PREPARATION FOR PROFESSIONAL CAREERS IN THE HEALTH CARE PROFESSIONS

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Even though many freshmen plan to major in pre-medicine, it is not, by itself, a major. It is a set of courses taken as part of a major, by which a student acquires a solid science background in preparation for applying to a professional school of choice. Students interested in the health care professions may choose any major, provided they complete the courses required for admission to any professional school to which they apply. Choosing a science major, however, gives the applicant the advantage of greater scientific breadth and depth of knowledge over non-science majors on the Medical College Admission Test (MCAT) and other professional school entrance exams. Because the courses required for admission to most professional schools often mirror the requirements for a biology or chemistry degree, many successful applicants choose one of those two majors, but many routes will prepare the student for the MCAT or other entrance exam and for the challenges of a professional health care curriculum.

Because most professional schools require a similar set of courses for admission, flexibility can be maintained in the selection of a career choice until the junior year. A typical applicant should plan to complete the following:

Code	Title	Credit Hours
BSC 120	Principles of Biology	4
BSC 121	Principles of Biology	4
CHM 211	Principles of Chemistry I	3
CHM 217	Principles of Chem Lab I	2
CHM 212	Principles Chemistry II	3
CHM 218	Principles of Chem Lab II	2
CHM 355	Organic Chemistry I	3
CHM 356	Organic Chemistry II	3
CHM 361	Intro Organic Chm Lab	3
PHY 201	College Physics I	3
PHY 202	General Physics I Laboratory	1
PHY 203	College Physics II	3
PHY 204	General Physics 2 Laboratory	1
Total Credit Hours		35

These courses should be regarded as a minimum. Completing these courses as part of a science major provides a sound science background. Additional required or recommended courses are subject to change, and vary among schools and programs. The responsibility lies with the student to become aware of all courses required and recommended by the professional schools to which he or she intends to apply and incorporate those courses into his or her curriculum. Elective courses can be chosen that simultaneously meet both the requirements for a major and admission to a professional school. With careful planning, the required and recommended courses can be combined with major coursework, progressing toward both admission to a professional school and graduation with a baccalaureate degree. Check with your assigned academic advisor frequently for guidance and assistance.

Admissions policies and procedures can vary considerably among professional health care schools. It is, therefore, strongly recommended that pre-professional students discuss their programs at least once each year with Mr. Brian Morgan, Associate Dean and Chief Pre-Professional Health Care Advisor, in Science Building 270. For current information, visit www.marshall.edu/preprof (http://www.marshall.edu/preprof/).

Pre-Health Care Professional Programs

Because each professional school may determine its own requirements, and because those requirements can vary among institutions and are subject to change, students should regard the courses listed below as examples only. This not a comprehensive statement of what actually is required by every professional school.

Programs

- Pre-Dentistry (http://catalog.marshall.edu/undergraduate/programs-az/science/preparation-professional-careers-health-care-professions/pre-dentistry/)
- Pre-Medicine (http://catalog.marshall.edu/undergraduate/programs-az/science/preparation-professional-careers-health-care-professions/pre-medicine/)
- Pre-Optometry (http://catalog.marshall.edu/undergraduate/programs-az/science/preparation-professional-careers-health-care-professions/pre-optometry/)
- Pre-Pharmacy (http://catalog.marshall.edu/undergraduate/programs-az/science/preparation-professional-careers-health-care-professions/pre-pharmacy/)
- Pre-Physical Therapy (http://catalog.marshall.edu/undergraduate/programs-az/science/preparation-professional-careers-health-care-professions/pre-physical-therapy/)
- Pre-Veterinary Medicine (http://catalog.marshall.edu/undergraduate/programs-az/science/preparation-professional-careers-health-care-professions/pre-veterinary-medicine/)

Courses

Biological Science

BSC 104 Introduction to Biology **4 Credit hours**
Fundamentals of biology with emphasis on the unity of life, energetics, genetics and the world of living things. Intended for non-science majors. 3 lec-2 lab.
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 105 Human Biology **4 Credit hours**
Fundamentals of biological human structure, function, and interactions with the environment. Intended for non-science majors. Does not count for health professions credit. 3 lec-2 lab.
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 120 Principles of Biology **4 Credit hours**
Study of basic biological principles common to all organisms through lecture and laboratory activities. Intended for science majors and pre-professional students. 3 lec-2 lab.
Pre-req: ACT Math with a score of 21 or SAT Mathematics Before Mar. 16 with a score of 500 or SAT MATH SECTION SCORE with a score of 530 or (MTH 121 with a minimum grade of C or MTH 123 with a minimum grade of C or MTH 127 with a minimum grade of C or MTH 130 with a minimum grade of C or MTH 132 with a minimum grade of C).
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 120H Principles of Biology Honors **4 Credit hours**
Study of basic biological principles common to all organisms through lecture and laboratory activities. Chemistry of life, cell biology, metabolism, heredity, and evolution. Intended for science majors and pre-professional students. 3 lec-2-lab.
Pre-req: Admitted Honors College with a score of 1 and (ACT Math with a score of 21 or SAT Mathematics Before Mar. 16 with a score of 500 or SAT MATH SECTION SCORE with a score of 530 or MTH 121 with a minimum grade of C or MTH 127 with a minimum grade of C or MTH 130 with a minimum grade of C or MTH 132 with a minimum grade of C).
Attributes: Honors, Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 121 Principles of Biology **4 Credit hours**
A continuation of the study of basic biological principles common to all organisms. Intended for science majors and pre-professional students. 3 lec-2 lab.
Pre-req: BSC 120 with a minimum grade of C.
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 227 Human Anatomy **4 Credit hours**
Principles of gross and microscopic anatomy of human body systems and their development. Provides preparation for degrees in health professions. Does not count towards a major in Biological Science. 3 lec-2 lab (ACT composite 19 or higher or 12 hrs. college credit, 100 level or above with minimum GPA of 2.3)
Pre-req: ACT Composite with a score of 19 or ACT Recalculated Composite with a score of 19 or SAT Mathematics Before Mar. 16 with a score of 480 or SAT MATH SECTION SCORE with a score of 510.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 228 Human Physiology **4 Credit hours**
Fundamentals of normal human physiology, from cells to systems. Provides the scientific background for understanding pathophysiology and preparation for degrees in health professions. Does not count toward a major in Biological Science. 3 lec-3 lab (PR: BSC 227 with grade C or better)
Pre-req: BSC 227 with a minimum grade of C.
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 250 Microbiol & Human Disease **4 Credit hours**
Introduction to microbiology with emphasis on the role of microorganisms in the disease process.
Pre-req: BSC 227 with a minimum grade of C.
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

BSC 280 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 281 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 282 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 283 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 301 Vertebrate Embryology **4 Credit hours**
Vertebrate development based chiefly on frog, chick and pig embryos. 2 lec-4 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 302 Principles of Microbiology **3 Credit hours**
Basic microbiological techniques, fundamental principles of microbial action, physiological processes, immunology, serology, disease process. (PR: BSC 121 with grade of C or better) This course is lecture only (the associated lab for this course is listed under a different course number)
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 304 Microbiology Lab **2 Credit hours**
A laboratory course emphasizing basic microbiological techniques including preparation of culture media, gram staining, isolation and identification of bacteria from diverse environments, and evaluation of antiseptics and disinfectants.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 310 Comp Vertebrate Anatomy **4 Credit hours**
Structure, function and relationships of systems of selected vertebrates with an emphasis on embryology and evolution. 2 lec.-4 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 312 Invertebrate Zoology **4 Credit hours**
Survey of invertebrate phyla from protists through non-vertebrate chordates. Emphasis is placed upon indentification of taxa, development, microanatomy, life histories and evolutionary relationship.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 320 Principles of Ecology **4 Credit hours**
A fundamental approach to the basic principles underlying the interrelationships of organisms with their biotic and abiotic environments. A variety of aquatic and terrestrial ecosystems will be studied in the field and in the laboratory. 3 lec-3 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 322 Principles Cell Biology **4 Credit hours**
A fundamental approach to the princples of cell biology covering general cellular structure and function, organelles, intercellular interactions, molecular inter- actions, and modern cellular and molecular methods. 3 lec-3 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 324 Principles of Genetics **4 Credit hours**
The fundamental principles and mechanisms of inheritance. 3 lec-4 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 365 Introductory Biochemistry **3 Credit hours**
A survey course including introduction to basic biochemical concepts, metabolic pathways, and bioenergetics. Pre: CHM327 or 356.
Pre-req: BSC 121 with a minimum grade of C and CHM 356 with a minimum grade of C or CHM 327 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 401 Ichthyology **4 Credit hours**
Anatomy, physiology, ecology, zoogeography, economic importance and classification of major groups and repre- sentative local species of fishes. 2 lec-2 lab and field.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 406 Herpetology **4 Credit hours**
Taxonomy, morphology, distribution, life history, and ecology of reptiles and amphibians with a special emphasis on representatives native to West Virginia. 2 lec-2 lab.
Pre-req: BSC 302 or BSC 320 or BSC 322 or BSC 324.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 408 Ornithology **4 Credit hours**
An introduction to avian biology: identification, distribu- tion, migration, and breeding activities of birds. 2 lec-4 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 409 Mammalogy **4 Credit hours**
A study of the structural features, evolution and classifi- cation of mammals; other topics will include ecology, zoo- geography, behavior, reproductive strategies, physiological adaptation to extreme environments and economic aspects. 2 lec-2 lab and field.
Pre-req: BSC 121 with a minimum grade of C or BSC 105 with a minimum grade of B.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 410 Remote Sensing/GIS Appl **4 Credit hours**
A study of the physical systems for collecting remotely sensed data. Statistical/spatial analysis and modeling using image processing/ geographic information/spatial computer software systems with earth resources applications.
Pre-req: (BSC 302 or BSC 320 or BSC 322 or BSC 324) and PHY 203 and PHY 204 and (MTH 225 or STA 225).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 411 Dgtl Image Proc/GIS Model **4 Credit hours**
A study of image processing/geographic information/spatial analysis systems, concurrent and parallel image processing 3-D modeling scenarios utilizing geophysical data for computer simulation modeling.
Pre-req: (BSC 410 or PS 410 or IST 420).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 413 Prin of Organic Evolution **3 Credit hours**
Facts and possible mechanisms underlying the unity and diversity of life with emphasis on Neo-Darwinian concepts of the role of species in evolutionary phenomena.
Pre-req: BSC 302 or BSC 320 or BSC 322 or BSC 324.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 416 Plant Taxonomy **4 Credit hours**
Recognition of our native seed plants and ferns. 2 lec-4 lab.
Pre-req: BSC 302 or BSC 320 or BSC 322 or BSC 324.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 417 Biostatistics **3 Credit hours**
Statistical skills for biological/biomedical research, with emphasis on applications. Experimental design/survey sampling, estimation/ hypothesis testing procedures, regression, ANOVA, multiple comparisions. Implementation using statistical software such as SAS, BMDP. Pre: Permission (consistent with MTH 518 description)
Pre-req: BSC 302 with a minimum grade of D or BSC 320 with a minimum grade of D or BSC 322 with a minimum grade of D or BSC 324 with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 420 Plant Physiology **4 Credit hours**
Experimental study of plant life processes to include applicable biophysical and biochemical principles. 2 lec-4 lab.
Pre-req: BSC 121 with a minimum grade of C and CHM 212 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 421 Phycology **4 Credit hours**
Morphology, taxonomy, and techniques used in the study of fresh- water algae with emphasis upon applictions of ecological principles to current water quality problems. 2 lec-4 lab.
Pre-req: BSC 121 with a minimum grade of C or BSC 105 with a minimum grade of B.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 422 Animal Physiology **4 Credit hours**
Physiological principles operating in cells, organs, and systems of animals, with a focus on vertebrate, including human, function. 3 lec-3 lab (PR: BSC 322, CHM 355, MTH 140 or 132 or 229; or permission)
Pre-req: BSC 322 with a minimum grade of D and CHM 355 with a minimum grade of D and (MTH 140 with a minimum grade of D or MTH 140H with a minimum grade of D or MTH 132 with a minimum grade of D or MTH 229 with a minimum grade of D or MTH 229H with a minimum grade of D).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 424 Animal Parasitology **4 Credit hours**
Morphology, life histories, classification, and host relationships of common parasites. 2 lec-4 lab.
Pre-req: BSC 121 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 425 Systematics **3 Credit hours**
Biosystematics is a unifying discipline that combines taxonomy (collecting, describing and naming organisms), phylogenetics (evolutionary relationships among species), and classification (organization of taxa into groups which ultimately reflect evolutionary relationship).
Pre-req: BSC 121 with a minimum grade of C.
Grade Mode: Normal Grading Mode

BSC 426 Medical Entomology **4 Credit hours**
Role of certain insects and other arthropods in the trans- mission of disease organisms and methods of control. 2 lec-4 lab.
Pre-req: BSC 302 with a minimum grade of D or BSC 320 with a minimum grade of D or BSC 322 with a minimum grade of D or BSC 324 with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 428 Neuroscience **3 Credit hours**
The fundamentals of cellular and systems neuroscience, with application towards understanding current research and biomedical problems.
Pre-req: BSC 120 and (BSC 322 with a minimum grade of C or BSC 422 with a minimum grade of C or CHM 355 with a minimum grade of C).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 430 Plant Ecology **4 Credit hours**
The study of plants and their interactions with their environment at different levels of ecological organization: individuals, populations, communities, and ecosystems. Emphasis on quantitative analysis of ecological data.
Pre-req: BSC 121 with a minimum grade of C and BSC 320 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 431 Limnology **4 Credit hours**
Study of inland waters; ecological factors affecting lake and stream productivity and various aquatic communities.
Pre-req: BSC 320.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 438 Emerging Infect Diseases **3 Credit hours**
Introduces students to infectious diseases that are either newly emergent or have returned to prominence within the last decade.
Pre-req: BSC 302 or BSC 320 or BSC 322 or BSC 324.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 443 Microbial Genetics **3 Credit hours**
Microbial Genetics covers the essential functions of DNA replication and gene expression in prokaryotic cells. The course includes molecular genetics of bacteria and phages, bioinformatics and discussion of laboratory techniques.
Grade Mode: Normal Grading Mode

BSC 445 Microbial Ecology **3 Credit hours**
This course introduces students to the vital roles that microbes play in sustaining life on earth. Includes both theoretical and practical concepts ranging from the origin of life to biodegradation.
Pre-req: BSC 302 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 448 Introductory Immunology **3 Credit hours**
Comprehensive study of the molecules, cells and processes of the immune system. Also covered are diseases with an immunologic basis and technological applications of immunological principles. Pre: C or better in BSC 121, CHM 212
Pre-req: BSC 322 with a minimum grade of D or BSC 324 with a minimum grade of D.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 450 Molecular Biology **3 Credit hours**
Advanced principles in molecular function emphasizing current research using recombinant DNA methodology.
Pre-req: BSC 322.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 454 Princ Adv Techn Mol Biol **3 Credit hours**
Students will gain an understanding of modern molecular biology through standard and novel methods and understand and criticize the published literature.
Pre-req: BSC 322 or BSC 324 or BSC 365 or BSC 450.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 456 Genes and Development **3 Credit hours**
Focuses on mechanisms of complex organismal development including cell specification, morphogenesis, and induction. Genetic manipulations of the model organism Drosophilia will illustrate current information.
Pre-req: BSC 320 or BSC 322 or BSC 324.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 460 Conservation Biology **3 Credit hours**
This course focuses on the North American model of wildlife conservation (and its history), principles of biological diversity, threats to habitats and species of concern, and conservation policy.
Pre-req: BSC 320.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 480 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 481 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 482 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 483 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

BSC 485 Independent Study **1-4 Credit hours**
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Credit/No Credit Grade Only

BSC 486 Independent Study **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Credit/No Credit Grade Only

BSC 487 Independent Study **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Credit/No Credit Grade Only

BSC 488 Independent Study **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Credit/No Credit Grade Only

BSC 491 Capstone Experience **2 Credit hours**
An independent study involving a research project or intern- ship. Must be approved by Biological Science Faculty.
Attributes: Capstone Course, No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

BSC 501 Ichthyology **4 Credit hours**
Anatomy, physiology, ecology, zoogeography, economic importance and classification of major groups and repre- sentative local species of fishes. 2 lec-2 lab and field.
Grade Mode: Normal Grading Mode

BSC 504 Cellular Physiology **4 Credit hours**
The physio-chemical nature of intracellular processes in plant and animal cells with emphasis on the functional significance of microscopic and submicroscopic structure and organization. 3 lec-3 lab.
Grade Mode: Normal Grading Mode

BSC 505 Economic Botany **3 Credit hours**
Plants used by man for food, ornamental purposes, building materials, textiles and other industrial purposes: economic importance of conservation. No laboratory.
Grade Mode: Normal Grading Mode

BSC 506 Herpetology **4 Credit hours**
A survey of the reptiles and amphibians of the world with special emphasis placed on forms resident to West Virginia aspects of zoogeography, anatomy, taxonomy, and behavior. 2 lec-2 lab.
Grade Mode: Normal Grading Mode

BSC 508 Ornithology **4 Credit hours**
An introduction to avian biology: Identification, distribution, migration and breeding activities of birds. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 509 Mammalogy **4 Credit hours**
A study of the structural features, evolution and classifi- cation of the mammals; other topics will include ecology, zoogeography, behavior, reproductive strategies, physiologi- cal adaptations to extreme environments and economic aspects. 2 lec-2 lab.
Grade Mode: Normal Grading Mode

BSC 510 Remote Sensing/GIS Appl **4 Credit hours**
A study of the physical systems for collecting remotely sensed data. Statistical/spatial analysis and modeling using image processing/ geographic information/spatial computer software systems with earth resources applications.
Grade Mode: Normal Grading Mode

BSC 511 Dgtl Image Proc/GIS Model **4 Credit hours**
A study of image processing/geographic information/spatial analysis systems, concurrent and parallel image processing 3-D modeling scenarios utilizing geophysical data for computer simulation modeling.
Grade Mode: Normal Grading Mode

BSC 513 Prin of Organic Evolution **3 Credit hours**
The facts and possible mechanisms underlying the unity and diversity of life with emphasis on Neo-Darwiniam concepts of the role of species in evolutionary phenomena.
Grade Mode: Normal Grading Mode

BSC 516 Plant Taxonomy **4 Credit hours**
Identification and classification of seed plants and ferns of eastern United States. Readings in history and principles of taxonomy, rules of nomenclature and related topics. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 517 Biostatistics **3 Credit hours**
Statistical skills for biological/biomedical research, with emphasis on applications.Experimental design/survey sampling, estimation/ hypothesis testing procedures, regression, AVONA, multiple comparisons. Implementation using statistical software such as SAS, BMDP. Permission (consistent with MTH 518 description)
Grade Mode: Normal Grading Mode

BSC 520 Plant Physiology **4 Credit hours**
Experimental study of plant life processes to include applicable biophysical and biochemical principles. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 521 Phycology **4 Credit hours**
Taxonomy and morphology of algae. Techniques used in the study of algae with emphasis upon application of ecological principles to current water quality problems. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 522 Animal Physiology **4 Credit hours**
Physiological principles operating in cells, organs, and systems of animals, with a focus on vertebrate, including human, function.
Grade Mode: Normal Grading Mode

BSC 524 Animal Parasitology **4 Credit hours**
Morphology, life histories, classification, and host relationships of common parasites. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 525 Systematics **3 Credit hours**
Biosystematics is a unifying discipline that combines taxonomy (collecting, describing, and naming organisms), phylogenetics (evolutionary relationships among species), and classification (organization of taxa into groups which ultimately reflect evolutionary relationship.
Grade Mode: Normal Grading Mode

BSC 528 Neuroscience **3 Credit hours**
The fundamentals of cellular and systems neuroscience, with application towards understanding current research and biomedical problems.
Grade Mode: Normal Grading Mode

BSC 530 Plant Ecology **4 Credit hours**
The study of plants and their interactions with their environment at different levels of ecological organization: individuals, populations, communities, and ecosystems. Emphasis on quantitative analysis of ecological data.
Grade Mode: Normal Grading Mode

BSC 531 Limnology **4 Credit hours**
The study of inland waters; ecological factors affecting lake and stream productivity and various aquatic communities. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 538 Emerging Infectious Diseases **3 Credit hours**
Introduces students to infections diseases that are either newly emergent or have returned to prominence within the last decade.
Grade Mode: Normal Grading Mode

BSC 543 Microbial Genetics **3 Credit hours**
Microbial Genetics covers the essential functions of DNA replication and gene expression in prokaryotic cells. The course includes molecular genetics of bacteria and phages, bioinformatics and discussion of laboratory techniques.
Grade Mode: Normal Grading Mode

BSC 545 Microbial Ecology **3 Credit hours**
This course introduces students to the vital roles that microbes play in sustaining life on earth. Includes both theoretical and practical concepts ranging from the origin of life to biodegradation.
Grade Mode: Normal Grading Mode

BSC 550 Molecular Biology **3 Credit hours**
Advanced principles in molecular function emphasizing current research using recombinant DNA methodology. (PR: BSC 322 or equivalent)
Grade Mode: Normal Grading Mode

BSC 556 Genes and Development **3 Credit hours**
An in depth study of the genetic mechanisms of complex organismal development including cell specification, induction and morphogenesis.
Grade Mode: Normal Grading Mode

BSC 560 Conservation Biology **3 Credit hours**
This course focuses on the North American model of wildlife conservation (and its history), principles of biology diversity, threats to habitats and species of concern, adn conservation policy. Primarily for teachers in the biological sciences, general and applied sciences. Includes fieldwork, seminars, and demonstrations related to conservation. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 580 Special Topics **1-4 Credit hours**
(PR: Permission)
Grade Mode: Normal Grading Mode

BSC 581 Special Topics **1-4 Credit hours**
(PR: Permission)
Grade Mode: Normal Grading Mode

BSC 582 Special Topics **1-4 Credit hours**
(PR: Permission)
Grade Mode: Normal Grading Mode

BSC 583 Special Topics **1-4 Credit hours**
(PR: Permission)
Grade Mode: Normal Grading Mode

BSC 585 Independent Study **1-4 Credit hours**
(PR: Permission)
Grade Mode: Credit/No Credit Grade Only

BSC 586 Independent Study **1-4 Credit hours**
(PR: Permission)
Grade Mode: Credit/No Credit Grade Only

BSC 587 Independent Study **1-4 Credit hours**
(PR: Permission)
Grade Mode: Credit/No Credit Grade Only

BSC 588 Independent Study **1-4 Credit hours**
(PR: Permission)
Grade Mode: Credit/No Credit Grade Only

BSC 601 Vertebrate Embryology **4 Credit hours**
Vertebrate development based on frog, chick and pig embryos. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 608 Plant Growth & Developmnt **4 Credit hours**
Comprehensive advanced study of correlative growth in plants with emphasis on germination, dormancy, growth substances and physiological phenomena associated with phases of development.
Grade Mode: Normal Grading Mode

BSC 610 Adv Vert Morphology **3 Credit hours**
AVM is an intensive, laboratory-based course in vertebrate morphology. Core responsibilities include detailed dissection and comparative cranial osteology. Each student must complete an independent dissection project and term paper.
Grade Mode: Normal Grading Mode

BSC 620 Taxonomy Vascular Plants **1-2 Credit hours**
Field studies in the taxonomy of higher plants. (Limited to 4 hours credit per student).
Co-req: BSC 622
Grade Mode: Normal Grading Mode

BSC 621 Taxonomy Vascular Plants **1-2 Credit hours**
Field studies in the taxonomy of higher plants. (Limited to 4 hours credit per student).
Grade Mode: Normal Grading Mode

BSC 622 Taxonomy Vascular Plants **1-2 Credit hours**
Field studies in the taxonomy of higher plants. (Limited to 4 hours credit per student).
Co-req: BSC 620
Grade Mode: Normal Grading Mode

BSC 625 Advanced Physiology **4 Credit hours**
Lecture, current literature and introduction to research in physiological systems. 3 lec-3 lab.
Grade Mode: Normal Grading Mode

BSC 631 Animal Ecology **4 Credit hours**
A study of population and behavior ecology; community dynamics and field techniques. 2 lec-4 lab.
Grade Mode: Normal Grading Mode

BSC 640 Cell Bio & Biotechnology **3 Credit hours**
Broad coverage of applied cell biology, biotechnology with high current interest and utility to the medical, agricultural and commercial product development. Application of DNA technologies for biotech commercialization.
Grade Mode: Normal Grading Mode

BSC 644 Quantitative Ecology **3 Credit hours**
An introduction to statistical analyses using presence absence, mark-recapture, and count data to estimate population parameters, such as occupancy and survival.
Grade Mode: Normal Grading Mode

BSC 649 Wetland Ecology **3 Credit hours**
Grade Mode: Normal Grading Mode

BSC 650 Special Problems **1-3 Credit hours**
By permission of adviser.
Grade Mode: Credit/No Credit Grade Only

BSC 651 Special Problems **1-3 Credit hours**
By permission of adviser.
Grade Mode: Credit/No Credit Grade Only

BSC 652 Special Problems **1-3 Credit hours**
By permission of adviser.
Grade Mode: Credit/No Credit Grade Only

BSC 660 Seminar I **2 Credit hours**
Topics relevant to preparation for a career in the life sciences including: literature mining and interpretation, scientific ethics, preparation and delivery of scientific presentations, and career development tools.
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

BSC 661 Topics in Biological Sciences **2 Credit hours**
In depth group discussion of current biological issues.
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

BSC 662 Seminar II **1 Credit hour**
Oral presentation of individual topics.
Pre-req: BSC 660.
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

BSC 679 Problem Report **1-4 Credit hours**
Preparation and completion of a written report from experimental or field research in biological sciences. (PR: permission)
Grade Mode: Normal Grading Mode

BSC 680 Special Topics **1-4 Credit hours**
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

BSC 681 Thesis **1-6 Credit hours**
By permission of adviser.
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

BSC 716 Adv Cell Phys Nurse Anesthesia **2 Credit hours**
Study of structure amd function of human cells, including protein synthesis, metabolism and reproduction. Study of genetic disorders and anesthesia. Study of anti-cancer drugs. Analyze types and rules of various cell membrane receptors on anesthesia process.
Grade Mode: Normal Grading Mode

BSC 717 Adv Ana Phy Path Nurse 1 **3 Credit hours**
Anatomy, Physiology, pathophysiology and anesthetic considerations related to the respiratory and renal systems.
Grade Mode: Normal Grading Mode

BSC 718 Adv Ana Phy Path Nurse 2 **3 Credit hours**
Anatomy, physiology, pathophysiology and anesthetic considerations related to the cardiovascular system.
Grade Mode: Normal Grading Mode

BSC 719 Adv Ana Phy Path Nurse 3 **3 Credit hours**
Anatomy, physiology, pathophysiology and anesthetic considerations related to the nervous and endocrine systems.
Grade Mode: Normal Grading Mode

Chemistry

CHM 109 Chemistry in the Home **4 Credit hours**
An introduction to basic concepts of chemical science as it applies to materials commonly found within the household. Students will be expected to learn to evaluate potential hazards of such materials.
Pre-req: MTH 121 or MTH 121B or MTH 121H or MTH 125 or MTH 127 or MTH 130 or MTH 130H or MTH 131 or MTH 132 or MTH 140 or MTH 190 or MTH 203 or MTH 220 or STA 225 or MTH 225 or MTH 229 or MTH 229H.
Attributes: Core II Natural Sciences
Grade Mode: Normal Grading Mode

CHM 111 Foundations of Chemistry **3 Credit hours**
This course will introduce students to basic chemical facts and concepts. Topics will include units, dimensional analysis, nomenclature, solutions, atomic structure, and stoichiometry.
Pre-req: MTH 127 with a minimum grade of C or ACT Math with a score of 21 or Placement Chemistry with a score of 111 or SAT Mathematics Before Mar. 16 with a score of 500 or SAT MATH SECTION SCORE with a score of 530 or MTH 130 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 205 General, Organic, and Biochem **3 Credit hours**
Introductory course for health professions students and non-science majors covering basic chemical principles with applications in organic chemistry and biochemistry.
Grade Mode: Normal Grading Mode

CHM 211 Principles of Chemistry I **3 Credit hours**
A study of the properties of materials and their inter- actions with each other. Development of theories and applications of the principles of energetics, dynamics and structure. Intended primarily for science majors and pre-professional students. 3 lec.
Pre-req: (ACT Math with a score of 23 or SAT Mathematics Before Mar. 16 with a score of 540 or SAT MATH SECTION SCORE with a score of 570 or CHM 111 with a minimum grade of C or Placement Chemistry with a score of 211) and CHM 217 (may be taken concurrently).
Concurrent PR: CHM 217
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

CHM 212 Principles Chemistry II **3 Credit hours**
A continuation of chemistry 211 with emphasis on the inorganic chemistry of the representative elements and transition metals. 3 lec.
Pre-req: (CHM 211 with a minimum grade of C and (CHM 218 (may be taken concurrently) with a minimum grade of D or CHM 218H (may be taken concurrently) with a minimum grade of D).
Concurrent PR: CHM 218 or CHM 218H
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

CHM 217 Principles of Chem Lab I **2 Credit hours**
A laboratory course that demonstrates the application of concepts introduced in Chemistry 211.
Pre-req: CHM 211 (may be taken concurrently).
Concurrent PR: CHM 211
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

CHM 218 Principles of Chem Lab II **2 Credit hours**
A laboratory course that demonstrates the application of concepts introduced in Chemistry 212.
Pre-req: CHM 212 (may be taken concurrently).
Concurrent PR: CHM 212
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

CHM 218H Prin Chem Honor Lab II **2 Credit hours**
An advanced laboratory class designed for Principles of Chemistry II students. This lab will introduce students to concepts and/or techniques important to later laboratory classes and research.
Pre-req: Admitted Honors College with a score of 1.
Co-req: CHM 212
Attributes: Honors, No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 280 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 281 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 282 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 283 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 291H Honors in Chemistry **1-4 Credit hours**
Independent study or undergraduate research project for outstanding students.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 305 Research Methods Chem **1 Credit hour**
A course concerning the searching and use of the chemical literature, ethical issues relating to the conduct of scientific research, proposal writing, scientific presentations, and proper scientific laboaratory conduct.
Pre-req: CHM 356 with a minimum grade of C.
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 327 Intro Organic Chemistry **3 Credit hours**
A one semester introduction to organic chemistry emphasizing structure, nomenclature, and reactivity. (Cannot fulfill an upper division chemistry elective.)
Pre-req: CHM 212 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 331 Chemistry Seminar **0 Credit hours**
Students attend lectures presented by internal and external speakers to learn about the nature and variety of chemical research.
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Credit/No Credit Grade Only

CHM 332 Chemistry Seminar **0 Credit hours**
Students attend lectures presented by internal and external speakers to learn about the nature and variety of chemical research.
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Credit/No Credit Grade Only

CHM 345 Intro to Analytical Chem **4 Credit hours**
An introduction to basic techniques of analytical chemistry and data analysis through statistical procedures. Traditional wet and contemporary instrumental methods are covered with an emphasis on experimental care and craftsmanship.
Pre-req: CHM 212 and (CHM 218 or CHM 218H).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 355 Organic Chemistry I **3 Credit hours**
A systematic study of organic chemistry including modern structural theory, spectroscopy, and stereochemistry; app- lication of these topics to the study of reactions and their mechanisms and applications to synthesis. 3 lec.
Pre-req: CHM 212 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 356 Organic Chemistry II **3 Credit hours**
Continuation of Chemistry 355. 3 lec.
Pre-req: CHM 355 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 357 Physical Chemistry: Quantum **4 Credit hours**
A study of quantum mechanics applied to atomic structure, chemical bonding, and spectroscopy. 3 lec.-2 lab.
Pre-req: CHM 212 and MTH 229.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 358 Physical Chemistry: Thermo. **4 Credit hours**
A study of chemical thermodynamics, equilibrium, and kinetics. 3 lec.-2 lab.
Pre-req: CHM 212 with a minimum grade of C and (MTH 229 or MTH 229H) and (PHY 211 or PHY 201).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 361 Intro Organic Chm Lab **3 Credit hours**
An introduction to of experimental organic chemistry with emphasis on fundamental techniques and their application to the preparation and identification of organic compounds. 6 lab.
Pre-req: CHM 356 (may be taken concurrently).
Concurrent PR: CHM 356
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 361H Intro Honors Organic Chem Lab **3 Credit hours**
This laboratory will introduce students to advanced concepts and techniques in organic synthesis and spectroscopy. It requires students to engage in an independent synthetic project from the chemical literature.
Pre-req: CHM 356 (may be taken concurrently) and Admitted Honors College with a score of 1.
Concurrent PR: CHM 356
Attributes: Honors
Grade Mode: Normal Grading Mode

CHM 365 Introductory Biochemistry **3 Credit hours**
A survey course including introduction to basic biochemical concepts, metabolic pathways, and bioenergetics. 3 lec.
Pre-req: CHM 327 or CHM 356.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 366 Intro Biochemistry Lab **2 Credit hours**
Introduction to basic biochemical laboratory techniques including chromatography, electrophonesis, and enzyme kinetics; methods for identification and characterization of biochemical systems. 4 lab.
Pre-req: CHM 365 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 390H Honors in Chemistry **1-4 Credit hours**
Independent study or undergraduate research project for outstanding students.
Pre-req: Admitted Honors College with a score of 1.
Attributes: Honors, No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 391H Honors in Chemistry **1-4 Credit hours**
Independent study or undergraduate research project for outstanding students.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 401 Research for Undergrad **1-4 Credit hours**
Students engage in research project in collaboration with a faculty member.
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 411 Modern Instrument Methods **4 Credit hours**
This course investigates the theory and functional aspects of modern analytical instrumentation. Emphasis is placed on the components of instruments and the applicability of various techniques to specific analytical problems.
Pre-req: CHM 307 with a minimum grade of C or CHM 357 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 428 Intro Forensic Methods **3 Credit hours**
Introduction to crime scene investigation, physical evidence collection, serology and DNA technologies (PCR,RFLP). Dis- cussion of statistical analysis of DNA and managing a DNA database, using CODIS as an example. (PR: CHM 365 and either BSC 322 or 324).
Pre-req: CHM 365 and (BSC 322 or BSC 324).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 431 Chemistry Seminar **0 Credit hours**
Students attend lectures presented by internal and external speakers to learn about the nature and variety of chemical research.
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Credit/No Credit Grade Only

CHM 432 Chemistry Seminar **0 Credit hours**
Students attend lectures presented by internal and external speakers to learn about the nature and variety of chemical research. Students also present an oral and written presentation of their capstone experience.
Pre-req: CHM 490 or CHM 491.
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Credit/No Credit Grade Only

CHM 448 Adv Inorganic Chemistry I **4 Credit hours**
Study of physical properties and periodic relationships of inorganic materials. 3 lec, 2 lab.
Pre-req: CHM 356 with a minimum grade of D and (CHM 357 with a minimum grade of D or CHM 358 with a minimum grade of D).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 451 Biological Mass Spectrometry **4 Credit hours**
This course investigates the theory and applications of mass spectrometry. It includes a laboratory component in which you will learn to run the mass spectrometers and interpret mass spectral results.
Pre-req: CHM 356 with a minimum grade of C.
Grade Mode: Normal Grading Mode

CHM 465 Adv Organic Chemistry I **3 Credit hours**
Studies of the dynamics of organic reactins with emphasis on mechanisms and stereochemistry. 3 lec.
Pre-req: CHM 356 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 466 Adv Organic Chemistry II **3 Credit hours**
A continuation of Chemistry 465 with emphasis on synthetic methods. 3 lec.
Pre-req: CHM 356 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 467 Intermediate Biochemistry **3 Credit hours**
An intermediate level discussion of the biochemistry of mammalian cells.
Pre-req: CHM 365 with a minimum grade of C or BSC 365 with a minimum grade of C.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 478 Appl Microscopy in Research **4 Credit hours**
A combined lecture/lab/self-motivated research course that results in a microscopy based project to be presented by each student in a public forum (may augment capstone).
Grade Mode: Normal Grading Mode

CHM 480 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 481 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 482 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 483 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

CHM 485 Independent Study **1-4 Credit hours**
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 486 Independent Study **1-4 Credit hours**
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 490 Internship **1-6 Credit hours**
Students engage in supervised chemical laboratory work in a professional setting.
Pre-req: CHM 305.
Attributes: Capstone Course, No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 491 Capstone Experience **2-4 Credit hours**
Students engage in a collaborative research project with a faculty member.
Pre-req: CHM 305.
Attributes: Capstone Course, No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

CHM 511 Modern Instrument Methods **4 Credit hours**
This course investigates the theory and functional aspects of modern analytical instrumentation. Emphasis is placed on the components of instruments and the applicability of various techniques to specific analytical problems.
Pre-req: CHM 307 with a minimum grade of C or CHM 357 with a minimum grade of C.
Grade Mode: Normal Grading Mode

CHM 540 Thermodynamics **3 Credit hours**
An introduction to chemical thermodynamics and statistical mechanics. 3 lec.
Grade Mode: Normal Grading Mode

CHM 548 Adv Inorganic Chemistry I **4 Credit hours**
Study of physical and chemical properties and periodic relationships of inorganic materials. 3 lec, 2 lab (PR: CHM 356, CHM 307, or CHM 357)
Grade Mode: Normal Grading Mode

CHM 549 Adv Inorganic Chem II **3 Credit hours**
A detailed consideration of bonding, structure, reaction rates and equilibrium involving inorganic materials. 3 lec.
Grade Mode: Normal Grading Mode

CHM 551 Biological Mass Spectrometry **4 Credit hours**
This course investigates the theory and applications of mass spectrometry. It includes a laboratory component in which you will learn to run the mass spectrometers and interpret mass spectral results.
Grade Mode: Normal Grading Mode

CHM 565 Adv Organic Chemistry I **3 Credit hours**
Studies of the dynamics of organic reactions with emphasis on mechanisms and stereo chemistry. 3 lec.
Grade Mode: Normal Grading Mode

CHM 566 Adv Organic Chemistry II **3 Credit hours**
A continuation of Chemistry 565 with emphasis on synthetic methods. 3 lec.
Pre-req: CHM 565.
Grade Mode: Normal Grading Mode

CHM 567 Intermediate Biochemistry **3 Credit hours**
A survey course including introduction to basic biochemical concepts, bioenergetics, and information transfer.
Pre-req: CHM 365 with a minimum grade of C or BSC 365 with a minimum grade of C.
Grade Mode: Normal Grading Mode

CHM 580 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 581 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 582 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 583 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 585 Independent Study **1-4 Credit hours**
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

CHM 586 Independent Study **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 587 Independent Study **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 588 Independent Study **1-4 Credit hours**
Grade Mode: Normal Grading Mode

CHM 604 Theories Analytical Chem **2 Credit hours**
Offered on demand.
Pre-req: CHM 556.
Grade Mode: Normal Grading Mode

CHM 607 Theoretical Organic Chem **2 Credit hours**
The application of quantitative methods to problems in structure and dynamics. 2 lec.
Pre-req: CHM 565.
Grade Mode: Normal Grading Mode

CHM 618 Kinetics **3 Credit hours**
An advanced study of reaction rates and mechanisms.
Grade Mode: Normal Grading Mode

CHM 628 Special Topics-Inorganic **1-3 Credit hours**
Offered on demand.
Grade Mode: Normal Grading Mode

CHM 629 Special Topics-Organic **1-3 Credit hours**
Offered on demand.
Grade Mode: Normal Grading Mode

CHM 630 Special Topics-Physical **1-3 Credit hours**
Offered on demand.
Grade Mode: Normal Grading Mode

CHM 631 Seminar **1 Credit hour**
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

CHM 632 Seminar **1 Credit hour**
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

CHM 678 Applied Micr in Research **4 Credit hours**
A combined lecture/lab/self-motivated research course that results in a microscopy based project to be presented by each student at an open forum (can augment thesis project).
Grade Mode: Normal Grading Mode

CHM 679 Problem Report **3 Credit hours**
Preparation of a comprehensive written report on a topic in Chemistry of current importance. Registration only by permission of Department.
Grade Mode: Normal Grading Mode

CHM 682 Research **1-12 Credit hours**
Credit in the course is earned by pursuing a directed original investigation in a field of chemistry. Twelve semester hours credit in research are applied toward the M.S. degree. Students may sign for one or more credit hurs per semester depending upon the time to be spent on research. A grade of PR may be reported at the close of each term or semester.
Grade Mode: Normal Grading Mode

CHM 685 Independent Study **1-4 Credit hours**
Individual study of topics not offered in regularly scheduled classes.
Grade Mode: Normal Grading Mode

CHM 686 Independent Study **1-4 Credit hours**
Individual study of topics not offered in regularly scheduled classes.
Grade Mode: Normal Grading Mode

CHM 687 Independent Study **1-4 Credit hours**
Individual study of topics not offered in regularly scheduled classes.
Grade Mode: Normal Grading Mode

CHM 688 Independent Study **1-4 Credit hours**
Individual studt of topics not offered in regularly scheduled classes.
Grade Mode: Normal Grading Mode

CHM 723 Chemistry and Physics **3 Credit hours**
Scientific prinicples and clinical application of properties of matter, gas laws, vaporization, fluid dynamics, explosion hazards, electrical safety, acid-base balance, blood gas analysis, biochemistry in anesthesia, mechanisms of narcosis. Analyze the molecular basis for molecular bonding, stereochemistry, protein confirmation, enzyme-substrate reactions.
Grade Mode: Normal Grading Mode

Physics

PHY 101 Conceptual Physics **3 Credit hours**
Introduces nonscience majors to applications of physics in life. Emphasizes conceptual understanding of basic principles in classical and modern physics. Recommended for science students with no high school physics.
Pre-req: (MTH 121 or MTH 127 or MTH 130 or MTH 130E or MTH 229 or MTH 229H or MTH 203 or MTH 121B) or MTH 130H and PHY 101L (may be taken concurrently).
Concurrent PR: PHY 101L
Co-req: PHY 101L
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 101L Conceptual Physics Lab **1 Credit hour**
Conceptual Physics Laboratory. A laboratory course designed to include the principles and applications of physics that are introduced in Physics 101. (CR: PHY 101) 2 lab.
Co-req: PHY 101
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 190 Overview of Physics (CT) **3 Credit hours**
An algebra-based overview of well-established topics studied as part of a major in physics, including classical physics, special relativity, quantum mechanics, particle physics, and cosmology.
Attributes: Critical Thinking
Grade Mode: Normal Grading Mode

PHY 201 College Physics I **3 Credit hours**
First half of an introduction to physics for life-science students, using algebra and vectors by triangles: force, energy, particle dynmaics, rotation, fluids, waves, thermal phenomena.
Pre-req: (MTH 127 and MTH 122) or (MTH 130 and MTH 122) or MTH 132 or (MTH 140 and MTH 122) or MTH 229 or MTH 229H or MTH 140H and PHY 202 (may be taken concurrently).
Concurrent PR: PHY 202
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 202 General Physics I Laboratory **1 Credit hour**
Laboratory to accompany PHY 201 or PHY 211, focusing on mechanics concepts and applications.
Pre-req: PHY 201 (may be taken concurrently) or PHY 211 (may be taken concurrently).
Concurrent PR: PHY 201 or PHY 211
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 203 College Physics II **3 Credit hours**
Second half of an introduction to physics for students of natural (life) sciences, using algebra and vectors by triangles: E&M fields, circuits; ray optics, interference; atoms, nuclei.
Pre-req: (PHY 201 with a minimum grade of C and PHY 202 with a minimum grade of C) and PHY 204 (may be taken concurrently) with a minimum grade of C.
Concurrent PR: PHY 204
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 204 General Physics 2 Laboratory **1 Credit hour**
Laboratory to accompany PHY 203 or PHY 213, focusing on classical E&M, circuits, and optics.
Pre-req: (PHY 203 (may be taken concurrently) or PHY 213 (may be taken concurrently)).
Concurrent PR: PHY 203 or PHY 213
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 211 University Physics I **4 Credit hours**
First half of an introduction to physics for students of physical science or engineering, using calculus and vectors by components: force, energy, particle dynamics, rotation, fluids, waves, thermodynamics.
Pre-req: (MTH 229 (may be taken concurrently) or MTH 229H (may be taken concurrently)) and PHY 202 (may be taken concurrently).
Concurrent PR: (MTH 229 or MTH 229H) and PHY 202
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 213 University Physics II **4 Credit hours**
Second half of an introduction to physics for students of physical science or engineering, using calculus and vectors by components: E&M fields, circuits; ray optics, interference; atoms, nuclei.
Pre-req: MTH 230 (may be taken concurrently) and PHY 204 (may be taken concurrently) and (PHY 201 with a minimum grade of C or PHY 211 with a minimum grade of C) and PHY 202.
Concurrent PR: MTH 230 and PHY 204
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 214 Lab Methods in Physics **1 Credit hour**
A laboratory course to accompany Physics 211-213. 3 lab.
Pre-req: PHY 213 (may be taken concurrently).
Concurrent PR: PHY 213
Attributes: Natural Sciences, Core II Natural Sciences
Grade Mode: Normal Grading Mode

PHY 222 Investigate the Universe **2 Credit hours**
A creative laboratory course designed to give students an opporutnity to work with modern research equipment, with ample time to conduct experiments and/or investigate phenomenae of their choosing.
Pre-req: (MTH 122 and MTH 127) or (MTH 122 and MTH 130) or MTH 132.
Grade Mode: Normal Grading Mode

PHY 280 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 281 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 282 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 283 Special Topics **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 300 Electricity & Magnetism **3 Credit hours**
A course including the study of electrostatics, magneto- statics, electromagnetic induction, introduction to Maxwell's equations and electromagnetic waves. 3 lec.
Pre-req: (PHY 203 or PHY 213) and MTH 231.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 302 Electricity & Magnetism II **3 Credit hours**
A study of Maxwell's equations and electromagnetic waves, radiation theory, optical phenomena, and electrodynamics. 3 lec.
Pre-req: PHY 300.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 304 Optics **3 Credit hours**
An intermediate course in geometrical and physical optics. 3 lec.
Pre-req: (PHY 203 or PHY 213) and (PHY 405 (may be taken concurrently) or PHY 505 (may be taken concurrently)).
Concurrent PR: PHY 405 or PHY 505
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 308 Thermal Physics **3 Credit hours**
A study of thermodynamics, kinetic theory of gases, and an introduction to statistical mechanics 3 lec.
Pre-req: (PHY 203 or PHY 213) and MTH 231.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 314 Electronic Physics **3 Credit hours**
A study of transistors, integrated circuits and their associated circuits. 3 lec.
Pre-req: PHY 203 or PHY 213 and PHY 415 (may be taken concurrently).
Concurrent PR: PHY 415
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 320 Intro Modern Physics **3 Credit hours**
An introductory study of atomic and molecular theories, relativity, quantum theory, and nuclear physics. 3 lec.
Pre-req: MTH 230 and (PHY 203 or PHY 213).
Co-req: PHY 421
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 330 Mechanics **3 Credit hours**
An intermediate study of the fundamental principles of statics of particles and rigid bodies, momentum and energy, dynamics of particles, harmonic oscillations, and wave motion. 3 lec.
Pre-req: MTH 231 and (PHY 203 or PHY 213).
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 340 Scientific Computing **3 Credit hours**
Introduction to some of the most important tools and techniques in scientific computing, including object-oriented design, version control, and MPI for high-performance computing.
Pre-req: MTH 229 with a minimum grade of D or MTH 229H with a minimum grade of D or IST 163 with a minimum grade of D.
Grade Mode: Normal Grading Mode

PHY 350 Biological Physics **3 Credit hours**
Physical principles underlying the mechanisms by which living organisms survive, adapt, grow. Will enhance writing skills and strategies. 2 lec - 2 lab. (PR: PHY 203 or 213, and PHY 204)
Pre-req: PHY 203 (may be taken concurrently) or PHY 213 (may be taken concurrently) and PHY 204.
Concurrent PR: PHY 203 or PHY 213
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 360 Medical Physics **3 Credit hours**
Physics principles applied to devise methods for diagnostic and treatment of the human body. Will enhance writing skills and strategies. 2lec-2lab.
Pre-req: (PHY 203 or PHY 213) and PHY 204.
Grade Mode: Normal Grading Mode

PHY 405 Optics Lab **2 Credit hours**
A course in optical experiments encompassing geometrical and physical optics. This course is to be taken with Physics 304.
Pre-req: PHY 304 (may be taken concurrently).
Concurrent PR: PHY 304
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 415 Electronics Lab **2 Credit hours**
A course in laboratory measurements encompassing transistors, integrated circuits, and their associated circuits. This course is to be taken with Physics 314.
Pre-req: PHY 314 (may be taken concurrently).
Concurrent PR: PHY 314
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 420 Astrophysics **3 Credit hours**
A detailed study of core problems in Astrophysics such as orbital dynamics, radiation processes, stellar structure and evolution, galactic dynamics, and cosmology.
Pre-req: PHY 213 with a minimum grade of D and MTH 231 with a minimum grade of D.
Grade Mode: Normal Grading Mode

PHY 421 Modern Physics Lab **2 Credit hours**
Laboratory exercises on modern physics topics encompassing both experiments of historic significance and current applications. To be taken with Physics 320, or equivalent.
Co-req: PHY 320
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 425 Solid State Physics **3 Credit hours**
The course provides a broad introduction to the structure and physical properties of solids. It also serves as a basis for advanced courses in solid state and condensed matter physics.
Pre-req: PHY 320 or PHY 442 or CHM 442.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 435 Computational Physics **3 Credit hours**
A course on using numerical methods and computer programming languages for solving complex physics problems and for the simulation of various physical processes. 2 lec-2 lab.
Pre-req: PHY 213 with a minimum grade of D and PHY 330 with a minimum grade of D and (PHY 445 with a minimum grade of D or PHY 446 with a minimum grade of D) and MTH 231 with a minimum grade of D.
Grade Mode: Normal Grading Mode

PHY 442 Quantum Mechanics **3 Credit hours**
A study of waves and particles, the Schroedinger and Heisenberg formulations, particles in potential fields, scattering and perturbation theories, and application to atomic and nuclear structure. 3 lec.
Pre-req: MTH 335 and PHY 330.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 443 Quantum Mechanics II **3 Credit hours**
This is the second part of a two-semester introduction to quantum mechanics. Emphasis is on applications of quantum theory including approximation techniques and the study of more realistic quantum systems.
Pre-req: PHY 442 or CHM 442.
Grade Mode: Normal Grading Mode

PHY 444 Advanced Laboratory **2 Credit hours**
Developments in producing and detecting correlated photon pairs has enabled implementation of undergraduate laboratories demonstrating fundamental quantum mechanical principles. This laboratory also incorporates fundamental solid state and materials science experiments.
Pre-req: PHY 425 (may be taken concurrently) and PHY 442 (may be taken concurrently).
Concurrent PR: PHY 425 and PHY 442
Co-req: PHY 425, PHY 442
Grade Mode: Normal Grading Mode

PHY 445 Math Methods of Physics **3 Credit hours**
An introduction to theory of orthogonal functions, curvilinear coordinate systems, vector and tensor fields, and their applications in physics. Problems are drawn from different areas of physics. 3 lec.
Pre-req: PHY 203 or PHY 213 and MTH 231.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 446 Math Methods of Physics II **3 Credit hours**
A second semester of a full year course on methods of solving problems in physics: calculus of variations, ordinary and partial differential equations, and special functions with real physics problems.
Pre-req: PHY 445.
Grade Mode: Normal Grading Mode

PHY 447 Mechanics for Teachers **4 Credit hours**
An indepth study of mechanics for education majors specializing in Physics with emphasis on problem solving techniques, demonstrations, experiments and computer applications. (PR: PHY 203, MTH 122 and MTH 140)
Pre-req: PHY 203 or PHY 213.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 480 Special Topics **2-4 Credit hours**
By permission of department chairman.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 481 Special Topics **1-4 Credit hours**
By permission of department chairman.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 482 Special Topics **1-4 Credit hours**
By permission of department chairman.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 483 Special Topics **1-4 Credit hours**
By permission of department chairman.
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 485 Independent Study **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 486 Independent Study **1-4 Credit hours**
Attributes: No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

PHY 487 Independent Study **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 488 Independent Study **1-4 Credit hours**
Attributes: Natural Sciences
Grade Mode: Normal Grading Mode

PHY 491 Capstone **1-2 Credit hours**
To give a capstone expeience to physics majors in their junior or senior years by applying the principles of physics to the solution of real life problems. (PR: CSD 203, or 218 and lab).
Attributes: Capstone Course, Natural Sciences
Grade Mode: Normal Grading Mode

PHY 492 Capstone **1-2 Credit hours**
To give a capstone experience to physics majors in their junior or senior years by applying the principles of physics to the solution of real life problems. (PR: PHY 491)
Pre-req: PHY 491.
Attributes: Capstone Course, No Textbook Required, Natural Sciences
Grade Mode: Normal Grading Mode

PHY 505 Optics Lab **2 Credit hours**
A course in optical experiments encompassing geometrical and physical optics. This course is to be taken with Physics 304.
Pre-req: PHY 304 (may be taken concurrently).
Concurrent PR: PHY 304
Grade Mode: Normal Grading Mode

PHY 515 Electronics Lab **2 Credit hours**
A course in laboratory measurements encompassing transistors, integrated circuits, and their associated circuits. This course is to be taken with Physics 314.
Grade Mode: Normal Grading Mode

PHY 520 Astrophysics **3 Credit hours**
A detailed study of core problems in Astrophysics such as orbital dynamics, radiation processes, stellar structure and evolution, galactic dynamics, and cosmology.
Grade Mode: Normal Grading Mode

PHY 521 Modern Physics Lab **2 Credit hours**
Laboratory exercises on modern physics topics encompassing both experiments of historic significance and current applications. To be taken with Physics 320, or equivalent.
Grade Mode: Normal Grading Mode

PHY 525 Solid State Physics **3 Credit hours**
The purpose of this course is to provide a broad introduction to the structures and physical properties of solids, which are of extraordinary importance in the modern world.
Grade Mode: Normal Grading Mode

PHY 535 Computational Physics **3 Credit hours**
A course in using numerical methods and computer programming languages for solving complex physics problems and for the simulation of various physical processes. 2 lec-2 lab.
Grade Mode: Normal Grading Mode

PHY 542 Quantum Mechanics **3 Credit hours**
Mathematical formalism of quantum mechanics, particles in potential fields, perturbation theory and other approxima- tion methods, scattering, applications to simple systems. 3 lec.
Grade Mode: Normal Grading Mode

PHY 543 Quantum Mechanics II **3 Credit hours**
This is the second part of a two-semester introduction to quantum mechanics. Emphasis is on applications of quantum theory including approximation techniques and the study of more realistic quantum systems.
Grade Mode: Normal Grading Mode

PHY 544 Advanced Lab **2 Credit hours**
Developments in producing and detecting correlated photon pairs has enabled implementation of undergraduate laboratories demonstrating fundamental quantum mechanical principles. This laboratory also incorporates fundamental solid state and materials science experiments.
Pre-req: PHY 525 (may be taken concurrently) with a minimum grade of D and PHY 542 (may be taken concurrently) with a minimum grade of D.
Concurrent PR: PHY 525 and PHY 542
Grade Mode: Normal Grading Mode

PHY 545 Math Methods of Physics **3 Credit hours**
An introduction to the theory of orthogonal functions, curv- ilinear coordinate systems, vector and tensor fields and their applications in Physics. Problems are drawn from different areas of physics. 3 lec.
Grade Mode: Normal Grading Mode

PHY 546 MTH Methods of Physics II **3 Credit hours**
A second semester of a full year course on methods of solving problems in physics: calculus of variations, ordinary partial differential equations and special functions with real physics problems.
Pre-req: PHY 545.
Grade Mode: Normal Grading Mode

PHY 547 Mechanics for Teachers **4 Credit hours**
An indepth study of mechanics for education majors specializing in Physics with emphasis on problem solving techniques, demonstrations, experiments and computer applications. (PR: PHY 203, MTH 122 and MTH 140)
Grade Mode: Normal Grading Mode

PHY 580 Special Topics **2-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 581 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 582 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 583 Special Topics **1-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 585 Independent Study **1-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 586 Independent Study **1-4 Credit hours**
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

PHY 587 Independent Study **1-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 588 Independent Study **1-4 Credit hours**
Grade Mode: Normal Grading Mode

PHY 600 Electricity and Magnetism I **4 Credit hours**
A study of electrostatics and associated boundary-value problems, electric multipoles and macroscopic media, dielectrics, magnetostatics, time-varying fields, Maxwell equations and conservation laws, plane electromagnetic waves and wave propagation.
Grade Mode: Normal Grading Mode

PHY 608 Statistical Mechanics **4 Credit hours**
The course introduces thermodynamics and statistical mechanics to graduate students of physics and other science and engineering disciplines as two complimentary approaches to study physical properties of systems in equilibrium.
Grade Mode: Normal Grading Mode

PHY 610 Special and Gen Relativity **3 Credit hours**
General relativity, the classical theory of one of the four fundamental forces, is not a standard course offer. This course of Special and General Relativity intends to fill this gap by introducing the key concepts that lead to a revolution in our understanding of space and time. The students will learn about spacetime curvature, metrics, geodesics, black holes, gravitational waves, and cosmology.
Grade Mode: Normal Grading Mode

PHY 620 Modern Astrophysics I **3 Credit hours**
Modern Astrophysics is firmly grounded in the fundamental principles of physics, and will offer students the opportunity to use the physics they have learned in understanding the nature of the universe. This course provides a graduate-level introduction to astrophysics, focusing on stellar structure and evolution.
Grade Mode: Normal Grading Mode

PHY 625 Condensed Matter Physics **3 Credit hours**
This course studies complex phenomena that occur in solids and quantum liquids, and exposes the students to some theoretical tools used to describe the basic interactions behind these phenomena.
Grade Mode: Normal Grading Mode

PHY 630 Classical Mechanics **4 Credit hours**
Study of variational principes and Lagrange's equations, the two-body central force problem, the kinematics and dynamics of rigid-body motion, Hamilton equations of motion, canonical transformations, Hamilton-Jacobi theory, and small oscillations.
Grade Mode: Normal Grading Mode

PHY 631 Seminar **1 Credit hour**
Grade Mode: Normal Grading Mode

PHY 632 Seminar **1 Credit hour**
Grade Mode: Normal Grading Mode

PHY 640 Fundamentals of Physics **4 Credit hours**
A course in fundamental concepts of physics. Subject content varies. Designed primarily to strengthen conceptual understanding of teachers.
Grade Mode: Normal Grading Mode

PHY 642 Adv Quantum Mechanics **4 Credit hours**
This course covers advanced topics of quantum mechanics at the graduate level. Topics include fundamental issues, approximation methods and applications.
Pre-req: PHY 630 (may be taken concurrently) with a minimum grade of D.
Concurrent PR: PHY 630
Grade Mode: Normal Grading Mode

PHY 645 Methods of Math. Physics **4 Credit hours**
This course will review and develop theories of real and complex analysis, group theory, tensors, special functions, differential and integral transforms, emphasizing their application to electrodynamics, quantum statistical mechanics, etc.
Grade Mode: Normal Grading Mode

PHY 661 Special Topics **1-3 Credit hours**
Grade Mode: Normal Grading Mode

PHY 662 Special Topics **1-3 Credit hours**
Grade Mode: Normal Grading Mode

PHY 682 Thesis Research **1-6 Credit hours**
Grade Mode: Normal Grading Mode

PHY 685 Independent Study **1-4 Credit hours**
Advanced Independent Study in Physics.
Attributes: No Textbook Required
Grade Mode: Normal Grading Mode

PHY 686 Independent Study **1-4 Credit hours**
Advanced Independent Study in Physics.
Grade Mode: Normal Grading Mode