

- 292 Applications in Environmental Studies**
 Fall, 2(1-2) Interdepartmental with Agriculture and Natural Resources; Engineering; Communication Arts and Sciences; Social Science. P: (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) P: (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: 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: 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: 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: 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, fluorescence 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

NEUROLOGY AND NOP OPHTHALMOLOGY

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.

Neurology and Ophthalmology—NOP

- 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.

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.

- 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.

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.
- 202 Introduction to Nursing Practice I**
Fall. 2(1-3) R: Open only to students in the College of Nursing except students in PreNursing and Registered Nurses.
Theoretical concepts of nursing necessary for professional practice. Assessment, interpersonal communication, documentation and decision-making.
- 204 Introduction to Nursing Practice II**
Spring. 4(2-6) P: (NUR 202 and PHM 350 or concurrently) C: PHM 350 concurrently.
Nursing practice concepts in simulated and clinical practice settings. Development of nursing practice psychomotor skills.
- 215 Core Competencies in Nursing I**
Fall, Spring. 1(1-0) R: Open only to students in the College of Nursing.
Assessment core nursing competencies applying natural, social and nursing science.
- 300 Pathophysiology**
Fall, Spring. 4(4-0) P: (ANTR 350 and PSL 250) Not open to students with credit in NUR 341.
Abnormal physiological health transitions over the lifespan. Disorders affecting cells, organs, and systems involved in the regulation of structure and function within the human organism. How diseases affect the structures, functions, and systems of the human organism. Influence of genetics, ethnicity, environment, and age.
- 303 Concepts of Nursing Care of the Adult**
Fall, Spring. 4(4-0) P: (NUR 204 and NUR 341) C: NUR 304 concurrently.
Family centered nursing care for adults at various levels of health and illness. Prototype health states with emphasis on associated nursing diagnosis and professional standards of care.
- 304 Practicum in Nursing Care of the Adult**
Fall, Spring. 4(0-12) P: (NUR 204 and NUR 341) C: NUR 303 concurrently.
Nursing care of the adult client with an emphasis on health promotion, disease prevention, care in acute and chronic illness, and rehabilitation.
- 305 Concepts of Nursing Care of the Childbearing Family**
Fall, Spring. 2(2-0) P: (NUR 204 and NUR 341) C: NUR 306 concurrently.
Concepts of holistic nursing care with culturally diverse childbearing families during the prenatal, intrapartum, and postpartum periods. Concepts of health promotion and risk factors in client care situations.