harmful effects of weed plants. With a goal toward minimal environmental impact and maximum economic benefit, students will learn how to properly mix, apply, and discard herbicides. Prerequisite: Botany of Vascular Plants. 2 hours Lecture and 3 hours Laboratory — 3 credits

**AE 4131**  
**Auto CAD**  
This course teaches how to use AutoCAD, a computer aided design tool, in the production of landscape and drafting designs. The student will learn the basics of creating a design using the computer and many of the advanced features a CAD program makes available. 3 hours Lecture and Practicum — 3 credits

**AE 4211**  
**Seminar (Agronomy)**  
The course includes student reports and discussion on recent scientific findings in soils, field crops, and related subjects. 4 hours Discussion — 4 credits (one credit per year)

**AE 4218**  
**Seed Science**  
This course investigates how seeds are produced, harvested, cleaned, stored, and marketed. Several case studies will be investigated. Discussions about the role of biotechnology, state and federal regulations, international trade agreements, and environmental protection will be included. Prerequisite: Field Crops I or Soils. 3 hours Lecture and Discussion — 3 credits

**AE 4222**  
**Golf Course Design and Construction**  
This course covers the basic principles, practices, and procedures of golf course design and construction. Highlights include a field trip to local golf courses and a design project. 3 hours Lecture and Discussion — 3 credits

**SA 1105**  
**Introduction to Small Animal Science**  
This course emphasizes animal care and management in relation to animal characteristics, control, handling, restraint, animal facility design, and legal compliance. Students will become acquainted with a variety of animals, their origin, characteristics, and usage. Basic experimental techniques will be acquired in the laboratory component of the course. 2 hours Lecture and 3 hours Laboratory — 3 credits

**SA 2001**  
**People and Animals**  
The student will learn about the relationship between people and animals through domestication, religion, culture, farming, research and pets. The role of pets in the family will be examined. The role of animals in human health and the effect of humans on animals will also be discussed. 3 hours Lecture and Discussion — 3 credits

**SA 2101**  
**Animal Assisted Activities and Therapy**  
The course explores the use of AAA and AAT in different fields including education, psychology and physical therapy. By exploring the different areas, students will learn how to develop, present and implement an AAA/AAT program and gain an understanding of the responsibilities that go along with such programs. Prerequisite: People and Animals. 3 hours Lecture and Discussion — 3 credits

**SA 2110**  
**Introduction to Zoo Keeping**  
This course will explore the major aspects of caring for captive wildlife and responsible collection management. We will emphasize both the limitations and positive impact zoos have on conservation. Topics covered will include, but are not limited to, responsible stewardship, population management, captive breeding, reintroduction, nutrition and feeding, health, reproduction, observation, and the design and care of exhibits. Enrollment is limited to students in the Zoo Science major. All or part of this course is taught at an off-campus location. Students must provide their own transportation. 3 hours Lecture and Discussion — 3 credits
SA 2113  
**Wild Animals in Captivity**  
Wildlife care and management is a scientific discipline requiring specialized training. This course emphasizes hands-on applications, including handling and restraint of wild animals, using the collection at the Elmwood Park Zoo. Enrollment is limited to students in the Zoo Science major. All or part of the course is taught at an off-campus location. Students must provide their own transportation. Prerequisite: Concurrent enrollment in Introduction to Zoo Keeping or permission of Instructor. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 2218  
**Animal Training and Enrichment**  
Operant conditioning and basic principles of animal psychology are explored. Students will learn how to use these principles to train both domestic and wild animals and to improve their psychological well being in captivity. Major components of enrichment will be reviewed with respect to the principles of animal management. This course provides the hands-on experience needed to apply behavioral techniques to the management of captive populations. Prerequisite: Wild Animals in Captivity. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 2220  
**Animal Record Keeping Systems**  
This course introduces students to data collection, record keeping, studbook analysis, and the specialized software used by zoos for animal information systems and collection management. Students will learn to complete accurate records for daily husbandry, medical care, species inventory and shipping and use computer technology to access data, transform that data into information, and communicate that information to others. Prerequisites: Information Technology Concepts and Computer Applications. 2 hours Lecture and Discussion — 2 credits

SA 2370  
**Employment Program**  
Each student in Animal Biotechnology and Conservation is required to spend 500 hours in approved jobs related to the student’s major. Each employment experience that will be used toward the Employment Program must be registered with the Office of Career and Life Education before employment commences — 4 credits

SA 3000, 4000  
**Selected Topics I and II**  
Special projects are designed to meet individual needs of students in their respective fields. Projects will be arranged on a one-to-one basis with a department faculty member and with the approval of the Department Chairperson. A maximum of two credits will be accepted toward graduation. 3 hours student/faculty instruction per week — 1 credit each

SA 3032  
**Herpetology**  
This course explores the major aspects of the biology of the amphibians and reptiles. The structure and function of these animals as individuals, populations, and biotic communities are examined. Aspects to be covered include the general anatomy of the “herptiles” and the evolution and taxonomy of modern reptiles and amphibians. A review of biodiversity and systematics is incorporated within the course. Prerequisites: Biological Science I and II and Anatomy and Physiology of Animals, Introduction to Small Animal Science or Introduction to Zoo Keeping. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 3034  
**Mammalogy**  
This course presents a broad overview of the field of mammalogy, including the evolution, structure, diversity, taxonomy, biogeography, and behavioral ecology of mammals. The laboratory component of the course emphasizes physical structure and development, field methods, and systematics, with an emphasis on local mammalian fauna. Prerequisites: Biological Science I and II and Anatomy and Physiology of Animals, Introduction to Small Animal Science or Introduction to Zoo Keeping. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 3112  
**Wildlife Management**  
The process of managing wildlife presents a broad array of problems, from the protection of endangered species to the control or elimination of pests. This course applies major ecological concepts to the practice of wildlife management. In lecture, we will examine how ecological principles can be used to devise viable management strategies. The laboratory will be devoted largely to field methods for studying wildlife and the identification of terrestrial vertebrates. Students are required to attend outside field trips, complete evening field work, and prepare study specimens of mammalian skins and skulls. Prerequisites:
Course Descriptions

Introduction to Small Animal Science or Introduction to Zoo Keeping; Principles of Ecology or Ecology; Biological Science I and II or Biology I and II. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 3115
Zoo Internship I: Animal Care
This internship will allow students to work with keepers at the Elmwood Park Zoo to develop hands-on skills, including proper care, handling, restraint and behavioral observation of wild animals. The internship experience will culminate in a final project requiring students to develop plans for a new exhibit or enrichment program at the zoo. This internship does not apply to the Employment Program requirement. Enrollment is limited to students in the Zoo Science major. Students must provide their own transportation to the Zoo. Prerequisites: Introduction to Zoo Keeping, Wild Animals in Captivity, and Animal Record Keeping Systems — 2 credits

SA 3124
Animal Behavior
An introduction to the analysis of animal behavior, emphasizing an evolutionary approach. Animal behavior is investigated, through both the ecological processes that have driven the evolution of behavior and the physiological mechanisms that allow behaviors to be performed. A major objective of the laboratory will be to foster a strong sense of how science proceeds. Students are encouraged to ask their own questions and design their own experiments, and will work in groups to determine goals, set predictions, create appropriate tests, and analyze results. Prerequisites: Required: Biological Science I and II or Biology I and II. Recommended: Ecology. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 3133
Aquatic Animal Science
An examination of the history of animal keeping and present-day ornamental aquatic animal husbandry industries. The biological processes occurring in the aquarium environment are explored. Students will learn the proper set-up and maintenance of home aquaria, and the theory and application of aquarium science in the design, set-up and maintenance of the basic reef aquarium system. Topics will include but are not limited to the chemical, physical and biological environment, water quality, filtration, lighting, health and nutrition, and species compatibility. Lab will require the set-up and maintenance of a freshwater aquarium. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 3150
Behavior and Management of Alternative Agricultural Animals
This course acquaints students with alternative agricultural animals that are raised for meat, fiber, leather and/or companionship. Students study the behaviors and uses of these animals as well as general anatomy and physiology, nutrition, medical care and related routine husbandry practices, with comparisons made to similar domestic animals. Animals to be discussed will include camels, ruminants, cervids, game birds, and bison as well as unusual breeds and types of domestic animals such as sheep, cattle, swine, goats and equids. 3 hours Lecture — 3 credits

SA 3216
Zoo Internship II: Public Education
This internship will allow students to work with the educational staff at the Elmwood Park Zoo. Students will assist in teaching special classes to students from primary and secondary schools as part of the zoo’s docent program or outreach efforts. They may also work with scouting programs, seniors, or other groups visiting the zoo for educational functions. The internship experience will culminate in a final project requiring students to develop plans for a new educational program at the zoo. This internship does not apply to the Employment Program requirement. Enrollment is limited to students in the Zoo Science major. Students must provide their own transportation to the Zoo. Prerequisites: Introduction to Zoo Keeping, Wild Animals in Captivity — 2 credits

SA 3475
Companion Animals
This course examines the different species of companion animals with emphasis on behavior, nutrition, health concerns, physiology and animal care. The historical uses and domestication of various species are discussed along with keeping nondomesticated species as pets. Animal use in society is also discussed, including overpopulation, humane treatment, and animals for assistance purposes. 3 hours Lecture — 3 credits.

SA 4016
Senior Seminar
This course is a study of recent research within the field of animal biotechnology and conservation on topics selected by students with special emphasis on oral presentations. 1 hour Lecture and Discussion — 1 credit
SA 4041
**Senior Research**
Selected seniors with at least a 2.5 GPA may engage in supervised investigations involving library work and laboratory or field experiments related to small animal science. Prerequisites: Permission of the Department Chairperson and faculty sponsorship. — 1-3 credits

SA 4050
**Canine Behavior and Training**
This course provides a historical, scientific, psychological and developmental look at humankind’s best friend, the dog. Topics include but are not limited to specific breed types; healthcare, including reproduction; canine training and education; competitive activities; careers with canines and current issues. 3 hours Lecture — 3 credits.

SA 4051
**Current Topics**
This research and discussion course emphasizes topics of current interest to the field of animal science and conservation. It may be repeated for a maximum of 2 credits. 1 hour Lecture and Discussion — 1 credit

SA 4123
**Zoo Animal Health and Disease**
The housing of multiple species under close conditions requires careful training in the prevention of disease outbreaks and cross-species contamination. This course emphasizes both disease prevention in exotic collections and managing the risk of zoonotic diseases. Animal disease and clinical pathology are examined as they apply to the management of wild animals in captivity. Enrollment is limited to students in the Zoo Science major. Prerequisites: Anatomy and Physiology, General Microbiology, or permission of Instructor. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 4124
**Pathology and Diseases of Small Animals**
This is an advanced course addressing the development of disease and the effect the process induces on tissues, organs, and the body. The last third of the course examines specific diseases or disease conditions of small animals. Prerequisites: Anatomy and Physiology, General Microbiology, or permission of Instructor. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 4129
**Clinical Pathology**
This subspecialty of pathology is concerned with the theoretical and technical aspects (methods or procedures) of chemistry, bacteriology, virology, mycology, parasitology, immunology, hematology, and biophysics as they pertain to the diagnosis of disease and the care of animal patients. This course stresses deductive reasoning. Prerequisites: Pathology and Diseases of Small Animals and Anatomy and Physiology of Animals, or permission of Instructor. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 4222
**Reproduction of Small Animals**
This course examines the special problems encountered in small animal reproduction. Extensive laboratory experience emphasizes manipulation of the reproductive system, application of techniques utilizing hormones, fertilization, fetal development and in vitro manipulation of murine gametes and embryos. Prerequisites: Anatomy and Physiology of Animals or permission of Instructor. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 4224
**Nutrition for Exotic Animals**
This course examines the special nutritional problems posed by wild animals in captivity. Zoos contain hundreds of species, each representing a digestive strategy for a specific ecological niche. Students will combine information on natural history, historical records, and domestic animal models to design feeding programs for captive wildlife. Prerequisites: Principles of Organic Chemistry or Organic Chemistry I. 2 hours Lecture and 3 hours Laboratory — 3 credits

SA 4225
**Small Animal Research Techniques**
Students are introduced to all phases of research from literature search, planning and performing experiments, to the writing of a research paper. Further experience is gained in anesthesia, surgical techniques, and animal models of human disease. Transgenic technology is discussed extensively and techniques are introduced in the laboratory. Techniques that reduce the number of animals used in research are stressed. Prerequisites: Anatomy and Physiology of Animals or Comparative Anatomy and Comparative Physiology, or permission of Instructor. Recommended: Reproduction of Small Animals. 2 hours Lecture and 3 hours Laboratory — 3 credits