Course Descriptions

Descriptions of all courses and departments may be found at the web site for the CMU Bulletin:
http://www.cmich.edu/bulletins/course-desc/default.htm

Descriptions of courses approved for the University Program appear in italic type.

Credit and Attendance Hours
The number of semester hours of credit in each course is indicated by the first number following the title of the course. Within the parentheses, the first number indicates the number of hours of lecture per week; the second number, the hours of laboratory per week. EXAMPLE: 4(3-2) means four hours of credit, three hours of lecture, two hours of laboratory.

Astronomy (AST)

Specific Courses Required on the Integrated Science Secondary Major, followed by courses that students would likely take to fill the “additional 3 credits in geology, astronomy or meteorology course at the 300-level or higher selected in consultation with an advisor.”

AST 111 Astronomy 3(3-0) (Master Syllabus) (Course Syllabus)
An overview of modern astronomy which illustrates the basic physical principles and methodologies underlying all the sciences. Topics include the solar system, stars and stellar systems, galaxies and cosmology. (Group II-A)

AST 112 Introduction to Astronomical Observations 1(0-2) (Master Syllabus) (Course Syllabus)
The observation and interpretation of the sky using the naked eye, small telescopes, celestial globes, and star maps. Supplements 111 by providing observational experience. Satisfies University Program Group II laboratory requirement. Pre- or corequisite: AST 111. (Group II-A)

AST 260 General Astronomy I 4(3-2) (Master Syllabus)
A mathematical treatment of modern astronomy for majors/minors in the sciences. Coordinate systems, astronomical instruments, time, moon and eclipses, earth as a planet, other solar system objects. Prerequisite: PHY 145 or permission of instructor.

AST 261 General Astronomy II 4(3-2) (Master Syllabus)
A continuation of AST 260. Stellar astronomy, interstellar matter, galactic structure, galaxies, quasars, cosmology. Prerequisite: AST 260 or permission of instructor.
AST 311 Vistas in Astronomy 3(3-0)
Descriptive treatment of astronomical topics of most interest. Typical topics include spacecraft results, extraterrestrial life, astroarchaeology, UFOs, pulsars, black holes, quasars, cosmology. Prerequisite: AST 111 or 260.

Biology (BIO)

Specific Courses Required on the Integrated Science Secondary Major, followed by courses that students would likely take to fill the “additional 3 credit BIO course at the 300-level or higher selected in consultation with an advisor.”

BIO 101 General Biology 3(2-2) (Master Syllabus) (Course Syllabus) (Lab Syllabus)
Principles of life; its origin, development, and organization. Fundamental makeup, metabolism, heredity and ecology of basic life components. Satisfies University Program Group II laboratory requirement. Credit cannot be earned in both BIO 101 and 105. (Group II-A)

BIO 105 Introductory Quantitative Biology 3(2-2) (Master Syllabus) (Course Syllabus)
Basic theories of biology including the characteristics of life, physiological mechanisms of organisms, patterns of heredity, and ecological interactions. Quantitative aspects of these topics. Satisfies University Program Group II laboratory requirement. Credit cannot be earned in both BIO 101 and 105. (Group II-B)

BIO 203 General Botany 3(2-3) (Master Syllabus) (Course Syllabus)
Fundamental structure and physiology of plants. Prerequisite: BIO 101 or 105.

BIO 208 Microbiology 3(2-3) (Master Syllabus) (Course Syllabus)
The biology of microorganisms: viruses, bacteria, actinomycetes, fungi, algae, and protozoa. Prerequisite: BIO 101 or 105.

BIO 218 General Zoology 3(2-3) (Master Syllabus) (Course Syllabus)
A general survey of the animal kingdom with emphasis on phylogeny, taxonomy, structure, physiology, and ecology of type examples of the major phyla. Prerequisite: BIO 101 or 105.

Potential BIO Electives:

BIO 306 Natural History of Vertebrates 3(2-3)
Collection, identification, museum specimen preparation, and life-history studies of vertebrates through field and laboratory experiences.

BIO 310 Ornithology 3(2-3)
An introduction to avian biology emphasizing evolution, systematics, and the annual cycle. Identification, song, and general ecology are studied through field trips and laboratory work.

BIO 312 Life Manipulations 3(3-0)
Current technology and the ethical implications of issues such as contraception, artificial insemination, in vitro fertilization, cloning, genetic engineering, abortion, and euthanasia. Prerequisite: Completion of Group II requirements of the University Program.

BIO 322 Bacteriology 4(2-4)
The biology of bacteria with an emphasis on the relationship of bacteria to man and the environment. Laboratory techniques will be strongly stressed. Prerequisite: BIO 208 or permission of instructor.

**BIO 324 Cell Biology 3(3-0)**
Cell structure, nature and function of cellular organs, the plasma membrane, cell cycle, cell aging. Prerequisite: 12 hours of biology; CHM 120, CHM 127, and CHM 342 (may be taken concurrently); OR CHM 131 and CHM 132; OR CHM 161 and CHM 211.

**BIO 325 Biotechnology 3(2-3)**
Laboratory experience in the theory and practice of techniques used in basic cell and molecular biology research and their applications in biotechnology. Prerequisites: BIO 208, and BIO 324 or BIO 326; one of the following CHM sequences: CHM 120, CHM 127 and MH 342 (may be taken concurrently); OR CHM 131 and CHM 132; OR CHM 161 and CHM 211.

**BIO 326 Genetics 4(3-3)**
The principles of heredity dealing with the location, transmission, structure and function of genes and the results of modern genetic techniques. Prerequisite: 9 hours of biology.

**BIO 329 General Plant Morphology 3(2-3)**
A survey of the plant kingdom with emphasis on comparative morphology and evolution of major plant divisions.

**BIO 334 Soil Science 3(2-2)**
An introduction to the physical, chemical, and biotic properties of soils; soil classification and mapping; and soil resource issues. Identical to ESC 334. Credit may not be earned in more than one of these courses. Prerequisites: Six (6) hours of environmental science; CHM 120 or CHM 131.

**BIO 337 Comparative Vertebrate Anatomy 4(3-3)**
An anatomical survey to illustrate the major morphological characteristics of and changes that have occurred within the phylum chordata with an emphasis on the vertebrates. Ontogenetic and evolutionary trends are developed within the framework of functional morphology and adaptation. Prerequisites: BIO 218.

**BIO 338 Human Ecology 3(3-0)**
The relationship of humans to their environment and the influence of their activities on the environment.

**BIO 340 Ecology 3(2-3)**
Interaction among plants, animals, man, and the environment. Prerequisite: Completion of University Program Group II (Natural Sciences) and a minimum of 45 hours of University credit.

**BIO 361 Water Conservation 1(Spec)**
Man's use and misuse of water and our future needs of this resource are reviewed. Management strategies and rehabilitation techniques for this resource are discussed. Two week duration only. Prerequisite: BIO 240.

**BIO 362 Forest Conservation 1(Spec)**
A practical follow-up to BIO 240 concentrating on the tools and techniques used in forest measurement, harvest, and conservation. Two week duration only. Prerequisite: BIO 240.
BIO 363 Fisheries Conservation 1(Spec)
A practical follow-up to BIO 240 emphasizing the tools and general techniques used in management to best conserve our fisheries resources. Two week duration only. Prerequisite: BIO 240.

BIO 364 Wildlife Conservation 1(Spec)
A practical follow-up to BIO 240 dealing specifically with the wildlife resource. Two week duration only. Prerequisite: BIO 240.

BIO 366 Freshwater Biology 3(2-3)
An introduction to the ecology of freshwater systems with an emphasis on the natural history, identification, and collection of freshwater organisms. Prerequisite: 6 hours of biology.

BIO 365 BIO Environmental Contaminants 3(3-0)
Survey of pesticide characteristics and residue problems, hazardous wastes, ground and surface water contaminants, air pollution and acid rain, and other environmental pollution concerns. Prerequisites: CHM 132 (CHM 342 and BIO 240 recommended), or permission of instructor.

BIO 366 Freshwater Biology 3(2-3)
An introduction to the ecology of freshwater systems with an emphasis on the natural history, identification, and collection of freshwater organisms. Prerequisite: 6 hours of biology.

BIO 391 Plant Physiology 4(3-3)
The physical and chemical basis of plant structure and function. Prerequisite: CHM 120, CHM 127, and CHM 342 (may be taken concurrently); OR CHM 131 and CHM 132; OR CHM 161 and CHM 211; or equivalent.

BIO 392 Mammalian Physiology 4(3-3)
The functioning of the mammalian body and its component parts. Prerequisite: CHM 120, CHM 127, and CHM 342 (may be taken concurrently); OR CHM 131 and CHM 132; OR CHM 161 and CHM 211; or equivalent.

BIO 403 Undergraduate Research 3-4(Spec)
Open to seniors and selected juniors, majoring in biology, who have completed 20 hours with a B average. Philosophy, techniques, and methods of research. See instructor by the middle of the semester prior to enrollment to design the project and sign the contract. Registration requires approval of department chairperson.

BIO 440 Wildlife Ecology 2(2-0)
An in-depth treatment of the life history and ecology of Michigan's most important game birds and mammals. Field trips are required. Prerequisite: BIO 340.

BIO 487 Neuroscience Seminar 1-2(Spec)
Analysis of current research in specified areas of neuroscience; critiquing and discussing primary literature and the students' current research relating to specific topics. Students will repeat this course for a maximum of 2 credits. Identical to PSY 487. Credit may not be earned in more than one of these courses. Prerequisites: Signed Neuroscience Major and prior or concurrent neuroscience research experience through BIO 403 or PSY 496 335,335 (or equivalent).

BIO 495 Undergraduate Internship in Biology 1-4(Spec)
An in-depth work experience in the student's area of interest performed under a trained professional in the selected area of biology for 6 to 24 weeks. Prerequisites: The student must have junior standing with a minimum of a 3.0
grade point average in biology and completed at least 20 credit hours before being eligible for the internship program. Students not meeting these requirements may petition for a waiver through their advisor and the department chair.

**BIO 500 Biological Statistics 3(2-2)**
An introduction to biological statistics; emphasis on concepts of descriptive statistics and central tendency, inferential statistics. ONE-WAY ANOVA and correlation/linear regression. Prerequisites: Twelve (12) hours of biology or permission of instructor; math competency equivalent to MTH 130 recommended.

**BIO 501 Evolution 3(3-0)**
Mechanisms of descent with modification are discussed in a framework of microevolution, speciation, and macroevolution. Prerequisites: 9 hours of biology; BIO 326.

**BIO 509 Ichthyology 4(2-4)**
Anatomy, taxonomy, physiology, natural history, and ecology of fishes with laboratory emphasis on fishes of the Great Lakes region. Prerequisites: BIO 218 or equivalent.

**BIO 518 Animal Behavior 3(2-3)**
Behavior in invertebrate and vertebrate organisms related to genetics, morphology, and the ecology of animal populations. Prerequisite: One year of biology.

**BIO 524 Molecular Biology 4(3-3)**
Molecular basis of genetics and gene expression primarily in prokaryotes and techniques of recombinant DNA technology. Laboratory includes nucleic acid purification and recombinant DNA procedures. Prerequisites: BIO 208, 326; CHM 346, 522 (may be concurrent); or permission of instructor.

**BIO 525 Plant Ecology 4(2-4)**
A study of plants emphasizing physical and biotic interrelationships, and factors which govern their distribution. Field work stressed. Prerequisites: BIO 340; a plant identification course highly recommended.

**BIO 526 Limnology 3(3-0)**
Factors contributing to the biological productivity of fresh water habitats and the relationship of different factors that influence biological productivity in lakes and streams. Prerequisites: BIO 340; one year of college chemistry recommended; or permission of instructor.

**BIO 527 Limnological Methods 3(0-6)**
Qualitative and quantitative measurements of the chemical-physical-biological factors fundamental to a study of limnology.

**BIO 531 Aquatic Vascular Plants 3(2-3)**
Classification, ecology, and importance of aquatic vascular plants and their role in fisheries problems, wildlife management, and limnology.

**BIO 537 Immunology 4(3-3)**
A description of the biological and biochemical mechanisms of the immune response. Emphasis will be placed on antibody structure, antigen-antibody interaction, immunobiology, and serology. A knowledge of aseptic techniques is strongly recommended. Prerequisites: BIO 326; CHM 521.

**BIO 538 Anatomical Preparations 2(1-3)**
Practical techniques involved in the preparation of dry skeletal material, limb-muscle units, differential staining, air-dried viscera, latex injection, plastic embedding and freeze drying of vertebrate specimens. Prerequisites: BIO 101 or 105; BIO 218 or 337; or permission of instructor.

**BIO 541 Wildlife Biology and Management 4(2-4)**
Presents the basic ecological principles and the varied techniques utilized in managing the wildlife resource. Prerequisite: Permission of instructor.

**BIO 544 Developmental Biology 4(3-3)**
Cellular and molecular mechanisms of embryonic development, emphasizing animals. Prerequisites: BIO 324 or 326; CHM 132 or 161.

**BIO 549 Herpetology 3(2-3)**
Survey of extant amphibians and reptiles from standpoint of morphology, behavior, physiology, evolution, and
ecology. Local collecting field trips required. Prerequisites: Six hours of biology.

**BIO 557 Dendrology 3(2-3)**
Identification and other characteristics of Michigan evergreen and deciduous woody plants, both native and cultivated. Prerequisite: BIO 203.

**BIO 559 Field Botany 3(2-3)**
The collection, identification, and preparation of herbarium specimens from the local flora. Prerequisites: BIO 203.

**BIO 560 Avian Ecology 3(2-3)**
Relationships among behavior, community organization and ecology of birds are examined through investigative field work. Prerequisites: BIO 340; BIO 310 recommended.

**BIO 561 Wetland Ecology 3(2-3)**
Wetland systems classification and characterization in North America; includes ecological evaluation of wetland soil, water, plants, plant communities, animals, animal communities, values, destruction, conservation, management. Prerequisite: BIO 340 or permission of instructor.

**BIO 576 Animal Cell Culture 4(1-6)**
Practical aspects of animal cell culture, involving media preparation, aseptic manipulation of cell culture, cell maintenance, and cell storage. Prerequisites: BIO 392.

**BIO 590 Cardiovascular Physiology 3(3-0)**
Basic principles of normal mammalian cardiovascular physiology. Prerequisites: BIO 392 or equivalent.

**BIO 591 Neurophysiology 3(3-0)**
Study of the basic principles responsible for nervous system function. Includes discussion on the structure, electrophysiology, and biochemistry responsible for neural activity and senses. Prerequisites: BIO 392 or equivalent.

**BIO 592 Environmental Physiology 3(3-0)**
A survey of the adaptive physiological mechanisms whereby animals survive the challenge of their environment. Prerequisite: BIO 392.

Additional 500-level courses depending upon the student’s interests and abilities.

**Chemistry (CHM)**

**CHM 131 Introduction to Chemistry I 4(3-3) (Master Syllabus) (Course Syllabus)**
Fundamental concepts of chemistry. CHM 131 and 132 are recommended to constitute the standard one-year course. Satisfies University Program Group II laboratory requirement. (Prerequisite: high school algebra (one unit). Group II-B)

**CHM 132 Introduction to Chemistry II 4(3-3) (Master Syllabus) (Course Syllabus)**
Continuation of CHM 131. Prerequisite: CHM 131 or permission of instructor.

**CHM 161 Principles of Chemistry 5(4-4) (Master Syllabus) (Course Syllabus)**
Intensive introduction to chemical principles for the well-prepared, motivated student. Satisfies University Program Group II laboratory requirements. Prerequisites: Algebra (1 unit), Chemistry (1 unit) or CHM 120 (Group II-B)

**Earth Science (ESC)**
Specific Courses Required on the Integrated Science Secondary Major, followed by courses that students would likely take to fill the “additional 3 credits in geology, astronomy or meteorology course at the 300-level or higher selected in consultation with an advisor.” Many courses now listed as ESC will have a meteorology (MET) designator in the next year.

ESC 201 Weather 4(4-0) (Master Syllabus) (Course Syllabus)
Nature of atmospheric processes, weather, and climate why and how they vary over the face of the earth. (Group II-A)

ESC 240 Meteorology 4(3-2) (Master Syllabus)
Normally the first course for students majoring in Earth Science concentration in Meteorology. Quantitative treatment of atmospheric processes. How and why rains, winds, and storms occur. Credit may not be earned in both ESC 201 and 240. Satisfies University Program Group II laboratory requirement. Prerequisite: two years of high school algebra or MTH 107. (Group II-B).

ESC 301 Climatology and Climatic Change 3(3-0)
A study of major climate types, their controls, distribution patterns and significance. Examination of the causes and implications of climatic change. Prerequisites: One of the following: ESC 105, 201 or 240.

ESC 330 Biogeography 3(3-0)
Atmospheric, terrestrial, and aquatic influences on the world distribution of plant and animal life. Prerequisite: ESC 105 or permission of instructor.

ESC 334 Soil Science 3(2-2)
An introduction to the physical, chemical, and biotic properties of soils; soil classification and mapping; and soil resource issues. Identical to BIO 334. Credit may not be earned in more than one of these courses. Prerequisites: Six hours of environmental science; CHM 120 or CHM 131.

ESC 340 Micrometeorology 3(3-0)
Radiation balance, heat and moisture exchange, and wind structure near the ground; influences of topography, soil type, cultivation techniques, and vegetation. Applications of agriculture, forestry, cities, and air pollution. Prerequisite: ESC 105, 201 or 240, or permission of instructor. Concurrent enrollment in ESC 341.

ESC 346 Air Pollution 3(3-0)
Nature and sources of gaseous and particulate pollutants, their origin, transport, dispersion, modification, and removal. Factors related to industrial site selection and control programs. Prerequisite: ESC 105, 201 or 240, or permission of instructor.

ESC 350 Environmental Catastrophes 3(3-0)
Causes and effects of hurricanes, tornadoes, blizzards, earthquakes, volcanic eruptions, dam failures, tidal waves, freak seas, plagues, epidemics, and similar phenomena. Prerequisite: One or more environmental courses.

Geology (GEL)
Specific Courses Required on the Integrated Science Secondary Major, followed by courses that students would likely take to fill the “additional 3 credits in geology, astronomy or meteorology course at the 300-level or higher selected in consultation with an advisor.”
GEL 100 Introduction to Earth Systems 3(2-2) *(Master Syllabus)  (Course Syllabus)*  
A discovery-based introductory examination of the processes that shape our planet. Topics include the rock cycle, earthquakes, volcanoes, the Ice Age, and plate tectonics. Satisfies University Program Group II laboratory requirement. *(Group II A)* Credit may not be earned in both GEL 100 and 101, 102, 105 or 130.

GEL 130 Earth Processes 3(2-2) *(Master Syllabus)  (Course Syllabus)*  
An introduction to geologic processes from a quantitative perspective. Students will investigate rates and scales of processes including earthquakes, erosion, mountain building, and resource formation. Satisfies University program Group II laboratory requirement. Credit may not be earned in both GEL 130 and 100, 101, 102, or 105. *(Group II-B)*

GEL 201 Earth History 3(2-2) *(Master Syllabus)  (Course Syllabus)*  
The earth's history as revealed in the rock record. Geologic processes and concepts are applied to the evolution of North America and life through geologic time. Prerequisite: One of: GEL 100, 101, 105 or 130.

GEL 230 Prehistoric Life 3(3-0) *(Master Syllabus)  (Course Syllabus)*  
An introduction to the three-billion-year history of life on earth. Topics include the origin of life, mass extinctions, history of dinosaurs, and evolution of mammals. *(Group II-A)*

GEL 303 Oceanography: Marine Geology 3(3-0)  
Introduction to methods and equipment used to study the geology of ocean floors and the dynamic processes responsible for the formation of ocean basins. Prerequisites: One of: GEL 100, 101, 105, 130, 203, 301, or ESC 205.

GEL 304 Energy Resources 3(3-0)  
Various forms of energy in the universe. Sources of energy-producing materials with emphasis on conservation and depletion when consumption of energy is accelerating. Prerequisite: Junior standing.

GEL 310 Introductory Mineralogy 4(3-3)  
Introduction to crystallography. Physical and chemical properties, and descriptions of basic groups and classifications of minerals. Field trip fee required. Prerequisites: GEL 101 or 105, and GEL 102; or GEL 100 or 130; CHM 131 or 161 as prerequisite or corequisite.

GEL 320 Rocks 3(2-3)  
Origin, interpretation, and hand-spectimen identification of rock materials; for non-geology majors. Field trip fee required. Prerequisites: GEL 101, 102, or permission of instructor.

GEL 370 Structural Geology 3(2-3)  
Theoretical and applied study of structures developed by deformation of the earth's crust at microscopic, macroscopic, and regional scales. Field trip fee required. Prerequisites: GEL 201; MTH 132 or 136.

GEL 380 Hydrogeology 3(2-3)  
Introduction to the study of groundwater, groundwater flow, well hydraulics, groundwater quality and pollution and resource exploration, evaluation, and management. Field trip fee required. Prerequisites: GEL 101 or 105, and GEL 102; or GEL 100 or 130; MTH 106 or higher; junior standing.

GEL 385 Introductory Petroleum Geology 3(2-2)  
Petroleum deposits of the earth: location, origin, and occurrence. Technical aspects of exploration and production, emphasizing petroleum and natural gas formations of Michigan. Prerequisites: GEL 201.

GEL 430 Invertebrate Paleontology 3(2-3)  
A general survey of the taxonomy, phylogeny, identification, stratigraphy, and paleoecology of the major fossil invertebrate groups. Field trip fee required. Prerequisites: GEL 201; BIO 101, 218 are helpful.

Physics (PHY)
PHY 130 College Physics I 4(4-0) (Master Syllabus) (Course Syllabus) Mechanics, heat, kinetic theory, and sound. The mathematics used is algebra and trigonometry. The sequences PHY 130-131, 170-171 satisfy minimum requirements for medical and dental schools. Prerequisites: MTH 106 or equivalent. (Group II-B)

PHY 131 College Physics II 4(4-0) (Master Syllabus) (Course Syllabus)
A continuation of PHY 130 which covers the topics of electricity, magnetism, optics and modern physics. Prerequisite: PHY 130.

PHY 145 University Physics I 4(4-0) (Master Syllabus) Normally the first physics course for majors and minors. Mechanics of single and many-particle systems, conservation laws, statistical concepts, and gravitational interaction. Corequisites: MTH 136 (or MTH 132) or equivalent. (Group II-B)

PHY 146 University II 4(4-0) (Master Syllabus)
Electromagnetic interaction, electrical circuits, electromagnetic radiation, and optics. Not open to those with credit in PHY 131. Prerequisite: PHY 145. Corequisites: MTH 137 (or MTH 133) or equivalent.

PHY 170 College Physics Laboratory I 1(0-2) (Master Syllabus) (Course Syllabus) Experimental techniques of physics introduced by studying quantitative situations through error analysis, graphical analysis, small computer calculations, and linear measurements. Satisfies University Program Group II laboratory requirement. Corequisite: PHY 130. (Group II-B)

PHY 171 College Physics Laboratory II 1(0-2) (Master Syllabus) (Course Syllabus)
Laboratory experience for PHY 131. Introductory experimental techniques and instrumentation for electrical, optical, and nuclear phenomena. Prerequisite: PHY 170. Corequisite: PHY 131.

PHY 175 University Physics Laboratory I 1(0-2) (Master Syllabus)
Laboratory experience for PHY 145. Introduction to experimental techniques and the treatment of experimental data. Satisfies University Program Group II laboratory requirement. Corequisite: PHY 145. (Group II-B)

PHY 176 University Physics Laboratory II 1(0-2) (Master Syllabus)
Laboratory experience for PHY 146. Introduction to electrical measurements and instrumentation. Introduction to techniques of optical measurements. Prerequisite: PHY 175. Corequisite: PHY 146.

Science (SCI)

SCI 400 Teaching Integrated Science in Secondary School 3(3-1) (Master Syllabus)
Methods of teaching integrated science in the secondary school including hands-on investigations/laboratories, current curricula, and development of lesson plans in accord with best practices.
Professional Education (EDU)

EDU 107 Introduction to Teaching 3(3-1) (Master Syllabus)
An introductory course designed to provide prospective teacher education students with the opportunity to explore the teaching profession; includes 10 hours of field experience.

EDU 290 Technology in Education 3(1-4) (Master Syllabus)
Students will learn to operate various technology-based equipment; select and assess instructional media materials, courseware, and software; and integrate technology and media into K-12 instruction. Prerequisite: EDU 107.

EDU 310 Psychological Foundations of Education 3(3-0) (Master Syllabus)
Principles of learning, adolescent development and behavior, mental health; emphasis on application to teaching. Prerequisite: Admission to Teacher Education Program.

EDU 325 Middle Level and High School Teaching Methods 3(3-0) (Master Syllabus)
This course is designed to prepare students to design, deliver, and evaluate middle school, junior high and high school instruction. Prerequisites: Admission to Teacher Education. Pre- or corequisite: EDU 310

EDU 450 Content Area Literacy 3(3-0) (Master Syllabus)
Study and development of teaching strategies to improve literacy (reading, writing, and thinking for learning) in all disciplines. Prerequisites: Admission to Teacher Education; EDU 310; Pre- or Corequisite: EDU 325 or a music pedagogy course appropriate to the program for students seeking the Bachelor of Music Education degree.

EDU 432 Student Teaching Seminar 3(3-0) (Master Syllabus)
This course reinforces the components of the CLEAR Conceptual Framework as it pertains to transferring theory to practice while students are in student teaching. Prerequisites: students must have completed the requirements for student teaching and be enrolled in EDU 458, Student Teaching, as a component of the Elementary or Secondary Certification requirements for the Pre-K-12 Regular Education and Special Education teacher education programs.

EDU 458 Student Teaching 1-10(Spec) (Master Syllabus)
This experiential course, in which students integrate theory into practice, is the field-based culmination activity of the Pre-K-12 regular education teacher education program. CR/NC only. Prerequisites: admission to Teacher Education and completion of all Cycle II requirements of the mentoring program plus the following criteria: Elementary: a CMU overall GPA of 2.50 or higher; departmental approval of major(s) and minor(s) for teaching in content areas; C+ or higher in ALL professional education and methods courses taken before student teaching. Courses REQUIRED to be completed before student teaching: EDU 107, EDU 280, EDU 290, EDU 320, EDU 330, EDU 343, EDU 345, EDU 361, EDU 431, EDU 493, EDU 495 and all major and minor requirements listed in the Bulletin. Secondary: A CMU overall GPA of 2.50 or higher; departmental approval of major(s) and minor(s) for teaching in content areas; C+ or higher in ALL professional education and methods courses taken before student teaching. Courses REQUIRED to be completed before student teaching: EDU 107, EDU 290, EDU 310, EDU 325, EDU 450, EDU 495 and all major and minor requirements listed in the Bulletin.
EDU 495 Foundations of Education 3(3-0) (Master Syllabus)
Examines historical events and philosophical bases of American education. Major emphasis on political and legislative activities, social issues, and economic developments affecting the schools. Prerequisite: admission to Teacher Education program required (except for students not on teacher certification curricula).