402. Neurobiology
Fall, 3(3-0)
P: BS 110, BS 111 or LBS 144, LBS 145. R: Not open to freshmen and sophomores. Structure and function of nerve cells and nervous systems. QP: BS 210, BS 211, BS 212 or LBS 144, LBS 145, LBS 240 QA: ZOL 492

412. Invertebrate Ecology
Summer of odd numbered years: 4 credits. Given only at W.K. Kellogg Biological Station. P: BS 116. Ecology and systematics of selected invertebrate phyla with emphasis on the local fauna. Extensive field and laboratory work with living animals. QP: BS 212 QA: ZOL 412

415. Ecological Aspects of Animal Behavior
Fall, 3(3-0)
P: ZOL 213. R: Not open to freshmen. Advanced topics in the ecology and evolution of animal behavior. QP: ZOL 313 QA: ZOL 415

417H. Advanced Developmental Biology
Spring, 3(3-0)
P: ZOL 220 or ZOL 221. R: Not open to freshmen and sophomores. Multidisciplinary approaches to major current concepts. Historical perspectives, analyses from molecular to organismal level, and practical applications. QP: ZOL 317, ZOL 318 QA: ZOL 417, ZOL 456

421. Hormones and Development
Spring, 3(3-0) Interdepartmental with Physiology.

431. Comparative Limnology
Summer: 4 credits. Given only at W.K. Kellogg Biological Station. Interdepartmental with Botany and Plant Pathology, and Fisheries and Wildlife.
P: CEM 141 or CEM 151, ZOL 250. R: Not open to students with credit in FW 472. Physical, chemical, and biological aspects of lakes and streams. Introduction to freshwater biology, and population and community ecology. QP: CEM 141 or CEM 151, ZOL 389 or BOT 450 QA: ZOL 431, ZOL 452

446. Environmental Issues and Public Policy
Spring, 3(3-0) Interdepartmental with Resource Development.
P: Not open to freshmen and sophomores. The interrelationship of science and public policy in resolving environmental issues. Technical, social, economic, and legal influences. Case study approach. QP: ZOL 301, RD 393

450. Cancer Biology
Spring, 3(3-0) Interdepartmental with Medicine.

453. Field Studies in Marine and Estuarine Biology
Summer. 2 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of instructor.
P: ZOL 217 QA: ZOL 454

457. Foundations of Evolutionary Biology
Spring, 3(3-0)
P: BS 110. Reading and discussion of original works in evolutionary biology which have shaped modern evolutionary thought. QP: BS 212 QA: ZOL 457, ZOL 466

463. Environnemental Physiology
Spring, 4(4-0) Interdepartmental with Physiology.
P: ZOL 228 or ZOL 250. Aspects of physiology important to the environmental relations of vertebrates and invertebrates: energetics, thermal relations, osmotic-ionic relations, and exercise physiology. QP: BS 212 QA: ZOL 483

496. Capstone: Independent Study
Fall, Spring, 1 to 6 credits. A student may earn a maximum of 5 credits in all enrollments for this course. R: Approval of department. Supervised research on a topic not normally covered in the classroom. QZ: ZOL 451

499. Capstone: Internship in Zoology
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 5 credits in all enrollments for this course. R: Open only to seniors. Approval of department. International field experience to study tropical ecosystems. Individual project required. Given at various sites in Costa Rica by the Organization for Tropical Studies.

498. Capstone: Undergraduate Thesis
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 5 credits in all enrollments for this course. R: Open only to seniors. Approval of department. Practical experience applying Zoology training in a setting outside the University. QZ: ZOL 499

500. Topics in Ethology and Behavioral Ecology
Spring of even numbered years, 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. P: ZOL 415. R: Open only to graduate students. Critical analysis through seminar-discussions of the primary research literature. QP: ZOL 315 QA: ZOL 822

533. Advanced Neurobiology
Fall, 4(4-0) Interdepartmental with Physiology, and Pharmacology and Toxicology. R: Approval of department.
P: ZOL 452. Neuronal regulation by which hormones influence the reproductive, parental, and aggressive behavior of vertebrates. Plasticity. QP: ZOL 813

541. Chromosome Structure and Genetics
Spring of odd numbered years, 3(3-0) Interdepartmental with Genetics. R: Approval of department.
P: ZOL 458 QA: ZOL 483, GEN 842

584. Selected Topics in Human Genetics
Fall, 3(3-0)
P: ZOL 314. R: Open only to seniors and graduate students. Inheritance of human traits including medical, physiologic, forensic, biochemical, molecular and chromosomal areas. QP: ZOL 441, ZOL 341 QA: ZOL 844

Fall, Spring, Summer. A student may earn a maximum of 5 credits in all enrollments for this course. R: Open only to seniors. Zoology majors. Current and historical impact of current developments in Zoology.

601. Quantitative Methods in Ecology and Evolution
Fall, Spring, Summer. 3(3-0) Interdepartmental with Botany and Plant Pathology.
P: STT 465. Interpretation and analysis of ecological and evolutionary biology data. Statistical computer software.

611. Soil Zoology
Fall, Spring, Summer. 4(2-6) A student may earn a maximum of 10 credits in all enrollments for this course. R: Approval of department.
P: ENT 401 or ZOL 306. R: Open only to seniors and graduate students in College of Natural Science or College of Agriculture and Natural Resources. Soil fauna and their ecology, biology, and systematics. QP: ZOL 306 QA: ZOL 881

648. Molecular and Cellular Aspects of Development
Spring, 4(4-0) R: Approval of department.
P: ZOL 217 QA: ZOL 454

658. Special Problems
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Approval of department.

682. Topics in Ethology and Behavioral Ecology
Spring of even numbered years, 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. P: ZOL 415. R: Open only to graduate students. Critical analysis through seminar-discussions of the primary research literature. QP: ZOL 315 QA: ZOL 822

687. Advanced Neurobiology
Fall, 4(4-0) Interdepartmental with Physiology, and Pharmacology and Toxicology. R: Approval of department.
P: ZOL 452. Neuronal regulation by which hormones influence the reproductive, parental, and aggressive behavior of vertebrates. Plasticity. QP: ZOL 813

688. Molecular and Cellular Aspects of Development
Spring, 4(4-0) R: Approval of department.
P: ZOL 217 QA: ZOL 454

699. Special Problems
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Approval of department.
891. Current Topics in Ecology and Evolution
Summer: 1 credit. Given only at W.K. Kellogg Biological Station. A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Botany and Plant Pathology, and Crop and Soil Sciences. Presentation and critical evaluation of theoretical and empirical developments by visiting scientists. QA: ZOL 891

892. Biodiversity
Spring: 2(2-0). A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Fisheries and Wildlife. P: ZOL 250. Status of world biota and factors in the decline and extinction of major groups of plants and animals. Theory and design of natural reserves. Assessment and ecological meaning of diversity. Management for global and local diversity. QP: ZOL 250

895. Seminar
Fall, Spring: 1(1-0) A student may earn a maximum of 6 credits in all enrollments for this course. Graduate seminar on current research topics in Zoology. QA: ZOL 895

896. Population and Community Ecology
Fall: 4(4-0)

897. Community and Ecosystem Ecology
Spring: 4(4-0) Interdepartmental with Botany and Plant Pathology, and Fisheries and Wildlife. R: Open only to students in Interdepartmental Graduate Specializations in Ecology and Evolutionary Biology. Structure and function of natural communities and ecosystems. Community analysis along environmental gradients. Succession, food web analysis, energy flow, nutrient cycling, and effects of human activities on ecosystems. QP: ZOL 390, BOT 450 QA: ZOL 897

899. Master's Thesis Research
Fall, Spring, Summer: 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.

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.