850 Cell and Molecular Biology
Summer. 2 credits. RB: Secondary certification in biology, 3 years teaching experience. R: Approval of college. SA: NSC 850 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. RB: Secondary certification in biology, 3 years teaching experience. R: Approval of college. SA: NSC 851 Generation of laboratory exercises appropriate for secondary students.

852 Interdisciplinary Seminar in Biological Science
Fall, Spring. Summer. 1 credit. RB: Secondary certification in biology; 3 years teaching experience. R: Approval of college. SA: NSC 852 Intereleationships of biological science and technology. Role of society in regulation of research and technological innovations.

855 Environmental and Behavioral Biology
Summer. 3 credits. Spring. Given only at Summer. Given only at W.K. Kellogg Biological Station. RB: Secondary certification in biology; 3 years teaching experience. R: Approval of college. SA: NSC 855 Biotic and abiotic features of lakes, streams, forest ecosystems, and microbial ecosystems.

856 Environmental and Behavioral Biology Laboratory
Summer. 3 credits. Summer. Given only at W.K. Kellogg Biological Station. RB: Secondary certification in biology; 3 years teaching experience. R: Approval of college. SA: NSC 856 Laboratory and field examinations of lake, stream and forest ecosystems.

860 Problem Solving Techniques in Physical Science
Summer. 3 credits. RB: (NSC 861 and NSC 862 and NSC 863) Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college. SA: NSC 860 Measurement and analysis of chemical, physical, and geological phenomena.

861 Chemistry for Teachers
Summer. 2 credits. RB: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college. SA: NSC 861 Intensive lecture and laboratory study of basic chemistry from a modern viewpoint.

862 Physics for Teachers
Summer. 2 credits. RB: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college. SA: NSC 862 Intensive lecture and laboratory study of basic physics from a modern viewpoint.

863 Earth Science for Teachers
Summer. 2 credits. RB: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. R: Approval of college. SA: NSC 863 Intensive lecture and laboratory study of basic earth sciences from a modern viewpoint.

864 Interdisciplinary Seminar in Physical Science
Summer. 2 credits. RB: (NSC 860) R: Approval of college. SA: NSC 864 Interrelationships of the physical sciences. The role of society in regulation of science to technology transfer.

870 Teaching College Science
Spring. 2 credits. RB: One year of graduate study in a biological or physical science. R: Approval of college. SA: NSC 870 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. RB: Open only to inservice K-12 teachers with baccalaureate degrees. R: Approval of college. SA: NSC 889 Research in faculty laboratories. Oral and written presentations.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open only to master's students in the College of Natural Science. Approval of college. SA: NSC 899 Master's thesis research.

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. RB: Secondary certification in chemistry or physics or earth science or physical science or biology, 3 years teaching experience. R: Approval of college. SA: NSC 901 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. RB: 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. R: Approval of college. SA: NSC 902 Weekend workshops with research faculty exploring background and latest findings in their area of research.

SMALL ANIMAL SCIENCE

Department of Small Animal Clinical Sciences
College of Veterinary Medicine

511 Veterinary Radiology
Fall. 1(1-0) R: Open only to graduate-professional students in College of Veterinary Medicine. Principles of veterinary radiology, radiation safety, and normal radiologic anatomy.

611 Diagnostic Imaging Clerkship
Fall, Spring. Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. Diagnostic radiography and ultrasound imaging. Radiation safety. Special procedures.

612 Problems in Diagnostic Imaging Clerkship
Fall, Spring. Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (SCS 611) Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine. Advanced diagnostic radiography, ultrasound imaging, and magnetic resonance imaging.

613 Diagnostic Ultrasound Clerkship
Fall, Spring. 3 credits. RB: (SCS 611) Completion of semester 5 of the veterinary program. R: Open only to fourth year graduate-professional students in the College of Veterinary Medicine. Principles of ultrasound physics, ultrasound scanning techniques, and interpretation of ultrasound imaging.

625 Small Animal General Medicine Clerkship
Fall, Spring. Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine. Diagnostic and treatment services for routine and emergency outpatients.

626 Small Animal Soft Tissue Surgery Clerkship
Fall, Spring. Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine. Ovariohysterectomy or orchietomy. Aspects of pre- and post-operative management and anesthesia.
636 Problems in Soft Tissue Surgery Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (SCS 626) R: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Soft tissue surgery problems.

637 Operative Surgery Clerkship: Instruction and Review
Fall. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in the College of Veterinary Medicine. Approval of department.

Participation in the instruction of VM 557 (Operative Surgery), with preparation for the laboratory and discussion after the laboratory. Performance of additional surgical procedures, case discussions, rounds, and anatomy review. Approved independent study project required.

640 Cardiology Clerkship
Fall. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine.

Diagnosis and medical, and surgical treatment of small animal thoracic and cardiovascular disorders.

641 Ophthalmology Clerkship
Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine.

Ophthalmic evaluation of all species. Diagnosis and medical and surgical treatment of ophthalmic disease.

642 Zoo and Wildlife Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine.

Zoo animal and wildlife medicine and surgery.

643 Neurology Clerkship
Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine. Not open to students with credit in SCS 666.

Diagnosis and medical and surgical treatment of small animal neurological disorders.

644 Dermatology Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine.

Diagnosis and treatment of small animal dermatological disorders.

645 Intensive Care Unit Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in College of Veterinary Medicine. Not open to students with credit in SCS 622.

Intensive care and management of critically ill small animals.

646 Small Animal Orthopedic Clerkship
Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in the College of Veterinary Medicine.

Diagnosis and preoperative, surgical, and postoperative care of patients requiring routine and major orthopedic surgical procedures.

647 Small Animal Internal Medicine Clerkship
Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in the College of Veterinary Medicine.

Diagnosis and therapy for complicated medical cases of small animals.

648 Anesthesia Clerkship
Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the professional veterinary program.

Pre-anesthesia evaluation, induction, monitoring, and recovery of small animal patients requiring routine and major surgical procedure.

650 Advanced Cardiology
Spring. 3 credits. RB: (SCS 640) Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Advanced cardiology practice.

651 Advanced Comparative Ophthalmology Clerkship
Spring. 3 credits. RB: (SCS 641) Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine. R: Approval of department.

Problem-oriented approach to complex ocular disease processes at the gross and microscopic levels.

653 Problems in Neurology Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (SCS 643) R: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Neurologic problems.

656 Problems in Orthopedic Surgery Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (SCS 646) Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Orthopedic surgery problems.

657 Problems in Internal Medicine Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (SCS 647) Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Internal medicine problems.

658 Problems in Anesthesiology Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (SCS 648) Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Advanced practice of anesthesiology in the teaching hospital setting.

670 Clinical Nutrition for Small Animals
Spring. 3 credits. RB: Completion of Semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Principles of clinical nutrition and dietetics for dogs and cats: diet evaluation, nutritional assessment, critical care, nutrition support, and clinical case evaluations.

690 Veterinary Molecular Biology Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Concepts and techniques of veterinary molecular biology.

693 Problems in Small Animal Clinical Sciences Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.

Special problems.

694 Small Animal Specialty Practice Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: Completion of semester 5 of the professional veterinary program. R: Open only to fourth year graduate-professional students in the College of Veterinary Medicine. Supervised, off-campus, specialty practice experience in an assigned veterinary practice or other school of veterinary medicine.

695 Emergency and Critical Care Medicine
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of semester 5 of the professional veterinary program. R: Open only to graduate-professional students in the College of Veterinary Medicine.

Admission, triage, diagnosis, treatment, and discharge of patients entering an emergency service. Daily instructional rounds.

808 Problems in Small Animal Surgery
Fall, Spring, Summer. 1 to 9 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Open only to graduate students in Small Animal Clinical Sciences.
Small Animal Clinical Sciences—SCS

813 Small Animal Seminar
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to graduate students in Small Animal Clinical Sciences.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to graduate students in Small Animal Clinical Sciences.

Social science

SOCIAL SCIENCE SSC

College of Social Science

101 Preview of Science
Fall. 1 credit. Interdepartmental with Natural Science; Agriculture and Natural Resources; Engineering. Administered by College of Natural Science. R: Approval of college.

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 Natural Science; Agriculture and Natural Resources; Engineering; Communication Arts and Sciences. Administered by College of Natural Science. R: Approval of college.

200 Introduction to Social Work
Fall. 3(3-0) Interdepartmental with Social Work; Communication Arts and Sciences; Agriculture and Natural Resources; Engineering; Communication Arts and Sciences. Approved by College of Social Work.

Selected Topics in Social Science
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to juniors or seniors in the College of Social Science. Approval of college.

Field Study Abroad
Fall, Spring, Summer. 3 to 10 credits. A student may earn a maximum of 16 credits in all enrollments for this course. R: Open only to juniors or seniors. Approval of college.

Directed Research in Interdisciplinary Studies in Social Science (W)
Fall, Spring, Summer. 3 credits. P: Completion of Tier I writing requirement. R: Open only to juniors or seniors in the Interdisciplinary Studies in Social Science major. Approval of college.

Directed individual and small group research under faculty supervision in the student's Interdisciplinary Concentration.

International Development and Sustainability
Fall. 3(3-0) Interdepartmental with Resource Development; Anthropology; Political Science; Forestry. Administered by Department of Community, Agriculture, Recreation and Resource Studies.

Food Safety Seminar Series
Fall, Spring. 1(1-0) Interdepartmental with Veterinary Medicine; Agriculture and Natural Resources; Natural Science. Administered by College of Veterinary Medicine. RB: Enrollment in graduate program in related discipline.

Problems in Food Safety
Fall. 1(1-0) Interdepartmental with Veterinary Medicine; Agriculture and Natural Resources; Natural Science. Administered by College of Veterinary Medicine. RB: Enrollment in graduate program in related discipline.

Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course.

Doctoral dissertation research.

Social Work

SOCIAL WORK SW

School of Social Work
College of Social Science

200 Introduction to Social Work
Fall, Spring. 3(3-0)

290 Selected Topics in Social Work
Spring. 2 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.

310 Human Behavior and Social Environment
Fall, 3(3-0) P: (SOC 100 and PSY 101 and SW 200) and (PSY 200 or PSY 235 or PSY 236 or PSY 239 or PSY 244 or PSY 270 or PSY 280) and (ISB 204 or PSL 101 or PSL 250 or ZOL 341 or PSY 209) R: Open only to juniors or seniors in the School of Social Work.

320 Social Work and Policy I
Fall. 3(3-0) P: (SW 200 and PLS 100) and (EC 201 or EC 202) R: Open only to juniors or seniors in the School of Social Work.

340 Foundations of Social Work Practice
Spring. 3(3-0) P: (SW 310 and SW 320) R: Open only to juniors or seniors in the School of Social Work.

Social work practice, ethics, and values, in the context of social welfare policy in the United States.

Epidemiology
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 16 credits in all enrollments for this course.

390 Disease in Society: Introduction to Epidemiology and Public Health
Spring. 4(4-0) Interdepartmental with Epidemiology. Administered by Department of Epidemiology.

Human epidemiology and population health issues facing contemporary society. Developed and less-developed settings. Health-related information in the mass media and scholarly publications.

490 Special Topics in Social Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to juniors or seniors or graduate students.

493 Social Science Internship
Fall, Spring, Summer. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to juniors or seniors in the College of Social Science. Approval of college.

496 Field Study Abroad
Fall, Spring, Summer. 3 to 10 credits. A student may earn a maximum of 16 credits in all enrollments for this course. R: Open only to juniors or seniors. Approval of college.

499 Directed Research in Interdisciplinary Studies in Social Science (W)
Fall, Spring, Summer. 3 credits. P: Completion of Tier I writing requirement. R: Open only to juniors or seniors in the Interdisciplinary Studies in Social Science major. Approval of college.

Directed individual and small group research under faculty supervision in the student's Interdisciplinary Concentration.

Environmental and cultural components of sustainable development.

Food Safety Seminar Series
Fall, Spring. 1(1-0) Interdepartmental with Veterinary Medicine; Agriculture and Natural Resources; Natural Science. Administered by College of Veterinary Medicine. RB: Enrollment in graduate program in related discipline.

Problems in Food Safety
Fall. 1(1-0) Interdepartmental with Veterinary Medicine; Agriculture and Natural Resources; Natural Science. Administered by College of Veterinary Medicine. RB: Enrollment in graduate program in related discipline.

In-depth discussion of selected problems in food safety.

490 Special Topics in Social Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 16 credits in all enrollments for this course. R: Open only to graduate students.

Topics may cover contemporary, theoretical, or applied issues or interdisciplinary approaches.

499 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course.

Doctoral dissertation research.

Social Work practice, ethics, and values, in the context of social welfare policy in the United States.

300 Introduction to Social Work
Fall, Spring. 3(3-0)

Special Topics in Social Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 16 credits in all enrollments for this course. R: Open only to graduate students.

Topics may cover contemporary, theoretical, or applied issues or interdisciplinary approaches.

Doctoral dissertation research.

Social work practice, ethics, and values, in the context of social welfare policy in the United States.

310 Human Behavior and Social Environment
Fall, 3(3-0) P: (SOC 100 and PSY 101 and SW 200) and (PSY 200 or PSY 235 or PSY 236 or PSY 239 or PSY 244 or PSY 270 or PSY 280) and (ISB 204 or PSL 101 or PSL 250 or ZOL 341 or PSY 209) R: Open only to juniors or seniors in the School of Social Work.

General systems and ecological theories within the context of lifespan development as applied to social work.

320 Social Work and Policy I
Fall. 3(3-0) P: (SW 200 and PLS 100) and (EC 201 or EC 202) R: Open only to juniors or seniors in the School of Social Work.

History of social work and of public policy in welfare, health and civil rights. Roles of social work professionals in policy analysis, implementation and evaluation.

340 Foundations of Social Work Practice
Spring. 3(3-0) P: (SW 310 and SW 320) R: Open only to juniors or seniors in the School of Social Work.

Ethical and philosophical basis for generalist social work practice. Interviewing skills, assessment, and problem solving within an ecological-systems and developmental framework.

420 Social Work and Social Policy II
Fall. 3(3-0) P: (SW 340) R: Open only to juniors or seniors in the School of Social Work.

Application of social welfare policy to social work agencies. Current changes in welfare, health, and civil rights policy and their impact on social work clients. Diversity, social justice, and international policy issues.