Course Descriptions

Understanding Course Descriptions

The course descriptions on the following pages are in alphabetical order by subject and each course appears in numerical order. The following diagram will help you understand each part of a course description.

1 CNS 215 2 Introduction to Virtualization & Cloud Computing..... 3 3(2-2)
4 Normally Offered: F
5 Students will develop a working understanding of virtualization technologies and current virtualization software packages, as well as cloud terminologies and methodologies to implement, maintain, and support cloud technologies and infrastructures. The goal of the course is to provide students with the knowledge and skills necessary to develop and manage virtual systems and virtual networks within a business/cloud environment.
6 **Prerequisite:** CNS 150 and CNS 180.

1. Subject abbreviation & course number — This is a Network Administration course, sophomore level. Freshman courses are numbered 101-199; they may be elected by sophomores. Courses numbered 200-298 are sophomore courses; they may be elected by freshmen with the necessary prerequisites. Courses numbered under 100 may count toward the Associate in General Studies, but not toward any other degree.
2. Course Title
3. Credit & Contact Hours — Course credit hours are listed first, followed by the total contact hours in parentheses. These are the hours the class meets each week for lecture, laboratory work, and recitation. This example shows a four-credit course that meets two hours a week in lecture, with two lab hours, so it has 4 contact hours. A course showing 4(3-1-3) is a four-credit course that meets three hours a week in lecture, one hour a week in lab and three hours a week in recitation, for a total of 7 contact hours. Tuition is charged on contact hours.
4. Normally Offered — Tells when the course is scheduled. There are two semesters and a summer session: Fall Semester (F), Spring Semester (SP), or Summer Session (SU).
5. Course Description — This describes the content of the course.
6. Prerequisite/Co-requisite — To enroll, you must have successfully completed any course(s) or meet other requirements listed as prerequisite(s). This assures your ability to work at the level required in the course. Co-requisites are courses you must take during the same semester.

Course numbers, titles, credit hours, contact hours, and descriptions are subject to change. Use this catalog along with the semester schedule.

COURSE DESCRIPTIONS LISTINGS

ANTHROPOLOGY

ANP 121 CULTURAL ANTHROPOLOGY ....3(3-0)
Normally Offered: F, SP
This course is a comparative study of human adaptation over time and space. Emphasis is given to the dynamic nature of culture by using the record of prehistory, history, and contemporary societies.

ANP 239 RELIGIONS OF THE WORLD ..... 3(3-0)
Normally Offered: F (odd years)
Introduces the major religions of the world on a comparative basis. Original sacred documents will be read and underlying cultural assumptions studied. Objective is to develop an appreciation for the wide variety of religious experience and organization that exists in the world today. Student will come into contact with a wide variety of traditions ranging from the indigenous religious traditions of the United States to those of Buddhism, Hinduism and the world of Islam.

ANP 240 ARCHAEOLOGY ..... 3(3-1)
Normally Offered: F, SP
This course is an introduction to the modern practice of archaeology around the world. It will investigate archaeological field methods, theory, and applications that archaeologists apply to reconstruct the past from the material culture that humans leave behind. The course will analyze artifacts, data, and maps spanning time frames from ancient to the recent past.

ANP 257 UNDERWATER ARCHAEOLOGY ..... 3(3-0)
Normally Offered: On Demand
This course will provide students with an introduction to theory, method, technologies, and practice in underwater archaeology, with a focus on prehistoric and historical sites, worldwide and in the Great Lakes, inland lakes, and streams of the State of Michigan. Course content will draw primarily from anthropology and the applied social or behavioral sciences.
Prerequisite: ANP 121 or permission of instructor.

APPRENTICE – ELECTRICAL

APP 100E ELECTRICAL STUDIES FOR TRADES ..... 3(2-2)
Normally Offered: F, SP
An introductory course covering the fundamentals of electricity. Lecture topics include magnetism, Ohm's Law, capacitance, inductance, three-phase power, transformers, and motors. Students work in a lab environment to measure voltage, current, resistance, and power using both DC and AC circuits.
Prerequisite: One year of high school algebra.

APP 102E RESIDENTIAL WIRING & BLUEPRINT READING..... 3(2-2)
Normally Offered: SP
Course content includes residential wiring and blueprint reading in an organized manner.
Prerequisite: APP 100E, MTH 110.

APP 103E COMMERCIAL & INDUSTRIAL WIRING..... 3(2-2)
Normally Offered: F
Course content includes commercial and industrial applications of alternating current with applicable blueprint reading.
Prerequisite: APP 100E.

APP 104E AC & DC FUNDAMENTALS ..... 3(2-2)
Normally Offered: SP
Course content includes commercial and industrial applications of alternating current, DC motors, generators and direct current as applied to resistive networks in series, parallel and combination circuits.
Prerequisite: APP 100E, MTH 110.

APPRENTICE – ELECTRICAL

APP 107E SPECIALTY WIRING ..... 3(2-2)
Normally Offered: F
Course content includes low-voltage wiring methods, structured cabling for computer network and telephone systems, fiber optic wiring, CCTV security systems, fire alarm system operation and troubleshooting, medium-voltage and high-voltage wiring methods and terminations.
Prerequisite: APP 100E, MTH 110.

APP 111E ELECTRIC MOTOR CONTROL ..... 3(2-2)
Normally Offered: F
Course content includes motor control circuit layout theory and advanced motor control applications.
Prerequisite: APP 100E, MTH 110, or permission of instructor.

APP 114E PROGRAMMABLE CONTROLLERS ..... 3(2-2)
Normally Offered: SP
Course content includes programmable controller operations, programming, and their applications in industry.
Prerequisite: APP 100E, MTH 110, or permission of instructor.

APP 115E NATIONAL ELECTRIC CODE APPLICATION ..... 4(4-0)
Normally Offered: SP
A comprehensive study of the National Electric Code and its application to ensure a safe and adequate electrical installation. Specific Michigan code requirements and contractor requirements will be covered as well. Capstone course of apprentice electrical program and excellent preparation for State Journeyman or Master Electrician exam.
Prerequisite: APP 102E, APP 100E, APP 103E, or permission of instructor.

APP 122E DIGITAL ELECTRONICS FOR ELECTRICIANS ..... 3(2-2)
Normally Offered: F
Familiarizes the student with the basics of digital electronics. Topics covered will be numbering systems (binary, octal, hexadecimal), converting from and to base 10, binary arithmetic, Gate, AND, OR, NOR, NAND, and XOR, and the Boolean Algebra equivalent computer addressing: Adder and Subtractor counter, registers, and converters. The laboratory will use TTL and CMOS devices and troubleshooting will be stressed in the laboratory.
Co-requisite: APP 100E

APP 123E LINEAR ELECTRONICS FOR ELECTRICIANS ..... 3(2-2)
Normally Offered: SP
Stresses, in the laboratory, troubleshooting techniques of electronic circuits. Topics covered will be diode theory and uses in rectification; zener diodes and voltage regulation; bipolar transistors in the three configurations; suspended power supplies; field-effect transistors; operational amplifiers; soldering techniques; and component identification.
Co-requisite: APP 100E.

APPRENTICE – MILLWRIGHT

APP 104M PERSONAL PROTECTIVE EQUIPMENT (PPE) IN THE WORKPLACE ..... 1(1-0)
Normally Offered: F, SP
This course covers the basic PPE fundamentals of worker health and safety awareness in the key areas of respiratory, hearing, head, eye, and face hazard protection. Students can receive up to three different 3M / NC3 PPE certificates if they complete and pass the required criteria for each topic.

APP 106M INDUSTRIAL SAFETY ..... 1(1-0)
Normally Offered: F, SP
Orients students to items related to safety in the work place. Topics will include accident statistics and costs, personal safety, proper and safe selection and use of tools and material handling, equipment, and fire safety.

APPRENTICE – MILLWRIGHT

APP 121M APPRENTICE BLUEPRINT READING..... 3(2-2)
Normally Offered: F (odd years)
This course provides the student with a basic working knowledge of the alphabet of lines, three-view drawings, arrangement of views, and orthographic projection. Provides the student with a basic working knowledge of section views, dimensions, tolerances, and shop sketching.

APP 122M MACHINE REPAIR..... 3(2-2)
Normally Offered: F
This course provides the student with a basic working knowledge of principles of mechanical power transmission, belt drives, bearings, couplings, packing and seals, mechanical fasteners, pipe fittings, and pipe valves.

APP 124M APPRENTICE HYDRAULICS ..... 3(2-2)
Normally Offered: F (even years)
This course introduces the student to the principles and maintenance practices of power hydraulics and provides the student with a basic working knowledge of hydraulic fluids, piping, seals, reservoirs, actuators, directional controls, volume controls, pumps circuits, and graphical schematics.

APP 125M APPRENTICE MACHINE SHOP ..... 3(2-2)
Normally Offered: SP (even years)
Students will receive instructions on shop safety, measuring instruments, layout tools, lathes, milling machines, grinders, saws, the physics of metal cutting (speeds and feeds), and cutting tool materials.

APP 128M RIGGING & WEIGHT ESTIMATING ..... 1.5(1-1)
Normally Offered: F (odd years)
Provides the student with the basic working knowledge of rigging and weight estimating.

APP 129M APPRENTICE PNEUMATICS..... 1.5(1-1)
Normally Offered: F (odd years)
This course provides the student with a basic working knowledge of pumps, air compressors, and pneumatics.

APP 210M METAL FORMING & SHEETMETAL..... 3(2-2)
Normally Offered: F
This course provides the student with a basic knowledge of metal forming and how to manipulate metal into a finished product. There will be a specific focus on the selection, design, and manufacture of industrial safety equipment and guard design. Upon successful completion, the student will be able to identify the need for a guard, select an appropriate guarding method, design a guard, and manufacture a completed guard to industry standard.

APP 220M MECHATRONIC SYSTEM INTEGRATION AND REPAIR ..... 3(2-2)
Normally Offered: F
This course introduces students to the basic mechatronic system integration in modern manufacturing including products, machinery, and transportation. The course will include new construction and print reading, but will primarily focus on the troubleshooting, reprogramming, and repair of modern systems. This course will also prepare students for third-party credentialing exams.
Prerequisite: APP 114E, APP 122M, APP 129M.

APP 223M PREDICTIVE & PREVENTATIVE MAINTENANCE ..... 3(2-2)
Normally Offered: SP (even years)
A proactive approach to maintenance practice stressing the importance of Total Predictive Maintenance (TPM) Management, which increases productivity and quality, reducing failure and downtime.

ART

ART 101 ART HISTORY I ..... 3(3-0)
Normally Offered: F
Surveys Western art and architecture from Prehistoric through Early Renaissance periods. Focuses on architecture, sculpture, and painting from Prehistoric, Ancient Egyptian, Greek and Roman, Early Christian, Middle Ages, and Early Renaissance periods.

ART 102 ART HISTORY II ..... 3(3-0)
Normally Offered: SP
Surveys Western art and architecture from Late Renaissance, Mannerism, Baroque, Rococo, Neoclassicism, Romanticism, Realism, Art Nouveau, Impressionism, Post-Impressionism, Modern Art, Post-Modern Art, and Contemporary Art.

ART 103 2-D DESIGN ..... 3(2-2)
Normally Offered: F
Explores basic two-dimensional design elements and principles such as line, shape, space, color, balance, texture, and unity. Employs a variety of media to develop a basic design vocabulary.

ART 104 3-D DESIGN ..... 3(2-2)
Normally Offered: SP
Explores basic three-dimensional design elements and principles such as line, space, mass, plane, color, balance, emphasis, and unity. Employs a variety of media to develop a basic design vocabulary.
Prerequisite: ART 103.

ART 105 DRAWING I ..... 3(2-2)
Normally Offered: F
Introduces techniques in various drawing media and concepts in visual art with an emphasis on drawing from observation.

ART 106 2-D DIGITAL ART ..... 3(2-2)
Normally Offered: F
Introduces digital, 2-D image manipulation software using pixel, vector-based, and page layout applications. Identifies and applies basic to advanced image manipulation techniques through a variety of projects. Explores and develops the creative use of digital technology as a form of personal and/or commercial communication.

ART 107 PHOTOGRAPHY I ..... 3(2-2)
Normally Offered: F
Identifies, demonstrates, and discusses photographic concepts and techniques. Interprets and analyzes various processes from traditional to contemporary photographic styles. Employs digital photographic technologies as a creative medium for personal expression.

ART 108 PAINTING I ..... 3(2-2)
Normally Offered: F
Identifies, demonstrates, and discusses painting concepts, materials, and techniques. Various artistic processes will be explored from traditional to contemporary painting styles.

ART 109 CERAMICS I ..... 3(2-2)
Normally Offered: F
Identifies, demonstrates, and discusses basic clay hand-building techniques and surface design. Interprets and analyzes various processes of traditional and contemporary ceramic styles. Employs a variety of methods to produce ceramic vessels and objects.

ART

ART 110 SCULPTURE I ..... 3(2-2)
Normally Offered: F
Identifies, demonstrates, and discusses sculptural concepts and techniques. Interprets and analyzes various processes from traditional to contemporary sculptural styles. Employs a variety of methods using a variety of materials to produce sculpture.

ART 201 GRAPHIC DESIGN HISTORY ..... 3(3-0)
Normally Offered: F
Explores the history of graphic design from the earliest communication technologies to the present, with a focus on the Modern era. Examines changes in style and technology within the field and considers the relationship between graphic design and its cultural, political, and social contexts.

ART 202 GRAPHIC DESIGN I: TYPE ..... 3(2-2)
Normally Offered: F
Introduces the fundamental aspects of typography. Identifies and applies the history of typography, vocabulary terms, and foundational typographic techniques through a variety of design assignments.

ART 203 GRAPHIC DESIGN II: LAYOUT ..... 3(2-2)
Normally Offered: SP
Introduces typographic layout within complex informational structures. Identifies and applies appropriate typographic systems and imagery through a variety of projects.
Prerequisite: ART 202.

ART 204 DESIGN III: IDENTITY ..... 3(2-2)
Normally Offered: F
Define and apply the theories and practices of identity systems. Research, develop, and design a complete brand identity system along with its associated products.
Prerequisite: ART 203.

ART 205 DRAWING II ..... 3(2-2)
Normally Offered: SP
Continues the exploration of formal aspects of visual art with emphasis placed on articulating a personal response to various drawing problems. Practices drawing techniques and processes at the intermediate level using a variety of drawing media.
Prerequisite: ART 105.

ART 206 3-D DIGITAL ART ..... 3(2-2)
Normally Offered: SP
Introduces digital, 3-D imaging software and the forms generated from printing, CNC routing, and laser cutting. Identifies and applies basic to advanced imaging techniques through a variety of projects and materials. Explores and develops the creative use of digital technology as a form of personal and/or commercial communication.

ART 207 PHOTOGRAPHY II ..... 3(2-2)
Normally Offered: SP
Expands artistic and professional tools. Adds advance technical skills in camera and lighting to develop an individual photographic style. Uses digital photography assignments emphasizing experimentation in multiple areas including compositing, studio lighting, scanning, and color management techniques.

ART

ART 208 PAINTING II ..... 3(2-2)
Normally Offered: SP
Discusses relevant classical, modern, and contemporary painting concepts and techniques. Constructs paintings based on self-devised painting styles and methods. Analyzes critically and defends individual painting portfolio.
Prerequisite: ART 108.

ART 209 CERAMICS II ..... 3(2-2)
Normally Offered: SP
Identifies, demonstrates, and discusses wheel throwing and clay mold-making techniques. Generates complex ceramic surface design. Interprets and analyzes various traditional and contemporary ceramic processes. Employs a variety of methods to produce a portfolio of ceramic vessels and objects.
Prerequisite: ART 109.

ART 210 SCULPTURE II ..... 3(2-2)
Normally Offered: SP
Explores complex sculptural tools, processes, and materials. Manipulates materials and processes while also considering context, concept, and craft. Refines understanding of additive, subtractive, and constructive processes, as well as more complex mold-making and casting techniques.
Prerequisite: ART 110.

ART 280 FINE ART PORTFOLIO ..... 3(2-2)
Normally Offered: SP
Completes a fine art portfolio package for both school applications and job application.

ART 281 GRAPHIC DESIGN PORTFOLIO ..... 3(2-2)
Normally Offered: SP
Completes a graphic design portfolio package for both school applications and job applications.
processes, as well as more complex mold-making and casting techniques.
Prerequisite: Advisor's recommendation.

ART 290 FINE ART INTERNSHIP ..... 3(0-3)
Normally Offered: SP
Provides hands-on work experience in an off-site professional art business, gallery, museum, or art organization
Prerequisite: Advisor's recommendation.

ART 291 GRAPHIC DESIGN INTERNSHIP ..... 3(0-3)
Normally Offered: SP
Provides hands-on work experience in an off-site professional design business, company, or organization.
Prerequisite: Advisor's recommendation.

AMERICAN SIGN LANGUAGE

ASL 121 AMERICAN SIGN LANGUAGE ..... 4.0(4-0)
Normally Offered: F
This course introduces the basics of American Sign Language (ASL) and is designed for students who have little or no previous knowledge of ASL. The focus of the class will be on vocabulary, fingerspelling, numbers and grammatical non-manual signals. Students will also be exposed to Deaf Culture, and hot topics within the Deaf Community.

AMERICAN SIGN LANGUAGE

ASL 122 AMERICAN SIGN LANGUAGE II ..... 4.0(4-0)
Normally Offered: SP
This course continues to introduce the basics of American Sign Language (ASL) and is designed for students who have completed ASL 121, or similar course work. The focus of the class will be on vocabulary, fingerspelling, sentence structure and grammatical non-manual signals. Students will also be exposed to Deaf Culture, and hot topics within the Deaf Community.
Prerequisite: ASL 121 or instructor approval

AUTOMOTIVE

AUT 118 AUTOMOTIVE FUNDAMENTALS ..... 4(2-4)
Normally Offered: F
Provides the student with fundamental knowledge of the automotive repair industry from business concerns t government considerations, and from basic auto repair skills to understanding the integration of modern vehicle systems. Lecture is combined with lab exercises and work on live vehicles.

AUT 119 AUTOMOTIVE BRAKE SYSTEMS ..... 5(2-6)
Normally Offered: F
Provides the student with knowledge and skills to maintain, diagnose, and repair automobile and light truck braking systems. Brake operating principles, construction, maintenance, machining, and overhaul procedures will be covered. Antilock brakes and the related systems of traction control and stability control and the liability one undertakes in servicing these systems will be covered as well. Practical knowledge will be gained by working on live vehicles in the lab.
Prerequisite: Placement in ENG 111 and MTH 110 or instructor permission.

AUT 122 AUTOMOTIVE AIR, FUEL & EMISSIONS SYSTEMS ..... 4(2-4)
Normally Offered: SU
This course is designed to provide the student with an understanding of the theory, construction, operation, diagnosis, and repair of automotive fuel and emission systems. Environmental, safety, and legal concerns will be emphasized. Alternative fuel concepts will also be explored.
Prerequisite: AUT 124 with a grade of 2.0 or higher or instructor approval.

AUT 123 AUTOMOTIVE SUSPENSION, STEERING & ALIGNMENT ..... 5(2-6)
Normally Offered: F
Acquaints the student with operating principles and nomenclature of the various suspension and steering components. Both manual and power steering components will be studied. Alignment geometry and suspension dynamics and wheel/tire balance will be studied. Emphasis will be placed on the diagnosis and repair of suspension, steering, and alignment problems.
Prerequisite: Placement in ENG 111 and MTH 110 or instructor permission.

AUT 124 AUTOMOTIVE ELECTRICAL & ELECTRONICS SYSTEMS I ..... 5(2-6)
Normally Offered: F
Provides the student with the essential technical knowledge and manual skills to diagnose, repair, and maintain automotive electrical and electronic systems. Electrical theory, circuit types, wiring repair, reading electrical schematics and diagrams, electrical measurements, magnetism, electromagnetism, and use of diagnostic equipment will be covered.
Prerequisite: Placement in ENG 111 and MTH 110 or instructor permission.

AUT 125 AUTOMOTIVE ELECTRICAL & ELECTRONICS SYSTEMS II ..... 5(2-6)
Normally Offered: SP
Takes the student who has a basic automotive electrical background into a deeper understanding of automotive electrical systems. Lighting systems, horns, warning devices, instruments, accessories and body electrical, including air bags, anti-lock brakes, power windows, locks and keyless entries, are studied. Much time is spent on diagnosis, repair and installation of these systems.
Prerequisite: AUT 124 or instructor permission.

AUTOMOTIVE

AUT 201 COMPUTERIZED ENGINE CONTROLS ..... 4(2-4)
Normally Offered: SP
Provides the student in lecture and lab with the theory and operating principles of computerized engines. Reviews electrical and electronic principles, computer operation, and common computer components, followed by more in-depth studies of GM, Ford and Chrysler systems. The course concludes with an update as to what has been done during the last two years, along with a look at what is coming in the future.
Prerequisite: AUT 124 or instructor permission.

AUT 202 ENGINE PERFORMANCE DIAGNOSIS & TUNE-UP ..... 5(2-6)
Normally Offered: SP
Provides the student with information that integrates the understanding of mechanical automotive systems with the myriad electrical systems that current automobiles employ. Study will also include gaining an understanding of operation, service, diagnosis, and repair of automobile ignition systems.
Prerequisite: AUT 124 with a grade of 2.0 or higher or instructor permission.

AUT 205 AUTOMOTIVE CLIMATE CONTROL ..... 3(2-2)
Normally Offered: SU
Provides the student with theory operating principles of various automotive climate control systems. Problem diagnosis and repair of compressors, refrigerant controls, and electric circuit controls will be covered. Safety will be stressed and charging and servicing units of live vehicles will be practiced.

AUT 207 HYBRID & ELECTRIC VEHICLES ..... 4(2-4)
Normally Offered: SU
This course is designed to provide the student with an understanding of the theory, construction, operation, diagnosis, and repair of automotive hybrid and alternative fuel systems. Environmental, safety, and legal concerns will be emphasized.

AUT 209 AUTOMOTIVE TRANSMISSIONS & DRIVE TRAINS ..... 5(2-6)
Normally Offered: SP
Provides the student with instruction and practice in maintenance, diagnosis, and repair of automatic and manual transmission, clutch systems, transfer cases, and general drive trains. Operating principles and concepts of power flow will be emphasized.
Prerequisite: Successful completion of AUT 124 or instructor permission.

AUT 221 ENGINE REPAIR & OVERHAUL ..... 5(2-6)
Normally Offered: F
Introduces the design and construction of the various automotive power plants. Engine mechanical system diagnosis and service procedures, with emphasis on spark ignition engines, are studied. Disassembly, inspection, measurement, reconditioning, and reassembly of the various engine components are practiced. Use of proper service procedures are stressed both in the classroom and lab. Students are expected to complete at least one engine overhaul assignment.

AVIATION

AVI 135 UAS PILOT EXAM PREP ..... 1(.75-.5)
Normally Offered: SP
FAA regulations require all commercial UAS operators to pass an aeronautical knowledge certification exam. Unmanned Aerial Systems (Drone) Pilot Exam Prep is open to anyone interested in becoming a commercial UAS Pilot, regardless of industry application, and will prepare students to sit for the FAA Exam (offered at testing sites throughout the state). This course will cover National Airspace, maps, weather, operations and inspections, and professional and ethical behavior in the aviation industry. This is not a hands-on operations course, but will provide minimal instruction on operating systems.

AVIATION

AVI 136 UAS OPERATIONS AND SAFETY ..... 1(.5-1)
Normally Offered: SP
Unmanned Aerial Systems (Drone) Operations and Safety is open to anyone interested in a hands-on experience with UASs. Students will learn using a hands-on approach to conduct preflight inspections, program the platforms, and complete successful missions.

AVI 137 UAS PAYLOADS AND PROCESSING ..... 1(.5-.75)
Normally Offered: SP
Unmanned Aerial Systems (Drone) Payloads and Processing introduces students to different types of payloads designed for drone platforms and how to process data collected during a mission. Students will examine FLIR data and process collected data using Datumate® software.

BIOLOGY

Biology Placement Guidelines and Course Equivalences — One year of high school biology with a "C" or higher grade within the last five years is equal to BIO 114 Introduction to Biology. Advanced Placement (AP): test score of 3 = BIO 114 Introduction to Biology; test score of 4 or 5 (see biology faculty for placement).

BIO 110 ESSENTIALS OF ANATOMY AND PHYSIOLOGY ..... 4(3-2)
Normally Offered: F, SP
This course addresses the principles of human anatomy and physiology as related to various health care fields. It incorporates three unifying themes: the relationship between physiology and anatomy, the interrelations among the organ systems, and the relationship of each organ system to homeostasis.
Prerequisite: High school biology or equivalent.

BIO 114 INTRODUCTION TO BIOLOGICAL SCIENCE ..... 4(3-2)
Normally Offered: F, SP, SU
A basic course for non-science majors on the principles of biology, including a survey of life forms, coverage of classification, cytology, comparative anatomy and physiology, classical and molecular genetics, evolution, and ecology.

BIO 129 INTRODUCTION TO FIELD BIOLOGY ..... 3(2-2)
Normally Offered: F, SU
Gives the beginning student an introduction to the disciplines of field study and natural history in biology. Course emphasis will be on learning to recognize common plants and animals of Eastern United States and knowledge of the habitats where one would expect to find these organisms. Numerous field trips will be taken and a portion of the instruction time will be spent outdoors.

BIO 140 MICROBIOLOGY FOR THE HEALTH SCIENCES ..... 3(3-2)
Normally Offered: F, SP
This course is targeted for students pursuing associate degree level programs in the allied health sciences. Emphasis will be placed on the microorganisms that cause disease. Content includes the diagnosis and pathogenesis of infectious diseases, host defense mechanisms, epidemiology, public health, healthcare-associated infections, and infection control. Students majoring/minoring in biology or other pre-professional programs are advised to take BIO 227.
Prerequisite: BIO 110 or BIO 114 or equivalent; CEM 100 or CEM 111 or equivalent recommended.

BIO 161 GENERAL COLLEGE BIOLOGY I ..... 4(3-2)
Normally Offered: SP
First installment of a year-long introductory course in biology for science majors. Topics include macromolecules, energy metabolism, cytology cellular reproduction, genetics, evolution, phylogeny, viruses, bacteria and protists.
Prerequisite: BIO 114 or equivalent; eligibility placement in ENG 111 and CEM 111 or CEM 100 (as a co-requisite).

BIOLOGY

BIO 162 GENERAL COLLEGE BIOLOGY II ..... 4(3-2)
Normally Offered: F
Second semester of a year-long introductory course in biology for science majors. Topics include biological diversity and evolution of plants, fungi, and animals; form and function of plants and animals; development; ecology and behavior.
Prerequisite: BIO 114, or BIO 161, or equivalent; eligibility for placement in ENG 111.

BIO 200 ANATOMY & PHYSIOLOGY FOR ALLIED HEALTH ..... 6(4.5-3)
Normally Offered: SU (odd years)
This course is designed for students in allied health programs. It is an intensive lecture/laboratory course emphasizing the basic concepts and principles of human anatomy and physiology.
Prerequisite: BIO 110 or BIO 114 and CEM 100 or equivalent or permission of instructor.

BIO 201 HUMAN ANATOMY ..... 4(3-2)
Normally Offered: F, SP
This course is a comprehensive study of the microscopic and macroscopic structure of all the human body systems. In lecture, gross anatomy is incorporated with functional anatomy and clinically-related topics. Laboratory work includes the study of slides, human skeletons, anatomical models, and a prosected cadaver. Some animal organs are dissected and compared with those of humans.
Prerequisite: BIO 110 or BIO 114 or BIO 161.

BIO 203 HUMAN PHYSIOLOGY ..... 4(3-2)
Normally Offered: F, SP
Covers for the most part the normal functions of the human body. Topics that are stressed include cell physiology, movement, circulation, respiration, regulation of water and electrolyte balance, digestion and absorption of food, endocrinology, reproduction, and sensory processing. The lab considers clinical applications of physiology.
Prerequisite: BIO 201 and CEM 111 or equivalent.

BIO 207 WILDLIFE & FISHERIES ECOLOGY & MANAGEMENT ..... 3(2-2)
Normally Offered: SP
This course will give an overview of the management and conservation of natural resources. The topics will include careers and professional development; ecology; population dynamics and genetics; management of natural resources; legislation of natural resources; and human interactions and attitudes.
Prerequisite: high school algebra or equivalent.

BIO 210 INTRODUCTION TO BOTANY ..... 4(3-3)
Normally Offered: F
A basic survey course covering the major divisions of plants from algae through the flowering plants. Two weeks are spent on local flora, as well as traditional aspects of plant anatomy, physiology, paleontology, genetics, and ecology.
Prerequisite: BIO 114 or equivalent.

BIO 211 GENERAL ZOOLOGY ..... 4(3-2)
Normally Offered: SP
A survey course on the major phyla of animals. Includes evolutionary relationships, structure, function, behavior, adaptations, and economic importance of major groups of phyla of animals.
Prerequisite: BIO 114 with a 2.0 or better or equivalent.

BIO 215 FIELD BOTANY ..... 3(2-2)
Normally Offered: SU
This course will introduce students to the principles and rationale of classification, life histories, morphology and environmental relationships of plants. Emphasis will be placed on plant taxa of Michigan and the Great Lakes region. Students will be able to recognize common families, genera and species.
Prerequisite: BIO 114.

BIOLOGY

BIO 217 CELL BIOLOGY ..... 3(3-0)
Normally Offered: On Demand
A basic course in cytology. Approximately one-half of the course deals with cells of higher organisms, their numerous included organelles, and how cells organize and function as tissues. One-half of the course will deal with cellular physiology, cellular genetics, the cytology of abnormal cells such as cancer, cytology and medical applications and pathology. Recommended for biology majors.
Prerequisite: BIO 161.

BIO 227 MICROBIOLOGY ..... 4(3-3)
Normally Offered: SP
Involves identification, anatomy, physiology and genetics of microorganisms. Special emphasis is given to infectious diseases and the organisms that cause these diseases.
Prerequisite: BIO 161 or the following combinations: BIO 110 or BIO 114 and CEM 111.

BIO 228 PATHOPHYSIOLOGY..... 4(4-0)
Normally Offered: On Demand
Mechanisms of disease will be examined at the cellular, organ, and organ system levels as background for understanding clinical interventions. Alterations in structure and function will be correlated with adaptive responses. Capacity to cope with disease will be presented as a product of factors including heredity, age, and lifestyle.
Prerequisite: BIO 201 and BIO 203 with a 2.0 grade or higher.

BUSINESS ADMINISTRATION

BUS 115 FOUNDATIONS IN PERSONAL FINANCES (MASTERING THE BASICS)..... 1(1-0)
Normally Offered: F, SP
The Foundations in Personal Finance (Mastering the Basics) course provides students with strategies for managing money. The financial strategies are divided into five areas of study including savings, budget, debt, college student essentials, and philanthropy. This course will challenge the way students view money and empower them to graduate on a solid financial foundation.

BUS 116 FOUNDATIONS IN PERSONAL FINANCES (DEVELOPING YOUR SKILLS)..... 1(1-0)
Normally Offered: F, SP
The Foundations in Personal Finance (Developing Your Skills) course will assist students in becoming educated consumers. It will show students how companies compete for their money, identify financing strategies that encourage college students to go into debt, teach five basic rules for making large purchases, summarize the three keys to getting bargains, and describe the seven basic rules of negotiating and summarizing laws that protect consumers from illegal collection practices. Students will learn actions to take when their identity has been compromised and how to communicate effectively with credit bureaus and other agencies about collections issues.

BUS 117 FOUNDATIONS IN PERSONAL FINANCES (CONSIDERING THE FUTURE) ..... 1(1-0)
Normally Offered: F, SP
The Foundations in Personal Finance (Considering the Future) explores the three basic principles of financial planning for the future, including investments, retirement and savings plans, and real estate. Students will examine the relationship between diversification and risk, and compare and contrast different types of investments. Various retirement account tax treatments will be classified and summarized. Students will learn why a home is a great investment, how to determine what to look for when purchasing a home, and how to maximize the sale of a home. Students will compare and contrast the various types of home mortgages and identify the pros and cons of renting versus owning a home.

BUSINESS ADMINISTRATION

BUS 121 INTRODUCTION TO BUSINESS ..... 3(3-0)
Normally Offered: F, SP, SU
This course examines an overall view of today's business world. Topics discussed include the American economic system, the organization and management of businesses, financing, marketing, international trade, human resources management, and other business-related topics.

BUS 122 PERSONAL SELLING ..... 3(3-0)
Normally Offered: F
This course covers selling, covering the selling process, buy motivation, careers in selling, and ethical problems in selling. Both oral and written presentations are used. Use is made of video technology in oral presentations. Sales demonstrations in class are evaluated by both the students in the class and the instructor.

BUS 123 PRINCIPLES OF ACCOUNTING I ..... 4(4-0)
Normally Offered: F
Stresses the basic concept of accounting and financial reporting. The accounting cycle is presented, followed by discussion of current assets and liabilities, fixed assets and related depreciation methods, and systems of internal control and electronic data processing. Practice in accounting skill is obtained through the recording of transactions and preparation of financial statements.
Co-requisite: BUS 125 or MTH 113 or MTH 121 or MTH 122 or MTH 123 or MTH 130 or MTH 131 or MTH 132 or MTH 223 or MTH 231 or MTH 232.

BUS 124 PRINCIPLES OF ACCOUNTING II ..... 4(4-0)
Normally Offered: SP
Continues the coverage of financial accounting from BUS 123, including corporations, stock issuance, long term assets and liabilities, investments, cash flows, and financial statement analysis. Provides the fundamentals of managerial accounting.
Prerequisite: BUS 123.

BUS 125 BUSINESS MATHEMATICS ..... 3(3-0)
Normally Offered: F
This course applies fundamental arithmetic processes to the solution of problems arising in a business office. It includes material covering fractions, decimals, percentages, trade and cash discounts, markup and markdown, payroll, simple and compound interest, annuities, present and future value, sinking funds, consumer and business credit, mortgage amortization, and depreciation.

BUS 127 PRINCIPLES OF MANAGEMENT ..... 3(3-0)
Normally Offered: F, SP
This course studies the basic concepts and considerations affecting the scope of management. Emphasis is upon the planning, organizing, actuating, and controlling functions of management. Case studies are used to delineate the problems of all units of management.

BUS 128 SMALL BUSINESS MANAGEMENT ..... 3(3-0)
Normally Offered: SP
Examines the significant problems encountered by those who wish to manage their own small business. Solutions are offered to general, financial and personnel management problems, capital needs and sources, advertising and markets, credit and inventory contracts, pricing and accounting problems.

BUS 221 BUSINESS LAW I ..... 3(3-0)
Normally Offered: F
Introduces the student to the basic principles of law that are applicable to business. The law is studied in the following areas: legal and constitutional foundations, court system, ethics, torts, contracts and UCC sales, personal property and bailments, and real property and landlord-tenant.

BUS 222 BUSINESS LAW II ..... 3(3-0)
Normally Offered: SP
Studies the law relating to intellectual property, business crimes, negotiable instruments, banking, creditor rights and bankruptcy, business organizations, employment, agency, and antitrust.

BUS 223 INTERMEDIATE ACCOUNTING I ..... 4(4-0)
Normally Offered: F
This course covers principles applicable to the corporate balance sheet and income statement following a review of accounting procedures developed in Accounting Principles. Accounting for assets, liabilities and stockholders' equity of corporations, as well as income statement reporting will be covered. Financial statement presentation and disclosures will be emphasized, taking into account international financial accounting standards.
Prerequisite: BUS 124 with 2.0 or higher

BUS 224 INTERMEDIATE ACCOUNTING II ..... 4(4-0)
Normally Offered: SP
This course continues the study of valuation principles applicable to the liability and equity sections of the balance sheet. Interpretation of financial statements is emphasized. A Statement of Cash Flows will be prepared. Procedures for correcting prior years' statements are evaluated and the problems of income tax allocation are studied. Students are encouraged to develop a philosophy of accounting which includes global accounting standards.
Prerequisite: BUS 223 with 2.0 or higher.

BUS 225 TAX OF INDIVIDUALS ..... 3(3-0)
Normally Offered: F
This course covers the principles of federal taxation relative to individuals and sole proprietorships. A focus on tax research is emphasized in response to ongoing revisions in federal tax laws. Concepts covered include the purpose of taxes and the impact of federal tax laws on society; reporting requirements, tax compliance, the IRS, and tax authorities; tax planning strategies and related limitations; gross income and exclusions; deductions for AGI and from AGI; tax computation and tax credits; the alternative minimum tax for individuals; investments, compensation, retirement savings and deferred compensation; and home ownership. Additionally, concepts are covered related to sole proprietorships, including business income, deductions, and accounting methods; and property acquisition, cost recovery, and property dispositions.
Prerequisite: BUS 123 or consent of instructor.

BUS 226 TAXATION OF BUSINESS ENTITIES ..... 3(3-0)
Normally Offered: SP
This course covers the principles of federal taxation relative to business entities, including corporations, S corporations, limited liability companies (LLC), limited partnerships, and general partnerships. Also addressed are business tax concepts related to the sole proprietorship business entity, although this entity type is covered extensively in BUS 225. A focus on tax research is emphasized in response to ongoing revisions in federal tax laws. Concepts covered include reporting requirements, tax compliance, tax planning strategies and related limitations; accounting methods, gross income and exclusions; business deductions; tax computation and tax credits, and the alternative minimum tax. Also covered are concepts related to property acquisition, cost recovery, and property dispositions. An overview of state and local taxes and multinational transactions related to business transactions is also included.
Prerequisite: BUS 123 and BUS 225 or consent of instructor.

BUS 228 COST ACCOUNTING ..... 3(3-0)
Normally Offered: F
Presents methods of determining materials, labor and manufacturing costs used to value inventory and to determine net income. Job order, process, and standard cost systems will be reviewed. Budgets and the relevance of costs to managers' decisions will be discussed.
Prerequisite: BUS 124 or consent of instructor.

BUSINESS ADMINISTRATION

BUS 229 ADVERTISING ..... 3(3-0)
Normally Offered: SP
This course covers the basic principles and practices of advertising including media, advertisement creation, copy and layout design, advertising planning and management, and the integration of advertising and the marketing system.

BUS 233 MANAGEMENT AND SUPERVISORY LEADERSHIP ..... 3(3-0)
Normally Offered: SU
This course presents the modern supervisory job in its proper perspective. Topics covered include most effective supervisory approaches; the role of the supervisor in the organization; the basis for good motivation, group member and team development, and sound team effort. The supervisor is discussed in relation to the total managerial environment, to self-management, and to the individual employee in the work group.

BUS 235 HUMAN RESOURCES MANAGEMENT ..... 3(3-0)
Normally Offered: SP
This course provides the foundation for contemporary theory and practices relating to the management of human resources activities. Attention is devoted to the personnel processes that are involved in the procurement, development, and maintenance of human resources. Emphasis is placed on the role of the departmental supervisor, manager, and their superiors in the management of subordinate personnel.

BUS 241 PRINCIPLES OF MARKETING ..... 3(3-0)
Normally Offered: F, SP
This course covers the marketing aspects of the firm including classification of goods, retailing, wholesaling, physical distribution, personal selling, advertising, pricing, market forecasting and research, and the economic/legal environment in which the business enterprise functions.

BUS 248 BUSINESS COMMUNICATIONS ..... 3(3-0)
Normally Offered: SP
This course is designed to improve upon all forms of business communications. This course focuses on developing the ability to compose effective business letters, memoranda, reports, and resumes. The principles of written and oral communication and the underlying psychology are studied. Additional topics include intercultural communication, non-verbal communication, how technology in changing communication, job applications, integrity and ethics, and legal aspects of communication. Students are required to write many business letters. Research will be conducted for the business report and a summary of the report will be presented in class using presentation software.
Prerequisite: Ability to keyboard or permission of instructor & placement in ENG 111 or 121.

BUS 255 BUSINESS APPLICATION SOFTWARE ..... 3(2-2)
Normally Offered: SP
A continuation of CIS 120, this second course teaches advanced skills using word processing, spreadsheet, database, and multimedia presentation software. Students will manage multiple worksheets and work with complex spreadsheet functions, as well as PivotTables and PivotCharts. Templates, styles, mail merge, advanced formatting of objects, and innovative presentation animations will be taught. Students will learn how to create advanced database queries and custom database reports. Solutions to business problems will be developed, integrating data between applications.
Prerequisite: CIS 120 or permission of instructor.

BUS 257 COMPUTERIZED ACCOUNTING SYSTEMS ..... 1.5(2-0)
Normally Offered: SP
Utilizes commercially available software for the small business accounting functions of accounts receivable, accounts payable, payroll, general ledger, inventory, accounting cycle completion, and financial statement reporting.
Prerequisite: BUS 123 and CIS 120, or instructor permission.

BUSINESS ADMINISTRATION

BUS 262 PROJECT MANAGEMENT ..... 3(2-2)
Normally Offered: F
Students will be presented a number of techniques and tools used in guiding a project from concept through lifecycle completion. Topics include defining a project scope, the project charter, work breakdown structure, creating a budget, defining objectives, evaluation, risk management, understanding triple constraints, and the usage of project management software. Instruction will include standards from ANSI, ISO, and the Project Management Institute (PMI).
Prerequisite or Co-requisite: ENG 111 or ENG 121, and CIS 120, or instructor permission.

BUS 390 UTILITY FINANCING & ACCOUNTING..... 3(3-0)
Normally Offered: F
This course introduces students to electric utility company financing and accounting. The unique characteristics of these regulated utilities, resulting from federal and state agency requirements, will be explored using the perspectives of the three types of utility company ownership, including investor-owned; cooperatives; and municipalities. Revenue rate-setting policies, operations and capital budgets, annual financial statements, and other financial and accounting aspects of electric utilities will be analyzed and evaluated. This course is designed to equip entry-level and middle managers in the electric utility profession with knowledge and skills to relate utility financing and accounting fundamentals to their job responsibilities.
Prerequisite: MTH 113 or higher.

BUS 391 UTILITY REGULATIONS..... 3(3-0)
Normally Offered: SP
This course focuses on public service commissions and the role of government in the modern utility, Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC) operations and how they affect the utilities and governing bodies for different types of utilities.
Prerequisite: ENG 111 or ENG 120.

BUSINESS INFORMATION SYSTEMS

BIS 101 KEYBOARD SKILLBUILDING ..... 1(0-2)
Normally Offered: SP
Allows students to develop individual keyboarding skills. Emphasis is on learning correct techniques and improving accuracy by identifying error patterns, with a resulting improvement in speed.

BIS 140 PROOFREADING & EDITING FOR BUSINESS PROFESSIONALS ..... 3(2-2)
Normally Offered: SP
Teaches students to apply the principles of English grammar, style, and usage to business correspondence. Topics include capitalization, numbers, abbreviations, word division, forms of address, and proofreading, particularly as applied to electronic documents.
Prerequisite: ENG 111 or qualifying placement score.

BIS 160 MEDICAL TERMINOLOGY ..... 4(4-0)
Normally Offered: F, SP
Presents the fundamentals of medical language for all allied health professionals and interested lay people. Includes definitions, pronunciations, spellings, and abbreviations of anatomical, symptomatic, diagnostic, and operative terms pertaining to each anatomical system of the body. Lecture, discussion, and workbook exercises bring the language alive by making the study interesting and logical.

BIS 167 MEDICAL ETHICS & LAW FOR HEALTH PROFESSIONALS..... 3(3-0)
Normally Offered: F, SP
Introduces allied health professionals to common, everyday medical law and medical ethical issues in the health professions. The student will learn to distinguish between morality and ethical issues and the reasoning of their importance. Through discussion the student will employ background information and case-driven approaches to the prototypes of ethical theories and problems. Major attention is devoted to basic personnel processes that include the proclamation, development, and maintenance of working ethically within different departments and organizations of Health Care.

CADD TECHNOLOGY

CAD 132 AUTOCAD FUNDAMENTALS ..... 1.5(1-1)
Normally Offered: SP
Introduces principles of CAD in an AutoCAD software environment, providing the student with fundamental knowledge of CAD system components and how to utilize AutoCAD software in the creation of technical drawings.
Prerequisite: Basic computer proficiency recommended or permission of instructor.

CAD 135 INTERMEDIATE AUTOCAD..... 1.5(1-1)
Normally Offered: SP
Continues utilization of CAD technology in an AutoCAD software environment for both mechanical and architectural applications. Previously learned principles are reviewed and their use expanded. More advanced concepts and methods are introduced.
Prerequisite: CAD 132.

CAD 150 3D MODELING..... 3(2-2)
Normally Offered: F, SP
This course introduces 3D parametric modeling and design techniques. Students will learn skills needed to create parametric models and designs of basic to moderately complex parts and assemblies. Students will learn how to then generate technical drawings from these models.
Prerequisite: Basic computer proficiency recommended or permission of instructor.

CAD 220 MACHINE DESIGN ..... 3(2-2)
Normally Offered: F
This course acquaints the student with advanced mechanical drawings and machine design problems. Topics covered include assembly and detail drawings, revisions, fits, finishes, geometric dimensioning and tolerancing, fasteners, bearings, and manufacturability. Calculations made in sizing components with emphasis on commercially available elements.
Prerequisite: CAD 150, MTH 110 or higher, and MFG 101.

CAD 250 ADVANCED 3D MODELING..... 3(2-2)
Normally Offered: SP
This course enhances students' knowledge of parametric design with advanced 3D modeling techniques and design intent. Emphasis is placed on design intent while learning advanced skills such as: top down assembly modeling, configurations, design tables, weldments, advanced shapes, model analysis, advanced templates, and an overview of different 3D modeling software in the market place.
Prerequisite: CAD 150.

CHEMISTRY

Chemistry Placement Guidelines and Course Equivalencies — One year of high school chemistry with a "C" or higher grade within the last five years is equal to CEM 100 Introductory Chemistry. Two years of high school chemistry with a "C" or higher grade within the last five years is equal to CEM 111 General Chemistry. Advanced Placement (AP): test score of 3 = CEM 121 General and Inorganic Chemistry; test score of 4 = CEM 121 General and Inorganic Chemistry and CEM 122 Inorganic Chemistry & Qualitative Analysis.

CEM 100 INTRODUCTORY CHEMISTRY ..... 5(4-3)
Normally Offered: F, SP, SU
Surveys inorganic chemistry, providing an introductory chemical background for students who do not have experience in chemistry. Course involves a parallel laboratory experience, as well as basic mathematical concepts necessary for Chemistry 111 or 121.

CHEMISTRY

CEM 111 GENERAL CHEMISTRY ..... 4(4-3)
Normally Offered: F, SP, SU
Introduces the study of atomic structure, periodic systems, chemical bonds, stoichiometry, gas laws, liquids, solids, solutions, and nuclear chemistry. Theory is illustrated and applied through selected laboratory experiences. Prepares chemistry majors having limited backgrounds in high school chemistry for CEM 121 and non-majors for CEM 112.
Prerequisite: One unit of high school algebra and chemistry or CEM 100.

CEM 112 ORGANIC & BIOCHEMISTRY ..... 4(4-3)
Normally Offered: SP
A continuation of CEM 111 with emphasis on organic and biochemistry. This is a survey course covering organic structure, synthesis, reactions, mechanism, and nomenclature. The biochemistry of proteins, carbohydrates, lipids, cells, genetics, etc. are covered. Laboratory experiments in biochemical and organic identification, synthesis, separation and purification with use of instrumentation are emphasized. Fulfills the basic science requirement for non-science majors and several health science categories.
Prerequisite: CEM 111 or 121 or its equivalent and one year of algebra or consent of instructor.

CEM 121 GENERAL & INORGANIC CHEMISTRY ..... 4(4-3)
Normally Offered: F, SP, SU
Includes atomic structure, periodic systems, bonding, descriptive chemistry, stoichiometry, gas laws, liquids and solids, solutions, etc. Theory is illustrated and applied through selected laboratory experiences. Designed as basic course for students in scientific programs dealing with fundamental chemical principles.
Prerequisite: One unit of high school algebra, geometry, and chemistry.

CEM 122 INORGANIC CHEMISTRY & QUALITATIVE ANALYSIS ..... 4(4-3)
Normally Offered: F, SP, SU
Continues CEM 121, with emphasis on the study of chemical kinetics, equilibrium, electrochemistry, chemical thermodynamics, and organic chemistry. The principles of these topics are applied in laboratory experiments.
Prerequisite: CEM 121 or consent of instructor.

CEM 221 ORGANIC CHEMISTRY ..... 5(4-3)
Normally Offered: F
Emphasizes fundamental principles of organic chemistry in the study of aliphatic and aromatic compounds. Laboratory work is selected to provide experience with common apparatus and techniques and illustrate preparations and reactions discussed in class.
Prerequisite: CEM 122 or equivalent.

CEM 222 ORGANIC CHEMISTRY ..... 5(4-3)
Normally Offered: SP
Continues CEM 221. The functional group compounds are studied in the areas of structure, organic synthesis and reaction mechanisms. Laboratory work includes organic qualitative analysis.
Prerequisite: CEM 221 or equivalent.

COLLEGE SUCCESS SKILLS

CSS 100 BECOMING A MASTER STUDENT ..... 2(2-0)
Normally Offered: F, SP
A student success course covering academic skills, life management skills, and an introduction to resources of the school and community.

CSS 120 FIRST YEAR STUDENT SEMINAR ..... 1(1-0)
Normally Offered: F, SP
A gateway or foundational course that introduces new students to the meaning, purpose, and value of post-secondary education and the college curriculum. This course will also address non-cognitive issues and the challenges they present to successful completion of a college degree and focuses on the development of skills, strategies, habits, and attitudes to deal with life issues.

COMPUTER INFORMATION SYSTEMS

CIS 120 INTRODUCTION TO MICROCOMPUTERS ..... 3(2-2)
Normally Offered: F, SP, SUM
Introduces the student to operating system and software applications of word processing, spreadsheets, databases, and multimedia presentations. Covers file management; using Help and Support; creating and editing flyers, letters, research papers, and resumes; creating spreadsheets and charts; using formulas and functions; performing what-if analysis; creating, maintaining, and querying a database; and creating and editing a presentation using illustrations, shapes, and transitions.

CIS 125 INTRODUCTION TO COMPUTER & TECHNOLOGY CAREERS ..... 3(2-2)
Normally Offered: F, SP
This course is designed for students who are considering a career in Information Technology (IT), or students who are considering careers working in fields that require a broad understanding of IT. Successful completion will demonstrate students have the ability to identify and explain basic computer components, set up a basic workstation, conduct basic software installation, establish basic network connectivity, identify compatibility issues, and identify / prevent basic security risks. Further, this course will assess the candidate's knowledge in the areas of safety and preventative maintenance of computers.

CIS 140 INTRODUCTION TO MICROSOFT CLIENT OS ..... 3(2-2)
Normally Offered: F
Using both a "hands-on" and theoretical approach, this course teaches students to manage system resources through the Microsoft client operating system (OS) environment. In addition to basic system commands, students will learn how to install and customize the operating system environment for deployment in an office or networked environment.

CIS 150 WORD PROCESSING ..... 3(2-2)
Normally Offered: F
This course presents fundamental through advanced word processing skill development. The areas of creating, editing, and formatting documents used personally and in business, including memos, letters, reports, newsletters, templates, forms, and large documents are covered. Extensive formatting skill development in documents using tables, graphics, shapes, styles, themes, headers, footers, footnotes, endnotes, citations, sources, captions, bibliographies, sections, bookmarks, equations, graphic layering, watermarks, and page borders will be covered. Mail merge, data sources, merged letters and envelopes, collaboration, tracking changes, and integrating with other software are also covered, as well as automating documents and forms with controls and macros, and large document management including master documents, subdocuments, and encryption.

CIS 170 SPREADSHEET SOFTWARE ..... 3(2-2)
Normally Offered: SP
This course presents fundamental through advanced spreadsheet software development. Students will learn formatting, formulas, functions, advanced charting, macros, pivot tables, pivot charts, tracking changes, merging, analysis tools, data tables, financial tools, solver, scenario manager, object linking and embedding, integration with databases, queries, filters, and developing a spreadsheet application.

CIS 206 OBJECT-ORIENTED PROGRAMMING ..... 3(2-2)
Normally Offered: F
Students will develop a basic understanding of arrays, pointers, structures, and object-oriented programming. The goal of the course is to provide students with the knowledge and skills they need to develop object-oriented applications (including mobile applications) using best programming practices. The course focuses on program structure, language syntax and implementation details.
Prerequisite: CIS 120 or instructor permission.

COMPUTER INFORMATION SYSTEMS

CIS 207 ADVANCED OBJECT-ORIENTED PROGRAMMING..... 3(2-2)
Normally Offered: SP
Students will build upon their knowledge of object-oriented programming by learning to work with inheritance, interfaces, subclasses and threads, as well as arrays, collections, strings, and how to interact with databases. Students will also develop extensive graphical user interfaces.

CIS 240* MULTIMEDIA PRESENTATIONS..... 3(2-2)
Normally Offered: SP
Covers the fundamentals of modern usage of multimedia in presentations. Design techniques will be taught, along with using clip art, graphics and audio-visual files to enhance presentations. Using computer software designed for this purpose, students produce overheads, interactive slide shows, handouts and speaker notes. Skills learned are demonstrated by doing a multimedia project.
* Course prepares students for the Microsoft Office Specialist (MOS) exam to become certified at the core level using PowerPoint.
Reading Level Recommendation: College Level

CIS 241 INTRODUCTION TO WEB DESIGN & MANAGEMENT..... 3(2-2)
Normally Offered: SP
This course teaches students how to design, create, implement, and maintain a web site. Web page design principles are covered along with using hypertext markup and web-authoring software to create and manage web pages/sites. Students learn integration techniques for web-based databases, how to use multimedia in a web site, how to create and enhance images for web sites, and how to ensure security for a private Intranet for a target audience.

CIS 250 DESKTOP PUBLISHING..... 3(2-2)
Normally Offered: F
This course introduces the principles, equipment, and skills used in the publishing process using desktop publishing software. Students will create and modify a wide range of publications, using judgment related to fonts, spacing, text, layouts, colors, graphics, and media.

CIS 258 INTRODUCTION TO ENTERPRISE DATABASE..... 3(2-2)
Normally Offered: SP
Students will learn about the history of SQL, database options deployed in the marketplace today, and will be introduced to the fundamentals of enterprise database technology. Topics covered include database concepts, database design theory, entity-relationship models, SQL language, security, and database security and maintenance.

COMPUTER NETWORK SYSTEMS

CNS 150 NETWORKING FUNDAMENTALS..... 3(2-2)
Normally Offered: F
This course will introduce hardware and software technologies utilized to build computer networks and communicate data among devices. Students will build a working Local Area Network (LAN) utilizing multiple protocols and operating systems.
Co-requisite: CIS 140 and CNS 151 or instructor permission.

CNS 151 NETWORK COMMUNICATION CABLING..... 3(2-2)
Normally Offered: F
This course is designed to provide the learner with the knowledge to install and support the physical layer of computer and telecommunications networks. Students will learn proper installation and certification techniques based on TIA/EIA standards for copper and fiber optic cabling.

CNS 155 INTRODUCTION TO ROUTING & SWITCHING..... 3(2-2)
Normally Offered: SP
Using a basic knowledge of computer networks, students will learn how to link multiple networks together using routing, switching, VPN or WAN technologies. Using CISCO standards, students will simulate a working Internet environment and explore a variety of techniques and routing protocols.
Prerequisite: CNS 150 or instructor permission.

COMPUTER NETWORK SYSTEMS

CNS 170 PC REPAIR & MAINTENANCE ..... 4(3-2)
Normally Offered: F
Students will be introduced to techniques and tools utilized in repairing desktop and laptop computer systems and peripherals. In a lab environment, students will practice the diagnosis, identification, and replacement of computer components using industry recognized processes and technical documentation.

CNS 180 INTRODUCTION TO MICROSOFT SERVER ..... 3(2-2)
Normally Offered: SP
This course will introduce students to the Microsoft Server solution. Students in a lab experience will practice the deployment and administration of a Microsoft Server utilizing Active Directory to audit and manage user and computer accounts.
Prerequisite: CIS 140 or instructor permission.

CNS 215 INTRODUCTION TO VIRTUALIZATION & CLOUD COMPUTING ..... 3(2-2)
Normally Offered: F
Students will develop a working understanding of virtualization technologies and current virtualization software packages, as well as cloud terminologies and methodologies to implement, maintain, and support cloud technologies and infrastructures. The goal of the course is to provide students with the knowledge and skills necessary to develop and manage virtual systems and virtual networks within a business/cloud environment.
Prerequisite: CNS 150 and CNS 180.

CNS 220 ADVANCED MICROSOFT SERVER ..... 3(2-2)
Normally Offered: F
This course focuses on the different application tools available in a Microsoft Server and how they are used to help manage, share, and secure network resources. Specifically, students will learn about virtualization technologies, software deployment tools, Terminal Services, and deploying web sites through IIS and SharePoint.
Prerequisite: CNS 180 or instructor permission.

CNS 230 INFORMATION SECURITY ..... 3(2-2)
Normally Offered: F
This course will introduce techniques to reduce or mitigate risks to information technology assets. Specifically, desktop, network, and server applications will be discussed. A variety of case studies, ethical considerations, and penetration tools will be explored.
Co-requisite: CNS 150 or instructor permission.

CNS 235 ADVANCED INFORMATION SECURITY ..... 3(2-2)
Normally Offered: On Demand
Students will continue exploring Information Security concepts introduced in CNS 230. This course will also review a number of new objects including physical security or equipment, secure software design, business continuity and business recovery. The materials for this course are based upon the Certified Information Systems Security Professional-Common Body of Knowledge (CISSP-CBK).
Prerequisite: CNS 230 or instructor permission.

CNS 240 OPEN-SOURCE NETWORKING ..... 3(2-2)
Normally Offered: F
Students will learn the foundational differences between open source and commercially purchased software. By utilizing LINUX in a lab setting, a comparison to and contrast with Microsoft Server products will be drawn. The class will help participants become familiar with freely available software using command line and graphical user interface options.
Prerequisite: CIS 140 or instructor permission.

COMPUTER NETWORK SYSTEMS

CNS 245 ETHICAL HACKING & PENETRATION TESTING ..... 3(2-2)
Normally Offered: SP
This course will assess current penetration testing, vulnerability assessment, and vulnerability management skills with a focus on network resiliency testing. Successful students will demonstrate their ability to plan and scope assessments, handle legal and compliance requirements, and perform vulnerability scanning and penetration testing activities using a variety of tools and techniques, then analyze the results of those activities.
Prerequisite: CNS 230.

CNS 252 POWERSHELL AND SCRIPTING ..... 3(2-2)
Normally Offered: SP
In this course students will learn to use Windows PowerShell to administer operating systems, automate and customize features, processes, and the day-to-day functions needed to maintain and optimize a network and server infrastructure all from a command line interface.

CNS 260 AMAZON WEB SERVICES (AWS) CLOUD PRACTITIONER ..... 3(2-2)
Normally Offered: SP
This course is designed for individuals who want to develop a fundamental understanding of the Amazon Web Services (AWS) Cloud, independent of any specific technical role. Students will learn about AWS Cloud concepts, core AWS services, security, architecture, pricing, and support to build your AWS Cloud knowledge. Students will learn from both a hands-on and theoretical perspective.
Prerequisite: CNS 230, CNS 215.

CNS 295 NETWORK ADMINISTRATION/CYBER SECURITY CAPSTONE ..... 3(1-4)
Normally Offered: SP
This course is designed to enable students to assimilate the broad educational themes embedded in the major. As such, the course is constructed to require students to interact as teams and individuals to design, plan, and defend appropriate projects approved by the instructor that will enable them to demonstrate individual and group mastery of skills and competencies learned across the entire curriculum. The course helps students develop knowledge and skill sets that may facilitate their career growth.
Prerequisite: CNS 150, CNS 155, CNS 180, CNS 215, CNS 220, CNS 230.

CONCRETE TECHNOLOGY

CON 110 INTRODUCTION TO CONCRETE TECHNOLOGY ..... 1(1-0)
Normally Offered: F
Introduces the various divisions of the concrete industry. Course reviews each division (Ready Mixed Concrete, Concrete Masonry, Prestress/Precast, Engineering, etc.), and shows the types and needs of employment in each division.

CON 121 AGGREGATES .....3.5(2.1-2.8)
Normally Offered: F
Studies the entire aggregate industry. The purpose and function of fine aggregates (sand) and coarse aggregates (gravels, crushed stone, etc.) and their relationship in the construction industry are examined. Both natural and manufactured lightweight aggregates are studied. Industrial standards for testing evaluation are covered in lecture and in a hands-on laboratory.

CON 122 CONCRETE ADMIXTURES ..... 1(1-0)
Normally Offered: SP
Examines the nature of concrete and how its characteristics can be altered through the use of admixtures. The effects of both chemical and mineral admixtures to Portland Cement are studied. Industrial standards for these materials will be covered.

CONCRETE TECHNOLOGY

CON 123 CEMENTITIOUS MATERIALS..... 1.5(.9-1.2)
Normally Offered: F
Examines the chemical and physical components of various cementitious materials such as Portland Cement, slag cement, fly ash, silica fume, etc. Also included are the production methods and standard tests of cement performance.

CON 124 CONCRETE MIX PROPORTIONING..... 4(2-4)
Normally Offered: SP
Covers several theories of proportioning concrete mixes, including normal weight, lightweight, high strength, and others. Emphasis is given to the effect of altering mix ingredients and proportions on the properties of plastic and hardened concrete. Lab exercises intended to assist in developing a better understanding of equipment and procedures standard to the industry.
Prerequisite: CON 121 and CON 123 or permission of instructor.

CON 221 PLACED CONCRETE I..... 4(3-3)
Normally Offered: F
Studies the placed concrete industry from surveying for form layout to the final finishing of placed concrete. Mixing, placing, forming, finishing, curing, and jointing are covered. Mix proportioning to solve placing problems is examined.
Prerequisite: CON 124 or permission of instructor.

CON 222 PLACED CONCRETE II..... 4(3-3)
Normally Offered: SP
Continues Placed Concrete I in studying industrial standards including American Society of Testing and Materials (ASTM) and American Concrete Institute (ACI) using standard deviation methods. The course covers the use of fibers, pozzolans, pumping, engineering properties of placed concrete, high performance mixes, soils, and roller-compacted concrete.
Prerequisite: CON 124 and CON 221.

CON 223 CONCRETE MASONRY PRODUCTION..... 4(3-3)
Normally Offered: F
Covers the manufacturing of concrete masonry products including sieve analysis, aggregate blending, mix designs and proportioning, manufacturing techniques on full scale block equipment, and curing methods. Testing methods of masonry products and architectural specifications as they pertain to the masonry producer are studied.
Prerequisite: CON 121 and CON 123 or permission of instructor.

CON 224 PRESTRESS/PRECAST CONCRETE..... 3(2-3)
Normally Offered: SP
Covers the final use of various precast concrete masonry, prestress concrete, roofing tile, pavers, pipe, panels, and other precast units. Special attention is given to the layout and manufacturing of prestress units according to industrial standards, engineering properties, testing methods and product specifications.
Prerequisite: CON 223.

CON 226 CONCRETE TROUBLESHOOTING & REPAIR..... 2(2-0)
Normally Offered: SP
Examines the basics of concrete inspection including equipment, materials, and procedures. Covers the process of determining problems with concrete and deals with repair of problems. Studies the ways that problems can be reduced by using proper construction procedures.
Prerequisite: CON 221.
Co-requisite: CON 222.

CONCRETE TECHNOLOGY

CON 227 CONSTRUCTION INSPECTION ..... 2(2-0)
Normally Offered: F
Covers inspection procedures required in the construction industry with main emphasis on concrete related materials and procedures. Building codes, specifications, reporting procedures, and contract requirements will be covered in detail.
Prerequisite: CON 124 or permission of instructor.

CON 231 CONCRETE PROJECT LAB I ..... 1(0-1)
Normally Offered: F
Provides the opportunity for individual research and experimentation. Students are encouraged to pursue research in areas of interest that are not included in regular classes. Results of project labs are shared with other students, thereby increasing their value. The course is taken during the sophomore year with hours arranged. Each student is assigned an instructor in the field of his/her technical specialty.
Prerequisite: CON 121, CON 123, CON 124, or permission of instructor.

CON 232 CONCRETE PROJECT LAB II ..... 2(0-2)
Normally Offered: SP
Provides continued opportunity for individual research and experimentation. Students are encouraged to pursue research in areas of interest that are not included in regular classes. Results of project labs are shared with other students, thereby increasing their value. The course is taken during the sophomore year with hours by arrangement. Each student is assigned an instructor in the field of his/her technical specialty.
Prerequisite: CON 231 or permission of instructor.

CONSTRUCTION

CST 112 BUILDING CONSTRUCTION ANALYSIS ..... 3(3-0)
Normally Offered: SP
Studies construction designs and methods. Materials and methods of construction in the categories of wood, steel, and concrete are covered individually to show the capabilities of each.

CST 151 CONSTRUCTION SUMMER CO-OP ..... 6(0-6)
Normally Offered: SU
Gives the student opportunity to gain on-the-job experience with summer employment with a construction firm or related business during the interval between the freshman and sophomore years.

CRIMINAL JUSTICE

CRJ 101 CRIMINAL JUSTICE PHYSICAL EDUCATION ..... 3(1-2)
Normally Offered: SP
Designed for the Criminal Justice student that needs to improve his or her fitness level and lose weight. This is a low impact fitness course (i.e. walk/run, use of resistance bands, building endurance, introduction to weight training) with lectures on benefits of exercise and guidelines, fitness and wellness, coronary risk factors and physical fitness, stress, motivation, and behavior change, issues in weight control, and nutrition.
Prerequisite: Criminal Justice student or instructor permission. Participants with physical restrictions or other medical health problems must have a written permission statement from their physician prior to active participation in this program.

CRJ 102 INTRODUCTION TO CAREERS IN CRIMINAL JUSTICE ..... 1(1-0)
Normally Offered: F, SP
Introduces the various divisions of criminal justice at federal, state, and local levels of government including law enforcement, courts, corrections, and forensics highlighting job opportunities in each area.

CRIMINAL JUSTICE

CRJ 110 CRIMINAL JUSTICE PHYSICAL EDUCATION ..... 2(1-2-0)
Normally Offered: F
Physically prepares student to meet entry-level physical agility testing requirements for police officer and corrections officer and introduced military style discipline. Includes advanced development of exercise skills to increase and maintain levels of flexibility, muscle strength, body composition and cardiovascular endurance. Instruction will be a military style workout, including running, upper body strength workouts, push-ups, sit-ups, leg lifts and jumping jacks.
Prerequisite: Criminal Justice student or instructor permission. Participants with physical restrictions or other medical health problems must have a written permission statement from their physician prior to active participation in this program.

CRJ 119 INTRODUCTION TO HOMELAND SECURITY ..... 3(3-0)
Normally Offered: SP
The Introduction to Homeland Security course will define the role of the Federal, State and Local Governments when dealing with a terrorist attack from an emergency management and first responder perspective. The topic of what prompts people to engage in a terrorist attack will be explored. The student will learn how to prepare and recover from a terrorist attack. Finally, what future challenges emergency managers and first responders can expect to face when dealing with homeland security issues will be discussed.

CRJ 121 INTRODUCTION TO CRIMINAL JUSTICE ..... 3(3-0)
Normally Offered: F
Surveys the field of law enforcement, including the role of police officers in society, the history of law enforcement and the organization of law enforcement agencies.

CRJ 131 INTRODUCTION TO CORRECTIONS ..... 3(3-0)
Normally Offered: F
Covers the history and development of penology, treatment of convicted law violators of all ages, appraisal of correctional treatment on post correctional behavior and an evaluation of rehabilitative efforts in modern penology.

CRJ 132 INTRODUCTION TO COMPUTER FORENSICS & CYBERCRIME ..... 3(2-2)
Normally Offered: SP
This course instructs the foundational skills necessary for the collection, evaluation, and investigation of computer crimes and electronic evidence. Lecture and lab sessions will explain how information is stored and retrieved from different types of devices.
Prerequisite: CRJ 121 and CIS 120; or CRJ 121 and CNS 230; or instructor consent

CRJ 211 ETHICS IN CRIMINAL JUSTICE ..... 3(3-0)
Normally Offered: F
Introduces students and practitioners to the fundamentals of ethical theory, doctrines and controversies, and rules of moral judgment. Covers ways and means of making moral judgment. Addresses the state of ethics in police, corrections, probation and parole.

CRJ 220 JUVENILE DELINQUENCY ..... 3(3-0)
Normally Offered: F
Analyzes the causes and control of crime, including juvenile delinquency, statistics of crime, problems of juvenile offenders, juvenile court procedures, and the work of youth agencies.

CRJ 221 CRIMINAL LAW ..... 3(3-0)
Normally Offered: F
Consists of the study of the origin, nature, and purpose of substantive law with particular emphasis on the basic elements of the crimes, both statutory and common law. Criminal law topics covered are: Crime defined, sources of, legal limits, elements of, scope, defenses, crimes against people, habitation and property; offenses against government and justice.

CRIMINAL JUSTICE

CRJ 222 CRIMINAL PROCEDURES..... 3(3-0)
Normally Offered: SP
A basic survey of criminal procedure and constitutional rights as they apply to the criminal process from apprehension through the appellate process. Topics covered: Arrest, search and seizure, self-incrimination, pre-trial proceedings, trial, punishment, appeal, juvenile offenders, prisoner's rights, double jeopardy, confessions.
Prerequisite: Consent of instructor or CRJ 221.

CRJ 223 POLICE ADMINISTRATION ..... 3(3-0)
Normally Offered: SP
Deals with staff functions, management, budgeting, training, public relations, record keeping and other areas of the administration of a law enforcement agency.

CRJ 224 POLICE OPERATIONS..... 3(3-0)
Normally Offered: SP
Deals with line functions: patrol operations, investigative divisions, traffic divisions, non-crime functions and basic organization of modern law enforcement agencies.

CRJ 229 CRIMINAL INVESTIGATION..... 4(3-1)
Normally Offered: SP
Introduces criminal investigation procedures, including conduct at crime scenes, collecting evidence, methods used in police laboratories and presentation of evidence in court.

CRJ 230 FIELD SERVICE PRACTICUM ..... 3(3-0)
Normally Offered: F
Presents structured practical training with the student obtaining experiences which fit particular interests in law enforcement. Experiences are on campus or at local law enforcement agencies.
Prerequisite: CRJ 121, and all students must be at least 18 years of age and have completed the Hepatitis B shot series.

CRJ 233 COMMUNITY POLICING..... 3(3-0)
Normally Offered: F
Surveys the relationships between policing agencies and the communities which they serve. The emphasis is placed on communications and orientation toward common goals, with an examination of current problems in community tensions and conflict involving the police.

CRJ 234 MULTICULTURAL LAW ENFORCEMENT ..... 3(3-0)
Normally Offered: SP
Multicultural Law Enforcement will provide practical guidelines on how the police can work with cultural groups in the community. This course will examine the historical context of police relationships and identify the key issues that must be addressed. This course will focus on the cross-cultural contact that police officers have with citizens, victims, and suspects from diverse backgrounds. Multicultural Law Enforcement will stress the need for awareness, understanding of cultural differences, and respect toward those of different backgrounds.

CRJ 235 CLIENT RELATIONS IN CORRECTIONS ..... 3(3-0)
Normally Offered: SP
This course will examine the dynamics of human interaction within correctional facilities. Human relations in general will be presented to establish a basis for more specific examination of the unique and complex situation found in corrections. The meaning and impact of culture will be explored, as well as the causes and influence of prejudice on clients and corrections staff. Considerable discussion time will focus on values, ethics, and professional responsiveness.

CRIMINAL JUSTICE

CRJ 236 CORRECTIONAL CLIENT GROWTH & DEVELOPMENT ..... 3(3- 0)
Normally Offered: F
The purpose of this course is to give the student an understanding of and sensitivity to the motivations and behaviors of correctional clients. The course begins by reviewing general factors believed to be influential in human development, then analyzes specific problems of prisoners. The course examines prevention theories, as well as intervention and treatment strategies.

CRJ 237 CORRECTIONAL INSTITUTIONS & FACILITIES ..... 3(3-0)
Normally Offered: SP
Provides the student with a concentrated overview of correctional institutions and facilities. Designed primarily for students intending to pursue a career in the criminal justice system or for those already employed within the system, this course has relevance to other students pursuing a social sciences orientation. The course explores federal, state, county, and local facilities, including maximum, close, medium, and minimum custody facilities. It addresses community facilities, co-educational facilities, and the safety and security requirements and considerations related to each. Constitutional and managerial issues are stressed. The course includes historical developments and philosophy.

CRJ 238 LEGAL ISSUES IN CORRECTIONS ..... 3(3-0)
Normally Offered: F
This course studies state and federal law related to corrections. Particular emphasis is placed on constitutional issues and remedies for violations of rights. Students will gain insights into a wide range of policy considerations behind corrections law and administrative procedures. Leading cases and court decisions will be discussed at length and their impact on corrections explored.

CRJ 239 CRIMINOLOGY ..... 3(3-0)
Normally Offered: F
This course provides a broad survey of criminal behavior and attempts to explain it. Topics include definitions and measurements of crime, theories of crime causation, and crime types. It prompts students to think critically about the causes of crime and the link between crime theories and policies.

CRJ 248 LOCAL CORRECTIONS OFFICER ACADEMY ..... 10(6.5-5)
Normally Offered: SU
This course is certified by the Michigan Sheriff's Coordinating and Training Council. The Michigan Sheriff's Coordinating and Training Council has approved a 160-hour Local Corrections Officer Academy for correctional personnel supervising inmates in county jails. The Academy consists of 14 modules: Booking and Intake, Correctional Law, Cultural Diversity, Custody and Security, Defensive Tactics, Ethics, Fire Safety, First Aid/CPR/AED, Interpersonal Communications, Prisoner Behavior, Report Writing, Workplace Harassment, Stress Management, and Suicide Awareness. After the student has successfully completed the Academy and met all Michigan Sheriff's Coordinating and Training Council requirements, he/she will be certified by the Training Council as having completed the required 160-hour Academy.

DIRECTED STUDIES

251 DIRECTED STUDIES 1-5
Aids advanced students or those who have exhausted regular offerings in their area of interest. The average student pursuing an associate degree will not find room in their program for this type of credit. The concept does not apply to remedial work. A directed study must be planned in advance of registration and cannot be used at the end of a semester to fill requirements. Careful attention must be given to the description of the work proposed because this constitutes the record of a course outline which is filed with the instructor, the Vice President of Instruction, and the Registrar's Office. The student is responsible for securing proper forms with all required signatures.

ECONOMICS

ECN 225 MONEY AND BANKING ..... 3(3-0)
Normally Offered:
This course will introduce the student to the basic terms and concepts which are central to understanding the role of money, financial intermediaries, and financial markets in the national economy. Among the terms and ideas discussed are: money and the money supply, financial instruments, interest rates, the varied structures and roles of financial intermediaries, the Federal Reserve, and monetary policy.

ECN 231 ECONOMICS (MICRO) ..... 3(3-0)
Normally Offered: F, SP
This course focuses on the analysis of individual consumer and supplier behavior. Students will learn the basics of consumer demand theory, labor supply theory, price theory, and various production decisions in different types of competitive markets. Upon completion, students should have a fundamental appreciation and comprehension for the motivation of individual firms and consumers.
Prerequisite: BUS 125, MTH 113, MTH 118, MTH 121, MTH 122, MTH 123, MTH 130, MTH 131, MTH 132, MTH 223, MTH 231 or MTH 232

ECN 232 ECONOMICS (MACRO) ..... 3(3-0)
Normally Offered: F, SP
This course is a study of the behavior of the economy as a whole. It introduces aggregate economics and examines macroeconomic issues of aggregate output and price stability, the study of choosing the economic role of government, money and banking, national income analysis, employment, and inflation. Students who complete this course will have an improved understanding of our national economy and the critical economic issues of our time, as well as gain a more mature understanding of the role macroeconomics plays in their lives.
Prerequisite: BUS 125, MTH 113, MTH 118, MTH 121, MTH 122, MTH 123, MTH 130, MTH 131, MTH 132, MTH 223, MTH 231 or MTH 232

ELECTRICAL POWER TECHNOLOGY

EPT 230 POLY-PHASE METERING ..... 2(1-2)
Normally Offered: SP
In this course, students learn about single-phase metering and poly-phase metering, including meter design, adjustments, compensations, and applications. They also learn about power factor analyzers, meter demand theory, high amperage CT cabinets and primary metering. Students will construct and test single-phase and poly-phase transformer rated meter installations.
Prerequisite: APP 100E.
Co-requisite: APP 104E.

EST 301 POWER SYSTEMS ..... 3(3-0)
Normally Offered: SP
This course applies electrical theory accompanied with physics to electrical systems including power flows, system design, and load management of different types of electrical power systems.
Prerequisite: PHY 221, EST 302, EST 304.
Co-requisite: PHY 222.

EST 302 CIRCUITS ..... 4(4-0)
Normally Offered: F
Course covers circuit analysis of DC circuits (resistance, capacitance, inductance) and AC circuits; DC power and energy calculations; DC power consuming devices and harmonies; conversion of AC to DC and brief introduction of DC power electronics; defines phasors complex power and impedance; mathematical calculations showing AC power and energy; apply metering theories to determine system qualities such as electricity power and energy; and using basic calculus to show how energy is power integrated over time.
Prerequisite: APP 104E.
Co-requisite: PHY 221.

ELECTRICAL SYSTEMS TECHNOLOGY

EST 304 PHASOR ANALYSIS/THREE PHASE POWER..... 3(3-0)
Normally Offered: F
Course uses trigonometric functions showing sinusoids; why three phase and not two or four? Compare the different types of three-phase systems (Wye, Delta, grounded, ungrounded). Course covers transforming the AC time domain into phasors for analysis of steady state systems. Vector quantities and vector math.
Prerequisite: APP 104E.
Co-requisite: PHY 221.

EST 306 ELECTRIC POWER GENERATION ..... 3(3-0)
Normally Offered: F
Course covers DC, AC, single-phase, and three-phase rotating machines; synchronous and asynchronous motors and generators; types of generators and turbines; DC vs AC generation; conservation of energy during generation, i.e. losses of mechanical energy to electrical energy.
Prerequisite: APP 104E.
Co-requisite: PHY 221, EST 302, EST 304.

EST 307 INTRODUCTION TO COMPUTER MODELING OF POWER SYSTEMS..... 3(2-2)
Normally Offered: SP
Course covers power system parameters and what they mean in the model; how power system components' and lines' impedances determine how energy flows. Uses computer models of electric systems to accurately control and predict the electric grid.
Prerequisite: EST 301.

EST 308 DISTRIBUTION/TRANSFORMER POWER..... 3(3-0)
Normally Offered: F
Course is designed to provide a broad overview of the transmission of electricity versus the distribution of electricity.
Prerequisite: EST 306.
Co-requisite: EST 301.

EST 401 RENEWABLES ..... 3(3-0)
Normally Offered: F
Course provides an overview of modern types of renewable generation sources. Included are photovoltaics (solar), wind, wave, and geothermal.
Prerequisite: EST 306.

EST 402 SCADA ..... 3(2-2)
Normally Offered: F
Course covers Supervisory Control and Data Acquisition (SCADA) Systems and what they do; implementing and operating existing SCADA systems; SCADA components such as PLC's, relays, contracts, and communication schemes.
Prerequisite: IND 120, APP 114E.

EST 403 PROTECTION..... 3(3-0)
Normally Offered: SP
Course covers the protection of the system from anomalies; general protection rules and why the system needs such protection; protection devices such as fuses, sectionalizers, reclosures, circuit switchers, and breakers; and coordination of protection devices.
Prerequisite: EST 301.

EST 404 POWER LINE PARAMETERS ..... 3(3-0)
Normally Offered: SP
Course is a basic introduction to power line and system parameter calculations; finding X/R ratios for short, medium, and long lines; wire and cable properties, resistivity/conductivity; and power line construction efforts.
Prerequisite: EST 301
Co-requisite: EST 406

ELECTRICAL SYSTEMS TECHNOLOGY

EST 405 RELAYING ..... 3(2-2)
Normally Offered: SP
Course covers the three generations of relaying, electromechanical, solid-state, and microprocessor; relay functions and operations i.e. 50/51 Instantaneous/Time overcurrent; testing relays; general relaying principles such as protection zones, and proper relay connections.
Prerequisite: EST 301.

EST 406 THE GRID ..... 3(3-0)
Normally Offered: F
Course covers the history of the grid; why AC dominated over DC; the elements of the electric grid i.e. Generation, Transmission, Distribution, and Consumption; and Independent System Operators.
Prerequisite: EST 301, EST 306.
Co-requisite: EST 404.

EST 408 ELECTRICAL SYSTEMS CAPSTONE PROJECT ..... 3(2-2)
Normally Offered: SP
Course covers safety practices in the electric utility industry, print reading, and assigns a capstone project that will require students to use knowledge gained in prior courses to complete.
Prerequisite: EST 308, EST 404.
Co-requisite: EST 307, EST 403, EST 405.

ELECTRONICS

ELE 220 PC BASE DATA ACQUISITION & CONTROL..... 3(2-2)
Normally Offered: SP
An introduction to Data Acquisition (DAQ), signal conditioning, sensors, digital and analog inputs and outputs, instrumentation communications, and basic controls. Through projects, students will learn how to setup, program, build, and troubleshoot PC-based DAQ and control systems.
Prerequisite: APP100E and basic computer proficiency recommended.

ENGINEERING

EGR 122 INTRODUCTION TO ENGINEERING..... 1(1-0)
Normally Offered: F
This course introduces students to the profession of engineering and related fields. Topics include degrees and careers in engineering, engineering modeling and analysis, engineering cost estimation, engineering ethics, and other topics related to engineering.

EGR 130 TEAM DESIGN PROJECT ..... 2(1-2)
Normally Offered: SP
This project-based course utilizes each student's diverse skills in a semester long development of a project or projects selected by the class. The course is structured as a company with multiple projects and objectives designed to give students real world project experience. Students will work in teams. Each team will progress through all stages of a project – conception, design, build, redesign, and formal presentation. Each student is assigned a part of the project with a required written report that is in line with their skills and interests. This course is open to all students; however, priority is given to Marine Technology, Mechanical Design Technology, and Pre-Engineering students.
Prerequisite: Permission of Instructor.

EGR 221 STATICS..... 3(3-0)
Normally Offered: F
Covers the fundamental principles of mechanics with engineering applications. Topics include forces, moments, machines, structures, friction, hydrostatics, and virtual work.
Prerequisite: PHY 221, MTH 231 (may be taken concurrently).

ENGLISH

ENG 111 ENGLISH COMPOSITION I..... 3(3-0)
Normally Offered: F, SP, SU
Provides basic instruction for the college freshman in communication skills. Reading skills are developed through the analysis of essays. Writing skills are developed through a study of expository writing, language usage, structure, and mechanics.
Prerequisite: A minimum of a 12th grade reading level is required for placement in this course.

ENG 112 ENGLISH COMPOSITION II..... 3(3-0)
Normally Offered: F, SP, SU
Non-fiction and short fiction materials are used to further develop written communication skills introduced and practiced in ENG 111. Special emphasis is placed on critical thinking, critical analysis, and research leading to academic writing.
Prerequisite: Grade of 2.0 or better in ENG 111 or ENG 121.

ENG 120 APPLIED COMMUNICATIONS..... 3(3-0)
Normally Offered: F
Coordinates education in the technical and the academic fields. The course demonstrates the application of academic concepts by relating these concepts to technical subjects. Students review the types of communication skills needed in the workplace. This course is not intended for transfer students.
Co-requisite: Enrollment in one of the following programs: Automotive Service & Repair, Computer-Aided Drafting & Design, Concrete Technology, Machine Tool Technology.

ENG 121 ADVANCED ENGLISH COMPOSITION I..... 3(3-0)
Normally Offered: F
Provides instruction for the college freshman who has demonstrated above-average ability in communication skills. The instructor uses essays to teach a variety of expository writing forms.
Prerequisite: Above-average competence in grammatical/writing skills as determined by the English Dept. and placement tests.

ENG 122 ADVANCED ENGLISH COMPOSITION II..... 3(3-0)
Normally Offered: SP
Non-fiction and short fiction materials are used to develop further the written communication skills introduced and practiced in ENG 121. Special emphasis is placed on critical thinking, critical analysis and research leading to academic writing.
Prerequisite: Grade of 2.0 or better in ENG 111 or ENG 121.

ENG 123 TECHNICAL COMMUNICATION ..... 3(3-0)
Normally Offered: SP
Develops practical written communication skills for the workplace. Students design and prepare a variety of conventional technical and business documents, including business letters, memoranda, job application materials, short reports, empirical and comparative studies, instructional manuals and proposals. Topics include purpose and audience analysis, text production, page layout and document design.
Prerequisite: ENG 111 or ENG 120 or ENG 121 or consent of instructor.

ENG 203 INTRODUCTION TO MYTHOLOGY..... 3(3-0)
Normally Offered: F
Studies myths from several cultures. They are examined from the perspective of their common themes and capacity to be transformed through time while maintaining their universal motifs. Attention is also focused on the functions of mythology, including a primary one of providing guidance for the individual through important passages of life. Several works of literature are examined to demonstrate the mythic process at work and the fundamental part that myth plays in literary expression.
Prerequisite: Sophomore standing or permission of instructor.

ENGLISH

ENG 204 INTRODUCTION TO LITERATURE ..... 3(3-0)
Normally Offered: SP (odd years), SU
Introduces students to three basic forms of imaginative literature: short fiction, poetry, and drama. Instructs students in the skills to appreciate, enjoy, and critically analyze such literary texts. Components of the course include themes, formal elements, and critical approaches.
Prerequisite: ENG 111 or 121 and sophomore standing, or permission of instructor.

ENG 221 BRITISH LITERATURE I ..... 3(3-0)
Normally Offered: On Demand
Helps the student read literature with understanding and appreciation. The course consists of the study of representative English fiction, poetry and drama.
Prerequisite: ENG 112 or ENG 122.

ENG 222 BRITISH LITERATURE II ..... 3(3-0)
Normally Offered: Spring
This is the second course in a two-semester survey of British Literature, covering Romanticism, the Victorian Age, and Twentieth Century Literature to the present day. Readings will include poetry, fiction, non-fiction, and drama.
Prerequisite: ENG 112 or ENG 122.

ENG 223 AMERICAN LITERATURE I ..... 3(3-0)
Normally Offered: On Demand
This is the first semester of a two-semester survey of American literature, beginning with readings from the colonial conquest period, covering the Puritan writings of the 17th century, the Deist and Rationalistic writings of the American Revolution, early Romanticism, and ending with works of the abolitionists and Transcendentalists at approximately the time of the Civil War. Readings will consist of classic American works, as well as those of lesser-known writers, and will sample several genres to provide variety and a broader insight into American thought.
Prerequisite: ENG 111 or ENG 121 and ENG 112 or ENG 122.

ENG 224 AMERICAN LITERATURE II ..... 3(3-0)
Normally Offered: F (odd years)
This second semester of a two-semester survey of American literature, begins approximately at the time of the Civil War and leads into a study of contemporary literature. Emphasis will be placed on the historical development of American thought and literature, with an effort to include culturally diverse writings that may have been previously excluded from American literature. The course will also sample various genres and diverse regions of the country, as well as represent different schools of writing, such as Naturalism, Realism and Modernism.
Prerequisite: ENG 111 or ENG 121 and ENG 112 or ENG 122.

ENG 229 CREATIVE WRITING ..... 3(3-0)
Normally Offered: F
Develops skills in writing one or more of the following forms: the short story, the play, the poem and the essay. The students meet individually with the instructor for criticism of their manuscripts. The class meets regularly to discuss common problems and successes.
Prerequisite: Grade of 2.0 or better in ENG 111 or 121.

ENG 242 CHILDREN'S LITERATURE ..... 3(3-0)
Normally Offered: F, SP
Provides the second semester freshman and sophomore student with a general understanding of the development and uses of children's literature from its beginning to the present. Methods of analysis of both fiction and non-fiction prose as well as poetry are emphasized.
Prerequisite: Grade of 2.0 or better in ENG 111 or ENG 121

ENGLISH

ENG 243 THE SHORT STORY ..... 3(3-0)
Normally Offered: SP
This course presents an intensive study of the short story as a literary form. In addition to its primary focus on formal elements, the course considers historical context/development, author biography, and critical theory. Readings are drawn from a variety of international, as well as American literary sources.
Prerequisite: ENG 111, ENG 121, or Instructor permission

ENG 244 THE NOVEL ..... 3(3-0)
Normally Offered: F, SP
Presents an intensive study of the novel as a literary genre. Concentration on how the formal elements of the novel (such as narrative technique, point of view, tone, plot, character development, style and the structure of time and place) define the theme the novelist is presenting. The readings for the course are selected from representative novels. Some written work is a partial requirement for the course.

ENVIRONMENTAL SCIENCE

ENV 101 ENVIRONMENTAL SCIENCE ..... 4(3-2)
Normally Offered: F
This course analyzes environmental issues, including ecology, natural cycles, populations, energy, and human impact on the environment. Politics, public policy, and sustainability will be discussed. The lab portion will include outdoor experiences.

FRENCH

FRN 121 FRENCH I ..... 4(4-0)
Normally Offered: F
This is a basic French course designed to introduce the French language to students, giving them a rudimentary knowledge of written and spoken French. Six skills will be addressed: reading, writing, listening, speaking, pronunciation, and translation. These skills will be developed throughout the course through instruction, drill, choral response, readings, music, and class interaction. Systemic grammar instruction as well as whole-language techniques will be incorporated to enhance learning. Students will also be introduced to French culture, literature, geography, famous persons, and history through a variety of media. Students who already have a strong background in French, e.g., having had more than two years in high school or other institutions, should refrain from taking this elementary class since it is intended for beginners. FRN 122 French II, which is offered in the spring semester, will be a better course for stronger students.

FRN 122 FRENCH II ..... 4(4-0)
Normally Offered: SP
This second semester of college French corresponds roughly to one to two semesters of high school French. This basic French course will focus on the continued development of linguistic skills, i.e., reading, listening, speaking, and pronunciation, with emphasis on the written language.
Prerequisite: FRN 121 or two semesters of high school French.

GEOGRAPHY

GEO 125 GEOGRAPHY ..... 3(3-0)
Normally Offered: On Demand
Analysis of characteristics and significance of world land form, climate, soils, vegetation, mineral and water resources, as well as tectonic and glaciation forces.

GEO 126 HUMAN GEOGRAPHY ..... 3(3-0)
Normally Offered: F, SP
This course is a systematic study of spatial patterns and processes that have shaped human use and alteration around the world. Students will analyze how people perceive space, interact spatially, as well as the meaningfulness of space. The course will touch on topics of economics, history, politics, demographics, the environment, culture, agriculture, and planning.

GEOGRAPHY

GEO 127 PHYSICAL GEOGRAPHY ..... 4(3-2)
Normally Offered: F, SP
This course analyzes and examines the characteristics and significance of world land forms, climate, soils, vegetation, minerals, and water resources, as well as tectonic and glaciation. Additionally, it considers the relationships between the environment and humans.

GEO 151 INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEM ..... 1.5(2-0)
Normally Offered: F, SP
Introduces principles of geographical information systems (GIS) in an ArcGIS software environment, providing the student with fundamental knowledge of GIS system components and how to utilize ArcGIS software in the creation of maps and analysis of spatial data. Students will also gain basic experience with the use of global positioning system (GPS). Applications will be cross disciplinary in nature, including such fields as the environmental sciences, oceanography, business, marketing, demographics, history, tourism, and real estate management.

GEO 152 ADVANCED GEOGRAPHIC INFORMATION SYSTEM ..... 1.5(2-0)
Normally Offered: F, SP
Continues utilization of GIS technology in a spatial software environment. Previously learned principles are reviewed and expanded. Advanced spatial data analysis, editing, and geocoding concepts and methods are introduced. Students collect GPS data and create a formal GIS map for presentation. Applications will be cross disciplinary in nature, including such fields as the environmental sciences, oceanography, business, marketing, demographics, history, tourism, and real estate management.
Prerequisite: GEO 151.

GERMAN

GER 123 GERMAN ..... 4(4-0)
Normally Offered: F
An introductory course for anyone interested in developing basic speaking, reading, listening and writing skills in the German language. No previous experience with German is required.

GER 124 GERMAN ..... 4(4-0)
Normally Offered: SP
A second semester level course for anyone interested in developing and improving their basic speaking, reading, listening and writing skills in the German language.
Prerequisite: GER 123 or other previous experience with German is required

HEALTH

HEA 100 INTRODUCTION TO NURSING ..... 1(1-0)
Normally Offered: F, SP
Introduces students to the profession of nursing. Topics include degrees and careers in nursing, medical ethics, medical terminology, infection control, nursing salary and cost information, and other topics related to nursing.

HEA 102 NUTRITION ..... 3(3-0)
Normally Offered: F
This course offers information about human nutrition and how it influences personal health. Emphasis is placed on current nutritional research; U.S. Government guidelines and goals; U.S. RDA's human nutritional needs of foods; human energy needs of foods; human growth and development; and nutrition and human performance.

HEA 103 INTRODUCTION TO PRE-PROFESSIONAL HEALTH CAREERS ..... 1(1-0)
Normally Offered: F, SP
Introduces students to the pre-professional health careers, including pre-med, pre-dental, pre-pharmacy, and pre-therapy options. Topics include degrees and careers, medical ethics, medical terminology, infection control, salary and cost information, and other related topics.

HEALTH

HEA 106 FUNDAMENTALS OF SURGICAL CARE ..... 1(1-0)
Normally Offered: F, SP
This course offers LPN students an introduction to surgical services. It is delivered in collaboration with the MyMichigan Health surgical team and includes learning experiences in the MyMich simulated Operating Room. Students interested in this course will follow a surgical services application and selection process. This course is open to two LPN nursing students each semester.

HEA 133 DOSAGE CALCULATION & MEDICAL TERMINOLOGY ..... 2(2-0)
Normally Offered: F, SP
This course introduces the concept of dosage calculation as a means of solving nursing mathematical problems. Abbreviations, conversion factors, simple and advanced calculations are covered. This course will also cover the basics of medical terminology as used by the health care professional. This is a prerequisite course for the LPN and ADN Nursing programs.

HISTORY

HST 121 HISTORY OF THE EARLY WESTERN WORLD TO 1500: FROM MESOPOTAMIA TO MARTIN LUTHER ..... 3(3-0)
Normally Offered: F
This course studies the emergence of Europe from the Ancient Worlds of Mesopotamia, Egypt, Greece, and the Roman Empire. Students analyze the rise of governments, religion, capitalism, war, disease, education, and social structures through primary and secondary sources.

HST 122 HISTORY OF THE MODERN WESTERN WORLD 1500-PRESENT: GALILEO TO GLOBALIZATION ..... 3(3-0)
Normally Offered: SP
This course studies the rise of science and reasoning, the onset of Protestantism, revolutionary destruction of old regimes, the establishment of liberal parliamentary democracies, and the rise of totalitarian movements in the present ear of global conflict.

HST 123 HISTORY & EXPLORATION OF EMBATTLED PROFESSION – INTRO TO EDUCATION ..... 3(3-0)
Normally Offered: SP
This course introduces the history of education in the United State for students intending to pursue a career in education. The focus of the course is the historical evolution of education and educational systems in the United States; comparison of educational systems nationally and internationally, and the role that education has played in fostering a democratic republic in the United States. Through anthropological and ethnographic perspectives, students examine the profession of education through research, methods, praxis, and immersion. Students explore various aspects of the educational system and professional applications while analyzing and comprehending the cultural, social, economic, and pedagogical challenges facing the educational system of the U.S. in the 21st century.

HST 221 UNITED STATES HISTORY I ..... 3(3-0)
Normally Offered: F
This course provides opportunity for extended exploration of U.S. History from the period of pre-colonial America through the establishment of the United States and the evolution of the Civil War. The course fosters breadth of understanding and appreciation of history while emphasizing the responsibilities of citizenship for students with broad occupational, academic, personal, and civic interests. Topics include pre-European society in the Americas, European settlement, colonial development, the development of constitutional government and representative democracy, social and economic development, the western territorial expansion of the United States, sectionalism, and the Civil War and its causes.

HISTORY

HST 222 UNITED STATES HISTORY II ..... 3(3-0)
Normally Offered: SP
This course provides opportunity for extended exploration of U.S. history from the Civil War through the present day. The course fosters breadth of understanding and appreciation of history while emphasizing the responsibilities of citizenship for students with broad occupational, academic, personal, and civic interests. Topics include the Civil War and its repercussions, post-war reconstruction, the expansion of economic industrialization and subsequent implications for the socio-political order, the Gilded Age, Progressive era, Populism, World War I, Great Depression, New Deal, World War II, Cold War, post-Cold War era, and 9/11 and beyond.

HST 225 TWENTIETH CENTURY U.S. HISTORY ..... 3(3-0)
Normally Offered: SP (odd years)
This course provides expanded analysis of 20th century social, cultural, political and economic issues, events, trends, and people within domestic and international context throughout the 20th century since 1900. This course lays a broad foundation for better understanding of the dynamics of 21st century America in a global and historical context. Topics include ideological struggles of foreign and domestic relevance, economic development, globalization, wars and conflicts, social-cultural evolution, challenges of federalism, states' rights, and civil rights movements among the more traditional events, people and chronologies defining the history of the United States and its context. The course fosters breadth of understanding and appreciation of history while emphasizing the responsibilities of citizenship for students with broad occupational, academic, personal, and civic interests.

HST 227 CONTEMPORARY AMERICAN PROBLEMS..... 3(3-0)
Normally Offered: F (even years)
This course surveys current domestic and international problems of significant relevance to the United States and the world around it. Emphasis is placed on the nature and complexity of current issues with exploration of the origins of such problems from historical perspective guiding a deeper understanding of such issues and their implications for present day society within a larger global and historical context. Topics include population and immigration, environmentalism, nationalism, industrial development, workplace standards, urbanization, race relations, socio-economic status and class, globalization, national debt, and technology. The course fosters breadth of understanding and appreciation of history while emphasizing the responsibilities of citizenship for students with broad occupational, academic, personal, and civic interests.

HUMANITIES

HUM 110 INTRODUCTION TO OLD TESTAMENT LITERATURE ..... 3(3-0)
Normally Offered: F
Introduces the student to the Old Testament canon, its historical antecedents and development, cultural setting, literary styles, and subject matter. Attention is given to the importance of the Old Testament's leading ideas in developing Western culture. Critical problems related to the ancient texts will be introduced in the context of Medieval and modern debates.

HUM 114 INTRODUCTION TO NEW TESTAMENT LITERATURE..... 3(3-0)
Normally Offered: SU
Introduces the student to the New Testament canon, its historical antecedents and development, cultural setting, literary styles, and subject matter. Attention is given to the importance of the New Testament's leading ideas to developing Western culture. Critical problems related to the ancient texts will be introduced in the context of Medieval and modern debates.

HUM 210 INTRODUCTION TO CINEMA ..... 3(3-0)
Normally Offered: F, SP
This course provides a broad introduction to the study of film. Emphasis will be placed on a particular genre while exploring certain historical and contemporary pieces of cinematic art for examination, analysis, and evaluation. Filmmakers, important schools of filmmaking, and film production will also be investigated.

HUMANITIES

HUM 241 HUMANITIES I ..... 4(4-0)
Normally Offered: F, SP
Introduces the student to the terminology, concepts, and attitudes that are needed to be able to appreciate, describe, interpret, and evaluate artistic artifacts of humanity, cross culturally, and throughout history. The course cultivates an international perspective and examines how various art forms can aid in the process of self-discovery.

HUM 242 HUMANITIES II ..... 4(4-0)
Normally Offered: SP
Continues to develop the terminology, ideas, concepts, and attitudes that are needed to be able to appreciate, describe, interpret, and evaluate humanities and art-related artifacts. In addition, Humanities II further emphasizes the interrelationships amongst the arts — including but not limited to sculpture, architecture, painting, and film — and examines how these art forms aid in the process of self-discovery.
Prerequisite: HUM 241 or permission of instructor

INDUSTRIAL

IND 110 INDUSTRIAL ORGANIZATIONS ..... 3(3-0)
Normally Offered: On Demand
A detailed survey of organizational theories and structures, operational, financial, marketing, and accounting activities; duties of management, planning, control, personnel, safety, wages, policy and human factors necessary for effective management of an industrial organization.

IND 120 INDUSTRIAL COMPUTERS & NETWORKING ..... 3(2-2)
Normally Offered: F
An introduction to computers and networks as used in an industrial setting. The course will start with the basics of computer usage and file management and work up to hands on building of basic industrial networks between personal computers and instrumentation.

IND 225 STRENGTH OF MATERIALS ..... 4(3-2)
Normally Offered: F
This course employs a practical approach to stress, strain, shear, torsion, and moments found in mechanical and construction design. Bolted and welded constructions, axial tension and compression members, shafts, beams, columns, and trusses will be studied. Shear and moment diagrams will be used to analyze beams. Lab testing of the strengths of materials will be utilized.
Prerequisite: MTH 110 or higher.

IND 229 HYDRAULIC & PNEUMATIC POWER ..... 3(2-2)
Normally Offered: F
An introduction to hydraulic and pneumatic principles and components. Covers primary laws and formulas, calculations, schematics, design considerations, and troubleshooting. Consists of lectures, hands-on labs, and projects.
Co-requisite: MTH 110 or higher.

LAW

LAW 125 INTRODUCTION TO LEGAL PRINCIPLES ..... 3(3-0)
Normally Offered: F, SP
This course provides a broad introduction to the U.S. legal system, including the philosophy of law and the principles on which legal rules and the legal process are based. It introduces the origin and development of law, court structures, types of law and how they are made, enforced, interpreted, and applied in society. The course examines lawmaking institutions and their evolution in the U.S with focus on Michigan courts. It covers the different kinds of substantive law and how one goes about using the law relative to a variety of legal topics and issues facing society. Emphasis is placed on recognition of legal issues and applications to students' personal and professional pursuits.

MANUFACTURING TECHNOLOGY

MFG 101 MACHINING PROCESSES I..... 4(2-4)
Normally Offered: F
Students will receive instructions on shop safety, measuring instruments, layout, and bench work. They will also receive instructions on lathes, milling machines, drill presses, pedestal grinders, saws, and basic CNC operations.

MFG 102 MACHINING PROCESSES II ..... 4(2-4)
Normally Offered: SP
Continuation of Machining Processes I with more specialization in machine setups. Topics include: precision grinding, lathe inside thread cutting, mill boring, broaching, the use of indexable cutting tools, CNC machining operations, lean manufacturing, and advanced methods of inspection.
Prerequisite: MFG 101.

MFG 120 PRINT INTERPRETATION & PROCESSES..... 3(2-2)
Normally Offered: F
Introduces blueprint symbols and their meanings as used in a manufacturing operation. Provides instruction and practice to develop skill in spatial visualization, sketching, including auxiliary and sectional views, design standards, detail and assembly drawings, geometric dimensioning rules and tolerances, thread callouts, title blocks, material lists, and notes for use by various manufacturing personnel. Including machining and welding processes also covers examination and testing of welds.

MFG 122 INTRODUCTION TO MANUFACTURING..... 3(2-2)
Normally Offered: F, SP
This course is an introduction to manufacturing and covers the following main topics: history, types, business, and modern challenges. Technical drawings, materials, manufacturing processes, quality assurance, and career opportunities will also be examined.

MFG 150 INTRODUCTION TO INDUSTRIAL ROBOTICS ..... 3(2-2)
Normally Offered: F
This course will cover basic operations of industrial robots focusing on FANUC robots using teach pendants as well as integrated system interfaces. The primary focus of this course is to give students a basic working knowledge of programming and operations of handling tool-type robots. Additionally, this course will discuss other robot systems such as programming using computer based and mobile applications, spray and applicator systems, and welding applications.

MFG 201 CNC I ..... 4(2-4)
Normally Offered: SP
This is an introductory course for CNC machinery. Students will develop safe working habits and calculate machine speeds and feeds of milling machines and lathes. They will study the Cartesian coordinate system, absolute and incremental positioning, and datum and delta dimensioning for CNC machines. Math for CNC programming and calculation of linear and circular interpolation will be covered.
Prerequisite: MFG 101, or instructor permission.

MFG 202 CNC II ..... 4(2-4)
Normally Offered: SP
This is a follow-up course for MFG 201 Introduction to CNC and MFG 204 Computer Aided Manufacturing courses. Students will learn how to set up and run various types of computer numerical control machines and associated tooling, as well as CMM inspection of the finished parts. The student will also use machine conversational controls and CAD/CAM to create CNC programs, master records and inspection sheets.
Prerequisite: MFG 201, and MFG 220, or permission of instructor.

MANUFACTURING TECHNOLOGY

MFG 204 COMPUTER-AIDED MANUFACTURING..... 3(2-2)
Normally Offered: F
Provides the student with the basic knowledge of Computer Aided Manufacturing (CAM) systems and how to manipulate various types of Computer Aided Drafting (CAD) data in the creation of Computer Numerical Control part programs. The student will create CNC programs, tooling set-up sheets, process sheets, and fixture sheets to create a CNC master record. Calculations for proper Speeds and Feeds will also be required. The programs created in this course will run on machines in MFG 202 CNC II.
Prerequisite: MFG 101, basic computer skills, or permission of instructor.

MFG 205 CNC III..... 4(2-4)
Normally Offered: SP
This is a follow-up course for MFG 201 CNC I, MFG 202 CNC II, MFG 204 Computer-Aided Manufacturing, and MFG 220 Jigs and Fixture design Fundamentals. This is a lab only course designed to give the student an experience similar to working in a job or production shop. The student will apply all previous classes by being required to design parts in CAM, apply fixturing using multiple set-ups, inspect the parts using CMM and optical comparators, apply change orders to parts, and produce a master record.
Prerequisite: MFG 202, MFG 204, and MFG 220, or permission of instructor.

MFG 206 ADVANCED CAD / CAM INTEGRATION..... 3(2-2)
Normally Offered: F
This course is a continuation of MFG 204 Computer-Aided Manufacturing and will examine Computer-Aided Manufacturing (CAM) and Computer-Aided Drafting (CAD) with a specific emphasis on the interaction between the two systems. The student will create CNC programs using both CAD and CAM systems and manipulate both programs to make a completed CNC program. The completed CNC program will be run in MFG 205 CNC III. The class will also prepare students for industry standard third-party credentialing tests.
Prerequisite: MFG 101, MFG 201, MFG 204, or instructor's permission.

MFG 210 GREEN MANUFACTURING AND SUSTAINABILITY..... 3(3-0)
Normally Offered:
This course covers how environmentally conscious decisions can impact the processes involved in manufacturing and organizational management. Green Revolution, green standards and certifications for manufacturing and business, including global guidelines are core concepts. Students will work through a road map to a green organization and understand ISO programs for sustainability.

MFG 220 JIGS AND FIXTURE DESIGN FUNDAMENTALS ..... 4(2-4)
Normally Offered: F
This is a tool design course using Autodesk® (Fusion 360) software. It covers types and functions of jigs, CNC fixtures, and check gauges. Included in the design process are part nesting, locating, clamping, work holding, and application of commercially available tool components. The complete design includes economic tool budgets, proper application of tolerances and datums, selection of materials, and generation of complete working drawings. Fixture designs in this course will be used in MFG 202, CNC II, and MFG 205, CNC III.
Prerequisite: MFG 201 or instructor's permission.

MFG 230 MANUFACTURING CAPSTONE PROJECT ..... 3(2-2)
Normally Offered: SP
This course will be a semester-long project-based course that will employ the students' skills in CAD, CAM, CNC, Machining, and Jigs and Fixturing. The course will be run as a job shop and involve multiple projects to allow the students experience in customer interaction, group work, project time management, and project deadlines. This course will provide students additional lab time to build skills in manufacturing and completing third-party credentialing exams.
Prerequisite: MFG 202, MFG 204, MFG 220, or instructor's permission.

MARINE TECHNOLOGY

MRT 101 INTRO TO SUBMERSIBLE ROBOTICS WITH BUILD ..... 3(2-2)
Normally Offered: F
An introductory hands-on course for anyone with an interest in submersible technology and/or working with underwater robotics. This course follows International Marine Contractors Association's (IMCA) Guidance for the Safe and Efficient Operations of Remotely Operated Vehicles (ROV) with a heavy emphasis on hands-on operations and working in the field.

MRT 110 INTRODUCTION TO CAREERS ON THE WATER ..... 2(1-2)
Normally Offered: SU
This course is a hands-on introduction to marine technology related careers that perform work on, under, and near the water. Through a partnership with the Thunder Bay National Marine Sanctuary, students will have the opportunity to experience working on the water through the lens of maritime archaeological research. This includes exposure to technology, methodologies, and research vessel operations that apply to a wide range of on-the-water career paths. Topics include: careers on the water, maritime archaeology, remote sensing theory and practice, Great Lakes maritime heritage and culture, ocean and Great Lakes conservation issues, and safety on the water.

MRT 210 ROV PILOTING ..... 2(1-2)
Normally Offered: SU
This course is a hands-on introduction course in piloting underwater Remotely Operated Vehicles (ROV). Students will have the opportunity to launch, pilot, navigate, and recover an actual ROV. They will be trained on the basic operations of small observation class ROVs to the large work class ROVs used in deep ocean work.

MATHEMATICS

To enter a new mathematics course or continue a sequence, a grade of 2.0 or higher in any prerequisite course is recommended. SAT or ACCUPLACER scores will also be used as guides in placing new students in mathematics courses.

MTH 103ALP INTERMEDIATE ALGEBRA SUPPORT ..... 2(2-0)
Normally Offered: F, SP
This course is designed to help students review and develop the skills necessary to succeed in the co-requisite course, MTH113ALP. This course will integrate arithmetic, algebraic reasoning, equations, graphing, along with college success content. This is a support course for MTH113 ALP designed for those students who have a deficiency in algebra.

MTH 110 TECHNICAL MATH I ..... 3(2-2)
Normally Offered: F, SP
This course is designed for those who will apply mathematics to various technical fields. Topics covered include a review of basic arithmetic, units of measure, algebra fundamentals, simple equations and formulas, geometric principles, and calculator usage will be introduced. In all areas there is strong emphasis placed on solving industrial applications.

MTH 111 MATHEMATICS FOR ELEMENTARY TEACHERS I ..... 3(3-0)
Normally Offered: F
Includes historical and present numeration systems, real number systems for concept of set through systems of natural numbers, whole numbers, integers and rational numbers, geometric concepts from set viewpoint, irrational numbers, operations and properties applied to mathematical sentences, square root, cube root, and metric system. A required course for elementary teachers.

MATHEMATICS

MTH 112 TECHNICAL MATH II ..... 3(2-2)
Normally Offered: SP
This course is a continuation of MTH 110 Technical Math I, which places emphasis on applying mathematics to various technical industrial fields. Topics covered include advanced algebra, trigonometry, geometry, quadratics, statistical process control, and calculator usage. In all areas there will be a strong emphasis placed on solving practical industrial applications.
Prerequisite: MTH 110 or permission of instructor.

MTH 113 INTERMEDIATE ALGEBRA..... 4(4-0)
Normally Offered: F, SP, SUM
Reviews the important topics covered in the first year of high school algebra. Further work on factoring, fractions, equations, functions and graphs, exponents and radicals, quadratics and logarithms. Does not count toward a major or minor in mathematics.

MTH 113ALP INTERMEDIATE ALGEBRA..... 4(4-0)
Normally Offered: F, SP
Reviews the important topics covered in the first year of high school algebra. Further work on factoring, fractions, equations, functions and graphs, exponents and radicals, quadratics and logarithms. Does not count toward a major or minor in mathematics.

MTH 114 ACCELERATED ALGEBRA ..... 6(6-0)
Normally Offered: F
Reviews the important topics considered in the first year of high school algebra. Further work on factoring, fractions, equations, functions and graphs, exponents and radicals, quadratics and logarithms. Does not count toward major of minor in mathematics. This is an accelerated course, as such the work load is significant.

MTH 115 APPLIED ALGEBRA & TRIGONOMETRY I..... 5(4-2)
Normally Offered: F
Presents the mathematical topics most frequently encountered in technical work. Application of various functions of algebra, plane geometry and trigonometry are used. Emphasis is on the numerical approach rather than the analytical.

MTH 116 APPLIED ALGEBRA & TRIGONOMETRY II..... 5(4-2)
Normally Offered: SP
Covers advanced algebra, geometry and trigonometry. Applications of the various topics are made to different technical areas.
Prerequisite: MTH 115.

MTH 117 MATHEMATICS FOR ELEMENTARY TEACHERS II ..... 3(3-0)
Normally Offered: SP
Covers algebra, coordinate geometry, functions, geometric construction, rotation and symmetry, mapping, statistics and experimentation. This course is designed for elementary education majors and use of computers in the elementary classroom will be emphasized.
Prerequisite: MTH 111 with a grade of 2.0 or higher.

MTH 118 MATHEMATICS FOR LIBERAL ARTS / QUANTITATIVE REASONING ..... 4(4-0)
Normally Offered: F, SP
This course is for students pursuing a liberal arts curriculum or a program without a specified mathematics requirement. Upon successful completion of this course students will be able to use mathematics in a variety of practical applications including statistics, financial math, geometry, symbolic logic, probability and counting principles, graph theory, and voting schemes. Emphasis will be placed on problem solving, communication with mathematics, and the usefulness of math in the everyday world.

MATHEMATICS

MTH 119 INTRODUCTION TO COMPUTERS AND PROGRAMMING..... 3(3-0)
Normally Offered: F, SP
This course introduces the student to a collection of contemporary computer applications, including operating system concepts, word processing, spreadsheets, and programming concepts. Computer terminology is introduced; however, the major emphasis is placed upon computer usage and applications. Students should have some keyboarding skills.

MTH 121 COLLEGE ALGEBRA ..... 4(4-0)
Normally Offered: F, SP
Reviews previous mathematics, stressing modern approaches. Including topics related to business such as compound interest installment buying and annuities, matrices, linear algebra, linear programming, and logarithms. May require some written interpretations of mathematical applications. For non-science majors.
Prerequisite: MTH 113 or equivalent with a grade of 2.0 or higher.

MTH 122 PLANE TRIGONOMETRY ..... 3(3-0)
Normally Offered: F, SP
Includes the study of trigonometric functions, identities, graphing, inverse trigonometric functions and sinusoidal functions. Exponential and trigonometric equations are solved. Oblique and right triangles are studied, as well as radian measure and complex numbers. This is a required course for students who plan to take advanced mathematics and lack a high school background in this subject.
Prerequisite: A grade of 2.0 or higher in MTH 113 or one-and-one-half years of high school algebra with a grade of 2.0 or higher.

MTH 123 COLLEGE ALGEBRA AND ANALYTIC TRIGONOMETRY ..... 4(4-0)
Normally Offered: F, SP
Covers sets, inequalities, functions, and inverse functions, real and complex number systems, introduction to coordinate geometry, trigonometric identities and functions, trigonometric equations, elementary theory of equations, progressions, mathematical induction, determinants, matrices, permutations, combinations and the binomial theorem. Offered for students who intend to enter the analytic geometry and calculus sequence, but who do not meet the necessary prerequisites.
Prerequisite: A grade of 2.0 or higher in MTH 113 and MTH 122, or one-and-one-half years of high school algebra and one semester of high school trigonometry with a grade of 2.0 or higher.

MTH 130 CALCULUS FOR BUSINESS/SOCIAL SCIENCES ..... 4(4-0)
Normally Offered: On Demand
This course continues the study of mathematical applications in Business and social sciences beyond the finite linear forms of MTH 121 College Algebra into a variety of non-linear forms. Functional analysis, differentiation, applications of derivatives, anti-differentiation, applications in integration, and functions of two variables are studied.
Prerequisite: MTH 121 or MTH 123 or instructor permission.

MTH 131 ANALYTIC GEOMETRY AND CALCULUS I ..... 5(5-0)
Normally Offered: F, SP
Covers rate of change of functions, limits, differentiation, and integration of algebraic and trigonometric functions and applications.
Prerequisite: MTH 123 or equivalent with a grade of 2.0 or higher.

MTH 132 ANALYTIC GEOMETRY AND CALCULUS II ..... 5(5-0)
Normally Offered: SP
Includes transcendental functions, techniques of integration, analytic geometry, polar coordinates, parametric equations and infinite series.
Prerequisite: MTH 131 with a grade of 2.0 or higher.

MATHEMATICS

MTH 221 C++ PROGRAMMING..... 4(3-2)
Normally Offered: SP
This course is intended to satisfy the programming requirements for engineering and science students and is designed to teach the traditional concepts of programming such as integer, floating-point, and character data types, I/O, control structures, loops, functions, and arrays using the C++ programming language. It also teaches modern, object-oriented programming techniques using classes and data abstraction. Additional topics include dynamic array allocation, pointers, file manipulation, and inheritance. A brief introduction to MATLAB® software is included
Prerequisite: MTH 123 or above.

MTH 223 STATISTICAL METHODS..... 4(4-0)
Normally Offered: F, SP
This course covers elementary statistics. Topics are: the nature of statistical methods, frequency distributions and graphs, measure of central tendency, dispersion, probability including conditional probability, the binomial, normal, T-, chi-square, and F-distributions, confidence intervals, hypothesis testing, linear regression modeling, and analysis of variance (ANOVA). Computer software will be used to reinforce student mathematical skills.
Prerequisite: MTH 113 or equivalent with a grade of 2.0 or higher.

MTH 231 ANALYTIC GEOMETRY AND CALCULUS III ..... 5(5-0)
Normally Offered: F
This course covers vectors, vector-valued functions and motion in space, linear algebra, partial differentiation, multiple integrals, and vector analysis.
Prerequisite: MTH 132 with a grade of 2.0 or higher.

MTH 232 DIFFERENTIAL EQUATIONS ..... 4(4-0)
Normally Offered: SP
This course includes differential equations of order one with applications, linear equations with constant coefficients (homogeneous and nonhomogeneous), variation of parameters, inverse differential operations, systems of linear equations, Laplace transforms with applications, nonlinear systems of differential equations, and an introduction to power series solutions. This is a required course for students majoring in engineering, mathematics, and physics.
Prerequisite: MTH 231 with a grade of 2.0 or higher.

METALLURGY

MET 200 MATERIAL SCIENCE..... 3(2-2)
Normally Offered: F
Introduction to the study of the science of engineering metals. Included in topics of study are atomic structure and bonding, properties and testing of materials. Methods of production and fabrication, methods of changing properties including heat treatment of metals, alloying and surface treatments. Introduces mechanical properties, phase diagrams, thermal processing, alloying, and corrosion. The common classification systems used to identify the various engineering materials are also covered. Laboratory exercises include heat treatment and destructive and non-destructive materials testing.

MUSIC

MUS 110 MUSIC APPRECIATION ..... 3(3-0)
Normally Offered: F
Students will be exposed to many forms and periods of Western music, with emphasis on listening in order to follow the composer's musical ideas.

MUS 120 FUNDAMENTALS OF MUSIC ..... 3(3-0)
Normally Offered: F, SP
Acquaints the student (both with and without a musical background) with the fundamental elements of music. Including, but not limited to: pitch, meter and rhythm, chords/harmony, notation, and ear training.

MUSIC

MUS 121 PIANO..... 2(0-2)
Normally Offered: F, SP
Gives individual instruction in the fundamentals of keyboard technique. Graded pieces comprise the repertoire that is chosen according to the student's proficiency. One-half hour lessons each week, by prior arrangement with instructor.

MUS 122 PIANO..... 2(0-2)
Normally Offered: F, SP
Continues instruction in the fundamentals of keyboard technique. Graded pieces comprise the repertoire that is chosen according to the student's proficiency. It is a continuation of MUS 121 and is comprised of a one-half hour lesson each week by prior arrangement with instructor.
Prerequisite: MUS 121.

MUS 123 VOICE I..... 2(0-2)
Normally Offered: F, SP
Student begins his/her study of voice with simple folk songs and easily-learned art songs. Subject matter includes: an attitude of enthusiasm, pleasure and confidence in singing, proper posture and diaphragmatic breathing, clear enunciation of pure vowel sounds and precise articulation of consonant sounds. A variety of styles are studied including: art songs and arias, texts in foreign languages and proper pronunciation of these texts.

MUS 124 VOICE II..... 2(0-2)
Normally Offered: F, SP
This course continues one-on-one instruction and builds upon concepts learned in MUS 123 Voice I. Students will add some foreign language songs in this course.
Prerequisite: MUS 123 Voice I for instructor permission.

MUS 125 MUSIC THEORY..... 4(4-0)
Normally Offered: F
Analytical study of musical structure. Including, but not limited to the following: chord analysis and progression, voice leading, figured bass, phrase structure and cadences, harmonization, ear training, dictation, and part writing. The foundation course for all music degree programs.
Prerequisite: MUS 120 or ability to read sheet music.

MUS 126 MUSIC THEORY..... 4(4-0)
Normally Offered: F, SP
Further studies the elements of musical notation, ear training and part-writing techniques. This is a continuation of MUS 125. Both semesters of Music Theory are recommended for all students who expect to continue in music after leaving Alpena Community College, whether majoring or minoring in music.
Prerequisite: MUS 125.

MUS 130 COMMUNITY CHORUS WITH THUNDER BAY ARTS COUNCIL..... 1(2-0)
Normally Offered: F
Partnership with Thunder Bay Arts Council community chorus will allow students to learn, prepare, and perform approximately fifteen choral arrangements. Chorus, study, and rehearsals include the basics of informed singing in a group setting such as proper breathing, pronunciation, maintenance of relative pitch, counting, blend, dynamics, and interpretation.

MUS 160 APPLIED FLUTE I..... 2(0-2)
Normally Offered: F, SP
Applied Flute I will provide the student with private instruction in flute pedagogy and flute literature. Student must provide own flute, purchase method book and music.

MUSIC

MUS 161 APPLIED FLUTE II..... 1(0-2)
Normally Offered: F, SP
Applied Flute II will provide students with private instruction in more advanced flute pedagogy and flute literature than provided in Applied Flute I.
Prerequisite: MUS 160.

MUS 221 PIANO..... 2(0-2)
Normally Offered: F, SP
Gives individual instruction in the fundamentals of keyboard technique. Graded pieces comprise the repertoire which is chosen according to the student's proficiency. It is a continuation of MUS 122. It is comprised of a one-half hour lesson each week, by prior arrangement with instructor.
Prerequisite: MUS 121 and MUS 122.

MUS 222 PIANO..... 2(0-2)
Normally Offered: F, SP
Gives individual instruction in the art of piano mastery. Graded pieces comprise the repertoire that is chosen according to the student's proficiency. It is a continuation of MUS 221. It is comprised of a one-half hour lesson each week by prior arrangement with instructor.
Prerequisite: MUS 221.

MUS 228 MUSIC IN THE ELEMENTARY CLASSROOM ..... 3(3-0)
Normally Offered: SP
Acquaints the prospective elementary school teacher with music fundamentals and musical activities used in the classroom. Students receive practical experience in teaching elementary songs and using various teaching aids such as piano, rhythm instruments, and autoharp.

MUS 229 MUSIC COMPOSITION ..... 2(2-0)
Normally Offered: On Demand
Studies the works of a variety of composers to understand how melodies are written and musical material is organized to form a unified piece. Students will complete their own composition using the Finale 2004 program.
Prerequisite: MUS 125.

NURSING

NUR 128 PHARMACOLOGY I..... 1.5(1.5-0)
Normally Offered: F, SP
This course provides drug therapy foundations for the delivery of safe patient care. Emphasis is placed on the basics of core drug knowledge and patient related variables in drug administration.
Prerequisite: BIO 110, HEA 133, ENG 111, SPE 121.

NUR 135 PN TRANSITION TO PRACTICE..... 1(1-0)
Normally Offered: F, SP
This course focuses on the knowledge and skills necessary to transition from the role of student to the role of entry level practicing nurse. Content includes a discussion of current issues in health care, leadership and management, professional practice issues, and transition into the workplace. Emphasis is placed on NCLEX-PN test-taking skills, computer-assisted practice tests, development of a plan for remediation, and review of selective content specific to the practice of entry level practical nursing.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143.

NURSING

NUR 140 FOUNDATIONS OF NURSING ..... 3(3-0)
Normally Offered: F, SP
This course focuses on the foundational concepts of nursing care. Reinforcement of nursing theory is included with the expanded concepts of the role of the practical nurse providing holistic and culturally competent care. This course includes the introduction of the standard principles and skills of nursing practice as applied to common physical, psychosocial, and physiological components of health.
Prerequisite: BIO 110, HEA 133, ENG 111, SPE 121.
Co-requisite: NUR 140LC.

NUR 140LC NURSING FOUNDATIONS LAB ..... 1.5(0-4.5)
Normally Offered: F, SP
This course will provide students with basic nursing skills within the laboratory setting. Skills taught will enable students to function in a safe and professional manner in the role of the general practical nurse.
Prerequisite: BIO 110, HEA 133, ENG 111, SPE 121.
Co-requisite: NUR 140.

NUR 142 MEDICAL SURGICAL NURSING I ..... 2.5(2.5-0)
Normally Offered: F, SP
This course introduces the practical nursing role in disease management and the continuum of care for the individual from early through late adulthood in various settings. The student identifies and describes nursing concepts that assist the patient in achieving optimal functioning for patients with medical/surgical problems.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121.

NUR 143 MEDICAL SURGICAL NURSING CLINICAL I ..... 2(0-6)
Normally Offered: F, SP
This course exposes the student to caring for the adult patient in the clinical environment. Strategies which enhance critical thinking, clinical reasoning, and clinical judgement are incorporated into this experience. This clinical experience strengthens the student's understanding of the nursing process, nursing theory, patient care, data collection, interventions, and fundamental skills. Management of disease processes related to various body systems will be emphasized with the expectation of consistent application in patient care.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121.

NUR 150 MEDICAL SURGICAL NURSING II ..... 2.5(2.5-0)
Normally Offered: F, SP
This course focuses on the Practical Nurse role in the area of disease management and the continuum of care for the individual from early through late adulthood in various settings. This includes the pathophysiological components of disease. In this course, students use the nursing process to identify and describe nursing concepts that assist the patient in achieving optimal functioning for patients with medical/surgical problems.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143.
Co-requisite: NUR 151.

NUR 151 MEDICAL SURGICAL NURSING II CLINICAL ..... 2(0-6)
Normally Offered: F, SP
Students are introduced to the clinical environment providing direct patient care to the adult population in a health care environment. The student will be expected to function in the practical nurse role providing total patient care to a minimum of 3-4 patients. The student is expected to function at the level of a basic team member.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143.
Co-requisite: NUR 150.

NURSING

NUR 152 OB/REPRODUCTIVE HEALTH/PEDS/PSYCH THEORY ..... 2(2-0)
Normally Offered: F, SP
This course provides the theoretical background to prepare the Licensed Practical Nurse student to care for women in all phases of the reproductive cycle and all aspects of newborn care. This course covers the ethical aspects of Pediatric and Women's Health including Human Trafficking and safety of women and children. This course will also cover the introductory concepts of psychiatric nursing, mental health diseases, and nursing care of patients with mental health conditions in both the acute care setting and withing the community.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143

NUR 153 OB/REPRODUCTIVE HEALTH/PEDS/PSYCH CLINICAL..... 1.5(0-4.5)
Normally Offered: F, SP
This course focuses on concepts pertaining to the health needs of women, children, and childbearing families in multiple health care settings. Health promotion, maintenance of health for individuals of childbearing and childrearing families is included. Principles of mental health, growth, and development allow for understanding of the individual and family unit. Nursing care of at-risk families and children with special needs is included. Mental health and psychiatric concepts are included in this clinical course. High-fidelity simulation will be included as a part of this clinical course.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143.

NUR 156 PHARMACOLOGY II..... 2.0(2-0)
Normally Offered: F, SP
This course continues the study of the effect of specific medications on the body systems and ways to promote therapeutic effect and recognize and treat side effects or toxic effects.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143.

NUR 157 PN NURSING SIMULATION LAB..... 2.0(0-6.0)
Normally Offered: F, SP
This simulation course focuses on the integration of simulation technology into clinical education. It continues the development of critical thinking and clinical decision-making skills application to the Licensed Practical Nurse role in simulated learning experiences. Students will apply the nursing process to various patient care scenarios, expanding their knowledge and skills in the area of quality and safe patient care, teamwork and communication, evidence-based practice, and clinical reasoning using high-fidelity patient simulators.
Prerequisite: NUR 128, NUR 140, NUR 140LC, NUR 142, NUR 143.

NUR 228 RN PHARMACOLOGY I ..... 2.5(2.5-0)
Normally Offered: F, SP
This course provides drug therapy foundations for the delivery of safe patient care. Emphasis will be placed on the Registered Nurse's management of drug therapy, the basics of core drug knowledge, and patient related variables in drug administration. The RN's management of drugs affecting various body systems, disease states, and other health conditions will be considered.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121.
Co-requisite: BIO 140, ENG 112, NUR 238, NUR 239LC, NUR 245, NUR245LC.

NUR 229 RN PHARMACOLOGY II ..... 2.5(2.5-0)
Normally Offered: F, SP
This course provides additional drug therapy foundations for the delivery of safe patient care. Emphasis will be placed on the Registered Nurse management of drug therapy, the basics of core drug knowledge, and patient related variables in drug administration. Additionally, the nursing management of drugs affecting various body systems, disease states, and other health conditions will be offered.
Prerequisite: NUR 228, NUR 238, NUR 239LC, NUR 245, NUR 245LC.
Co-requisite: NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.

NURSING

NUR 234 HEALTH CARE THERAPIES I ..... 2(2-0)
Normally Offered: SP
Students will receive an education in a variety of complimentary care modalities for self and clients through creative movement, engaging activities, and purposeful discussion. This course focuses on exploration of self, progress toward self-realization, and self-enhancement to encourage the building of skills and awareness for holistic individual and client care.

NUR 235 HEALTH CARE THERAPIES II ..... 2.5(2.5-0)
Normally Offered: F
Students will acquire an education on an array of complimentary care modalities for self and clients through creative movement, engaging activities, and purposeful discussion. This course spotlights the exploration of self, progress toward self-realization and self enhancement to inspire the building of skills and awareness of holistic individual and client care. Specific topics covered in this course include breath work, yoga, self-exploration, color therapy, massage, acupressure (Tapping), hypnosis, doshas, muscle memory, anxiety management, heart mapping, vibrations/frequencies, growth boards, mindfulness/sleep, and advancing knowledge of chakras.

NUR 236 HEALTH CARE THERAPIES III ..... 2.5(2.5-0)
Normally Offered: SP
Students will gain an education on a range of complimentary care modalities for self and clients through creative movement, engaging activities, and purposeful discussion. This course targets the exploration of self, progress toward self-realization and self enhancement to support the building of skills and awareness of holistic individual and client care. Specific topics covered in this course include green living, astrology/natal chart, numerology, grounding, Tai Chi/Pilates, art therapy, geology/gemology, pranic healing, dance therapy, improving self-esteem, Feng Shui, and kinetics.

NUR 237 HEALTH CARE THERAPIES IV ..... 2.5(2.5-0)
Normally Offered: F
Students will gain an education on a cross section of complimentary care modalities for self and clients through creative movement, engaging activities, and purposeful discussion. This course centers on the exploration of self, progress toward self-realization and self enhancement to strengthen the building of skills and awareness for holistic individual and client care. Specific topics covered in this course include acupuncture, archetypes, Bach flower remedies, past life regressions, shamanic journey, drum therapy, dream interpretation, angel cards/readings, auras, Zuni fetishes, persuasion, and religions of the world.

NUR 238 RN FOUNDATIONS ..... 3(3-0)
Normally Offered: F, SP
This course focuses on the foundational concepts of Registered Nurse care. Reinforcement of nursing theory is included with the expanded concepts of the RN's role providing holistic, safe, and culturally competent care. This course includes the introduction of the standard principles of skills of nursing practice as applied to common physical, psychosocial, and physiological components of health.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121.
Co-requisite: BIO 140, ENG 112, NUR 228, NUR 239LC, NUR 245, NUR245LC.

NUR 239LC RN FOUNDATIONS LAB ..... 2(0-6)
Normally Offered: F, SP
This course will provide Registered Nurse students with the opportunity to learn basic nursing skills within the laboratory setting. Skills taught will enable the RN to function in a safe and professional manner.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121.
Co-requisite: BIO 140, ENG 112, NUR 228, NUR 238, NUR 245, NUR245LC.

NURSING

NUR 242 RN PARENT/CHILD NURSING THEORY ..... 2.5(2.5-0)
Normally Offered: F, SP
This course will provide the theoretical background to prepare the student to care for women in all phases of the reproductive cycle as well as children with health problems. The focus will be on health promotion, patient education, and understanding the physiological adaptations of these populations. The concepts of growth and development will be discussed as they relate anticipatory guidance specific to age groups from infancy through adolescents.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 243.

NUR 243 ADVANCED PARENT/CHILD NURSING CLINICAL ..... 1.5(0-4.5)
Normally Offered: F, SP
This clinical course focuses on the concepts of caring for women during the antenatal, intrapartum, and postpartum periods. Exploration of nursing care of newborns in the acute care setting are included. Students will care for women admitted for conditions related to reproductive health, gynecological issues, and at-risk health situations. Supplemental learning experiences will be completed with area agencies surrounding women's health and pediatric populations.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 242.

NUR 245 PHYSICAL ASSESSMENT ..... 2.0(2.0-0)
Normally Offered: F, SP
This course is designed to teach the student a health orientated approach to nursing assessment of clients across the life span in a variety of settings. The primary focus of the course is on health assessment findings of every major body system, with recognition of abnormal findings. The course emphasizes development of the skills needed to perform a comprehensive health assessment. Data collection through comprehensive history taking and physical assessment is emphasized. Utilization of assessment findings in clinical decision making and application of the nursing process is focused on health promotion and disease prevention strategies.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121
Co-requisite:

NUR 245LC PHYSICAL ASSESSMENT LAB ..... 1.0(0-3.0)
Normally Offered: F, SP
This course is designed to provide students the opportunity to learn and practice history taking and physical examination skills. The focus is on physical assessment findings of every major body system. Students will utilize critical thinking skills in identifying health alterations, interpreting abnormalities, formulating nursing diagnoses, and documenting findings appropriate to nursing. This lab will include various learning environments including the skills lab, simulation lab, and a community setting.
Prerequisite: BIO 110, ENG 111, HEA 133, SPE 121
Co-requisite: NUR 245

NUR 247 RN SIMULATION LAB I 2 (0-6.0)
Normally Offered: F, SP
This nursing simulation course focuses on the integration of simulation technology into clinical education. This course continues the development of critical thinking and clinical decision-making skills applicable to the nursing role in simulated learning experiences. Students will apply the nursing process to various patient care scenarios, expanding their knowledge and skills in the area of quality and safe patient care, teamwork and communication, evidence-based practice, and clinical reasoning using high fidelity patient simulators.
Prerequisite: NUR 228, NUR 238, NUR 239LC, NUR 245, NUE 245LC.
Co-requisite: NUR 229, NUR 252, NUR 253, NUR 258, NUR 259.

NUR 248 RN SIMULATION LAB II 2 (0-6.0)
Normally Offered: F, SP
This course focuses on the integration of simulation technology into clinical education, continuing the development of critical thinking and clinical decision-making skills applicable to the nursing role in simulated learning experiences. Students will apply the nursing process to various patient care scenarios, expanding their knowledge and skills in the areas of quality and safe patient care, teamwork and communication, evidence-based practice, and clinical reasoning using high fidelity patient simulators.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 242, NUR 243, NUR 255, NUR 260, NUR 261, NUR 262.

NUR 252 PSYCHIATRIC NURSING THEORY ..... 2(2-0)
Normally Offered: F, SP
This course provides the theoretical background to prepare the Registered Nurse student to provide care for clients with acute and chronic psychiatric disorders and chemical dependency problems.
Prerequisite: NUR 228, NUR 238, NUR 239LC, NUR 245, NUR 245LC.
Co-requisite: NUR 229, NUR 247, NUR 253, NUR 258, NUR 259.

NUR 253 PSYCHIATRIC NURSING CLINICAL 1.5 (0-4.5)
Normally Offered: F, SP
This is a clinical course with experience on an acute in-patient behavioral health unit, a residential drug and alcohol treatment program, and a community setting for the chronically mentally ill. Level II nursing students assume aspects of the scope of practice of the Registered Nurse in Michigan by providing care to clients with acute and chronic behavioral health problems.
Prerequisite: NUR 228, NUR 238, NUR 239LC, NUR 245, NUR 245LC.
Co-requisite: NUR 229, NUR 247, NUR 252, NUR 258, NUR 259.

NUR 255 NURSING LEADERSHIP ..... 1(1-0)
Normally Offered: F, SP
This hybrid course provides the basics of leadership and management techniques to enable students to provide care to groups of patients. Legal and ethical problems in nursing will be identified and investigated. It will also include the concepts of role transition from student to graduate nurse as well as job-seeking strategies for an entry level Registered Nurse position. Developing strategies for first-time success on the NCLEX-RN exam will be discussed /explored.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 242, NUR 243, NURE 248, NUR 260, NUR 261, NUR 262.

NUR 258 RN MEDICAL/SURGICAL I ..... 2.0(2.0-0)
Normally Offered: F, SP
This course introduces the student to the Registered Nurse role in disease management and the continuum of care for the medical surgical individual across the lifespan in various settings. The students focus on nursing concepts that assist patients to achieve optimal functioning.
Prerequisite: NUR 228, NUR 238, NUR 239LC, NUR 245, NUR 245LC.
Co-requisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 259.

NUR 259 RN MEDICAL/SURGICAL I CLINICAL ..... 3.0(0-9.0)
Normally Offered: F, SP
This course exposes the Registered Nurse student to caring for the adult patient in the clinical environment. Strategies which enhance critical thinking, clinical reasoning, and clinical judgement are incorporated into this experience. This clinical experience strengthens the RN student's understanding of the nursing process, nursing theory, patient assessment, interventions, and fundamental nursing skills. Management of disease processes related to various body systems will be emphasized with the expected application of consistent patient care. High fidelity simulation may also be included in this clinical course.
Prerequisite: NUR 228, NUR 238, NUR 239LC, NUR 245, NUR 245LC.
Co-requisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258.

NURSING

NUR 260 RN MEDICAL/SURGICAL II ..... 2.0(2.0-0)
Normally Offered: F, SP
This course is a continuation of NUR 258 which provides the theoretical background, knowledge, and skills to prepare the student to provide holistic care for adult patients with common, acute, and chronic medical/surgical problems.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 242, NUR 243, NUR 248, NUR 255, NUR 261, NUR 262.

NUR 261 RN MEDICAL/SURGICAL II CLINICAL..... 2.0(0-6.0)
Normally Offered: F, SP
This clinical course focuses on the coordination of care, physical and psychosocial assessment, and care of patients in the health care setting. Students will complete experiential learning opportunities in the areas of the Intensive Care Unit and Emergency Department. By the end of the rotation, the student will be expected to manage a full complement of medical surgical patients in the acute care setting. Additionally, medical/surgical high-fidelity simulations may be used to enhance the students' critical thinking and clinical reasoning skills.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 242, NUR 243, NUR 248, NUR 255, NUR 260, NUR 262.

NUR 262 RN TRANSITION TO PRACTICE..... 2.0(2.0-0)
Normally Offered: F, SP
This course provides learning activities to prepare the Registered Nurse for practice with emphasis on first time NCLEX-RN success and the concepts of role transition from student to graduate nurse. Current issues and trending topics that the nurse will encounter will be explored.
Prerequisite: NUR 229, NUR 247, NUR 252, NUR 253, NUR 258, NUR 259.
Co-requisite: NUR 242, NUR 243, NUR 248, NUR 255, NUR 260, NUR 261.

PHYSICAL EDUCATION & HEALTH FITNESS

PEH 104 OPEN WATER DIVER..... 1(0.5-1)
Normally Offered: SU
The course covers the basic principles and practices of scuba diving skills, including terminology, theory, and safety procedures. Class includes classroom/online materials and confined water activities. Upon satisfactory completion of course, students will have the option to complete their open water dives and obtain PADI certification.
Prerequisite: Successful completion of PADI swim test required for certification.

PEH 105 ADVANCED OPEN WATER DIVER..... 1(0.5-1)
Normally Offered: SU
The Advanced Open Water Diver course provides the fundamentals to increase diving skills and knowledge with a strong focus on enhancing comfort in the water. The course builds on PEH 104 and develops new capabilities by introducing skills such as underwater navigation and deeper water diving (60-100 ft.), including the practical aspects and physiological effects of deeper scuba diving. Class includes classroom/online materials, pool session and open water dives. PADI certification upon satisfactory completion of course.
Prerequisite: PEH 104 or proof of equivalent certification and successful completion of PADI swim test required for certification. Instructor permission required.

PEH 110 PERSONALIZED FITNESS I..... 2(0-3)
Normally Offered: F, SP, SU
Provides development of basic exercise skills to increase and maintain levels of cardiovascular endurance, muscular strength, flexibility and body composition. Students will perform a personalized Tri Fit fitness profile and be responsible for documenting progress toward personal goals.
Prerequisite: Participants with physical restrictions or other medical health problems must have a written permission statement from their physician prior to active participation in this program.

PHYSICAL EDUCATION & HEALTH FITNESS

PEH 112 PERSONALIZED FITNESS II ..... 2(0-3)
Normally Offered: F, SP, SU
Includes advanced development of exercise skills to increase and maintain levels of cardiovascular endurance, muscular strength, flexibility and body composition. Provides a basic overview of nutrition guidelines that will enable students to perform a 3-day personal dieting analysis.
Prerequisite: PEH 110 and participants with physical restrictions or other medical health problems must have a written permission statement from their physician prior to active participation in this program.

PEH 181 YOGA FOR FITNESS I ..... 2(0-4)
Normally Offered: F, SP
This course incorporates powerful poses with relaxation poses. The sequential order allows for flowing movements designed to increase flexibility, strength and balance.

PEH 182 YOGA FOR FITNESS II ..... 2(0-4)
Normally Offered: SP
This course incorporates powerful poses with relaxation poses. The sequential order allows for flowing movements designed to increase flexibility, strength and balance. The poses will build on skills acquired in PEH 181 Yoga for Fitness I and, therefore, will be more advanced.

PEH 247 ADVANCED KARATE TANG SOO DO II ..... 2(0-4)
Normally Offered: F, SP
Continuation of the study and practice of Tang Soo Do Karate. Students may train and test for the next belt level in Tang Soo Do.
Prerequisite: PEH 162 or instructor permission.

PEH 263 WORKPLACE FIRST AID/CPR/AED ..... 1(1-0)
Normally Offered: F, SP
This course seeks to help participants identify and eliminate potentially hazardous conditions in their environment, recognize emergencies and make appropriate decisions for first aid care. It teaches the knowledge and skills that individuals in the workplace need to know to give immediate care to an ill or injured person until more advanced medical care arrives. Students who successfully complete this course according to American Red Cross standards will receive adult, child, and infant First Aid, CPR and AED certification.

PEH 264 COMMUNITY FIRST AID/CPR/AED (BLS) ..... 1(1-0)
Normally Offered: F, SP, SU
This course seeks to help participants identify and eliminate potentially hazardous conditions in their environment, recognize emergencies and make appropriate decisions for first aid care. It teaches the knowledge and skills that individuals in the community need to know to give immediate care to an ill or injured person until more advanced medical care arrives. Students who successfully complete this course according to American Heart Association standards will receive adult, child, and infant First Aid, CPR and AED certification. There is a separate course fee for this course.

PREFORMING ARTS

PFA 101 INTRODUCTION TO DANCE ..... 3(3-0)
Normally Offered: On Demand
This course will introduce the student to the basic components in ballet and jazz techniques.

PFA 102 DANCE II ..... 3(3-0)
Normally Offered: On Demand
Continues the curriculum in dance principles in creative and contemporary movement, ballet basics and jazz techniques from Dance I.
Prerequisite: PFA 101 or instructor permission.

PERFORMING ARTS

PFA 108 ACTING I ..... 3(3-0)
Normally Offered: F, SP
This course provides students with a comprehensive foundation in acting, focusing on developing fundamental skills and techniques. Through a combination of exercises, scene work, and improvisation, students will explore character development, emotional expression, physicality, voice, and body awareness. Emphasis is placed on the process of preparing and performing a role, building confidence on stage, and cultivating a deeper understanding of the actor's craft. No prior acting experience is required.

PFA 110 ACTING II ..... 3(3-0)
Normally Offered: F, SP
Acting II continues to develop improvisational and creative dramatic skills for more complex performance situations. In addition, Acting II will introduce students to scene study utilizing Stanislavski techniques for performance of scripted material.
Prerequisite: PFA 108.

PFA 203 DANCE III ..... 3(3-0)
Normally Offered: On Demand
This course is geared for the student of dance who has a background in dance and would like to continue their education in ballet and jazz techniques. An introduction to choreography will also be covered.
Prerequisite: PFA 102 or instructor permission.

PFA 204 DANCE IV ..... 3(3-0)
Normally Offered: On Demand
This course is designed for the student of dance who has had extensive experience in the field before attending college. Jazz, ballet and modern technique will be covered along with an introduction to the art of choreography. This is meant to be a continuation of Dance III.
Prerequisite: PFA 203 or instructor permission.

PFA 211 ACTING III ..... 3(3-0)
Normally Offered: F, SP
Acting III will focus on developing audition techniques, script analysis and advanced character analysis utilizing the Stanislavski technique.
Prerequisite: PFA 110.

PFA 212 ACTING IV ..... 3(3-0)
Normally Offered: F, SP
Acting IV will focus on advanced performance activity and character analysis and development utilizing the Stanislavski point of view. Acting IV will concentrate on preparing students for continued studies in theatre at the university level.
Prerequisite: PFA 211.

PHILOSOPHY

PHL 125 LANGUAGE AND REASON ..... 3(3-0)
Normally Offered: F, SP
Develops the student's problem solving and critical thinking skills and enhances the student's understanding of the relationship between language and thinking. Topics covered include, but are not limited to, critical thinking, verbal reasoning, analogical thinking, pattern recognition, mathematical thinking, and more. Emphasis is on the development of specific skills that are necessary for the student to effectively read and process information in a critical way.

PHL 225 PHILOSOPHY ..... 3(3-0)
Normally Offered: F, SP, SU
Surveys some of the main problems of philosophy and the ideas of great thinkers from ancient times to the present.
Prerequisite: Sophomore standing or consent of instructor.

PHILOSOPHY

PHL 228 INTRODUCTION TO ETHICS..... 3(3-0)
Normally Offered: F, SP, SU
Introduces the student to both a variety of classical ethical theories as well as to the application of these theories to a number of contemporary moral issues. Areas of focus include bio- and business ethics, environmental ethics, crime and punishment issues, and political and economic ethical issues, etc. The principal aim of the course is to help students become more knowledgeable about ethical theories and issues as well as to help them develop practical methods for reaching critically defendable positions on the moral questions that affect their lives.
Prerequisite: ENG 111 or ENG 121 with a grade of 2.0 or higher, or permission of instructor.

PHYSICAL SCIENCE

PHS 113 INTRODUCTION TO PHYSICAL SCIENCE ..... 4(3-2)
Normally Offered: F, SP
Develops fundamental concepts in mass, energy, space and time through use of selected material from the areas of physics, chemistry, astronomy and earth science. Attention is given to methods and the process of scientific investigation. May be elected by those not majoring in science to meet science requirements.

PHYSICS

PHY 111 APPLIED PHYSICS ..... 3(2-2)
Normally Offered: F, SP
Includes classical mechanics, simple machines, power transmission, structure and properties of matter, thermodynamics and heat. The emphasis is placed upon practical, technical and industrial aspects of physics rather than upon philosophical and theoretical considerations. Designed specifically to furnish a sound scientific background for students majoring in certain technical fields.
Prerequisite: Algebra and preferably high school physics. Technical students having two years of algebra with trigonometry are encouraged to enroll in PHY 121-122 as a substitute for PHY 111-112.

PHY 121 GENERAL COLLEGE PHYSICS ..... 4(4-2)
Normally Offered: F
Meets the needs of liberal arts students, especially those on pre-medical, pre-dental, pre-law, general science and secondary education programs. This course also meets the needs of technical students who satisfy the prerequisites. Topics covered include classical mechanics, heat, thermodynamics, wave motion, and sound.
Prerequisite: One and one-half years of high school algebra with one-half year of trigonometry. Students having one semester of calculus sequence are encouraged to enroll in PHY 221 in place of PHY 121.

PHY 122 GENERAL COLLEGE PHYSICS ..... 4(4-2)
Normally Offered: SP
Continues PHY 121. Topics included are electricity and magnetism, light and optics, special relativity, and some other aspects of modern physics.
Prerequisite: PHY 121.

PHY 123 INTRODUCTION TO ASTRONOMY ..... 3(3-0)
Normally Offered: F
Includes historical introduction, methods of astronomy, the solar system, the sun, stars, stellar systems, galaxies and some current topics in cosmology. Designed for liberal arts students. Although no prerequisites are required, simple algebra and geometry are used and a general science background is desired.

PHY 124 INTRODUCTION TO PHYSICAL GEOLOGY ..... 4(3-0-2)
Normally Offered: SP
Lecture, discussion, labs, and field trips will be used to study the processes that shape our world. Topics include: minerals, rocks, volcanism, earthquakes, continental drift, erosion and deposition, the ice age, and the economic significance of geology to humankind.

PHYSICS

PHY 221 PHYSICS ..... 5(3-2-2)
Normally Offered: F
Includes topics in classical mechanics, heat, thermodynamics, wave motion, and sound. The class is designed primarily for students majoring in chemistry, engineering, mathematics, or physics; but other students who desire a rigorous course in physics and who satisfy the prerequisites are encouraged to enroll in this course. The course consists of three lecture hours per week along with two one-hour problem-solving sessions and one double period laboratory session.
Prerequisite: High school physics and MTH 131 or its equivalent.

PHY 222 PHYSICS ..... 5(3-2-2)
Normally Offered: SP
Continues Physics 221. Includes electricity, magnetism, light and optics, and some special topics of modern physics. The course consists of three hours of lecture per week along with one double period problem session and one double period laboratory session.
Prerequisite: PHY 221 or consent of instructor.

POLITICAL SCIENCE

PLS 221 AMERICAN GOVERNMENT AND POLITICS ..... 3(3-0)
Normally Offered: F, SP, SU
This course provides opportunity for extended exploration of national government, politics, and civics in the United States while fostering breadth of understanding and appreciation for the structure of political processes, government, and the responsibilities of citizenship relevant to students with broad occupational, academic, personal, and civic interests. Emphasis is placed on the nature of representative democracy, political philosophies, the U.S. Constitution and its historical evolution, federalism, the institutions of government, civil liberties, basic rights of citizenship, and practical politics, including political behavior, political parties, interest groups, and the policy making processes regarding a variety of contemporary domestic and international issues.

PLS 222 STATE AND LOCAL GOVERNMENT ..... 3(3-0)
Normally Offered: F (even years, SP (odd years)
This course surveys politics, government, and civic engagement at the state and local level with comparative perspective from a variety of states within the United States. Considerable attention is afforded formal institutions of government at the state, county, township, city, and village levels of government, including the challenges facing each level of government within the federal system of the United States. Special attention is given to the occupational, academic, personal, and civic interests of students in a participatory social, political, and governmental system.

PLS 228 INTERNATIONAL RELATIONS ..... 3(3-0)
Normally Offered: F (odd years)
This course provides a broad and comprehensive survey of modern international systems and relations among nations and states throughout the world from historical, social, cultural, economic, and political perspectives. Included are considerations of inter-governmental and non-governmental organizations such as the United Nations, NATO, as well as regional surveys of major issues in the Middle East, Africa, the Indian subcontinent, Asia, Europe, and the Americas, placing the United States within this larger international context. The course emphasizes relations among nations and states relative contemporary global events, conflicts, and trends of global perspective. It fosters breadth of understanding and appreciation of international dynamics and global awareness for students with broad occupational, academic, personal, and civic interests.

POLITICAL SCIENCE

PLS 230 COMPARATIVE GOVERNMENT ..... 3(3-0)
Normally Offered: SP (even years)
This course surveys the governmental and political structures, practices, and ideological foundations of democratic and non-democratic countries around the world comparing and contrasting their systems of government and politics. Included in the comparative survey of countries are Great Britain, France, Germany, China, and Iran relative to one another and the United States. Consideration is given to the methodologies of comparative study of politics, nation-states and their development, state institutions (parliamentary versus presidential and mixed systems), democracy, authoritarianism, political ideologies, nationalism, electoral systems, political parties, interest groups, political culture, and political economy within the various countries. The course fosters breadth of understanding and appreciation of comparative analysis and global awareness for students with broad occupational, academic, personal, and civic interests.

PSYCHOLOGY

PSY 101 GENERAL PSYCHOLOGY ..... 3(3-0)
Normally Offered: F, SP, SU
Presents the basic subjects of the field of psychology from the scientific study of behavior and mind of humans and animals. Subjects include, but are not limited to, biology of behavior, learning, memory and cognition, human development and emotions, health, abnormal behavior and therapy, and social interaction.

PSY 226 DEVELOPMENTAL PSYCHOLOGY ..... 3(3-0)
Normally Offered: F, SP
This course covers the physiological and psychological development of humans from conception through old age. The course includes social, emotional, and cognitive development; relations with parents, peers, and others; and problems related to school, work, and society.
Prerequisite: PSY 101, ENG 111 or permission of instructor.

PSY 230 HUMAN SEXUALITY ..... 3(3-0)
Normally Offered: F, SP
This course will cover the biological, psychological, and socio-cultural aspects of human sexuality.
Prerequisite: PSY 101, ENG 111 or instructor permission.

PSY 241 SOCIAL PSYCHOLOGY ..... 3(3-0)
Normally Offered: SP
This course begins with a discussion surrounding the methods used to study social psychology and is followed by a consideration of how individuals view themselves and others by examining the accuracy of impressions, intuitions, and explanations. Part three explores the cultural sources of attitudes to better recognize the social forces impacting individuals. Finally, part four focuses on social relations. Discussions will be directed at subjects such as prejudice, aggression, attraction, altruism, conflict, and peacemaking.
Prerequisite: PSY 101, ENG 111, or instructor permission.

PSY 242 ABNORMAL PSYCHOLOGY ..... 3(3-0)
Normally Offered: F, SP
This course will familiarize students with the history of how people have reacted to abnormal behavior in others, biological and psychosocial theories about the origins and dynamics of mental illness and abnormal behavior, classification and assessment of disorders, and therapeutic methods to treat these disorders.
Prerequisite: PSY 101, ENG 111 or instructor permission.

SOCIOLOGY

SOC 123 INTRODUCTION TO SOCIOLOGY ..... 3(3-0)
Normally Offered:
This introduction to sociology offers students foundational understandings of central sociological approaches, including terminology, theory, and methods that sociologists use to understand life worlds, social order, social conflict, and social change. Students will learn how sociologists examine social arrangements to shape human experience and how people create order and conflict.

SPEECH

SPE 121 SPEECH COMMUNICATION ..... 3(3-0)
Normally Offered: F, SP, SU
Presents communication fundamentals with emphasis on oral communication. Topics include origin of language, semantics, interpersonal and intrapersonal communication, etc. Students discuss materials and participate in informal and formal speech activities.

SPE 123 PUBLIC COMMUNICATION ..... 3(3-0)
Normally Offered: F, SP
A course in public communication including practical experience and theoretical study of small group discussions and the public speech.

SPE 126 ORAL INTERPRETATION OF LITERATURE ..... 3(3-0)
Normally Offered: On Demand
An introduction to the analysis, interpretation, rehearsal and oral performance of literature. Students work with selections of prose, poetry and drama written for adults and children.

SPANISH

SPN 117 CONVERSATIONAL SPANISH ..... 1(1-0)
Normally Offered: On Demand
An introductory, exploratory course for prospective travelers or those who are considering enrolling in a full language study course.

SPN 125 SPANISH ..... 4(4-0)
Normally Offered: F, SP
Promotes grammatical, cultural and geographic appreciation of the Spanish language and the people who speak it. This introductory course will begin to develop the student's fluency in listening to, speaking, reading and writing Spanish.

SPN 126 SPANISH ..... 4(4-0)
Normally Offered: F
Continues SPN 125. Promotes grammatical, cultural and geographic appreciation of the Spanish language and the people who speak it. This course will continue developing the student's fluency in listening to, speaking, reading and writing Spanish.
Prerequisite: SPN 125 or instructor's permission.

STUDENT DEVELOPMENT EDUCATION

SDE 101 INTRODUCTION TO CAREERS ..... 1(1-0)
Normally Offered: F, SP, SU
This class provides multiple opportunities for students to enhance their self-awareness in relation to the world of work. Various careers are explored through the use of videotapes, inventories and campus resources. Life-long decision-making skills are emphasized and applied to personal goals and values.

SDE 201 JOB SEARCH STRATEGIES ..... 1(1-0)
Normally Offered: F, SP
This course is designed to equip students with the essential skills and tools needed for a successful job search. By analyzing personal strengths and interests, students will align their career paths with their abilities. The course provides practical experience in developing professional resumes and cover letters tailored to specific job postings. Students will gain valuable insights into effective interviewing techniques through mock interviews, preparing them to present themselves confidently in professional settings. Additionally, students will learn to navigate and complete online job applications, ensuring they are proficient in the digital aspects of job searching. Through a combination of self-assessment, practical application, and skill development, this course prepares students for their transition into the workforce.

UTILITY ARBORIST

UAR 100 INTRODUCTION TO UTILITY ARBORIST ..... 1(1-0)
Normally Offered: F
This course will provide students with an understanding of the equipment, safety, and different career opportunities in the Utility Arborist field.

UAR 110 CLIMBING ..... 3(1-4)
Normally Offered: F
This course is based on ANSI standards, focusing on training safe and proficient climbers. Students will learn and practice aerial rescue techniques focusing on safe tree climbing, effective use of ropes, saddles, and gaffs. Students will learn plan-of-action for both climbing and trimming to prepare for employment in the industry.

UAR 115 TOOLS AND EQUIPMENT ..... 3(2-2)
Normally Offered: F
This course is based on ANSI standards, focusing on proficiency with required tools and equipment common in the utility and arborist industries. Additionally, this course will allow students lab time to build skills in proper tool and equipment techniques and maintenance, including but not limited to chainsaws, chippers, ropes, and riggings.

UAR 120 TREE FELLING ..... 3(2-2)
Normally Offered: SP
This course is based on ANSI standards, focusing on successful tree felling. Additionally, this course will allow students lab time to build skills in proper tree felling technique around conductors and electrical hardware equipment.

UAR 125 PESTICIDE APPLICATION ..... 2.5(2-1)
Normally Offered: SP
This course is based on MDARD standards, focusing on safe herbicide and pesticide application, regulations, and application methods around utilities. Upon successful completion, students will be prepared to take the MDARD pesticide application exam for industry-recognized certification.

UTILITY TECHNICIAN

UTT 101 INTRODUCTION TO THE UTILITY INDUSTRY ..... 1(1-0)
Normally Offered: F
This course orients students to the importance of and opportunities in the utility industry.

UTT 102 CLIMBING ELEVATED WORK SITES ..... 1(1-0)
Normally Offered: F
Provides practical experience in working in an elevated work site. Climbing and bucket truck operation will be stressed.

UTT 103 OVERHEAD CONSTRUCTION ..... 1(1-0)
Normally Offered: F
Proper overhead construction techniques will be demonstrated and practiced. Topics will include tool selection, pole selection and setting, rigging, safety procedures, maintenance techniques, and vehicle trailer operations.
Co-requisite: UTT 102.

UTT 110 LINE MECHANIC LAB I ..... 6(1.5-9)
Normally Offered: F
Orient students, in an outdoor lab setting, to proper and safe climbing techniques and the use of aerial lift devices. Students will construct overhead and underground primary and secondary electrical systems. Safe equipment operation will be stressed.
Co-requisite: UTT 102, UTT 103, UTT 203.

UTILITY TECHNICIAN

UTT 111 LINE WORKER PHYSICAL FITNESS I ..... 2(1-2)
Normally Offered: F
Designed for the Utility Technician student to improve fitness levels to meet the demands of lineworker training and unique job requirements. Course focuses on injury prevention, flexibility, endurance, and strength. Course will include individual and group workout activities.
Prerequisite: UTT student or instructor permission.
Co-requisite: UTT 110 or instructor permission.

UTT 202 TRANSFORMER FUNDAMENTALS ..... 2(1-2)
Normally Offered: SP
Orients student to the operation of and types of transformers used by the utility industry. Selection of proper transformer for a given application and maintenance of transformers will be stressed.
Co-requisite: UTT 201.

UTT 203 UNDERGROUND CONSTRUCTION ..... 2(2-0)
Normally Offered: F
Introductory course in underground utility construction and equipment operation. Includes hands-on experience in cable laying, splicing and terminations of both primary and secondary cable.

UTT 204 SYSTEM DESIGN AND OPERATION ..... 4(4-0)
Normally Offered: SP
Provides an orientation to utility system design and operation from point of origination to end user consumer. Includes generation and generation types, transmission, distribution, secondaries, and services.
Co-requisite: APP 100E or Instructor Permission.

UTT 206 EQUIPMENT/VEHICLE OPERATION ..... 2(1-2)
Normally Offered: F
Designed to educate the student in the proper way to inspect a commercial motor vehicle prior to use, operate a commercial motor vehicle, and educate the student on the various laws and regulations that govern the commercial motor vehicle license.
Valid Driver's License is required; must be able to obtain a Department of Transportation Medical card; must obtain a Commercial Learners Permit from the Secretary of State of Michigan; must pass an alcohol and drug screening and submit results dated within 30 days before class start time.

UTT 208 CLIMBING & WORKING IN ELEVATED WORK SITES ..... 2(2-0)
Normally Offered: SP
Classroom study of climbing and elevated work platforms used in the utility industry to perform construction and maintenance. Topics include dead line and live line techniques as well as safety instruction.
Prerequisite: Student must be a qualified climber.
Co-requisite: UTT 210.

UTT 210 UTILITY LINE/MECHANIC LAB ..... 5(1-8)
Normally Offered: SP
Orient students, in an outdoor lab setting, to the proper and safe construction and maintenance of overhead and underground electric systems. To include test and diagnostic equipment as well as transformer function, installation, selection and troubleshooting of single phase and three-phase power banks.
Prerequisite: First semester of Utility Technology program.
Co-requisite: UTT 201, UTT 202, and UTT 208.

UTT 211 LINE WORKER PHYSICAL FITNESS II ..... 2(1-2)
Normally Offered: SP
Advanced line worker fitness course concentrating on stamina, strength, and mental toughness required to complete a line worker apprentice program and be successful as a career lineworker. Course includes individual and group workout activities.
Prerequisite: UTT 110 or instructor permission.
Co-requisite: UTT 210 or instructor permission.

UTILITY TECHNICIAN

UTT 222 ELECTRIC BASIC LINE CLIMBING ..... 4(2-4)
Normally Offered: SU
This course is designed to provide students with the basic knowledge and pole climbing skills necessary to successfully progress through the Electric Line Apprentice Program.
Prerequisite: Must have successfully completed UTT Basic Certificate Program.

UTT 223 GROUND/UTILITY WORKER ..... 5(2-6)
Normally Offered: SU
This course is designed to provide students with the basic Ground/Utility Worker knowledge and skills necessary to progress through the Electric Line Apprentice Program.
Prerequisite: Must have successfully completed UTT Basic Certification Program.

UTT 224 ENERGIZED SECONDARY WORKER ..... 5(2-6)
Normally Offered: SU
This course addresses the knowledge and skills necessary to progress through the Utility Technician Advanced Certificate program with a focus on the installation and maintenance of secondary lines of 120/240 Volts. Safe work practices on energized conductors and aerial lifts, digger derricks, and associated equipment are developed and required. This course is normally offered during the summer semester and the Consumers Energy training facility in Marshall, Michigan.
Prerequisite: Must have successfully completed UTT Basic Certification program.

UTT 300 WORKING WITH UTILITY SYSTEMS ..... 6(5-2)
Normally Offered: SP
Provides an orientation to, and hands on operation of, test and troubleshooting equipment used in the utility industry. Orients student to the operation of and types of transformers used by the utility industry. Selection of proper transformer for a given application and maintenance of transformers will be stressed. Orients student to the design and operation of an electrical utility system from point of generation, transmission, and distribution, to end user.
Co-requisite: APP 100E.

WELDING

WLD 123 SMAW WELDING PROCESSES ..... 4(2-4)
Normally Offered: F
This course covers basic Shielded Metal Arc Welding using E6010 and E701 electrodes, used in all positions. Welding safety, oxyacetylene and plasma cutting, equipment set-up, electrodes, joint design, and welding theory will be discussed.

WLD 124 CMAW AND FCAW WELDING PROCESSES ..... 4(2-4)
Normally Offered: F, SP
Gives the student experience in Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW) and out-of-position shielded metal arc welding. Welding equipment setup, welding theory and processes, nonferrous metals, testing and inspection, welding design, welding blueprints, and general welding shop equipment will be studied.

WLD 134 INTRODUCTION TO WELDING TECHNIQUES ..... 2(1-2)
Normally Offered: F, SP
This course provides students with an introductory course in basic SMAW welding techniques, equipment set-up, safety, and applications.

WLD 135 INTERMEDIATE WELDING ..... 1.5(.75-1.5)
Normally Offered: F, SP
This course provides students with an intermediate level of SMAW welding techniques, equipment set-up, safety, and applications.
Prerequisite: WLD 134.

WELDING

WLD 138 AMERICAN WELDING SOCIETY LEVEL I ..... 4(2-4)
Normally Offered: F, SP
This course will cover intermediate welding practices which will prepare students for the American Welding Society Level I entry level welding certification requirements. Welding will be performed in the flat, horizontal, vertical, and overhead positions. This is an additional course to provide the student with more time to fi8nish the Level I assignments that have not been competed in prior coursework.
Prerequisite: WLD 123, WLD 124, or instructor permission.

WLD 238 AMERICAN WELDING SOCIETY LEVEL II ..... 4(2-4)
Normally Offered: F, SP
This course will cover advanced pipe welding practices which will prepare students for the American Welding Society Level II advanced welding certification requirements. Welding will be performed on pipe in the 2G, 5G, and 6G positions. This is an additional course to provide the student with more time to finish the Level II assignments that have not been competed in prior coursework.
Prerequisite: WLD 123, WLD 124, or instructor permission.

WLD 240 GAS TUNGSTEN ARC AND PIPE WELDING ..... 4(2-4)
Normally Offered: F, SP
Students will develop the skills, principles, and application of gas tungsten arc welding. Welds will be done on different thicknesses of ferrous and non-ferrous metals in all positions. Proper material cleaning, joint fit-up, and safety are also introduced. Base pipe welding practices will also be introduced in this course.

WLD 242 WELDING FABRICATION ..... 3(1-4)
Normally Offered: SP
This course covers sheet metal, structural steel, AWS structural D1.1 welding code practices and weldments, CNC plasma cutting and layout, material processing, WPS development, creating a bill of materials, and fabrication to print specifications. Students will be required to complete a capstone fabrication project.
Prerequisite: WLD 123 or WLD 124 and MFG 120 or instructor permission.

WLD 250 ADVANCED PIPE WELDING ..... 5(2-6)
Normally Offered: F
This course is designed to train the student in advanced pipe and tube welding procedures, using various welding processes. Students will learn to weld carbon steel, aluminum and stainless steel pipe and tubing in the 2G, 5G, and 6G positions. Strong emphasis will be placed on proper joint preparation and adherence to the applicable AWS, ASME, and API welding code standards.
Prerequisite: WLD 240 or instructor permission.

WLD 252 SPECIALTY WELDING AND TESTING PROCEDURES ..... 5(2-6)
Normally Offered: SP
This course is designed to train welders in the weldability of less common metals and the proper equipment and electrode selection, machine set-up, and base metal preparation required to make a high quality weld. Students will be taught the basic Destructive (DT) and Nondestructive (NDT) weld control testing procedures for checking discontinuities and defects that could affect weld integrity, appearance, and strength. Strong emphasis will be placed on confirming weld quality and adherence to all applicable AWS, ASME, and API welding code standards.
Prerequisite: WLD 124 or instructor permission.

WLD 254 CNC THERMAL CUTTING SYSTEMS ..... 3(2-3)
Normally Offered: F
This is an introductory course designed to train the student in the basic operation and programming of a CNC plasma & oxyfuel cutting table. Emphasis will be placed on safety, machine operation, set-up, programming software, and troubleshooting. Laboratory will include the set-up, programming, and operation of a basic CNC plasma & oxyfuel cutting system.

WELDING

WLD 260 WELDING AUTOMATION ..... 3(2-2)
Normally Offered: SP
This is an introductory course designed to train the student in the basic operation and programming of a robotic welding cell. Emphasis will be placed on safety, justification, fixturing, set-up, programming, and troubleshooting. Laboratory will include the set-up and operation of basic automatic welding systems with a sturdy of the effects of welding parameters on weld outcomes.
Prerequisite: WLD 124 or instructor permission.