

**NATURAL SCIENCE NSC**

**College of Natural Science**

**961. Seminar in Music Teacher Education**  
*Fall of odd years. 3(3-0) R: Open only to graduate students in College of Arts and Letters and in College of Education.*  
Issues, trends, and strategies for preparing prospective music educators.

**962. Advanced Studies in the Philosophy of Music Education**  
*Fall of even years. 3(3-0) R: Open only to graduate students in College of Arts and Letters and in College of Education.*  
Historic and contemporary views of the value and import of music and music education and their translation into practice.

**963. Seminar in Administration of Music Programs**  
*Spring of even years. 3(3-0) R: Open only to graduate students in College of Arts and Letters and in College of Education.*  
Issues and strategies for effective administration of music education programs in K-12 and higher education.

**965. Advanced Research Methods in Music Education**  
*Spring. 3(3-0) P: MUS 864. R: Open only to graduate students in College of Arts and Letters and in College of Education.*  
Music education research projects using computerized statistical analysis.

**970. Pedagogy of Theory**  
*Fall of odd years. 3(3-0) R: Open only to graduate students in the School of Music.*  
Organization, goals, and procedures for teaching music theory to undergraduates. Choice and sequencing of topics, pacing, supplementary materials, educational philosophies, and relevance to performance.

**972. Analytical Studies I**  
*Fall. 3(3-0) R: Open only to graduate students in School of Music.*  
Melody, harmony, rhythm, color, texture, counterpoint, and structure in selected musical masterpieces from the 13th century to the early 19th century.

**973. Analytical Studies II**  
*Spring. 3(3-0) R: Open only to graduate students in School of Music.*  
Melody, harmony, rhythm, color, texture, counterpoint, and structure in selected musical masterpieces from the nineteenth and twentieth centuries.

**974. Atonality, Serialism, and Set Theory**  
*Spring. 2(2-0) R: Open only to graduate students in School of Music.*  
Atonal and paratonal music. Related compositional and analytical systems. Serialism, integral serialism, and set theory.

**975. Readings in Music Theory**  
*Spring of odd years. 2(2-0) R: Open only to graduate students in School of Music.*  
Current topics in music theory. Research paper required.

**980. Composition**  
*Fall, Spring. 2(2-0) A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to graduate students in School of Music.*  
Advanced guided projects in creative writing of music.

**990. Doctoral Independent Study**  
*Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course. R: Approval of school.*  
Special projects, directed reading, and research arranged by an individual doctoral candidate and a faculty member in areas supplementing the regular course offerings.

**991. Special Topics**  
*Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 25 credits in all enrollments for this course. R: Approval of school.*  
Special topics supplementing regular course offerings proposed by faculty on a group study basis for doctoral students.

**992. Seminar in Musicology**  
*Spring. 3(3-0) A student may earn a maximum of 18 credits in all enrollments for this course. R: Open only to graduate students in School of Music.*  
Topics in musicology such as early notations, music editing, or historical performance practices.

**996. Doctoral Recital Performance**  
*Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Open only to doctoral students in Music Performance.*  
Directed experience in recital performance in partial fulfillment of requirements for the Doctor of Musical Arts degree.

**997. Doctoral Concert Conducting**  
*Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Open only to doctoral students in Music Performance.*  
Directed experience in concert conducting in partial fulfillment of requirements for the Doctor of Musical Arts degree.

**998. Doctoral Music Composition**  
*Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Open only to doctoral students in the Music Composition major.*  
Directed experience in composition in partial fulfillment of requirements for the Doctor of Musical Arts degree.

**999. Doctoral Dissertation Research**  
*Fall, Spring, Summer. 1 to 40 credits. A student may earn a maximum of 40 credits in all enrollments for this course. R: Open only to doctoral students in School of Music. Approval of school.*

**101. Preview of Science**  
*Fall. 1(1-0) Interdepartmental with Agriculture and Natural Resources; Engineering; and 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.

**192. Environmental Issues Seminar**  
*Fall, Spring. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Agriculture and Natural Resources; Engineering; Social Science; and 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: Drew Section of MTH 0823 or MTH 116 or MTH 132 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: 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: 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.

**320. Introduction to Theory and Applications of Modern Microscopy**  
*Spring. 2(1-2) P: Completion of University mathematics requirement. R: Open only to juniors and seniors.*  
General principles of operation of electron, laser, and scanning probe microscopes. Applications of microscopy. Specimen preparation for microscopy.

## Descriptions—Natural Science of Courses

### 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.

### 401. Science Laboratories for Secondary Schools (W)

Fall. 4(2-6) R: Open only to seniors in the College of Natural Science with a teacher certification option. Completion of Tier I writing requirement. Laboratory equipment, supplies, demonstrations, exercises, and safety. Care of live organisms. Disposal of biological and chemical wastes. Field trips required.

### 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) R: Open only to seniors in the Human Biology major. Completion of Tier I writing requirement. Integration of human biology disciplines with a focus on health and disease.

### 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 and seniors in the College of Natural Science with a teacher certification option. Research in faculty laboratories. Oral and written presentations.

### 600. Special Problems for K-8 Teachers

Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Elementary teacher certification, 3 years teaching experience. Approval of department. Supervised study of problems in biological, physical, or earth sciences.

### 651. Physical Science I

Summer. 2 credits. R: Elementary teacher certification, 3 years teaching experience. Approval of college. The nature of matter and energy including energy transfer, density, and conservation of mass. Properties of elements, mixtures, and compounds.

### 652. Physical Science II

Summer. 2 credits. R: Elementary teacher certification, 3 years teaching experience. Approval of college. Electricity and magnetism, force and motion, heat and temperature, sound, and light

### 653. Earth Science I

Summer. 2 credits. R: Elementary teacher certification, 3 years teaching experience. Approval of college. The solar system, including the sun, planets, earth, and its moon. Weather and the water cycle.

### 654. Earth Science II

Summer. 2 credits. R: Elementary teacher certification, 3 years teaching experience. Approval of college. Rocks, minerals, and fossils and the physical and geological processes that form them.

### 655. Life Science I

Summer. 2 credits. R: Elementary teacher certification, 3 years teaching experience. Approval of college. Structure, function, genetics, and classification of organisms, including protists, plants, animals, and decomposers.

### 656. Life Science II

Summer. 2 credits. R: Elementary teacher certification, 3 years teaching experience. Approval of college. Interrelationships among and between organisms and their surroundings. Ecosystems, habitats, food chains, cycles, and pollution.

### 800. Problems in Biological or Physical Science for Teachers

Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Teacher Certification required. Approval of college. Supervised study of problems in biological or physical science.

### 802. Essentials of Electron Microscopy

Fall, Spring. 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) P: 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(1-4) P: 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 Electron Microscopy

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 40 credits in all enrollments for this course. P: NSC 802; NSC 810 or NSC 820. Use of electron microscopy techniques for selected research topics.

### 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. Administered by Crop and Soil Sciences. R: Approval of department; application required. 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) Interdepartmental with Arts and Letters. Discussion and critique of students' writing in peer response workshop groups

### 850. Cell and Molecular Biology

Summer. 2 credits. P: Secondary certification in biology, 3 years teaching experience. R: Secondary certification in biology, 3 years teaching experience; approval of college. Molecular basis of structure and function of cells. Protein structure and function, cell physiology, metabolic energy and transmission of genetic information.

### 851. Cell and Molecular Biology Laboratory

Summer. 3 credits. P: Secondary certification in biology; 3 years teaching experience. R: Approval of college. Generation of laboratory exercises appropriate for secondary students.

### 852. Interdisciplinary Seminar in Biological Science

Fall, Spring, Summer. 1 credit. P: Secondary certification in biology; 3 years teaching experience. R: Approval of college. Interrelationships of biological science and technology. Role of society in regulation of research and technological innovations.

### 855. Environmental and Behavioral Biology

Summer. 3 credits. Given only at W.K. Kellogg Biological Station. P: Secondary certification in biology; 3 years teaching experience. R: Approval of college. Biotic and abiotic features of lakes, streams, forest ecosystems, and microbial ecosystems.

### 856. Environmental and Behavioral Biology Laboratory

Summer. 3 credits. Given only at W.K. Kellogg Biological Station. P: Secondary certification in biology, 3 years teaching experience. R: Approval of college. Laboratory and field examinations of lake, stream and forest ecosystems.

**860. Problem Solving Techniques in Physical Science**

Summer. 3 credits. P: NSC 861, NSC 862, NSC 863. R: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. Approval of college. Measurement and analysis of chemical, physical, and geological phenomena.

**861. Chemistry for Teachers**

Summer. 2 credits. P: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college.

Intensive lecture and laboratory study of basic chemistry from a modern viewpoint.

**862. Physics for Teachers**

Summer. 2 credits. P: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college.

Intensive lecture and laboratory study of basic physics from a modern viewpoint.

**863. Earth Science for Teachers**

Summer. 2 credits. P: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college.

Intensive lecture and laboratory study of basic earth sciences from a modern viewpoint.

**864. Interdisciplinary Seminar in Physical Science**

Summer. 2 credits. P: NSC 860. R: Approval of college.

Interrelationships of the physical sciences. The role of society in regulation of science to technology transfer.

**870. Teaching College Science**

Spring. 2 credits. R: One year of graduate study in a biological or physical science. Approval of college.

Philosophies of education. Ethnic, gender, and cultural issues. Designing a laboratory course. Problems of class size. Instructional technologies. Assessment and evaluation.

**889. Research for Inservice Teachers**

Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to inservice K-12 teachers with baccalaureate degrees.

Research in faculty laboratories. Oral and written presentations.

**899. Master's Thesis Research**

Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to master's students in the College of Natural Science. Approval of college.

**901. Frontiers in Biological Science**

Fall, Spring. 1 to 4 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Secondary certification in chemistry or physics or earth science or physical science or biology, 3 years teaching experience. Approval of college.

Weekend workshops with research faculty exploring background and latest findings in their area of research.

**902. Frontiers in Physical Science**

Fall, Spring. 1 to 4 credits. A student may earn a maximum of 40 credits in all enrollments for this course. R: Open only to students with secondary teacher certification in chemistry or physics or earth science or physical science or biology and 3 years of teaching experience. Approval of college.

Weekend workshops with research faculty exploring background and latest findings in their area of research.

**NEUROSCIENCE**

**College of Natural Science**

**806. Advanced Neuroscience Techniques Laboratory**

Summer. 3(0-9) Interdepartmental with Psychology. P: (NEU 804 or concurrently) (PHM 827 and ANT 839 and PSY 811) R: Open only to doctoral students in the Neuroscience major.

Methods of neuroscience research and the underlying principles on which these methods are based.

**999. Doctoral Dissertation Research**

Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.

**NURSING**

**College of Nursing**

**202. Introduction to Nursing Practice I**

Fall. 3(2-3) 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)

Application of introductory nursing practice concepts in simulated and clinical practice settings. Development of introductory nursing practice psychomotor skills.

**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.

**NEU**

**NUR**

**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.

**306. Practicum in Nursing Care of the Childbearing Family**

Fall, Spring. 3(0-9) P: (NUR 204 and NUR 341) C: NUR 305 concurrently.

Practicum in nursing care with culturally diverse childbearing families during the prenatal, intrapartum and postpartum periods. Implementation of nursing process in various settings. Levels of risk reduction and health promotion.

**307. Concepts of Nursing Care of Children and Their Families**

Fall, Spring. 2(2-0) P: (NUR 204 and NUR 341) C: NUR 308 concurrently.

Theory and concepts related to the holistic care of children (infancy through adolescence) and their families.

**308. Practicum in Nursing Care of Children and Their Families**

Fall, Spring. 3(0-9) P: (NUR 204 and NUR 341) C: NUR 307 concurrently.

Clinical application of the theoretical concepts presented in NUR 307. Variety of health settings will be utilized for clinical practice.

**314. Transition to Professional Nursing**

Fall, Spring. 4(3-3) R: Open only to Registered Nurses in the College of Nursing.

Concepts and practicum for role transition for Registered Nurse seeking degree completion. Assessment, documentation, interpersonal skills and concepts of aging with emphasis on clinical decision making and socialization to professional role.

**319. Introduction to Nursing Theory and Research**

Spring. 3(3-0) P: (STT 300 or STT 201) and completion of Tier I writing requirement. R: Open only to students in the College of Nursing except students in PreNursing.

Major nursing theories and their application to practice. The research process, terminology and investigations undertaken in nursing.

**341. Clinical Problems in Adaptation**

Spring. 3(3-0) R: Open only to students in the College of Nursing except students in PreNursing.

Theoretical concepts related to individual's adaptive-maladaptive responses to stress. Emphasis on pathophysiology.

**409. Concepts of Psychiatric, Mental, and Community Health Nursing**

Fall, Spring. 4(4-0) P: Completion of Tier I writing requirement. R: Open only to students in the College of Nursing except students in PreNursing.

Health care trends and issues in public and mental health. Role, responsibilities, and activities of nurses in the provision of care in public and mental health.