

## NATURAL SCIENCE NSC

### College of Natural Science

#### 101 Preview of Science

Fall. 1 credit. 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.

#### 103 Strategies for Success

Fall, Spring. 1(1-0) R: Approval of department.

Development of effective academic, problem-solving, and other strategies necessary for college and career success. Discussion groups, study groups, and peer mentoring. Connections with University resources.

#### 150 Preview of Biomedical Research

Spring. 1(1-0) Interdepartmental with Biomedical Laboratory Diagnostics. Administered by Biomedical Laboratory Diagnostics. R: Open to freshmen or sophomores. SA: MT 150

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 and Communication Arts and Sciences and Engineering and Social Science. Administered by Natural Science. 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: (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: 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 to students in the Charles Drew Science Enrichment Laboratory.

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 and Communication Arts and Sciences and Engineering and Social Science. Administered by Natural 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) Interdepartmental with James Madison College. Administered by Natural Science. 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.

#### 493 Cooperative Education

Fall, Spring, Summer. 1 credit. Fall: W. K. Kellogg Biological Station. Spring: W. K. Kellogg Biological Station. Summer: W. K. Kellogg Biological Station. A student may earn a maximum of 3 credits in all enrollments for this course. P: Completion of Tier I Writing Requirement R: Approval of college; application required.

Educational employment experiences in industry and government related to the student's major.

#### 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 Biological Science Transmission Electron Microscopy Laboratory

Fall, Spring. 3(1-4) R: Approval of department.

Use of transmission microscope and preparative equipment in the biological sciences. Sample preparation techniques. Sectioning for electron microscopy.

#### 815 Physical Science Transmission Electron Microscopy Laboratory

Fall, Spring. 3(1-4) R: Approval of department.

Experimental methods for transmission electron microscopy in the physical sciences, including digital photography, imaging, diffraction, and microanalysis.

#### 816 Advanced Physical Science Transmission Electron Microscopy Laboratory

Fall, Spring. 1(1-1) A student may earn a maximum of 5 credits in all enrollments for this course. R: Approval of department.

Advanced experimental methods of transmission electron microscopy for the physical sciences. Bright field-dark field imaging. High resolution transmission electron microscope imaging. Nano beam diffraction and convergent beam diffraction. Scanning transmission electron microscope imaging, energy filtered transmission electron microscope imaging, and electron energy loss spectroscopy.

#### 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.

## Natural Science—NSC

### 828 Food Safety Seminar Series

Fall, Spring. 1(1-0) Interdepartmental with Agriculture and Natural Resources and Social Science and Veterinary Medicine. Administered by 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 Agriculture and Natural Resources and Social Science and Veterinary Medicine. Administered by 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. Administered by Natural Science.

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. Administered by Natural Science.

Discussion and critique of students' writing in peer response workshop groups