II (4 cr. each) Explores the fundamental laws, theories, and mathematical concepts of chemistry. Designed primarily for science and engineering majors. Requires a strong background in mathematics. Part I and II of II.

CHM 241 - Organic Chemistry I (3 cr.) Introduces fundamental chemistry of carbon compounds, including structures, physical properties, syntheses, and typical reactions. Emphasizes reaction mechanisms. Part I of II.

CHM 242 - Organic Chemistry II (3 cr.) Introduces fundamental chemistry of carbon compounds, including structures, physical properties, syntheses, and typical reactions. Emphasizes reaction mechanisms. Part II of II.

CHM 243 - Organic Chemistry Laboratory I (1 cr.) Taken concurrently with CHM 241 and CHM 242. Part I of II.

CHM 244 - Organic Chemistry Laboratory II (1 cr.) Taken concurrently with CHM 241 and CHM 242. Part II of II.

(CIV) Civil Engineering Technology

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: Engineering Technical Math or divisional approval.

(COS) Cosmetology

COS 81 - Cosmetology Theory I (4 cr.) Covers bacteriology, finger waving, sterilization and sanitation, wet hair styling, draping, shampooing and rinsing, permanent waving, haircutting, and properties of the scalp and hair.

COS 82 - Cosmetology Theory II (5 cr.) Covers 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 the instructor.

COS 190 - Coordinated Internship (4 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit.

COS 196 - On-Site Training (4 cr.) Specializes in career orientation and training program 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.

COS 198 - Seminar and Project (3 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit.

COS 290 - Coordinated Internship (4 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit.

COS 296 - On-Site Training (1-5 cr.) Specializes in career orientation and training program 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.

(CSC) Computer Science

CSC 200 - Introduction to Computer Science (4 cr.) Provides broad introduction to computer science. Discusses architecture and function of computer hardware, including networks and operating systems, data and instruction representation and data organization. Covers software, algorithms, programming languages and software engineering. Discusses artificial intelligence and theory of computation. Includes a hand-on component.

CSC 201 - Computer Science I (4 cr.) Introduces algorithm and problem solving methods. Emphasizes structured programming concepts, elementary data structures and the study and use of a high level programming language. Corequisite MTH 173 or equivalent or divisional approval.

CSC 202 - Computer Science II (4 cr.) Examines data structures and algorithm analysis. Covers data structures (including sets, strings, stacks, queues, arrays, records, files, linked lists, and trees), abstract data types, algorithm analysis (including searching and sorting methods), and file structures. Prerequisite CSC 201. Corequisite MTH 174.

CSC 205 - Computer Organization (4 cr.) Examines the hierarchical structure of computer architecture. Focuses on multi-level machine organization. Uses a simple assembler language to complete programming projects. Includes processors, instruction, execution, addressing techniques, data representation and digital logic.

(CST) Communications Studies and Theatre

CST 100 - Principles of Public Speaking (3 cr.) Applies theory and principles of public address with emphasis on preparation and delivery.

CST 110 - Introduction to 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.

CST 126 - Interpersonal Communication (3 cr.) Teaches interpersonal communication skills for both daily living and the world of work. Includes perception, self-concept, self-disclosure, listening and feedback, nonverbal communication, attitudes, assertiveness and other interpersonal skills.
CST 130 - Introduction to the Theatre (3 cr.) Surveys the principles of drama, the development of theatre production, and selected plays to acquaint the student with various types of theatrical presentations.

CST 131 - Acting I (3 cr.) Develops personal resources and explores performance skills through such activities as theatre games, role playing, improvisation, work on basic script units, and performance of scenes. Part I of II.

CST 132 - Acting II (3 cr.) Develops personal resources and explores performance skills through such activities as theatre games, role playing, improvisation, work on basic script units, and performance of scenes. Part II of II.

CST 136 - Theatre/Musical Workshop (1-6 cr.) Enables students to work in various activities of a play production or a musical production including performance, orchestra, set design, stage carpentry, sound, costuming, lighting, stage managing, props, promotion, or stage crew. May be repeated for credit. Variable hours per week. This course is cross-listed with MUS 129. Credit will not be awarded for both. Variable hours per week.

CST 151 - Film Appreciation I (3 cr.) Provides students with a critical understanding of film through the discussion and viewing of motion pictures with emphasis upon the study of film history and the forms and functions of film. Students will develop skills to analyze the shared social, cultural and historical influences of films and their contexts. Part I of II.

CST 152 - Film Appreciation II (3 cr.) Provides students with a critical understanding of film through the discussion and viewing of motion pictures with emphasis upon the study of film history and the forms and functions of film. Students will develop skills to analyze the shared social, cultural and historical influences of films and their contexts. Part II of II.

CST 231 - History of Theatre I (3 cr.) Analyzes and studies theatre history to include architecture, performers and performance, playwrights, stage, production methods, and audience from the Greeks through modern drama. Part I of II.

DNA 100 - Introduction to Oral Health Professions (1 cr.) Provides an introduction to the oral health profession and covers basic terminology, historical perspective, the credentialing process, accreditation, professional organizations, and legal and ethical considerations.

DNA 103 - Introduction to Oral Health (1 cr.) Teaches anatomy of the head and neck, the oral cavity hard and soft tissues, as well as tooth morphology. Includes dental terminology, deciduous and permanent dentition as well as pathology.

DNA 109 - Practical Infection Control (3 cr.) Studies principles of management of disease producing micro-organisms and diseases associated. Emphasis in placed on sterilization, asepsis, and disinfection techniques applicable in the dental office.

DNA 110 - Dental Materials (3 cr.) Studies the materials utilized in the laboratory aspect of dentistry as support in treatment. Emphasis is placed on the characteristics, manipulation, economical control, storage, and delivery of materials.

DNA 113 - Chairside Assisting I (3 cr.) Provides instruction on the principles of clinical chair side dental assisting, dental equipment use and maintenance, safety, instrument identification, tray set-ups by procedures, and patient data collection. Emphasis on patient management during restorative procedures.

DNA 114 - Dental Radiology and Practicum (3 cr.) Teaches the physics of dental radiation and safety, equipment operation, cone placement for the parallel and bisection techniques, panoramic exposures, mounting and film processing.

DNA 190 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1.5 hours. May be repeated for credit. Variable hours.

(DNH) Dental Hygiene

DNH 111 - Oral Anatomy (2 cr.) Studies the morphology and function of the oral structures with emphasis on the primary and permanent dentition, eruption sequence, occlusion, and intra-arch relationships.

DNH 115 - Histology/Head and Neck Anatomy (3 cr.) Presents a study of the microscopic and macroscopic anatomy and physiology of the head, neck, and oral tissues. Includes embryologic development and histologic components of the head, neck, teeth, and periodontium.

DNH 120 - Management of Emergencies (2 cr.) Studies the various medical emergencies and techniques for managing emergencies in the dental setting. Additional practical applications and simulations of emergencies maybe conducted to enhance basic knowledge from the one hour lecture component.

DNH 130 - Oral Radiography for the Dental Hygienist (3 cr.) Studies radiation physics, biology, safety, and exposure techniques for intra- and extra-oral radiographic surveys. Laboratory provides practice in exposure, processing methods, mounting, and interpretation of normal findings.

DNH 141 - Dental Hygiene I (5 cr.) Introduces clinical knowledge and skills for the performance of dental hygiene services; basic skill components, lab manikins and client practice.

DNH 142 - Dental Hygiene II (5 cr.) Exposes students to instrument sharpening, time management, and client education techniques and methods. Provides supervised clinical practice in the dental hygiene clinic with emphasis on developing client treatment and instrument skills. Prerequisite DNH 141.
DNH 143 - Dental Hygiene III (3 cr.) Introduces dental health care for clients with special needs. Includes introduction to computer concepts and applications. Provides supervised clinical practice in the dental hygiene clinic with emphasis on refining client treatment and instrumentation skills, including oral radiographs.

DNH 145 - General and Oral Pathology (2 cr.) Introduces general pathology with consideration of the common diseases affecting the human body. Particular emphasis is given to the study of pathological conditions of the mouth, teeth and their supporting structures. Prerequisite: DNH 113, 114 or 115.

DNH 146 - Periodontics for the Dental Hygienist (2 cr.) Introduces the theoretical and practical study of various concepts and methods used in describing, preventing, and controlling periodontal disease. Presents etiology, microbiology, diagnosis, treatment and prognosis of diseases.

DNH 150 - Nutrition (2 cr.) Studies nutrition as it relates to dentistry and general health. Emphasizes the principles of nutrition as applied to the clinical practice of dental hygiene.

DNH 190 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

DNH 214 - Practical Materials for Dental Hygiene (2 cr.) Studies the current technologic advances, expanded functions, and clinical/laboratory materials used in dental hygiene practice. Provides laboratory experience for developing skills in the utilization and applications of these technologies and functions.

DNH 216 - Pharmacology (2 cr.) Studies the chemical and therapeutic agents used in dentistry, including their preparation, effectiveness, and specific application.

DNH 226 - Public Health Dental Hygiene I (2 cr.) Studies and compares concepts of delivery of health care, applying the public health delivery model. Utilizes epidemiologic methods, research and biostatistics as applied to oral health program planning, implementation, and evaluation. Incorporates and applies current health issues and trends.

DNH 227 - Public Health Dental Hygiene II (1 cr.) Applies concepts of public health program planning through student directed community projects with an emphasis on preventative oral health education. Includes development of table clinics, bulletin boards, and volunteer service in the community. Prerequisite: DNH 226.

DNH 230 - Office Practice and Ethics (1 cr.) Studies the principles of dental ethics and economics as they relate to the dental hygienist. The course also includes a study of jurisprudence and office procedures.

DNH 235 - Management of Dental Pain and Anxiety in the Dental Office (2 cr.) Provides a study of anxiety and pain management techniques used in dental care. Students will understand the necessary theory to appropriately treat, plan and successfully administer topical anesthesia, local anesthesia, and nitrous oxide/oxygen analgesia. Includes the components of pain, pain control mechanisms, topical anesthesia, local anesthesia and nitrous oxide/oxygen analgesia. Prerequisites: DNH 115, DNH 120 and DNH 216.

DNH 244 - Dental Hygiene IV (5 cr.) Introduces advanced skills and the dental hygienist's role in dental specialties. Includes supervised clinical practice in the dental hygiene clinic and/or off-campus clinical rotations at various community facilities. Emphasizes treatment of clients demonstrating periodontal involvement, stressing application and correlation of knowledge and skills from previous semesters. Prerequisite DNH 143 or DNH 190.

DNH 245 - Dental Hygiene V (5 cr.) Exposes student to current advances in dentistry. Includes supervised clinical practice in the dental hygiene clinic and/or off-campus clinical rotations at various community facilities. Emphasis is placed on synthesis of knowledge from previous semesters, treatment of clients with moderate to advanced periodontal involvement and improving clinical speed while maintaining quality in preparation for practice. Prerequisite: DNH 244.

(DFR) Drafting (see also CAD - Computer-Aided Drafting)

DFR 114-115 - Drafting I-II (3 cr. each) Teaches geometric construction, orthographic projection, sections and conventions, pictorial drawings, isometric principles, oblique drawing, and dimensioning. Part I and II of II.

DFR 160 - Machine Blueprint Reading (3 cr.) Introduces interpreting of various blueprints and working drawings. Applies basic principles and techniques such as visualization of an object, orthographic projection, technical sketching and drafting terminology. Requires outside preparation.

(DSL) Light Diesel Mechanics

DSL 121 - Diesel Engines I (5 cr.) Studies the basic principles involved in the construction and operation of diesel engines. Examines fuel, air, cooling, and control system of various designs. Emphasizes engine overhaul and repair, including gauging proper measuring instruments and tools for these tasks. Part I.

DSL 122 - Diesel Engines II (5 cr.) Studies the basic principles involved in the construction and operation of diesel engines. Examines fuel, air, cooling, and control system of various designs. Emphasizes engine overhaul and repair, including gauging proper measuring instruments and tools for these tasks. Part II (Prerequisite DSL 121 Part I)

DSL 133 - Diesel Fuel and Injection System (5 cr.) Studies the design, operation, care, and repair of fuel injection systems used on a variety of diesel engines. Includes testing and reconditioning fuel injectors, nozzles, fuel pumps, and transfer pumps. Teaches use of calibrating.

DSL 135 - Introduction to Diesel Technology (3 cr.) Introduces careers in the diesel repair industry, safety
Focuses on the health and developmental needs of children and the methods by which these needs are met. Emphasizes positive health, hygiene, nutrition and feeding routines, childhood diseases, and safety issues. Emphasizes supporting the mental and physical wellbeing of children, as well as procedures for reporting child abuse.

**EGR Engineering**

**EGR 115 - Engineering Graphics (2 cr.)** Applies principles of orthographic projection, and multi-view drawings. Teaches descriptive geometry including relationships of points, lines, planes and solids. Introduces sectioning, dimensioning and computer graphic techniques. Includes instruction in Computer Aided Drafting.

**EGR 120 - Introduction to Engineering (2 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.

**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++.

**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.

**EGR 235 - Material and Energy Balances (3 cr.)** Covers fundamental chemical engineering topics including engineering problem solving, stoichiometric and composition relationships, material balances, energy balances, chemical operations and processes, reactive and non-reactive systems (batch, continuous, single-phase and multi-phase). Introduces thermodynamics and physical chemistry. Prereq: MTH 273, CHM 111, EGR 120.

**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.

**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.

**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.

(ELE) Electrical Technology

ELE 110 - Home Electric Power (3 cr.) Covers the fundamentals of residential power distribution, circuits, panels, fuse boxes, breakers, transformers. Includes study of the national electrical code, purpose and interpretation.

ELE 113-114 - Electricity I-II (3 cr. each) Teaches principles of electricity covering fundamentals, devices and components in both DC and AC circuits. Part I and II of II.

ELE 115 - Basic Electricity (3 cr.) Covers basic circuits and theory of fundamental concepts of electricity. Presents a practical approach to discussion of components and devices.

ELE 123-124 - Electrical Applications I-II (2 cr. each) 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. Part I and II of II.

ELE 131-132 - National Electrical Code I-II (3 cr. each) Provides comprehensive study of the purpose and interpretations of the National Electric Code as well as familiarization and implementation of various charts, code rulings and wiring methods including state and local regulations. Part I and II of II.

ELE 133-134 - Practical Electricity I-II (3 cr. each) Teaches the fundamentals of electricity, terminology, symbols, and diagrams. Includes the principles essential to understanding of general practices, safety and the practical aspects of residential and non-residential wiring and electrical installation, including fundamentals of motors and controls. Pre/Corequisite MTH 02 or equivalent. Part I and II of II.

ELE 143 - Programmable Controllers I (4 cr.) Studies operating characteristics, programming techniques, interfacing, and networking capabilities of programmable logic controllers. Studies controllers with analog and/or digital interfacing, hand-held and/or software programming. Prerequisites: ETR 156, ELE 158, or equivalent. Part I of II.

ELE 147 - Electrical Power and Control Systems (3 cr.) Reviews basic DC and AC circuits. Covers single-phase and three-phase AC power distribution systems, and protection devices, including types of AC motors. Presents analyzing and troubleshooting electrical control systems and motor protection devices. Prerequisite ELE 134 or equivalent.

ELE 152 - Electrical-Electronic Calculations I (3 cr.) Includes general math, scale readings, conversions between units of measure and algebra with exponents and radicals as it applies to DC circuits. [First of a three-sequence course].

ELE 153 - Electrical-Electronic Calculations II (3 cr.) Includes a review of DC applications, angular measurements, right triangle ratios, vector and vector algebra as it applies to AC circuits. [Second of a three-sequence course]. Prerequisite: ELE 152.

ELE 154 - Electrical-Electronic Calculations III (3 cr.) Includes a review of DC and AC applications and includes experimental equations and logarithms as it applies to electrical-electronic circuits. [Third of a three-course sequence]. Prerequisite: ELE 153.

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.

ELE 158 - Surface Mount Soldering (1 cr.) Emphasizes high reliability soldering concepts and soldering standards as applied to surface mount soldering and rework, covering identification, installation and removal of components, using various equipment including hot air and soldering iron. Provides an introduction to IPC-A-610 soldering standards.

ELE 190 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

ELE 199 - Supervised Study (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.

ELE 216 - Industrial Electricity (3 cr.) Studies rotating devices, single phase and polyphase distribution, magnetic devices, circuits and systems for industrial applications.

ELE 217 - Electric Power Utilities (2 cr.) Provides an introduction to the electric power utilities field. Examines the generation, transmission and distribution of electrical energy.

ELE 233 - Programmable Logic Controller Systems I (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. Part I of II.

ELE 237 - Human Machine Interface Systems (2 cr.) Introduces operation of human machine interface devices (HMI), hardware configuration, software programming and programmable logic controller network configuration of HMI devices. Offers troubleshooting practices concerning HMI devices used in industrial machine applications. Prerequisite: ELE 233 or equivalent.

ELE 239 - Programmable Controllers (3 cr.) Examines installation, programming, interfacing, and concepts of troubleshooting programmable controllers.

ELE 240 - Advanced Programmable Logic Controllers (3 cr.) Advances further study of Programmable Logic Controllers that was initiated in ELE 239. Students will learn to use more advanced program instructions, including data manipulation,
sequences and program control, and advanced PLC features, including timers, counters. Covers connectivity and use of a variety of real world I/O devices. Prerequisite: ELE 239.

ELE 248 - Microcontroller Interfacing and Programming (3 cr.) Explores issues and concerns related to the programming and interfacing of microcontrollers.

(EMS) Emergency Medical Services

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. Equivalent to HLT 105.

EMS 112 - Emergency Medical Technician - Basic I (4 cr.) Prepares student for certification as a Virginia and/or National Registry EMT-Basic. Focuses on all aspects of pre-hospital basic life support as defined by the Virginia office of Emergency Medical Services curriculum for Emergency Medicine Technician Basic.

EMS 113 - Emergency Medical Technician - Basic II (3 cr.) Continues preparation for 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.

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.

(ENE) Energy Technology

ENE - 100 Conventional and Alternate Energy Applications (4 cr.) Provides an overview of hydroelectric, coal, and nuclear energy production methods and renewable solar, geothermal, wind, and fuel cell technology. A complete system breakdown of conventional power production methods, efficiency, and sustainability when compared with solar. Prerequisite: ELE 176 or instructor approval.

ENE 105 - Solar Thermal Active and Passive Technology (4 cr.) Provides a comprehensive study of thermal technology as it applies to collector types and ratings, open-loop versus closed-loop and system sizing. Introduces hydronics, hot water, and pool heating applications. Provides an introduction to fluid dynamics and chemistry as it applies to system installation and maintenance.

ENE 110 - Solar Power Installations (4 cr.) Covers wiring, control, conversion, and ties to established power systems. Studies use of inverter, batteries, and charging systems. Prerequisite: ELE 157 or equivalent.

ENE 195 - Topics In (1-5 cr.) Provides an opportunity to explore topical areas of interest to or needed by students.

(ENF) English Fundamentals

ENF 1 - Preparing for College English I (8 cr.) Provides integrated reading and writing instruction for students who require extensive preparation to succeed in college-level English courses. Students will place into this course based on placement test score. Upon successful completion and faculty recommendation, students will move into Preparing for College English II (if they require no additional preparation) or into college-level English (if they require no additional preparation). Credit is not applicable toward graduation. Qualifying placement test score.

ENF 2 - Preparing for College English II (4 cr.) Provides integrated reading and writing instruction for students who require intermediate preparation to succeed in college-level English courses. Students will place into this course based on placement test score. Upon successful completion and faculty recommendation, students will move into Preparing for College English III (if they require additional preparation) or into college-level English (if they require no additional preparation). Credit is not applicable toward graduation. Qualifying placement test score.

ENF 3 - Preparing for College English III (2 cr.) Provides integrated reading and writing instruction for students who require minimal preparation for college-level English but still need some preparation to succeed. Students in this course will be co-enrolled in college-level English. Students will place into this course based on placement test score. Credit is not applicable toward graduation. Qualifying placement score. Co-Enrollment in a college-level English course.

(ENG) English

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.

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. Prerequisite: Students must successfully complete ENG 111 or its equivalent, and must be able to use word processing software.

ENG 115 - Technical Writing (3 cr.) Develops ability in technical writing through extensive practice in composing technical reports and other documents. Guides students in achieving voice, tone, style, and content in formatting, editing, and graphics. Introduces students to technical discourse through selected reading.
ENG 123 - Writing for the World Wide Web (3 cr.) Teaches students how to outline, compose, organize, and edit written materials for publication on the World Wide Web. Teaches students how to design basic web pages, compose website content, design web site layout and develop website navigation for a variety of possible audiences. Prerequisite: ENG 111 or approval.

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.

ENG 134 - Grammar for Writing and Speaking (3 cr.) Studies the various parts of speech with application to both writing and speaking. Includes significant assignments to demonstrate skills in a variety of written and verbal communication, and emphasizes the skills necessary for correct everyday usage of the English language.

ENG 135 - Applied Grammar (3 cr.) Develops ability to edit and proofread correspondence and other documents typically produced in business and industry. Instructs the student in applying conventions of grammar, usage, punctuation, spelling, and mechanics. Prerequisite ENG 134 or divisional approval.

ENG 210 - Advanced Composition (3 cr.) Helps students refine skills in writing non-fiction prose. Guides development of individual voice and style. Introduces procedures for publication. Prerequisite ENG 112 or divisional approval.

ENG 211 - Creative Writing I (3 cr.) Introduces the student to the fundamentals of writing imaginatively. Students write in forms to be selected from poetry, fiction, drama, and essays. Prerequisite ENG 112 or divisional approval. Part I of II.

ENG 212 - Creative Writing II (3 cr.) Introduces the student to the fundamentals of writing imaginatively. Students write in forms to be selected from poetry, fiction, drama, and essays. Prerequisite ENG 112 or divisional approval. Part II of II.

ENG 241, ENG 242 - Survey of American Literature I-II (3 cr. each) 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. Part I and II of II.

ENG 243, ENG 244 - Survey of English Literature I-II (3 cr. each) 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. Part I and II of II.

ENG 250 - Children's Literature (3 cr.) Surveys the history, development and genres of children's literature, focusing on analysis of texts for literary qualities and in terms of audience. Prerequisite(s): ENG 112 or 125 (or divisional approval).

ENG 251 - Survey of World Literature I (3 cr.) Examines major works of world literature. Involves critical reading and writing. Prerequisite ENG 112 or divisional approval. Part I of II.

ENG 252 - Survey of World Literature II (3 cr.) Examines major works of world literature. Involves critical reading and writing. Prerequisite ENG 112 or divisional approval. Part II of II.

ENG 253 - Survey of African-American Literature I (3 cr.) Examines selected works by Black American writers from the colonial period to the present. Involves critical reading and writing. Prerequisite ENG 112 or divisional approval. Part I of II.

ENG 254 - Survey of African-American Literature II (3 cr.) Examines selected works by Black American writers from the colonial period to the present. Involves critical reading and writing. Prerequisite ENG 112 or divisional approval. Part II of II.

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.

ENG 268 - The Modern Drama (3 cr.) Studies the modern drama. Emphasizes the understanding and enjoyment of dramatic literature. Requires critical reading and writing. Prerequisite ENG 112 or divisional approval.

(ENV) Environmental Science

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.

(ETR) Electronics Technology

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 mathematics used in circuit calculations. Introduces concepts of resistance, capacitance, inductance and magnetism. Focuses on electronics/circuits application.

ETR 123-124 - Electronic Applications I-II (2 cr. each) Provides laboratory and shop experience as applied to basic electronic devices, circuits and systems with emphasis on practical measurements. Part I and II of II.

ETR 136 - General Industrial Electronic Systems (3 cr.) Studies devices, circuits, power modules, analog and digital, open and closed loop control and servo systems. May include laboratory projects and modular troubleshooting.

ETR 141-142 - Electronics I-II (3 cr. each) Introduces electronic devices as applied to basic electronic circuits and systems. Part I and II of II.

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.

ETR 150 - Machine Control Using Relay & Programmable Logic (3 cr.) Provides an introduction to hardwired relay logic and the programmable logic controller (PLC) as utilized in a variety of different control tasks. Covers different types of inputs and outputs in control system. Teaches practical troubleshooting strategies.

ETR 151-152 - Electronic Circuits and Troubleshooting I-II (2 cr. each) Studies analog and digital circuits and systems with standard circuit test and troubleshooting procedures. Part I and II if I.

ETR 177 - Industrial Robotics and Robotics Programming (3 cr.) Prepares the student to safely operate and maintain a robot and develop and maintain basic robot programs.

ETR 180 - Industrial Ethernet Networking (2 cr.) Examines the theory and implementation of digital and communications systems. Features OSI model and plant floor networks. May include optical, wireless, satellite and other communications systems.

ETR 190 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

ETR 241-242 - Electronic Communications I-II (3 cr. each) Studies noise, information and bandwidth, modulation and demodulation, transmitters and receivers, wave propagation, antennas and transmission lines. Includes broad band communication systems, microwave, both terrestrial and satellite, fiber optics, multiplexing and associated hardware. Part I and II of II.

ETR 243 - Digital, Analog, and Data Communications Systems I (4 cr.) Teaches theory and implementation of digital and analog circuits in communication systems. Includes PCM, multiplexing, analog modulation, analysis and performance of transmitters and receivers. Includes optical satellite and other communications systems. Prerequisite: Knowledge of D.C./A.C. theory and devices.

ETR 246 - Electronic Motor Drives Systems (3 cr.) Introduces advanced operations, setup, programming and troubleshooting of electronic motor drives that are used for the control of industrial AC motors.

ETR 255 - Active Devices and Circuits (3 cr.) Teaches theory of active devices and circuits, devices and circuit parameters, semiconductor characteristics and the application of circuits to active systems. Includes testing and analysis of active devices and circuits. Prerequisite: Knowledge of D.C./A.C. theory.

ETR 282-283 - Digital Systems I-II (3 cr. each) Includes programming, circuity, logic, operation interfacing of computer and micro processing systems. Includes pulse circuits and pulse logic systems as applied to computer and microprocessor technology. Part I and II of II.

ETR 286 - Principles and Applications of Robotics (3 cr.) Provides an overview of terminology, principles, practices, and applications of robotics. Studies development, programming; hydraulic, pneumatic, electronic controls; sensors, and system troubleshooting.

ETR 290 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

ETR 295 - Topics In (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.

(FIN) Financial Services

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.

(GEO) Geography

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, race and ethnicity, religion, politics, and economic activities. Introduces the student to types and uses of maps.

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.

(GOL) Geology

GOL 105 - Physical Geology (4 cr.) Introduces the composition and structure of the earth and modifying agents and processes. Investigates the formation of minerals and rocks, weathering, erosion, earthquakes, and crustal deformation.

GOL 106 - Historical Geology (4 cr.) Traces the evolution of the earth and life through time. Presents scientific theories of the origin of the earth and life and interprets rock and fossil record.

(HIM) Health Information Management

HIM 106 - International Classification of Diseases I (2 cr.)
Introduces International Classification of Diseases Clinical Modification Coding I (ICD-10-CM) coding classification system and provides actual coding exercises. Prerequisite: HLT 143

HIM 107 - International Classification of Diseases II (3 cr.)
Stresses advanced International Classification of Diseases Clinical Modification Coding II (ICD-10-CM) coding skills through practical exercises. Prerequisite: Hit 106 or HIM 106.

HIM 130 - Healthcare Information Systems (3 cr.)
Teaches basic concepts of microcomputer software (to include operating systems, word processing, spreadsheets, and database applications. Focuses on microcomputer applications and information systems in the Healthcare environment. Provides a working introduction to electronic health information systems for allied health, teaching students how the adoption of electronic health records affects them as future healthcare professionals.

HIM 143 - Managing Electronic Billing in a Medical Practice (3 cr.)
Presents practical knowledge on use of computer technology in medical practice management. Develops basic skills in preparation of universal billing claim. Explores insurance claim processing issues.

HIM 226 - Legal Aspects of Health Record Documentation (2 cr.)
Presents the legal requirements associated with health record documentation. Emphasizes the policies and procedures concerning the protection of the confidentiality of patient's health records.

HIM 253 - Health Records Coding (3 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.

(HIS) History

HIS 101, HIS 102 - History of Western Civilization I-II (3 cr. each)
Examines the development of western civilization from ancient times to the present. Part I and II of II.

HIS 111, HIS 112 - History of World Civilizations I-II (3 cr. each)
Surveys Asian, African, Latin American, and European civilizations from the ancient period to the present. Part I and II of II.

HIS 121, HIS 122 - United States History I-II (3 cr. each)
Surveys United States history from its beginning to the present. Part I and II of II.

HIS 266 - Military History of the Civil War (3 cr.)
Analyzes military campaigns of the Civil War, including factors contributing to the defeat of the Confederacy and problems created by the war. May include field trips to Civil War sites in the region.

HIS 268 - The American Constitution (3 cr.)
Analyzes the origin and development of the United States Constitution. Includes the evolution of civil liberties, property rights, contracts, due process, judicial review, federal-state relationships, and corporate-government relations.

(HLT) Health

HLT 100 - First Aid and Cardiopulmonary Resuscitation (3 cr.)
Focuses on the principles and techniques of safety, first aid, and cardiopulmonary resuscitation.

HLT 105 - Cardiopulmonary Resuscitation (1 cr.)
Provides training in coordinated mouth-to-mouth artificial ventilation and chest compression, choking, life-threatening emergencies, and sudden illness. Equivalent to EMS 100.

HLT 106 - First Aid and Safety (2 cr.)
Focuses on the principles and techniques of safety and first aid.

HLT 116 - Introduction to Personal Wellness Concepts (3 cr.)
Introduces students to the dimensions of wellness including the physical, emotional, environmental, spiritual, occupational, and social components.

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.

HLT 130 - Nutrition and Diet Therapy (2 cr.)
Studies nutrients, sources, functions, and requirements with an introduction to diet therapy.

HLT 141 - Intro to Medical Terminology (2 cr.)
Focuses on medical terminology for students preparing for careers in the health professions.

HLT 143-144 - Medical Terminology I-II (3 cr. each)
Provides an understanding of medical abbreviations and terms. Includes the study of prefixes, suffixes, word stems, and technical terms with emphasis on proper spelling, pronunciation, and usage. Emphasizes more complex skills and techniques in understanding medical terminology. Part I and II of II.

HLT 200 - Human Sexuality (3 cr.)
Provides a basic understanding of human sexuality. Includes anatomy, physiology, pregnancy, family planning, venereal diseases, and sexual variations.

HLT 204 - Women's Health (3 cr.)
Explores current issues related to women's health and wellness with an emphasis upon prevention of disease and optimum well being. Takes a multi-ethnic approach to exploring the most up-to-date findings, diagnostic tools, and treatments for breast cancer, reproductive tract illness, heart, and other common diseases faced by women from puberty through menopause.

HLT 215 - Personal Stress and Stress Management (3 cr.)
Provides a basic understanding of stress and its physical, psychological, and social effects. Includes the relationships between stress and change, self-evaluation, sources of stress, and current coping skills for handling stress.
HLT 230 - Principles of Nutrition and Human Development (3 cr.) Teaches the relationship between nutrition and human development. Emphasizes nutrients, balanced diet, weight control, and the nutritional needs of an individual.

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.

HLT 261 - Basic Pharmacy I (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. Part I of II.

HLT 263 - Basic Pharmacy I Lab (1 cr.) Provides practical experience to supplement instruction in HLT 261-262. Should be taken concurrently with HLT 261-262, in appropriate curricula. Part I of II.

HLT 290 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

(HRI) Hotel-Restaurant-Institutional Management

HRI 101 - Hotel-Restaurant Organization and Management I (3 cr.) Introduces the history, opportunities, problems and trends of the hospitality industry. Covers the organization of the various sectors of the hospitality industry including human resources, general business considerations, and management theory. Part I of II.

HRI 106 - Principles of Culinary Arts I-II (3 cr.) Introduces the fundamental principles of food preparation and basic culinary procedures. Stresses the use of proper culinary procedures combined with food science, proper sanitation, standards of quality for food items that are made, and proper use and care of kitchen equipment. Part I of II.

HRI 119 - Applied Nutrition for Food Service (3 cr.) Studies food composition, nutrition science, and application of nutrition principles by the food service professional. Provides the student with a basic understanding of human nutrition and application of nutrition in the service of commercially prepared meals. A laboratory co-requisite (HRI 122) may be required as identified by the college.

HRI 128 - Principles of Baking (3 cr.) Instructions the student in the preparation of breads, pastries, baked desserts, candies, frozen confections, and sugar work. Applies scientific principles and techniques of baking. Promotes the knowledge/skills required to prepare baked items, pastries and confections.

HRI 140 - Fundamentals of Quality for the Hospitality Industry (3 cr.) Teaches quality in the hospitality industry, including material on the total quality management movement. Emphasizes quality from the customer's perspective.

HRI 154 - Principles of Hospitality Management (3 cr.) Presents basic understanding of the hospitality industry by tracing the industry's growth and development, reviewing the organization and management of lodging, food, and beverage operations, and focusing on industry opportunities and future trends.

HRI 158 - Sanitation and Safety (3 cr.) Covers the moral and legal responsibilities of management to insure a sanitary and safe environment in a food service operation. Emphasizes the causes and prevention of foodborne illnesses in conformity with federal, state and local guidelines. Focuses on OSHA standards in assuring safe working conditions.

HRI 190 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

HRI 195 - Topics In (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.

HRI 215 - Food Purchasing (3 cr.) Presents the method and procedures for purchasing food for hotels, restaurants and institutions. Deals with markets, federal and trade grades, governmental regulations, packaging, comparative versions price buying, yields and quality control.

HRI 218 - Fruit, Vegetable, and Starch Preparation (3 cr.) Instructs the student in the preparation of fruits, vegetables, grains, cereals, legumes and farinaceous products. Promotes the knowledge/skills necessary to prepare menu items from fruits, vegetables, and their byproducts, and to select appropriate uses as meal components.

HRI 219 - Stock, Soup, and Sauce Preparation (3 cr.) Instructs the student in the preparation of stocks, soups, and sauces. Promotes the knowledge/skills to prepare stocks, soups, and sauces, and to select appropriate uses as meal components.

HRI 220 - Meat, Seafood and Poultry Preparation (3 cr.) Provides the study and preparation of meat, poultry, shellfish, fish, and game. Promotes the knowledge/skills required to select appropriate use of these foods as meal components.

HRI 224 - Recipe and Menu Management (3 cr.) Presents a comprehensive framework for creating and evaluating recipes and menus for commercial and non-commercial food service operations. Requires students to use microcomputer software to design recipes, recipe files, and menus. Teaches students menu engineering analysis and methods for optimizing menu contribution margin.

HRI 241 - Supervision in the Hospitality Industry (3 cr.) A comprehensive review of considerations for preparing effective supervisors in restaurants and lodging operations.
HRI 251 - Food and Beverage Cost Control I (3 cr.) Presents methods of pre-cost and pre-control as applied to the menu, purchasing, receiving, storing, issuing, production, sales and service which result in achievement of an operation's profit potential. Emphasizes both manual and computerized approaches. Part I of II.

HRI 257 - Catering Management (3 cr.) Studies special functions in the hospitality industry. Presents lecture and demonstration in banquet layout, menus, services, sales and supervision.

HRI 290 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

HRI 298 - Seminar and Project (1-5 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

(HUM) Humanities

HUM 165 - Controversial Issues in Contemporary American Culture (3 cr.) Introduces students to selected issues in contemporary American culture. Includes topic areas ranging from welfare reform, economic development, privacy, environmental protection and conservation, evolution vs. creation, to family values, and special interest lobbying in our state and national governments. Focuses on the development of the student's critical thinking skills by analyzing, evaluating, and reflecting on opposing sides of the same issue as expressed by public leaders, special interest groups and academicians.

HUM 195 - Topics in (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.

HUM 198 - Seminar and Project (1-5 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

HUM 246 - Creative Thinking (3 cr.) Examines and analyzes creative and effective thinking processes with applications in individual and group projects to solve business, scientific, environmental, and other practical problems.

HUM 256 - Mythology in Literature and the Arts (3 cr.) Studies cultural expressions of mythology in literature and the arts. Considers several of the following mythologies, with emphasis on parallels and divergences: Egyptian, Near-Eastern, Greek, Roman, Celtic, Norse, Asian, and African.

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

(IND) Industrial Engineering Technology

IND 103 - Industrial Methods (3 cr.) Covers theoretical knowledge necessary for familiarization with common hand tools, common power tools, measuring tools and techniques, fastening components and procedures, grinding operations, metal cutting operations, and other miscellaneous tasks.

IND 123 - Introduction to Lean Manufacturing and Six Sigma (1 cr.) Covers basic Lean and Six Sigma concepts. Examines the importance of Lean and Six Sigma as pertaining to the world of manufacturing. Provides students with the opportunity to demonstrate the impact of Lean and Six Sigma manufacturing environment.

IND 137 - Team Concepts and 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.

IND 138 - Industrial Leadership and Career Development (1 cr.) Covers the importance of effective and ethical organizational behavior in career development. Provides students with guidance on how to be a high performance team member. Presents the tools necessary to manage and motivate team members in a manufacturing environment. Focuses on communication skills, professionalism, and ethics. Examines conflict resolution skills and the ability to identify behavioral types.

IND 161 - Product Design and Development I (5 cr.) Introduces the student to foundational concepts and tools in the design and development of products utilizing wood as a primary design medium.

IND 162 - Product Design and Development II (5 cr.) Advancement of the foundational concepts and tools in the design and development of products utilizing wood as a primary design medium.

IND 181 - World Class Manufacturing I (3 cr.) Studies the principles and applications of the globalization of industry. Emphasizes the fundamentals of interpersonal/team process, organization skills, total quality tools for continuous improvement, statistical process control, manufacturing resource planning and just-in-time.

IND 195 - Topics in (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. Variable hours

IND 199 - Supervised Study (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.

IND 243 - Principles and Applications of Mechatronics (3 cr.) Introduces terminology and principles related to Mechatronic system design and application. Integrates
Concepts of electrical/electronic, mechanical and computer technologies in the development, setup, operation and troubleshooting of automated products and systems. Covers breakdown of various automated manufacturing operations with emphasis on system planning, development and troubleshooting processes. Prerequisite: Divisional Approval.

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

**(INS) Instrumentation**

**INS 121 - Introduction to Measurement and Control (3 cr.)** Introduces applications of modern sensors, measurement equipment, and control systems, including operation and functions of components. Includes computer data acquisition and control with programming languages. Prerequisite: Divisional approval.

**INS 230 - Instrumentation I (3 cr.)** Presents the fundamental scientific principles of process control including temperature, pressure, level, and flow measurements. Topics include transducers, thermometers, and gauges are introduced along with calibration. Course prerequisites/corequisites ETR 113 and ETR 144.

**(ITD) Information Technology Database**

**ITD 110 - Web Page Design I (3 cr.)** Stresses a working knowledge of web site designs, construction, and management using HTML or XHTML. Includes headings, lists, links, images, image maps, tables, forms, and frames.

**ITD 112 - Designing Web Page Graphics (3 cr.)** Explores the creation of digital graphics for web design. Includes basic design elements such as color and layout will be explored utilizing a computer graphics program(s).

**ITD 115 - Web Page Design and Site Management (3 cr.)** Explores fundamentals of creating web pages and site management with web editing software. Students will learn techniques of web page design as well as managing the resources required to author and maintain a web site.

**ITD 120 - Design Concepts for Mobile Applications (4 cr.)** Provides skills for designing both Web-based and stand-alone applications for wireless devices. Details discussions of the needs for applications including mobile phones and a range of rich hand-held devices such as PDA's. Emphasizes the importance of usability, accessibility, optimization and performance to create fast-loading business enterprise applications and games.

**ITD 132 - Structured Query Language (3 cr.)** Incorporates a working introduction to commands, functions and operators used in SQL for extracting data from standard databases.

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

**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).

**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.

**ITD 250 - Database Architecture and Administration (3 cr.)** Involves in-depth instruction about the underlying architecture of databases and the handling of database administration.

**ITD 256 - Advanced Database Management (3 cr.)** Focuses in-depth instruction in the handling of critical tasks of planning and implementing large databases. Includes an introduction to concepts of advanced data warehousing and database configuration.

**ITD 258 - Database Performance and Tuning (3 cr.)** Emphasizes instruction to optimize the performance of a database management system. Includes methods for tuning data access and storage and discussions of resolving data performance problems.

**ITD 260 - Data Modeling and Design (3 cr.)** Introduces life cycle application development methodologies in a systematic approach to developing relational databases and designing applications. Presents content introducing functional and business process modeling, using modeling information to produce application designs, analyzing data requirements as entities, attributes, and relationships and map an entity relationship diagram to an initial database design. Identifies the available automated development tools and utilizes Oracle Developer software to perform practical applications of these concepts. Prerequisite: Oracle or SQL programming including DDL, DML, transaction control & queries with SELECT statement and some exposure to procedural language programming.

**(ITE) Information Technology Essentials**

**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.

**ITE 116 - Survey of Computer Software Applications (2 cr.)** Review current business software applications for microcomputers emphasizing comparison of a variety of software packages. Provides experience with multiple operating system commands, database, spreadsheet, and word processing programs.
ITE 120 - Principles of Information Systems (3 cr.) Provides an overview of the fundamentals of computer information systems. Focuses on the role of computers in business today including hardware, software, analysis, design, and implementation of information systems. Includes an introduction to computer ethics, and business and personal security. Exposes students to techniques used in programming and system development. Utilizes a hands-on component for spreadsheets, databases, and web design applications.

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.

ITE 131 - Survey of Internet Services (1 cr.) Introduces students to basic Internet terminology and services including e-mail, WWW browsing, search engines, ftp telnet, and other services.

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.

ITE 150 - Desktop Database Software (4 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.

ITE 182 - User Support/Help Desk Principles (3 cr.) Introduces a variety of tools and techniques that are used to provide user support in help desk operations. Includes help desk concepts, customer service skills, troubleshooting problems, writing for end users, help desk operations, and software, needs analysis, facilities management, and other related topics related to end user support.

ITE 195 - Topics in (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.

ITE 215 - Advanced Computer Applications and Integration (4 cr.) Incorporates advanced computer concepts including the integration of a software suite.

ITE 221 - PC Hardware and OS Architecture (3 cr.) Covers instruction about processors, internal functions, peripheral devices, computer organization, memory management, architecture, instruction format, and basic OS architecture.

ITE 225 - Mobile Computing (3 cr.) Focuses on key technical and business issues related to mobile computing: mobile environments, support services, mobile communication systems, and applications.

(ITN) Information Technology Networking

ITN 102 - Introduction to Networked Client Operating Systems (LAN) (4 cr.) Consists of instruction in the installation, configuration, administration, and troubleshooting of networked client operating systems in a data communications environment. This course can utilize any mixture of available networked client operating systems.

ITN 103 - Administration of Networked Servers (4 cr.) Instruction focuses on the installation, configuration, and management of local area networked servers. Topics covered include support for local area networked devices, system services, and deployment of networked operating systems. This course can include any version of Windows or Linux Server Platforms.

ITN 104 - Maintaining Servers in the Networked Infrastructure (4 cr.) Provides instruction on how to implement, manage, and maintain servers within a communications infrastructure. Topics covered include support for Terminal Services, Remote Access, Group Policy, NAT, IPSec, and specific security configurations.

ITN 106 - Microcomputer Operating Systems (3 cr.) Teaches use of operating system utilities and multiple-level directory structures, creation of batch files, and configuration of microcomputer environments. May include a study of graphical user interfaces.

ITN 107 - Personal Computer Hardware & Troubleshooting (3 cr.) Includes specially designed instruction to give a student a basic knowledge of hardware and software configurations. Includes the installation of various peripheral devices as well as basic system hardware components.

ITN 109 - Internet and Network Foundation (3 cr.) Provides a basic comprehension of Internet and network technologies including IT job roles, connection methods, TCP/IP functionality and DNS. Explores web server technologies with security and project management concepts. Introduces network creation, physical and logical topologies including media properties, server types, IP addressing and network security.

ITN 154 - Network Fundamentals, Router Basics, and Configuration (ICND1) - Cisco (4 cr.) Provides instruction in the fundamentals of networking environments, the basics of router operations, and basic router configuration.

ITN 155 - Switching, Wireless, and WAN Technologies (ICND2) - Cisco (4 cr.) Provides the skills and knowledge to install, operate, and troubleshoot a small-to-medium sized branch office enterprise network, including configuring several switches and routers, configuring wireless devices, configuring VLANs, connecting to a WAN, and implementing network security.

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, & network management.

**ITN 157 - WAN Technologies - Cisco (4 cr.)** Introduction to Wide Area Networking (WANs). Includes WAN design, LAPB, Frame Relay, ISDN, HDLC, and PPP.

**ITN 170 - Linux System Administration (3 cr.)** Focuses on the installation, configuration and administration of the Linux operating system and emphasizes the use of Linux as a network client and workstation.

**ITN 200 - Administration of Network Resources (4 cr.)** Focuses on the management of local area network servers. Teaches proper structuring of security systems. Explains print queues, disk management, and other local area network (LAN) issues. Presents concerns and issues for the purchase and installation of hardware and software upgrades. Can be taught using any network operating system or a range of operating systems as a delivery tool.

**ITN 201 - Administration & Management of Network Infrastructures (3 cr.)** Focuses on the administration and management of network infrastructures. Covers network addressing of clients and servers, naming resolution, remote access, security, printing services, and troubleshooting. Uses network operating system as the delivery tools.

**ITN 209 - Voice Over Internet Protocol (3 cr.)** Discusses in depth the concept, theory and principles of Voice over Internet Protocol technology. Reviews the existing PSTN architecture. Examines VOIP Quality of Service, various speech coding techniques, the H.323 architecture, Session Initiation Protocol, Media Gateway Protocol and the relationship between VOIP and SS7.

**ITN 213 - Information Storage and Management (4 cr.)** Focuses on advanced storage systems, protocol, and architectures including Storage Area Networks (SAN), Network Attached Storage (NAS), Fiber Channel Networks, Internet Protocol SANs (IPSAN), iSCSI, and Content Addressable Storage (CAS).

**ITN 231 - Desktop Virtualization (4 cr.)** Explores the concepts and capabilities of desktop and application virtualization with a focus on the installation, configuration, and management of the virtual desktop and application infrastructure.

**ITN 245 - Network Troubleshooting (3 cr.)** Focuses on servicing and maintaining local area networks (LANS). Teaches network installation, network troubleshooting, installation of file servers and workstations, configuring of network boards and cables, and diagnosing common network problems.

**ITN 254 - Virtual Infrastructure: Installation and Configuration (4 cr.)** Explores concepts and capabilities of virtual architecture with a focus on installation, configuration, and management of a virtual infrastructure, ESX Server, and Virtual Center. Covers fundamentals of virtual network design and implementation, fundamentals of storage area networks, virtual switching, virtual system management, and engineering for high availability.

**ITN 255 - Virtual Infrastructure: Deployment, Security and Analysis (4 cr.)** Focuses on the deployment, security, and analysis of the virtual infrastructure, including scripted installations, advanced virtual switching for security, server monitoring for health and resource management, high-availability management, system backups, and fault analysis.

**ITN 257 - Cloud Computing: Infrastructure and Services (3 cr.)** Focuses on cloud infrastructure, deployment, security models, and the key considerations in migrating to cloud computing. Covers the technologies and processes required to build traditional, virtualized, and cloud data center environments, including computation, storage, networking, desktop and application virtualization, business continuity, security, and management.

**ITN 260 - Network Security Basics (3 cr.)** Provides instruction in the basics of network security in depth. Includes security objectives, security architecture, security models and security layers; risk management, network security policy, and security training. Includes the five security keys, confidentiality, integrity, availability, accountability and auditability.

**ITN 261 - Network Attacks, Computer Crime and Hacking (3 cr.)** Encompasses in-depth exploration of various methods for attacking and defending a network. Explores network security concepts from the viewpoint of hackers and their attack methodologies. Includes topics about hackers, attacks, Intrusion Detection Systems (IDS) malicious code, computer crime and industrial espionage.

**ITN 262 - Network Communication, Security and Authentication (4 cr.)** Covers an in-depth exploration of various communication protocols with a concentration on TCP/IP. Explores communication protocols from the point of view of the hacker in order to highlight protocol weaknesses. Includes Internet architecture, routing, addressing, topology, fragmentation and protocol analysis, and the use of various utilities to explore TCP/IP.


**ITN 267 - Legal Topics in Network Security (3 cr.)** Conveys an in-depth exploration of the civil and common law issues that apply to network security. Explores statutes, jurisdictional, and constitutional issues related to computer crimes and privacy. Includes rules of evidence, seizure and evidence handling, court presentation and computer privacy in the digital age.

**ITN 276 - Computer Forensics I (4 cr.)** Teaches computer forensic investigation techniques for collecting computer-related evidence at the physical layer from a variety of digital media (hard drives, compact flash and PDAs) and performing analysis at the file system layer. Prerequisite: ITN 106, ITN 107.
Co-requisite: ITN 260. Credit will be given to ITN 275 or ITN 276 and ITN 277, but not all three courses.

**ITN 277 - Computer Forensics II (3 cr.)** Develops skills in the forensic extraction of computer evidence at a logical level using a variety of operating systems and applications (i.e., e-mail) and learn techniques for recovering data from virtual memory, temporary Internet files, and intentionally hidden files. Prerequisite: ITN 276, Computer Forensics I. Credit will be given to ITN 275 or ITN 276 and ITN 277, but not all three courses.

**ITP Information Technology Programming**

**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.

**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.

**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.

**ITP 134 - Visual C++ Programming I (4 cr.)** Provides instruction in fundamentals of object-oriented programming and design using C++ for GUI applications. Emphasizes software design and construction using the concepts of foundation classes.

**ITP 136 - C# Programming I (4 cr.)** Presents instruction in fundamentals of object-oriented programming and design using C#. Emphasizes program construction, algorithm development, coding, debugging, and documentation of applications within the .NET framework.

**ITP 140 - Client Side Scripting (3 cr.)** Provides instruction in fundamentals of Internet application design, development, and deployment using client side scripting language(s).

**ITP 160 - Introduction to Game Design and Development (3 cr.)** Introduces object-oriented game design and development. Provides overview of the electronic game design and development process and underlines the historical context, content creation strategies, game careers, and future trends in the industry. Utilizes a game language environment to introduce game design, object-oriented paradigms, software design, software development and product testing. Teaches skills of writing a game design document and creating a game with several levels and objects. Integrate 2D animations, 3D models, sound effects, and background music as well as graphic backgrounds.

**ITP 165 - Gaming and Simulation (3 cr.)** Introduces students to the concepts and applications of gaming and simulation through the use of gaming and simulation tools, as well as through basic programming skills.

**ITP 170 - Project Management (3 cr.)** Introduces the concepts of project management as defined by the Project Management Institute, the accreditation body for project management.

**ITP 200 - Data Structure and Algorithms (3 cr.)** Introduces searching and sorting algorithms and basic data structures. Examines data structures and algorithms in a given computer language including sets, strings, stacks, queries, arrays, linked lists, and trees.

**ITP 214 - Windows Mobile Development (4 cr.)** Provides skills for creating mobile enterprise solutions by using the Smart Device Extensions for Microsoft Visual Studio .NET and the Microsoft .NET Compact Framework for wireless devices. Develops systems including mobile phones and a range of rich hand-held devices such as PDAs using applications utilizing the .NET Compact Framework. Covers Enterprise business applications and game applications.

**ITP 215 - XML Web Services (4 cr.)** Presents the techniques for developing and implementing Web-based applications with Web forms, ASP.NET, and the Microsoft.NET Framework. Includes Windows services.NET remote objects, XML Web services, security, and consuming and manipulating Web data.

**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.

**ITP 224 - Mobile Java ME (4 cr.)** Provides skills for creating Java ME applications for wireless devices. Systems will be developed for mobile phones and a range of rich hand-held devices such as PDAs with applications utilizing the Java ME architecture and Java Specification Requests (JSRs).

**ITP 225 - Web Scripting Languages (3 cr.)** Introduces students to 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 using client-side and server-side scripting languages along with auxiliary tools needed for complete applications. Prerequisites: ITD 110, ITP 100.

**ITP 226 - Mobile Java Android Development (4 cr.)** Provides the necessary design and programming skills required for developing applications on mobile devices (smartphones, tablets, etc.). Utilize the Java-based Android Development Kit to create Android applications, from concept to business model to final product.

**ITP 236 - C# Programming II (4 cr.)** Focuses instruction in advanced object-oriented techniques using C# for application development. Emphasizes database connectivity and networking using the .NET Framework.
ITP 244 - ASP.NET - Server Side Programming (4 cr.) Entails instruction in creation of ASP.NET Web applications to deliver dynamic content to a Web site utilizing server controls, web forms, and web services to accomplish complex data access tasks.

ITP 246 - JAVA - Server Side Programming (3 cr.) Provides instruction in application and integration of web-based clients and server-side java to three-tier business applications. Includes use of tools UML, XML, Java servlets, JSPs, and JDBC database access.

ITP 251 - Systems Analysis and Design (4 cr.) Focuses on application of information technologies (IT) to system life cycle methodology, systems analysis, systems design, and system implementation practices. Covers methodologies related to identification of information requirements, feasibility in the areas of economic, technical and social requirements, and related issues are included in course content. Software applications may be used to enhance student skills.

ITP 258 - Systems Development Project (3 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.

ITP 265 - Applications of Modeling and Simulation (4 cr.) Expands understanding of Modeling and Simulation via the implementation of a capstone project. Continues to develop object oriented programming skills. Expands 3D visualization skills. Examines all aspects of the project lifecycle. Develops workplace readiness for the Modeling and Simulation industry.

(MAC) Machine Technology

MAC 101 - Machine Shop I (8 cr.) Introduces the machinist to identification, care, and use of precision tools and instruments. Emphasizes the operation of the drill press, lathe, power saw, grinder, and milling machine. Covers the sharpening of lathe cutting tools, safety, and good housekeeping. Provides for operation and setup on the various types of precision grinders, milling machines, and drill presses. Part I of II.

MAC 102 - Machine Shop II (7 cr.) Introduces the machinist to identification, care, and use of precision tools and instruments. Emphasizes the operation of the drill press, lathe, power saw, grinder, and milling machine. Covers the sharpening of lathe cutting tools, safety, and good housekeeping. Provides for operation and setup on the various types of precision grinders, milling machines, and drill presses. Part II of II.

MAC 108 - Computer Numerically Controlled (CNC) Grinding (2 cr.) Provides students with the opportunity to demonstrate proper techniques in computer numerically controlled (CNC) outside diameter (OD), internal diameter (ID), and surface grinding. Covers the programming and operation of various CNC grinders and the set-up of selected grinding operations. Focuses on understanding the importance of machine parameters and wheel selection to surface finish in grinding applications.

MAC 121 - Numerical Control I (2 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. Part I of II.

MAC 122 - Numerical Control II (2 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. Part II of II.

MAC 123 - Computer Numerical Control III (2 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.

MAC 126 - Introductory CNC Programming (3 cr.) Introduces programming of computerized numerical control machines with hands-on programming and operation of CNC machines.

MAC 127 - Advanced CNC Programming (3 cr.) Provides in-depth study of programming computerized numerical control machines.

MAC 128 - CNC Programming (2 cr.) Teaches programming of computerized numerical control machines. Focuses on CNC machining processes.

MAC 130 - Introduction to Electric Discharge Machining (EDM) (2 cr.) Introduces the equipment, processes, and components of electric discharge machining. Includes basic operation and programming for computer numerical control (CNC) electrical discharge machining (EDM).

MAC 131 - Machine Lab I (2 cr.) Teaches fundamental machine shop operations, bench work, layout, measuring tools, and safety. Part I of II.

MAC 134 - CMM Operation and Programming (2 cr.) Focuses on inspection using a Coordinate Measuring Machine. Includes hands-on demonstration of CMM setup, initialization and operation. Covers the essential aspects of the software and CMM operation, using a sample part for hands-on practice.

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.

MAC 150 - Introduction to Computer Aided Manufacturing (3 cr.) Introduces computer aided manufacturing (CAM) with emphasis on programming of numerical control machinery. Teaches program writing procedures using proper language and logic and a CAM programming system to produce numerical control code for machines. Teaches basic computer usage, 2 1/2D and 3D CAD-CAM integration, and code-to-machine transfer.
MAC 161-162 Machine Shop Practices I-II (3 cr. each)
Introduces safety procedures, bench work, hand tools, precision measuring instruments, drill presses, cut-off saws, engine lathes, manual surface grinders, and milling machines. Part I and II of II.

MAC 163-164 Machine Shop Practices III-IV (3 cr. each)
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. Part I and II of II.

MAC 195 - Topics In (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.

MAC 209 - Standards, Measurements and Calculations (3 cr.)
Presents typical mathematical and mechanical problems requiring the use of reference standards such as the Machinery's Handbook for solution. Presents use of the Coordinate Measuring Machine for solution.

MAC 221-222-223 - Advanced Machine Tool Operations I-II-III (7 cr. each)
Focuses on advanced lathe and mill work with concentration on fits, finishes, inspection, quality control, and basic heat treating. Includes design and construction of specific projects to determine the student's operational knowledge of all equipment. Part I, II and III of III.

MAC 224 - Advanced Tooling Applications (3 cr.)
Provides students with the opportunity to demonstrate the techniques for selecting proper tool applications. Focuses on complex tool geometries and their effects on machining parameters in a precision environment. Examines production advantages of advanced tooling applications. Highlights 5-axis milling programming to maximize tool life and optimize performance.

MAC 251 - Advanced Computer Aided Manufacturing (CAM)
Modeling and Simulation (3 cr.)
Provides students with the opportunity to demonstrate the usage of computer-aided manufacturing (CAM) in a complex 5-axis milling and 3-axis turning environment. Examines model and program complex parts using computer-aided design (CAD) and CAM software and features various complex multi-axis machining methods and applications. Applies machining methods to a flow cell machining production environment to witness positive production and quality impacts.

MAC 253 - Advanced Coordinate Measuring Machine (CMM)
Operating and Programming (3 cr.)
Provides students with the opportunity to demonstrate advanced coordinate measuring machine (CMM) programming using modeling and scanning. Examines advanced geometrical dimensioning and tolerancing (GD&T) theories and reports. Covers advanced machine tool calibration, investigate form, and use complex visual inspection equipment.

MAC 254 - Machining Flow Cell IT Integration (2 cr.)
Provides students with the opportunity to demonstrate process and quality control through the use of information technology (IT) systems in the manufacturing environment. Covers the use of measure cuts in high-end machining, systems communication, and data transfer to monitor productivity and quality. Features tools to monitor part quality in process.

MAC 255 - Introduction to Supply Chain Strategies for Industry (3 cr.)
Focuses on effective supply chain strategies for industry. Covers first article part inspections and production validation. Demonstrates flow cell ideology in a live flow cell production environment. Examines value stream mapping, customer/supplier roles, and quality systems in addition to proper health and safety guidelines.

MAC 256 - Multi-axis Machine Tool Set-up, Programming and Operation (3 cr.)
Covers the programming and operation of high end 5-axis milling and 3-axis turning machines. Features complex set-ups on 5-axis milling and 3-axis turning machines. Examines technical instructions and guidelines set forth by a flow cell precision machining environment. Demonstrates the necessary standard and quality audits associated with a machining flow cell.

MAC 257 - Precision Machining Flow Cell Capstone (4 cr.)
Provides students with the opportunity to demonstrate various machining methods such as 5-axis milling, 3-axis turning, internal diameter (ID) and outside diameter (OD) grinding in addition to vertical and wire electrical discharge machining (EDM). Covers coordinate measuring machine (CMM) programming and measuring, tool presetting and validation. Examines Lean and Six Sigma methodology in a live precision machining flow cell.

MAC 258 - Tool Inspection, Validation and Presetting (2 cr.)
Covers the importance of tool management and tool presetting in a production environment. Examines tool presetting and tool presetter programming. Provides students with the opportunity to inspect and validate complex tool geometry using a computer numerical controlled (CNC) tool presetter.

MAC 295 - Topics In (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.

(MDL) Medical Laboratory

MDL 101 - Introduction to Medical Laboratory Techniques (3 cr.)
Introduces the basic techniques including design of the health care system, ethics, terminology, calculations, venipuncture and routine urinalysis.

MDL 105 - Phlebotomy (4 cr.)
Introduces basic medical terminology, anatomy, physiology, components of health care delivery and clinical laboratory structure. Teaches techniques of specimen collection, specimen handling, and patient interactions.

MDL 106 - Clinical Phlebotomy (3 cr.)
Focuses on obtaining blood specimens, processing specimens, managing
assignments, assisting with and/or performing specified tests, performing clerical duties and maintaining professional communication. Provides supervised learning in college laboratory/and or cooperating agencies.

**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.

**MDL 125 - Clinical Hematology I (3 cr.)** Teaches the cellular elements of blood including blood cell formation, and routine hematological procedures.

**MDL 190 - Coordinated Internship (1-5 cr.)** Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1.5 hours. May be repeated for credit. Variable hours.

**MDL 210 - Immunology and Serology (3 cr.)** Teaches principles of basic immunology, physiology of the immune system, diseases involving the immune system, as well as serologic procedures.

**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.

**MDL 225 - Clinical Hematology II (3 cr.)** Teaches advanced study of blood to include coagulation, abnormal bloody formation, and changes seen in various diseases.

**MDL 251 - Clinical Microbiology I (3 cr.)** Teaches handling, isolation, and identification of pathogenic microorganisms. Emphasizes clinical techniques of bacteriology, mycology, parasitology and virology. Part I of II.

**MDL 252 - Clinical Microbiology II (3 cr.)** Teaches handling, isolation, and identification of pathogenic microorganisms. Emphasizes clinical techniques of bacteriology, mycology, parasitology and virology. Part II of II.

**MDL 262 - Clinical Chemistry and Instrumentation II (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. Part II of II.

**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.

**MDL 282 - Clinical Laboratory Techniques (3 cr.)** Includes performing techniques, procedures, and interpretation in all areas of the clinical laboratory or simulated laboratory setting.

**MDL 290 - Coordinated Internship (1-5 cr.)** Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1.5 hours. May be repeated for credit. Variable hours.

**MEC 100 - Introduction to Engineering Technology (2 cr.)** Introduces professional fields of engineering technology. Covers the work of the engineering technologist, professional ethics, division of industrial practice, and engineering problem solving with hand calculator and computer applications.

**MEC 111 - Materials for Industry (3 cr.)** Studies the nature, structure, properties, and typical applications of metallic, polymeric, ceramic, and composite materials. Focuses on applications of materials as well as the behavior of materials subjected to external stresses. Addresses as required the earth's limited material resources, energy efficient materials, dependence on foreign sources of materials, material systems, thermal processing, and electronic-related materials.

**MEC 126 - Computer Programming for Technologists (2 cr.)** Introduces computer software and programming. Covers programming for the microcomputer using high level languages. Teaches computer solutions of mathematical problems in applications such as circuit analysis and static equilibrium.

**MEC 131 - Mechanics I-Statics for Engineering Technology (3 cr.)** Teaches Newton's laws, resultants and equilibrium of force systems, trusses and frames, determination of centroids, and distributed loads and moments of inertia. Introduces dry friction and force systems in space.

**MEC 132 - Mechanics II Strength of Mat. for Eng. Tech. (3 cr.)** Teaches the concepts of stress and strain. Provides an analysis of stresses and deformations in loaded members, connectors, shafts, beams, columns, and combined stress.

**MEC 148 - Industrial Pipefitting (3 cr.)** Covers the fundamentals of industrial piping installation, components, and layout. Considers the types of pipe and fabrication of piping systems, as well as the methods used to connect them.

**MEC 154 - Mechanical Maintenance I (3 cr.)** Provides an overview of basic maintenance techniques and processes for industrial mechanics and technicians who are installing and maintaining industrial mechanical and power transmission components.

**MEC 161 - Basic Fluid Mechanics: Hydraulics/Pneumatics (3 cr.)** Introduces theory, operation and maintenance of hydraulic/ pneumatic devices and systems. Emphasizes the properties of fluids, fluid flow, fluid statics, and the application of Bernoulli's equation.

**MEC 162 - Applied Hydraulics and Pneumatics (3 cr.)** Introduces hydraulic and pneumatic systems found in construction equipment, road vehicles, and farm equipment. Includes the basic theory, construction, maintenance and repair of hydraulic and pneumatic power systems.

**MEC 168 - Pump Systems (2 cr.)** Introduces the principles and
applications of various commercial and industrial pumps and
pumping systems with setups to calculate and measure
pressure, flow and velocity of fluids within pumping systems.

MEC 169 - Steam Systems (2 cr.) Introduces the components,
principles and applications of various commercial and
industrial steam and thermal controlled systems. Covers how
to calculate and measure pressure, flow and system
performance.

MEC 208 - Materials Handling and Forklift Operation (2 cr.)
Provides guidance and hands-on experience in the use of jib,
overhead cranes and the rigging involved for lifting/moving
materials and working safely. Covers forklift training and safety
issues for operating a forklift on the job site. Course
prerequisites/corequisites SAF 130 or equivalent.

MEC 211-212 - Machine Design I-II (4 cr. each) Introduces
analytical design of bearings, clutches, coupling, brakes,
springs, gearing systems, and power shifting. Emphasizes
methods of construction, machine parts and specifications of
materials, and manufacturing processes. Part I and II of II.

MEC 254 - Mechanical Maintenance II (3 cr.) Covers
advanced maintenance techniques and processes for
industrial mechanics and technicians who are installing and
maintaining industrial mechanical and power transmission
components.

MEC 265 - Fluid Mechanics (3 cr.) Studies properties of fluids
and fluid flow, Bernoulli's theorem, measuring devices,
viscosity and dimensional analysis. Emphasizes fluid statics,
flow in pipes and channels, and pumps.

MEC 266 - Applications of Fluid Mechanics (3 cr.) Teaches
theory of hydraulic and pneumatic circuits including motors,
controls, actuators, valves, plumbing, accumulators, reservoirs,
pumps, compressors, and filters.

MEC 268 - Fluid Power - Hydraulic Systems (2 cr.) Studies
hydraulic components and their integration into complex
systems including system analysis and troubleshooting.
Introduces design considerations necessary for repair and
modification. Covers closed loop control and proportional
valves with electronic control.

MEC 269 - Fluid Power - Pneumatic Systems (2 cr.) Teaches
pneumatic components, systems and trouble analysis.
Introduces basic design for modification and repair. Covers
open loop control, fluidics, robotics and computer controls.

(MKT) Marketing

MKT 100 - Principles of Marketing (3 cr.) Presents principles,
methods, and problems involved in marketing to consumers
and organizational buyers. Discusses problems and policies
connected with distribution and sale of products, pricing,
promotion, and buyer motivation. Examines variations of
marketing research, legal, social, ethical, e-commerce, and
international considerations in marketing.

MKT 110 - Principles of Selling (3 cr.) Presents a fundamental,
skills-based approach to selling and relationship building.
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.

MKT 170 - Customer Service (1 cr.) Introduces students to the
concepts of marketing as they relate to customer service.
Teaches development of customer service training and
implementation of strategies to improve customer relations
and service. Includes lecture, role-playing, and case studies.

MKT 195 - Topics In (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.

MKT 216 - Retail Organization and Management (3 cr.)
Examines the organization of the retail establishment to
accomplish its goals in an effective and efficient manner.
Includes study of site location, internal layout, store
operations, and security. Examines the retailing mix, the
buying or procurement process, pricing, and selling. Studies
retail advertising, promotion, and publicity as a coordinated
effort to increase store traffic.

MKT 227 - Merchandise Buying and Control (3 cr.) Studies
the merchandising cycle. Explores techniques used in the
development of buying resources, merchandising plans, model
stock, unit control, and inventory systems. Highlights
merchandise selection, policy pricing strategies, and inventory
control methods.

MKT 228 - Promotion (3 cr.) Presents an overview of
integrated marketing communications through advertising,
public relations, personal selling and sales promotion. Focuses
on coordinating these activities into an effective campaign to
promote sales for a particular product, business, institution or
industry.

MKT 281 - Principles of Internet Marketing (3 cr.) Introduces
students to Internet marketing. Discusses how to implement
marketing programs strategically and tactically using online
communications tools. Teaches e-marketing strategies.

MKT 282 - Principles of E-Commerce (3 cr.) Studies 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 and
execution of marketing strategies.

MKT 297 - Cooperative Education (1-6 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.

MKT 298 - Seminar and Project (1-5 cr.) Requires completion
of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

(MTE) Math Essentials

MTE 1 - Operations with Positive Fractions (1 cr.) Includes operations and problem solving with proper fractions, improper fractions, and mixed numbers without the use of a calculator. Emphasizes applications and includes U. S. customary units of measure. Credit is not applicable toward graduation. Prerequisite: Qualifying placement score.

MTE 2 - Operations with Positive Decimals and Percents (1 cr.) Includes operations and problem solving with positive decimals and percents. Emphasizes applications and includes U. S. customary and metric units of measure. Credit is not applicable toward graduation. Prerequisite(s): MTE 1 or qualifying placement score.

MTE 3 - Algebra Basics (1 cr.) Includes basic operations with algebraic expressions and solving simple algebraic equations using signed numbers with emphasis on applications. Credit is not applicable toward graduation. Prerequisite: MTE 2 or qualifying placement score.

MTE 4 - First Degree Equations and Inequalities in One Variable (1 cr.) Includes solving first degree equations and inequalities containing one variable, and using them to solve application problems. Emphasizes applications and problem solving. Credit is not applicable toward graduation. Prerequisite(s): MTE 3 or qualifying placement score.

MTE 5 - Linear Equations, Inequalities and Systems of Linear Equations in Two Variables (1 cr.) Includes finding the equation of a line, graphing linear equations and inequalities in two variables and solving systems of two linear equations. Emphasizes writing and graphing equations using the slope of the line and points on the line, and applications. Credit is not applicable toward graduation. Prerequisite(s): MTE 4 or qualifying placement score.

MTE 6 - Exponents, Factoring and Polynomial Equations (1 cr.) The student will learn to perform operations on exponential expressions and polynomials. Students will also learn techniques to factor polynomials and use these techniques to solve polynomial equations. Emphasis should be on learning all the different factoring methods, and solving application problems using polynomial equations. Credit is not applicable toward graduation. Prerequisite(s): MTE 5 or qualifying placement score.

MTE 7 - Rational Expressions and Equations (1 cr.) Includes simplifying radical expressions, using rational exponents, solving radical equations and solving applications using radical equations. Credit is not applicable toward graduation. Prerequisite(s): MTE 6 or qualifying placement score.

MTE 8 - Rational Exponents and Radicals (1 cr.) Includes simplifying radical expressions, using rational exponents, solving radical equations and solving applications using radical equations. Credit is not applicable toward graduation. Prerequisite(s): MTE 7 or qualifying placement score.

MTE 9 - Functions, Quadratic Equations and Parabolas (1 cr.) Includes an introduction to functions in ordered pair, graph, and equation form. Also introduces quadratic functions, their properties and their graphs. Credit is not applicable toward graduation. Prerequisite(s): MTE 8 or qualifying placement score.

(MTH) Mathematics

MTH 111 - Basic Technical Mathematics (3 cr.) Provides a foundation in mathematics with emphasis in arithmetic, unit conversion, basic algebra, geometry and trigonometry. This course is intended for CTE programs. Prerequisites: MTE 1-3. Prereq OR Corequisite: MCR 1.

MTH 115 - Technical Mathematics I (3 cr.) Presents algebra through exponential and logarithmic functions, trigonometry, vectors, analytic geometry, and complex numbers. Prerequisites: Competency in Math Essentials MTE 1-6 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing required MTE units or equivalent. Part I of II.

MTH 120 - Introduction to Mathematics (3 cr.) Introduces number systems, logic, basic algebra, and descriptive statistics. Prerequisites: Competency in Math Essentials MTE 1-3 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent. (Intended for occupational/technical programs.)

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: Competency in Math Essentials MTE 1-3 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent. (Intended for occupational/technical programs.)

MTH 130 - Fundamentals of Reasoning (3 cr.) Presents elementary concepts of algebra, linear graphing, financial literacy, descriptive statistics, and measurement & geometry. Based on college programs being supported by this course, colleges may opt to add additional topics such as logic or trigonometry. This course is intended for occupational/technical programs. Prerequisite(s): Competency in MTE 1-3 as demonstrated through placement or unit completion or equivalent or Corequisite: MCR 2.

MTH 133 - Mathematics for Health Professions (3 cr.) Presents in context the arithmetic of fractions and decimals, the metric system and dimensional analysis, percents, ratio and proportion, linear equations, topics in statistics, topics in geometry, logarithms, topics in health professions including dosages, dilutions and IV flow rates. This course is intended for
programs in the Health Professions. Prerequisite(s): Competency in MTE 1-3 as demonstrated through placement or unit completion or equivalent or Corequisite: MCR 9.

**MTH 141 - Business Mathematics I (3 cr.)** Provides instruction, review, and drill in percentage, cash and trade discounts, mark-up, payroll, sales, property and other taxes, simple and compound interest, bank discounts, loans, investments, and annuities. Prerequisites: Competency in Math Essentials MTE 1-3 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent. Part I of II.

**MTH 152 - Mathematics for the Liberal Arts II (3 cr.)** Presents topics in functions, combinatorics, probability, statistics and algebraic systems. Prerequisites: Competency in Math Essentials MTE 1-5 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent.

**MTH 154 - Quantitative Reasoning (3 cr.)** Presents topics in proportional reasoning, modeling, financial literacy and validity studies (logic and set theory). Focuses on the process of taking a real-world situation, identifying the mathematical foundation needed to address the problem, solving the problem and applying what is learned to the original situation. Prerequisite(s): Competency in MTE 1-5 as demonstrated through placement or unit completion or equivalent or Corequisite: MCR 4: Learning Support for Quantitative Reasoning.

**MTH 155 - Statistical Reasoning (3 cr.)** Presents elementary statistical methods and concepts including visual data presentation, descriptive statistics, probability, estimation, hypothesis testing, correlation and linear regression. Emphasis is placed on the development of statistical thinking, simulation, and the use of statistical software. Prerequisite: Competency in MTE 1-5 as demonstrated through placement or unit completion or equivalent or Co-requisite: MCR 5: Learning Support for Statistical Reasoning.

**MTH 157 - Elementary Statistics (3 cr.)** Presents elementary statistical methods and concepts including descriptive statistics, estimation, hypothesis testing, linear regression, and categorical data analysis. (Credit will not be awarded for both MTH 157 and MTH 240 or MTH 241.) Prerequisites: Competency in Math Essentials MTE 1-5 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent.

**MTH 158 - College Algebra (3 cr.)** Covers the structure of complex number systems, polynomials, rational expressions, graphing, systems of equations and inequalities and functions, quadratic and rational equations and inequalities.

**MTH 161 - PreCalculus I (3 cr.)** Presents topics in power, polynomial, rational, exponential, and logarithmic functions, and systems of equations and inequalities. Credit will not be awarded for both MTH 161: PreCalculus I and MTH 167: PreCalculus with Trigonometry or equivalent. Prerequisite(s): Competency in MTE 1-9 as demonstrated through placement or unit completion or equivalent or Corequisite: MCR 6: Learning Support for Precalculus I.

**MTH 162 - PreCalculus II (3 cr.)** Presents trigonometry, trigonometric applications including Law of Sines and Cosines and an introduction to conics. Credit will not be awarded for both MTH 162: PreCalculus II and MTH 167: PreCalculus with Trigonometry or equivalent. Prerequisite(s): Placement or completion of MTH 161: PreCalculus I or equivalent with a grade of C or better.

**MTH 167 - PreCalculus with Trigonometry (5 cr.)** Presents topics in power, polynomial, rational, exponential, and logarithmic functions, systems of equations, trigonometry, and trigonometric applications, including Law of Sines and Cosines, and an introduction to conics. Credit will not be awarded for both MTH 167: PreCalculus with Trigonometry and MTH 161/MTH 162: Precalculus I and II or equivalent. Prerequisite(s): Competency in MTE 1-9 as demonstrated through placement or unit completion or equivalent or Corequisite: MCR 7: Learning Support for PreCalculus w Trigonometry.

**MTH 166 - PreCalculus with Trigonometry (4 cr.)** Presents college algebra, analytic geometry, trigonometry, and algebraic exponential, and logarithmic functions. Prerequisite: Competency in Math Essentials MTE 1-9 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent. (Credit will not be awarded for both MTH 163 and MTH 166).

**MTH 173 - Calculus with Analytic Geometry I (4 cr.)** Presents analytic geometry and the calculus of algebraic and transcendent functions including the study of limits, derivatives, differentials, and introduction to integration along with their applications. Designed for mathematical, physical and engineering science programs. Prerequisites: a placement recommendation for MTH 173 and four units of high school mathematics including Algebra I, Algebra II, Geometry and Trigonometry or equivalent. (Credit will not be awarded for more than one of MTH 173, MTH 175, or MTH 273.)

**MTH 174 - Calculus with Analytic Geometry II (4 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 more than one of MTH 174, MTH 176 or MTH 274.)

**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 units of high school mathematics including Algebra I, Algebra II, Geometry and Trigonometry or equivalent. (Credit will not be awarded for more than one of
MTH 173, MTH 175 or MTH 273.)

MTH 176 - Calculus of One Variable II (3 cr.) Continues the study of integral calculus of one variable including indefinite integral, definite integral and methods of integration with applications to algebraic and transcendental functions. 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.)

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 175.

MTH 178 - Topics in Analytic Geometry (2 cr.) Covers conic sections, polar and parametric equations, polar and parametric graphing, and calculus with vector valued functions. Designed for mathematical, physical, and engineering science programs. Prerequisite: 175, Corequisite: MTH 176.

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 158, MTH 163, MTH 166, or equivalent.

MTH 241 - Statistics I (3 cr.) Covers descriptive statistics, elementary probability, probability distributions, estimation, and hypothesis testing. Prerequisites: a placement recommendation for MTH 241 and MTH 163 or MTH 166 or equivalent. (Credit will not be awarded for both MTH 240 and MTH 241.)

MTH 245 - Statistics I (3 cr.) Presents an overview of statistics, including descriptive statistics, elementary probability, probability distributions, estimation, hypothesis testing, correlation, and linear regression. Credit will not be awarded for both MTH 155: Statistical Reasoning and MTH 245: Statistics I or equivalent. Prerequisite: Completion of MTH 154 or MTH 161 or equivalent with a grade of C or better.

MTH 261 - Applied Calculus I (3 cr.) Introduces limits, continuity, differentiation and integration of algebraic, exponential and logarithmic functions, and techniques of integration with an emphasis on applications in business, social sciences and life sciences. Prerequisite: Completion of MTH 161 or equivalent with a grade of C or better.

MTH 263 - Calculus I (4 cr.) Presents concepts of limits, derivatives, differentiation of various types of functions and use of differentiation rules, application of differentiation, antiderivatives, integrals and applications of integration. Prerequisite: Completion of MTH 167 or MTH 161/162 or equivalent with a grade of C or better.

MTH 264 - Calculus II (4 cr.) Continues the study of 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. Features instruction for mathematical, physical and engineering science programs. Prerequisite: Completion of MTH 263 or equivalent with a grade of C or better.

MTH 265 - Calculus III (4 cr.) Focuses on extending the concepts of function, limit, continuity, derivative, integral and vector from the plane to the three dimensional space. Covers topics including vector functions, multivariate functions, partial derivatives, multiple integrals and an introduction to vector calculus. Features instruction for mathematical, physical and engineering science programs. Completion of MTH 264: Calculus II or equivalent with a grade of C or better.

MTH 266 - Linear Algebra (3 cr.) Covers matrices, vector spaces, determinants, solutions of systems of linear equations, basis and dimension, eigenvalues, and eigenvectors. Features instruction for mathematical, physical and engineering science programs. Prerequisite: Completion of MTH 263 or equivalent with a grade of B or better or MTH 264 or equivalent with a grade of C or better.

MTH 267 - Differential Equations (3 cr.) Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with applications and numerical methods. Prerequisite: Completion of MTH 264 or equivalent with a grade of C or better.

MTH 272 - Applied Calculus II (3 cr.) Covers techniques of integration, multivariable calculus, and an introduction to differential equations. Prerequisite: MTH 271 or equivalent.

MTH 274 - Calculus II (4 cr.) Covers vectors in three dimensions, definite integrals, methods of integration, indeterminate forms, partial differentiation, and multiple integrals. Designed for mathematical, physical, and engineering science programs. Prerequisite: MTH 273 or equivalent. (Credit will not be awarded for more than one of MTH 174, MTH 176 or MTH 274.)

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.

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.

MTH 286 - Discrete Mathematics (4 cr.) Presents topics in discrete mathematical structures which are basic tools used in computer science. Covers sets, Boolean algebra, counting methods, generating functions and recurrence relations, graph theory, trees, and an introduction to finite state automata.
Designed for mathematical, physical, and engineering science programs. Prerequisite: MTH 174 or equivalent.

(MTS) Motorsports Management and Technology

MTS 105 - Fundamentals of Motorsports Technology (3 cr.) Introduces manual transmissions and differentials used in Stock car racing. Demonstrates and performs installation, repair, and maintenance of stock car repair, and maintenance of stock car manual gearboxes and final drive units. Prerequisites: ENG 03, ENG 05.

MTS 120 - Introduction to Motorsports Technology (3 cr.) Introduces the student to a survey of the Motorsports Industry. Explores the student to a broad overview of the industry, terminology and technology associated with developing a competition racecar.

MTS 125 - Motorsports Technology I (3 cr.) Introduces the student to the various systems of the racecar. Focuses on the inter-related functions and the theoretical concepts of the high performance race engine. Emphasizes hands-on skills with identification and installation of component parts of a race engine. Prerequisite: MTS 120.

MTS 126 - Motorsports Technology II (3 cr.) Introduces the student to charging, ignition systems and fuel systems of Stock car racing. Provides hands-on experience with specialized ignition systems, charging systems, fuel cells, fuel delivery, carburetion, and back up systems. Prerequisite: MTS 125.

MTS 130 - Motorsports Structural Technology I (3 cr.) Introduces the student to the basic design and fabrication of a racecar. Develops skills for use of the tools, equipment, and materials in the production of a racecar. Emphasizes safety, accuracy, and aesthetics of the racecar and the work environment. Prerequisite(s): MTS 125 and WEL 130.

MTS 135 - Sheet Metal Fabrication (3 cr.) Introduces sheet metal terminology, fabrication, and installation for covering structural framework of race cars. Provides project oriented, problem-based experiences with equipment and machinery used in the Motorsports industry.

(NAS) Natural Sciences

NAS 105 - Natural Science Topics for Modern Society (3 cr.) Emphasizes method of the scientific disciplines as applied to selected topics pertinent to modern society.

NAS 161 - Health Science I (4 cr.) Presents an integrated approach to human anatomy and physiology, microbiology, and pathology. Includes chemistry and physics as related to health sciences. Part I of II.

NAS 162 - Health Science II (4 cr.) Presents an integrated approach to human anatomy and physiology, microbiology, and pathology. Includes chemistry and physics as related to health sciences. Part II of II.

NAS 185 - Microbiology (4 cr.) Surveys microorganisms, presenting their characteristics and activities as related to health and disease.

(NSG) Nursing

NSG 100 - Introduction to Nursing Concepts (4 cr.) Introduces concepts of nursing practice and conceptual learning. Focuses on basic nursing concepts with an emphasis on safe nursing practice and the development of the nursing process. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or simulated environments. Prerequisite(s): BIO 141 or BIO 231 or NAS 161

NSG 106 - Competencies for Nursing Practice (2 cr.) Focuses on the application of concepts through clinical skill development. Emphasizes the use of clinical judgment in skill acquisition. Includes principles of safety, evidence-based practice, informatics and math computational skills. Prepares students to demonstrate competency in specific skills and drug dosage calculation including the integration of skills in the care of clients in simulated settings. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or simulated environments. Prerequisite(s): MTE 1-5 and BIO 141 (or BIO 231 or NAS 161)

NSG 130 - Professional Nursing Concepts (1 cr.) Introduces the role of the professional nurse and fundamental concepts in professional development. Focuses on professional identity, legal/ethical issues and contemporary trends in professional nursing. Prerequisite(s): BIO 141 or BIO 231 or NAS 161

NSG 152 - Health Care Participant (3 cr.) Focuses on the health and wellness of diverse individuals, families, and the community throughout the lifespan. Covers concepts that focus on client attributes and preferences regarding healthcare. Emphasizes population-focused care. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or cooperating agencies, and/or simulated environments. Prerequisite(s): BIO 142 (or BIO 232 or NAS 162), NSG 100, NSG 106, NSG 130 and NSG 200 Corequisite(s): BIO 150 or BIO 205

NSG 170 - Health/llness Concepts (6 cr.) Focuses on the
nursing care of individuals and/or families throughout the lifespan with an emphasis on health and illness concepts. Includes concepts of nursing care for the antepartum client and clients with common and predictable illnesses. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or simulated environments. Prerequisite(s): BIO 142 (or BIO 232 or NAS 162), NSG 100, NSG 106, NSG 130 and NSG 200 Corequisite(s): BIO 150 or BIO 205

NSG 200 - Health Promotion and Assessment (3 cr.) Introduces assessment and health promotion for the individual and family. Includes assessment of infants, children, adults, geriatric clients and pregnant females. Emphasizes health history and the acquisition of physical assessment skills with underlying concepts of development, communication, and health promotion. Prepares students to demonstrate competency in the assessment of clients across the lifespan. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or simulated environments. Prerequisite(s): BIO 141 (or BIO 231 or NAS 161)

NSG 210 - Health Care Concepts I (5 cr.) Focuses on care of clients across the lifespan in multiple settings including concepts related to physiological health alterations and reproduction. Emphasizes the nursing process in the development of clinical judgment for clients with multiple needs. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or simulated environments. Part I of II. Prerequisite(s): BIO 150 (or BIO 205), NSG 152 and NSG 170

NSG 211 - Health Care Concepts II (5 cr.) Focuses on care of clients across the lifespan in multiple settings including concepts related to psychological and physiological health alterations. Emphasizes the nursing process in the development of clinical judgment for clients with multiple needs. Provides supervised learning experiences in college nursing laboratories, clinical/community settings, and/or simulated environments. Part II of II. Prerequisite(s): BIO 150 (or BIO 205), NSG 152 and NSG 170

NSG 230 - Advanced Professional Nursing Concepts (2 cr.) Develops the role of the professional nurse in the healthcare environment in preparation for practice as a registered nurse. Introduces leadership and management concepts and focuses on the integration of professional behaviors in a variety of healthcare settings. Prerequisite(s): NSG 210 and NSG 211

NSG 252 - Complex Health Care Concepts (4 cr.) Focuses on nursing care of diverse individuals and families integrating complex health concepts. Emphasizes clinical judgment, patient-centered care and collaboration. Prerequisite(s): NSG 210 and NSG 211

NSG 270 - Nursing Capstone (4 cr.) Provides students with the opportunity to comprehensively apply and integrate learned concepts from previous nursing courses into a capstone experience. Emphasizes the mastery of patient-centered care, safety, nursing judgment, professional behaviors, informatics, quality improvement, and collaboration in the achievement of optimal outcomes of care. Provides supervised learning experiences in faculty and/or preceptor-guided college nursing laboratories, clinical/community settings, and/or simulated environments. Prerequisite(s): NSG 210 and NSG 211.

(NUR) Nursing

NUR 25 - Nursing Assistant (3 cr.) Teaches fundamentals of patient care with laboratory experience in foods and fluids, elimination, moving patients, morning, afternoon and evening care, care of hospital equipment, means of providing special comforts and safety, and admission and discharge procedures.

NUR 27 - Nurse Aide I (3 cr.) Teaches care of older patients with emphasis on the social, emotional, and spiritual needs. Covers procedures; communication and interpersonal relations; observation, charting and reporting; safety and infection control; anatomy and physiology; personal care, nutrition and patient feeding; death and dying. May include laboratory or clinical hours.

NUR 98 - Seminar and Project (3 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit.

NUR 100 - Introduction to Nursing and Health (2 cr.) Introduces concepts of nursing and health. Includes historical and cultural aspects, legal, and ethical responsibilities and an overview of health and the health care delivery system.

NUR 111 - Nursing I (8 cr.) Introduces nursing principles including concepts of health and wellness and the nursing process. Develops nursing skills to meet the biopsychosocial needs of individuals across the lifespan. Includes math computational skills, basic computer instruction related to the delivery of nursing care, communication skills, introduction to nursing, health, the health care system, legal aspects of nursing care, diagnostic testing, assessment, teaching and learning, asepsis, body mechanics and safety, personal care, activity/rest, wound care, nutrition, elimination, oxygenation, fluid and electrolytes, pain control, medication administration, aging populations and pre/post-operative care. Provides supervised learning experiences.

NUR 112 - Nursing II (8 cr.) Focuses on the nursing care of adults experiencing changes along the health/illness continuum that are common, well-defined, and have predictable outcomes. Includes math computational skills, basic computer instruction related to the delivery of nursing care; acid-base balance, gastrointestinal, genitourinary, musculoskeletal, immunology, oncology, sensori-neural, infectious diseases, endocrine, respiratory and blood disorders and care of the dying client. Provides supervised learning experiences in college nursing laboratories and/or cooperating agencies.
NUR 135 - Drug Dosage Calculations (2 cr.) Focuses on apothecary, metric, household conversion in medication dosage calculation for adult and pediatric clients. Provides a practical approach to learning to calculate and prepare medications and solutions. Includes calculating intravenous flow rates.

NUR 193 - Studies In (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 per week.

NUR 202 - Medical/Surgical Nursing I (4 cr.) Focuses on the care of individuals/families requiring complex or surgical treatment. Uses all components of the nursing process with increasing degrees of skill. Includes math computational skills and basic computer instruction related to the delivery of nursing care; cardiac, neurological, renal, burn disorders and clients experiencing shock. Provides supervised learning experiences in college nursing laboratories and/or cooperating agencies.

NUR 208 - Acute Medical-Surgical Nursing (5 cr.) Focuses on the use of nursing process to provide care to individuals/families with acute medical or surgical problems or to prevent such problems. Includes math computational skills and basic computer instruction related to the delivery of nursing care. Provides supervised learning experiences in cooperating agencies.

NUR 226 - Health Assessment (3 cr.) Introduces the systematic approach to obtaining a health history and performing a physical assessment.

NUR 230 - Pharmacology (3 cr.) Introduces general principles of drug action, pharmacology of the major drug classes, and specific agents within each class. Includes math calculations necessary to adapt dosages to the multidimensional needs of individuals across the lifespan.

NUR 245 - Maternal/Newborn Nursing (3 cr.) Develops nursing skills in caring for families in the antepartum, intrapartum, and post-partum periods.

NUR 246 - Parent/Child Nursing (3 cr.) Develops nursing skills in caring for both well and ill children in a variety of settings. Emphasizes theories of growth and development and the family as a unit.

NUR 247 - Psychiatric/Mental Health Nursing (3 cr.) Develops nursing skills in caring for individuals, families, and/or groups with mental health needs. Explores various treatment models, diagnostic categories, and rehabilitative measures.

NUR 254 - Dimensions of Professional Nursing (2 cr.) Explores the role of the professional nurse. Emphasizes nursing organizations, legal and ethical implications, and addresses trends in management and organizational skills. Explores group dynamics, relationships, conflicts, and leadership styles.

(PED) Phys Education and Recreation

PED 103 - Aerobic Fitness I (1-2 cr.) Develops cardiovascular fitness through activities designed to elevate and sustain heart rates appropriate to age and physical condition. Part I of II.

PED 104 - Aerobic Fitness II (1-2) Develops cardiovascular fitness through activities designed to elevate and sustain heart rates appropriate to age and physical condition. Part II of II.

PED 107 - Exercise and Nutrition I (2 cr.) Provides for the study and application of fitness and wellness and their relationship to a healthy lifestyle. Defines fitness and wellness, evaluates the student's level of fitness and wellness. Students will incorporate physical fitness and wellness into the course and daily living. A personal fitness/wellness plan is required for the 2 credit course. Part I of II.

PED 108 - Exercise and Nutrition II (2 cr.) Provides for the study and application of fitness and wellness and their relationship to a healthy lifestyle. Defines fitness and wellness, evaluates the student's level of fitness and wellness. Students will incorporate physical fitness and wellness into the course and daily living. A personal fitness/wellness plan is required for the 2 credit course. Part II of II.

PED 109 - Yoga (1-2 cr.) Focuses on the forms of yoga training emphasizing flexibility.

PED 110 - Zumba (1-2 cr.) Focuses on Latin rhythms, dance moves and techniques in Zumba. Utilizes physical activity, cardiovascular endurance, balance, coordination and flexibility as related to dance.

PED 111 - Weight Training I (1-2 cr.) Focuses on muscular strength and endurance training through individualized workout programs. Teaches appropriate use of weight training equipment. Part I of II.

PED 112 - Weight Training II (1-2 cr.) Focuses on muscular strength and endurance training through individualized workout programs. Teaches appropriate use of weight training equipment. Part II of II.

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.

PED 118 - Baseball Fundamentals I (1-2 cr.) Enhances the mental and physical ability of students for playing the sport of baseball. Introduces skills of weight training, flexibility, fielding, throwing, hitting, pitching, and position play. Explains the history of the sport and provides students an understanding of and respect for the game and its role in society.

PED 119 - Baseball Fundamentals II (1-2 cr.) Continues to enhance the mental and physical ability of students for playing the sport of baseball. Continues to teach the skills necessary to play the sport. Provides students with the opportunity to evaluate, train, and coach players in order to enhance others' playing abilities. Provides an understanding of the multiple processes involved in forming a baseball team.
PED 170 - Tai Chi I (1-2 cr.) Develops an understanding of the Theories and practices of Tai Chi. Explores the energy of exercise that will tone muscles, improve circulation and increase flexibility and balance. Discusses history and philosophy of exercise and relaxation techniques for stress reduction.

PED 195 - Topics In (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.

PED 206 - Sports Appreciation (2 cr.) Focuses on the history, trends, rules, methods, strategy, and terminology of selected sports activities. Provides student awareness as a spectator and/or participant.

PED 270 - Tai Chi II (1-2 cr.) Develops an understanding of the Theories and practices of Tai Chi. Explores the energy of exercise that will tone muscles, improve circulation and increase flexibility and balance. Discusses history and philosophy of exercise and relaxation techniques for stress reduction.

(PHI) Philosophy

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

PHI 220 - Ethics (3 cr.) Provides a systematic study of representative ethical systems.

PHI 226 - Social Ethics (3 cr.) Provides a critical examination of moral problems and studies the application of ethical concepts and principles to decision-making. Topics may include abortion, capital punishment, euthanasia, man and the state, sexuality, war and peace, and selected issues of personal concern.

(PHT) Photography

PHT 100 - Introduction to Photography (3 cr.) Introduces principles of photography with outside shooting assignments related to lecture topics.

PHT 101 - Photography I (3 cr.) Teaches principles of photography and fundamental camera techniques. Requires outside shooting and lab work. Part I of II.

(PHY) Physics

PHY 130 - Survey of Applied Physics (3 cr.) Surveys topics such as heat, electricity, and light with emphasis on practical applications.

PHY 201 - General College Physics I (4 cr.) Teaches fundamental principles of physics. Covers mechanics, thermodynamics, wave phenomena, electricity and magnetism, and selected topics in modern physics. Part I of II.

PHY 202 - General College Physics II (4 cr.) Teaches fundamental principles of physics. Covers mechanics, thermodynamics, wave phenomena, electricity and magnetism, and selected topics in modern physics. Prerequisite: MTH 163. Part II of II.

PHY 241-242 - University Physics I-II (4 cr. each) Teaches principles of classical and modern physics. Includes mechanics, wave phenomena, heat, electricity, magnetism, relativity, and nuclear physics. Prerequisite for PHY 241-MTH 173 or MTH 273 or divisional approval. Prerequisite for PHY 242-MTH 174 or MTH 274 or divisional approval. Part I and II of II.

(PLS) Political Science

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.

PLS 211 - U.S. Government I (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. Part I of II.

PLS 212 - U.S. Government II (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. Part II of II.

PLS 241 - International Relations I (3 cr.) Teaches geographic, demographic, economic, ideological, and other factors conditioning the policies of countries and discusses conflicts and their adjustment.

(PNE) Practical Nursing


PNE 158 - Mental Health and Psychiatric Nursing (1 cr.) Recognizes emotional needs of patients. Provides knowledge of the role that emotions play. Enables students to understand their own behavior as well as patient behavior.

PNE 161 - Nursing in Health Changes I (6 cr.) Focuses on nursing situations and procedures necessary to assist individuals in meeting special needs related to human functions.

PNE 162 - Nursing in Health Changes II (10 cr.) Continues the focus on nursing situations and procedures necessary to
assist individuals in meeting special needs related to human functions.

PNE 163 - Nursing in Health Changes III (9 cr.) Continues the focus on nursing situations and procedures necessary to assist individuals in meeting special needs related to human functions.

PNE 173 - Pharmacology for Practical Nurses (2 cr.) Studies history, classification, sources, effects, uses and legalities of drugs. Teaches problem solving skills used in medication administrations. Emphasizes major drug classes and specific agents within each class.

PNE 174 - Applied Pharmacology for Practical Nurses (2 cr.) Applies problem solving skills in preparing and administering medications.

(PNT) Printing

PNT 110 - Survey of Reproduction Processes (3 cr.) Presents history of printing, job safety, and career opportunities. Evaluates various printing processes including letterpress, offset, gravure, heat transfer, flexographic and screen printing.

PNT 130 - Applied Math for the Graphics Industry (3 cr.) Presents math skills as it relates to the graphics industry. Students will develop the computational skills necessary to prepare illustrations and photographs, computer page layouts, calculate paper stock and ink needs.

PNT 131 - Principles of Lithography I (4 cr.) Presents principles of lithography printing, its safety practices and equipment operation. Covers job planning, copy preparation, stripping, presensitized plates, small press operation, ink, paper handling, finishing operations.

PNT 135 - Print Imaging (2 cr.) Introduces the student to graphic imaging as it relates to the printing industry. Includes capturing and reproduction of line art, line copy and continuous tone by conventional and electronic methods.

PNT 141 - Printing Applications I (3 cr.) Provides instruction in the production of college-related publications and print shop management. Provides classroom and laboratory experiences in photography, layout and design, copy preparation, presswork, inventory control and production management. Part I of II.

PNT 142 - Printing Applications II (3 cr.) Provides instruction in the production of college-related publications and print shop management. Provides classroom and laboratory experiences in photography, layout and design, copy preparation, presswork, inventory control and production management. Part II of II.

PNT 211 - Electronic Publishing I (3 cr.) Teaches principles of typography and graphics, word processing and page layout. Survey of electronic publishing, hardware systems, peripherals, laser printers and imagesetters. Uses microcomputers to achieve a high degree of proficiency in completing a variety of laboratory projects. Prerequisite: PNT 131; Co-Requisites: PNT 221-222-223 or departmental approval.

PNT 221 - Layout and Design I (3 cr.) Analyzes production art necessary to prepare camera-ready copy for photomechanical printing. Teaches basic drawing concepts and techniques with emphasis on design principles, and care and use of instruments. Studies production methods to prepare ruled forms, overlays, bends, bleeds, two and multicolor forms for advertising and publication work.

PNT 222 - Layout and Design II (3 cr.) Analyzes production art necessary to prepare camera-ready copy for photomechanical printing. Teaches basic drawing concepts and techniques with emphasis on design principles, and care/use of instruments. Studies production methods to prepare ruled forms, overlays, bends, bleeds, two and multicolor forms for advertising and publication work.

PNT 231 - Lithographic Chemistry (2 cr.) Introduces chemistry and how it involves the printer. Covers the role of water in lithography, pH of solutions, plate coatings and film emulsions. Studies relationships of paper and ink, emulsification, waterlogging, effect of humidity, and causes and control of static electricity.

PNT 241 - Advanced Printing Applications (3 cr.) Continues PNT 141 to provide additional experience in production and shop management.

PNT 245 - Production Planning and Estimating (4 cr.) Teaches theory and gives experience in planning and quality control for printing production. Includes printing plant supervision and management techniques, organization, maintenance and inventory control systems. Discusses estimating for printing, including job layout, purchasing, pricing and trade customs.

PNT 251 - Offset Press Operations I-II (4 cr.) Explains procedures for practical operation of offset equipment including adjustments, setup make-ready, and imposition for single-color and multi-color production jobs. Studies feeder registration, printing and delivery systems, roller and blanket problems, ink and dampening problems, and quality control. Part I and II of II.

PNT 260 - Color Separation (3 cr.) Introduces study of color theories and principles as they apply to process color printing. Provides classroom and laboratory experiences in dot gain, densitometry, creation and manipulation of color images and electronic color separation. Prerequisites: PNT 132, PNT 135.

PNT 265 - Digital Imaging Applications (4 cr.) Provides an introduction to the proper use of software for production purposes. Covers design software for page layout and composition, image manipulation and creation, drawing and illustration.

PNT 298 - Seminar and Project (1-5 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May
be repeated for credit. Variable hours.

(PSY) Psychology

PSY 126 - Psychology for Business and Industry (3 cr.) Focuses on the application of psychology to interpersonal relations and the working environment. Includes topics such as group dynamics, motivation, employee-employer relationship, interpersonal communications. May include techniques for selection and supervision of personnel.

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 that cover physiological mechanisms, sensation/perception, motivation, learning, personality, psychopathology, therapy, and social psychology. Readiness to enroll in English 111 required.

PSY 201-202 - Introduction to Psychology I-II (3 cr. each) 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. Part I and II of II.

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, 201, or 202.

PSY 230 - Developmental Psychology (3 cr.) Studies the development of the individual from conception to death. Follows a life-span perspective on the development of the person's physical, cognitive, and psychosocial growth.

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.

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 125, 200, 201, 202 or divisional approval.

(REL) Religion

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.

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.

REL 230 - Religions of the World (3 cr.) Introduces the religions of the world with attention to origin, history, and doctrine.

REL 240 - Religions in America (3 cr.) Surveys various manifestations of religion in the American experience. Emphasizes concepts, problems, and issues of religious pluralism and character of American religious life.

(RTH) Respiratory Therapy

RTH 102 - Integrated Sciences for Respiratory Care II (3 cr.) Integrates the concepts of mathematics, chemistry, physics, microbiology, and computer technology as these sciences apply to the practices of respiratory care.

RTH 110 - Fund. Theory and Procedures for Respiratory Care (4 cr.) Focuses on the development of basic respiratory care skills necessary to enter the hospital environment. This is a first semester course that requires acceptance into the Respiratory Therapy program.

RTH 112 - Pathology of the Cardiopulmonary System (3 cr.) Presents pathophysiology of medical and surgical diseases with emphasis upon diseases of cardiopulmonary system.

RTH 113 - Pathophysiology of the Cardiopulmonary System (4 cr.) Presents pathophysiology of medical and surgical diseases with emphasis upon diseases of the cardiopulmonary system. Includes the development of diagnostic skills.

RTH 121 - Cardiopulmonary Science I (3 cr.) Focuses on pathophysiology, assessment, treatment, and evaluation of patients with cardiopulmonary disease. Explores cardiopulmonary and neuromuscular physiology and patho-physiology.

RTH 131 - Respiratory Care Theory and Procedures I (4 cr.) Presents theory of equipment and procedures and related concepts used for patients requiring general, acute and critical cardiopulmonary care. Part I of II.

RTH 132 - Respiratory Care Theory and Procedures II (4 cr.) Presents theory of equipment and procedures and related concepts used for patients requiring general, acute and critical cardiopulmonary care. Part II of II.

RTH 135 - Diagnostic and Therapeutic Procedures I (2 cr.) Focuses on purpose, implementation and evaluation of equipment, and procedures used in the diagnosis and therapeutic management of patients with cardiopulmonary disease.

RTH 145 - Pharmacology for Respiratory Care I (1 cr.) Presents selection criteria for the use of, and detailed information on pharmacologic agents used in pulmonary care.

RTH 190 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

RTH 199 - Supervised Study (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.
RTH 215 - Pulmonary Rehabilitation (1 cr.) Focuses on purpose and implementation of comprehensive pulmonary rehabilitation program.

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

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

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

RTH 227 - Integrated Respiratory Therapy Skills II (2 cr.) Presents intensive correlation of all major respiratory therapy subject areas reflecting the entry-level and advanced practitioner matrices. Emphasizes assessment, implementation, and modification of therapy to patient response.

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.

RTH 265 - Current Issues in Respiratory Care (2 cr.) Explores current issues affecting the profession of respiratory care.

RTH 290 - Coordinated Internship (1-5 cr.) Supervises on-the-job training in selected business, industrial or service firms coordinated by the college. Credit/practice ratio not to exceed 1:5 hours. May be repeated for credit. Variable hours.

RTH 299 - Supervised Study (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.

(SAF) Safety

SAF 120 - Safety & Health Standards: Regulations and Codes (3 cr.) Teaches development of safety standards, the Occupational Safety and Health Act (OSHA), its rules and regulations; penalties for non-compliance, and methods of compliance. Includes an examination of Government Regulatory Codes and appraisal of consensus, advisory, and proprietary standards.

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.

SAF 130 - Industrial Safety - OSHA 10 (1 cr.) Presents an introduction to occupational health and safety and its application in the workplace. Emphasizes safety standards and the Occupational Safety and Health Act (OSHA), its rules and regulations (OSHA 10).

(SDV) Student Development

SDV 100 - College Success Skills (1 cr.) Assists students in transition to colleges. Provides overviews of college policies, procedures, 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. May include English and Math placement testing. Strongly recommended for beginning students. Required for graduation.

SDV 101 - Orientation to College (1 cr.) Introduces students to the skills which are necessary to achieve their academic goals, to services offered at the college and to the discipline in which they are enrolled. Covers topics such as services at the college including the learning resources center; counseling, and advising; listening, test taking, and study skills; and topical areas which are applicable to their particular discipline.

SDV 106 - Preparation for Employment (1 cr.) Provides experience in resume writing, preparation of applications, letters of application, and successfully preparing for and completing the job interview. Assists students in identifying their marketable skills and aptitudes. Develops strategies for successful employment search. Assists students in understanding effective human relations techniques and communication skills in job search.

SDV 108 - College Survival Skills (1 cr.) Provides an orientation to the college. Introduces study skills, career and life planning. Offers an opportunity to engage in activities aimed at self-discovery. Emphasizes development of "coping skills" such as listening, interpersonal relations, competence, and improved self-concept. Recommended for students enrolled in developmental courses.

SDV 110 - Orientation to Teaching As a Profession (3 cr.) Introduces students to a career in teaching and education by allowing students to experience the components of the learner, the school environment and the classroom teaching environment. Utilizes the Virginia Teachers for Tomorrow/Teacher Cadet curriculum. Students participate in a 15-hour student teaching internship in a classroom at one of the levels between Kindergarten and grade 9.

SDV 195 - Topics In (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.

SDV 198 - Seminar and Project (1-5 cr.) Requires completion of a project or research report related to the student's occupational objectives and a study of approaches to the selection and pursuit of career opportunities in the field. May be repeated for credit. Variable hours.

(SOC) Sociology

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.

**SOC 201-202 - Introduction to Sociology I-II (3 cr. each)**
Introduces basic concepts and methods of sociology. Presents significant research and theory in areas such as socialization, group dynamics, gender roles, minority group relations, stratification, deviance, culture, community studies. Includes population, social change, and social institutions (family, education, religion, political system, economic system). Part I and II of II.

**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.

**SOC 235 - Juvenile Delinquency (3 cr.)**
Studies demographic trends, causal theories, and control of juvenile delinquency. Presents juveniles’ interaction with family, schools, police, courts, treatment programs, and facilities. Also approved for ADJ Juvenile curriculum.

**SOC 236 - Criminology (3 cr.)**
Studies research and causal theories of criminal behavior. Examines crime statistics, crime victims, and types of criminal offenses. Introduces role of police, judicial and correctional system in treatment and punishment of offenders. Is also approved for ADJ Criminology.

**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.

**(SPA) Spanish**

**SPA 101 - Beginning Spanish I (4 cr.)**
Introduces understanding, speaking, reading, and writing skills and emphasizes basic Spanish sentence structure. May include an additional hour of oral drill and practice per week. Part I of II.

**SPA 102 - Beginning Spanish II (4 cr.)**
Introduces understanding, speaking, reading, and writing skills and emphasizes basic Spanish sentence structure. May include an additional hour of oral drill and practice per week. Part II of II.

**SPA 103-104 - Basic Spoken Spanish I-II (3 cr. each)**
Teaches oral communication and introduces cultural mores and customs to students with no prior instruction in the language. Part I and II of II.

**SPA 150 - Spanish for Law Enforcement (3 cr.)**
Introduces Spanish to those in the criminal justice field. Emphasizes oral communication and practical first-hand police and justice vocabulary. May include oral drill and practice.

**SPA 201 - Intermediate Spanish (3 cr.)**
Continues to develop understanding, speaking, reading, and writing skills. Prerequisite SPA 102 or equivalent. May include oral drill and practice. Part I of II.

**SPA 203 - Intermediate Spanish I-II (3 cr.)**
Continues to develop understanding, speaking, reading, and writing skills. Classes conducted in Spanish. Prerequisite SPA 102 or equivalent. May include oral drill and practice. Part I of II.

**SPA 204 - Intermediate Spanish I-II (3 cr.)**
Continues to develop understanding, speaking, reading, and writing skills. Classes conducted in Spanish. Prerequisite SPA 102 or equivalent. May include oral drill and practice. Part II of II.

**(WEL) Welding**

**WEL 31 - Introductory Gas Tungsten Arc Welding (3 cr.)**
Introduces practical operations in use of tungsten arc welding and equipment, operations, safety practices in various positions, shielding gases, filler rods, process variations, and their applications.

**WEL 116 - Welding I (Oxyacetylene) (2 cr.)**
Teaches oxygen/acetylene welding and cutting including safety of equipment, welding, brazing and soldering procedures and cutting procedures.

**WEL 120 - Fundamentals of Welding (2 cr.)**
Introduces history of welding processes. Covers types of equipment, and assembly of units. Stresses welding procedures such as fusion, non-fusion, and cutting oxyacetylene. Introduces arc welding. Emphasizes procedures in the use of tools and equipment.

**WEL 121 - Arc Welding (2 cr.)**
Studies the operation of AC and DC power sources, weld heat, polarities, and electrodes for use in joining various alloys by the SMAW process. Covers welds in different types of joints and different welding positions. Emphasizes safety procedures.

**WEL 122 - Welding II (Electric Arc) (2 cr.)**
Teaches electric arc welding, including types of equipment, selection of electrodes, safety equipment and procedures, and principles and practices of welding.

**WEL 124 - Shielded Metal Arc Welding (Advanced) (4 cr.)**
Continues instruction on operation of AC and DC power sources, 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.

**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.

**WEL 135 - Inert Gas Welding (2 cr.)**
Introduces practical operations in use of inert gas shielded arc welding. Studies equipment operation, setup, safety and practice of GMAW (MIG) and GTAW (TIG).

**WEL 136 - Welding III (Inert Gas) (2 cr.)**
Studies Tungsten and metallic inert gas procedures and practices including principles of operation, shielding gases, filler rods, process variations and applications, manual and automatic welding, equipment and safety.
WEL 138 - Pipe and Tube Welding (2 cr.) Develops entry level skills for the inert gas tungsten welding process (TIG) with emphasis upon thin and thick wall carbon and stainless piping and tubing. Prerequisite: WEL 136.

WEL 145 - Welding Metallurgy (3 cr.) Studies steel classifications, heat treatment procedures, properties of ferrous and non-ferrous metals. Discusses techniques and practices of testing welded joints and destructive/nondestructive, visual magnetic and fluorescent testing.

WEL 150 - Welding Drawing and Interpretation (3 cr.) Teaches fundamentals required for successful drafting as applied to the welding industry. Includes blueprint reading, geometric principles of drafting and freehand sketching, basic principles of orthographic projection, preparation of drawings and interpretation of symbols.

WEL 160 - Gas Metal Arc Welding (4 cr.) Introduces semi-automatic welding processes with emphasis on practical application. Includes the study of filler wires, fluxes, and gases.

WEL 199 - Supervised Study (1-5 cr.) Assigns problems for independent study incorporating previous instruction and supervised by the instructor. May be repeated for credit. Variable hours.

WEL 233 - Gas Metal Arc Welding (GMAW) Aluminum (2 cr.) Examines the use of the Gas Metal Arc Welding (GMAW) process of welding aluminum. Focuses on welding aluminum projects in various weld joint configurations and in all welding positions.

WEL 235 - Advanced Gas Metal Arc Welding (GMAW) (3 cr.) Continues the study of Gas Metal Arc Welding (GMAW), wire feed welding. Metal Inert Gas (MIG) using spray transfer, pulsed GMAW, short circuit transfer, and flux cored wire on various metals and joint designs. Focuses on developing GMAW skills with practice and instruction in these advanced processes.

WEL 237 - Applied Welding Process (3 cr.) Studies advanced welding applications for various materials, advanced welding skills and fabrication equipment. Examines materials to be welded such as stainless steel and aluminum, choosing the proper welding process such as advanced Gas Tungsten Arc Welding (GTAW)-Aluminum, Gas Metal Arc Welding (GMAW)-Aluminum and Shielded Metal Arc Welding (SMAW), developing the appropriate welding procedure for the materials chosen and successfully completing a capstone project for the entire course of study.

WEL 238 - Gas Tungsten Arc Welding (GTAW) Aluminum (2 cr.) Examines the use of the Gas Tungsten Arc Welding (GTAW) process in welding aluminum. Focuses on practice welding aluminum projects in various weld joint configurations and in all welding positions.

WEL 241 - Robotic Welding I (2 cr.) Examines safety, setup, programming, and operation of a welding robot. Covers variables and problems in addition to solutions applied to provide a practical and efficient application of the Gas Metal Arc Welding (GMAW) process to an automated system. (Part I of II).

WEL 242 - Robotics Welding II (2 cr.) Incorporates skills learned in Robotic Welding I into simulating projects used in industry. Focuses on Gas Metal Arc Welding (GMAW) processes used to create weldments taken from industry drawings and blueprints. (Part II of II) WEL 241.

WEL 244 - Weld Testing and Codes (2 cr.) Covers non-destructive (NDT) weld testing and how it plays a critical role in assuring that structural components and materials meet specified requirements. Examines how and why these NDT processes are used and will use them to test welds and weldments.

WEL 247 - Welding Layout and Fabrication I (2 cr.) Introduces student to project layout from shop sketches/blueprints, developing templates/patterns and the use of fabrication tools. Covers the safe operation of different types of manual metal fabrication equipment used in the industry. Examines safe and efficient use of the manual metal shear, metal roller, metal break and other fabrication. (Part I of II).

WEL 248 - Welding Layout and Fabrication II (2 cr.) Applies previously learned skills from Welding and Fabrication I in a job-simulated situation. Focuses on pipe, structural steel and other weldments that will be fabricated using all available equipment and welding processes. Covers job site type blueprints and drawings used in fabrication. Incorporates American Welding Society (AWS) visual inspection, weld measurements and codes. (Part II of II) WEL 247.