

**NATURAL SCIENCE NSC****College of Natural Science**

- 100 Drew Freshman Seminar**  
Fall, 2(2-0) P: (MTH 1825 or concurrently) or (MTH 116 or concurrently) or (MTH 132 or concurrently) R: Approval of college. SA: NSC 201  
Academic and non-academic skills and strategies for successful college transition.
- 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.
- 104 Freshman Seminar Away in Natural Sciences**  
Fall, 2(1-2) R: Open to freshmen in the College of Natural Science. Approval of college.  
Introduction to scientific scholarship and academic inquiry via an intensive empirical learning experience. Strategies for academic success in science and enhancing the college experience.
- 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.
- 200 Drew Sophomore Seminar**  
Fall, 2(2-0) P: NSC 100 or approval of college R: Approval of college. SA: NSC 202  
Career exploration and preparation through service-learning experience.
- 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. 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.
- 475 International Field Studies in Natural Science**  
Summer, 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of college; application required.  
Contemporary issues in environmental, geological, biological or human health-related sciences of a specific study abroad location.
- 476 Natural Science Field Studies in Selected U.S.A. Locations**  
Summer, 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of college; application required.  
Contemporary issues in environmental, geological, biological or human health-related sciences of a selected domestic study away location.
- 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.
- 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.

## Natural Science—NSC

- 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.
- 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, Summer of odd years. 3(2-2)  
Confocal imaging, theory and practice. Optics, lasers, light paths for transmission, fluorescence and reflection imaging. Advanced techniques including Fluorescence recovery after photobleaching (FRAP), Förster resonance energy transfer (FRET), spectral imaging, laser capture and two-photon microscopy.
- 840 Writing in the Sciences**  
Fall, Spring. 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