NATURAL SCIENCE NSC

College of Natural Science

101 Preview of Science
Fall. 1 credit. Interdepartmental with Agriculture and Natural Resources; Engineering; Social Science. R: Approval of college.
Overview of natural sciences. Transitional problems. Communications and computer skills. Problem-solving skills. Diversity and ethics problems in science. Science and society.

102 Preprofessional Freshman Seminar
Fall, Spring. 1(1-0)
Overview of human health care professions with emphasis on academic and nonacademic undergraduate preparation, campus resources, communication and computer skills, and collaborative learning.

150 Preview of Biomedical Research
Spring. 1(1-0) Interdepartmental with Medical Technology. Administered by Medical Technology Program.
Exploration of biomedical research careers. Biomedical research in the United States: funding, safety, regulatory agencies, ethics, experimental design, trouble-shooting, and data interpretation.

192 Environmental Issues Seminar
Fall, Spring. 1 credit. A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Agriculture and Natural Resources; Engineering; Social Science; Communication Arts and Sciences. R: Open only to students in the College of Agriculture and Natural Resources or College of Engineering or College of Natural Science or College of Communication Arts and Sciences or College of Social Science. Approval of college.
Environmental issues and problems explored from a variety of perspectives, including legal, scientific, historical, political, socio-economic, and technical points of view.

201 Science Problem Solving Seminar I
Fall. 2(2-0) P:M: (MTH 1825 or concurrently or MTH 116 or concurrently or MTH 132 or concurrently) R: Approval of college.
Problem solving principles and strategies used in the disciplines of science and mathematics. Activities reflecting the types of problems encountered.

202 Science Problem Solving Seminar II
Spring. 2(2-0) P:M: (NSC 201) R: Approval of college.
Continuation of NSC 201.

203 Drew Laboratory Directed Studies
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (NSC 202) R: Open only to Drew Laboratory students.
Using topics related to a faculty member's ongoing research, students explore the relationship between science and technology and social issues.

292 Applications in Environmental Studies
Fall. 2(1-2) Interdepartmental with Agriculture and Natural Resources; Engineering; Communication Arts and Sciences; Social Science. P:M: (NSC 192) R: Open only to students in the Specialization in Environmental Studies.
Community engagement project. Projects vary depending on student's major and area of environmental interest.

390 Special Problems
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.
Faculty directed individualized study of an interdisciplinary problem.

448 Ecology, Law and Economics
Spring. 3(3-0) Interdepartmental with James Madison College. P:M: (EC 201)
Review and integrate principles of ecology, fundamentals of law, and principles of economics into a conceptual model that describes interrelations among the natural system, the economy, and the state. Analyze and assess the legal-economic natural resource and environmental policies in the context of the integrated model. Relate the ecology-law-economics model to emerging paradigms of sustainable development, ecological economics, industrial ecology, and the Natural Step.

490 Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.
Faculty directed individualized study of an interdisciplinary problem.

491 Selected Topics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.
Selected interdisciplinary topics not normally covered in other courses.

495 Capstone in Human Biology (W)
Fall, Spring. 2(2-0) P:M: Completion of Tier I writing requirement. R: Open only to seniors in the Human Biology or Lyman Briggs Human Biology major.
Integration of human biology disciplines with a focus on health and disease.

496 Directed Study in Human Biology
Fall, Spring, Summer. 1 to 3 credits. P:M: Completion of Tier I writing requirement.
Directed studies in human biology.

497 Internship in Human Biology
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: Completion of Tier I writing requirement.
Practical experience applying human biology training outside the classroom setting.

498 Research in Human Biology
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: Completion of Tier I writing requirement.
Research in faculty laboratories

499 Research
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors or seniors in the College of Natural Science with a teacher certification option.
Research in faculty laboratories. Oral and written presentations.

802 Essentials of Electron Microscopy
Fall. 2(2-0)
Principles of operation and uses of transmission and scanning electron microscopy. Related electron beam instruments. Specimen preparation and analytical methods.

810 Transmission Electron Microscopy Laboratory
Fall, Spring, Summer. 3(1-4) RB: (NSC 802)
Use of transmission microscope and preparative equipment. Preparation techniques for specimens, photographic and darkroom use, and interpretation of micrographs.

820 Scanning Electron Microscopy; Energy Dispersive X-ray Microanalysis
Fall, Spring. 3(2-2) RB: (NSC 802 or concurrently)
Use of scanning electron microscope and energy dispersive x-ray microanalysis. Machine variables, artifacts, quantitative analysis, specimen preparation, darkroom procedures.

825 Special Problems in Microscopy
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 40 credits in all enrollments for this course. RB: (NSC 802) and (NSC 810 or NSC 820 or NSC 837)
Use of microscopy techniques for selected research topics.

828 Food Safety Seminar Series
Fall, Spring. 1(1-0) Interdepartmental with Veterinary Medicine; Agriculture and Natural Resources; Social Science. Administered by College of Veterinary Medicine. RB: Enrollment in graduate program in related discipline
Selected current topics covering the broad areas of food safety as they relate to production, processing, transport, microbiology, toxicology, and social and human dimensions.

829 Problems in Food Safety
Fall. 1(1-0) Interdepartmental with Veterinary Medicine; Agriculture and Natural Resources; Social Science. Administered by College of Veterinary Medicine. RB: Enrollment in graduate program in related discipline
In-depth discussion of selected problems in food safety.

830 Nature and Practice of Science
Fall, Spring. 1 credit.
Foundations of scientific inquiry. Recommended scientific best-practices including principles and practices of research integrity and professionalism. Evaluation of scientific quality and productivity.

837 Confocal Microscopy
Fall, Spring. 2(2-2) Interdepartmental with Crop and Soil Sciences.
Confocal imaging, theory and practice. Basic optics. Lasers. Light paths for transmission, florescence and reflection. Image quality, analysis and processing.

840 Writing in the Sciences
Fall, Spring, Summer. 2(2-0) A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Arts and Letters.
Discussion and critique of students' writing in peer response workshop groups

835 Topics and Methods in Neuroepidemiology
Summer of even years. 3(3-0) Interdepartmental with Epidemiology. Administered by Department of Epidemiology. RB: (EPI 810)
Epidemiology of neurologic conditions and discussion of the inherent difficulty in studying these disorders.

827 Physiology and Pharmacology of Excitable Cells
Fall. 4(4-0) Interdepartmental with Pharmacology and Toxicology; Physiology; Zoology. Administered by Department of Pharmacology and Toxicology. RB: (PSL 431 or PSL 432 or BMB 401 or BMB 461 or ZOL 402)
Function of neurons and muscle at the cellular level: membrane biophysics and potentials, synaptic transmission, sensory nervous system function.

839 Systems Neuroscience
Spring. 4(4-0) Interdepartmental with Human Anatomy; Pharmacology and Toxicology; Physiology; Psychology; Zoology. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Agriculture and Natural Resources, Natural Science, Social Science, and Veterinary Medicine. SA: ANT 839
Anatomy, pharmacology, and physiology of multicellular neural systems. Sensory, motor, autonomic, and chemo-regulatory systems in vertebrate brains.

885 Vertebrate Neural Systems
Spring of odd years. 3(2-2) Interdepartmental with Human Anatomy; Physiology. SA: ANT 885
Comparative analysis of major component systems of vertebrate brains. Evolution, ontogeny, structure, and function in fish, amphibians, reptiles, birds and mammals.

890 Independent Study in Neuroscience
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: Bachelor's degree in neuroscience, biology, psychology, or related area.
Supervised student research on a specialized research topic in basic or clinical neuroscience.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 36 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
Master's thesis research.

992 Advanced Topics in Neuroscience
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. RB: (NEU 804 and NEU 811 and NEU 827 and ANT 839) Bachelor's degree in neuroscience, biology, psychology or related area.
Readings, presentations and discussion of specialized topics in neuroscience.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 120 credits in all enrollments for this course.
Doctoral dissertation research.

NEUROLOGY AND OPHTHALMOLOGY NOP

Department of Neurology and Ophthalmology
College of Osteopathic Medicine

552 Medical Neuroscience
Spring. 4(3-2) Interdepartmental with Physiology; Radiology; Human Anatomy. R: Graduate-professional students in the Colleges of Human Medicine and Osteopathic Medicine. SA: ANT 552
Correlation of normal structure and function of the human nervous system with clinical testing, classical lesions, and common diseases.

590 Special Topics in Clinical Neuroscience
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
Work under the direction of a faculty member on an experimental, theoretical or applied problem in clinical neuroscience or neurology.

617 Neurology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: (MED 608) R: Open only to graduate-professional students in College of Human Medicine. SA: MED 617
Office and inpatient experience. Evaluation and management of neurological disease.

620 Directed Studies
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 24 credits in all enrollments for this course. RB: Completion of Semester 6 in the graduate-professional program. R: Open only to graduate-professional students in the College of Osteopathic Medicine.
Study in general or specialty neurology and ophthalmology.

656 Neurology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to graduate-professional students in the College of Osteopathic Medicine upon completion of Units I and II. SA: PMR 656
Clinical exposure in neurology. Program structure developed to achieve proficiency in motor skills, aptitudes; comprehension of concepts and principles; patient evaluation, diagnosis, management, and therapy.

NEUROSCIENCE NEU

Program in Neuroscience
College of Natural Science

800 Neuroscience Research Forum
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course. RB: Bachelor's degree in neuroscience, biological or psychological science, or related area.
Readings, presentations, and discussions of research literature in neuroscience. Professional development.

804 Molecular and Developmental Neurobiology
Fall. 3(3-0) Interdepartmental with Pharmacology and Toxicology; Psychology; Pathology; Zoology. RB: Bachelor's degree in a Biological Science or Psychology. R: Open only to graduate students in the Neuroscience major.
Nervous system specific gene transcription and translation. Maturation, degeneration, plasticity and repair in the nervous system.

806 Advanced Neuroscience Techniques Laboratory
Spring. 3(0-9) Interdepartmental with Psychology; Pharmacology and Toxicology; Radiology; Physical Medicine and Rehabilitation. RB: (PHM 827) R: Open only to doctoral students in the Neuroscience major.
Methods and underlying principles of neuroscience research.

811 Advanced Behavioral Neuroscience
Spring. 3(3-0) Interdepartmental with Psychology. Administered by Department of Psychology. RB: (PSY 411) approval of department. R: Open only to graduate students in the Psychology and Neuroscience major.
Biological mechanisms involved in learning and memory, motivated behaviors, biological rhythms, and psychopathologies.

820 Advanced Neuroanatomy
Summer of odd years. 1 to 5 credits. A student may earn a maximum of 12 credits in all enrollments for this course. Interdepartmental with Human Anatomy. R: Approval of department.
Current topics in anatomy and physiology processes of central nervous system cells.

NURSING NUR

College of Nursing

110 Exploring Nursing
Fall, Spring. 2(2-0)
Introduction to the bio-psycho-social conceptual model of persons in relation to nursing and health. Core concepts and theoretical foundations that frame the art and science of nursing. Development of the profession from inception into contemporary practice and its relationship to the U.S. healthcare system.