FISHERIES AND WILDLIFE FW

Department of Fisheries and Wildlife
College of Agriculture and Natural Resources

100 Introduction to Fisheries and Wildlife
Fall, Spring. 3(2-2) R: Open only to freshmen or sophomores.
Fisheries and wildlife management, history, philosophy and careers; conservation ethics.

109 Conservation of Freshwater Ecosystems
Fall. 3(3-0) R: Not open to students in the Department of Fisheries and Wildlife. Not open to students with credit in FW 414 or FW 472 or ZOL 431.
Fundamentals of freshwater ecology emphasizing human impacts. Basic ecological principles of conservation and management. Applied problems: their symptoms, causes, and solutions.

110 Conservation and Management of Marine Resources
Spring. 3(3-0)
Marine environment, resource distribution, and human impacts on selected marine commercial fisheries. Conflicts in management goals between government and industry. Management goals and techniques in preserving and conserving marine resource biodiversity.

181 Introduction to Science, Technology, the Environment and Public Policy
Fall. 3(3-0) Interdepartmental with James Madison College. Administered by Fisheries and Wildlife.
Relation of science and technology to ethics and public policy. Environmental law and public policy. Managing fish, water and wildlife resources at state, national, and international levels. Science and technology in developing countries. Impacts of military technology on environmental policy.

203 Resource Ecology
Fall, Spring. 3(3-0)
Basic concepts of ecology which provide a foundation for examining environmental problems and their solutions.

205 Principles of Fisheries and Wildlife Management
Spring. 3(3-0)
Characteristics of the fish and wildlife resource. Ecological and societal factors influencing the management of fish and wildlife. Management techniques.

207 Great Lakes: Biology and Management
Fall. 3(3-0) Interdepartmental with Environmental Studies and Applications. Administered by Fisheries and Wildlife.
Living aquatic resources of the Great Lakes, environmental history, and biological resources and their management. Policy issues.

208 Outdoor Preparedness for Natural Resources Professionals
Spring. 3(3-0)
Basic outdoor preparedness. Psychology of becoming lost or an accident victim. Basic wilderness and sea survival. Wilderness accident management. Backcountry and coastal navigation.

211 Introduction to Gender and Environmental Issues
Spring. 3(3-0) Interdepartmental with Environmental Economics and Policy and Forestry and Resource Development and Women's Studies. Administered by Fisheries and Wildlife. R: Not open to freshmen. SA: PRM 211
The concept of gender. Overview of environment and habitat. Historical gender roles in environmental management. Gender-based theoretical perspectives. Case studies on developing and developed countries. Environmental management with emphasis on fisheries, wildlife and wetlands. Women environmental professionals.

238 Introductory Fisheries and Wildlife Field Experience
Summer. 3(1-4) RB: Introductory Biology, Botany, Zoology, Forestry, Natural Resources, Plant Biology, Fisheries and Wildlife course R: Approval of department; application required.
Terrestrial and aquatic field research techniques and their application to current issues. Interaction with professionals.

275 Seafood Systems Management
Spring. 3(3-0) Interdepartmental with Animal Science and Food Science. Administered by Fisheries and Wildlife.
Domestic and international perspectives on major aquatic foods. Cultural and nutritional value; wild harvest; aquaculture; processing technology; food handling and food safety.

284 Natural History and Conservation in Michigan
Fall. 3(2-3)
Identification, habitat requirements, and distribution of Michigan's flora and fauna. Interrelationships which influence natural resource use.

324 Wildlife Biometry
Spring. 3(2-3) P:M: (MTH 103 or MTH 116 or LBS 117) or ((MTH 124 or concurrently) or (MTH 132 or concurrently) or (LBS 118 or concurrently) or (MTH 152H or concurrently)) RB: ZOL 355
Quantitative techniques to analyze and interpret fisheries and wildlife data.

341 Writing Nature and the Nature of Writing
Fall. 3(3-0) Interdepartmental with Writing, Rhetoric and American Cultures. Administered by Writing, Rhetoric and American Cultures. P:M: Completion of Tier I writing requirement. SA: AL 341
Writing- and reading-intensive course focusing on the language of scientists, poets, essayists, naturalists, environmentalists, and biologists, and on their various responses to and representations of the natural environment.

364 Ecological Problem Solving
Spring. 3(2-2) P:M: ((MTH 124 or concurrently) or (MTH 132 or concurrently) or (LBS 118 or concurrently)) and (FW 324 or STT 201 or STT 231 or STT 421) and (ZOL 355 or BE 230)
Application of ecological concepts and models to problems in natural resource and ecosystem management.

369 Introduction to Zoo and Aquarium Science
Spring. 3(3-0) Interdepartmental with Landscape Architecture and Veterinary Medicine and Zoology. Administered by Zoology. P:M: (BS 110 or LBS 144 or LBS 148H)
Fundamentals of zoo and aquarium operations including research, interpretation, design, nutrition, captive breeding, conservation, ethics and management.

370 Introduction to Zoogeography
Fall. 3(3-0) Interdepartmental with Geography and Zoology. Administered by Zoology. P:M: (ZOL 355)
Patterns of geographical distribution of animals and the ecological and historical processes leading to these patterns.

404 Women and the Law in the United States
Fall of odd years, Spring of odd years. 3(3-0) Interdepartmental with Women's Studies. Administered by Women's Studies. RB: WS 201 or WS 202 or WS 203 R: Not open to freshmen or sophomores.
Law in the United States as a vehicle for structuring and maintaining women's social roles, and for social change.

410 Upland Ecosystem Management
Spring. 3(2-3) P:M: (ZOL 355 or FOR 404) and completion of Tier I writing requirement. RB: (FW 364) or for students in FW major.
Analysis and management of upland ecosystems to meet wildlife management and biodiversity objectives. Mitigation of human impact.

413 Wildlife Research and Management Techniques
Fall. 3(1-6) RB: FW 324 and FW 410 and (FW 412 or concurrently)
Field techniques used in collecting, analyzing, and communicating data on wild animal populations and their habitats.

414 Aquatic Ecosystem Management
Fall. 3(3-0) P:M: (ZOL 355) and completion of Tier I writing requirement. RB: (FW 364) or for students in FW major.
Management of aquatic habitats and populations for ecological and socioeconomic objectives; human impacts on aquatic ecosystems.

416 Marine Ecosystem Management
Fall. 3(3-0) P:M: FW 110 and ZOL 355
Management of marine ecosystems and populations for ecological and socio-economic objectives; anthropogenic impacts, mitigation, and marine resource conservation strategies.

417 Wetland Ecology and Management
Fall. 3(2-3) Interdepartmental with Plant Biology. Administered by Fisheries and Wildlife. P:M: (ZOL 355) and completion of Tier I Writing requirement SA: FW 412
Biological, physical, and chemical processes controlling wetland structure and function. Utilization, mitigation, and conservation of wetlands on a sustainable basis.

419 Applications of Geographic Information Systems to Natural Resources Management
Spring. 4(2-4) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Biosystems Engineering and Forestry and Geography. Administered by Fisheries and Wildlife. RB: GEO 221 Not open to students with credit in GEO 425.
Application of geographic information systems, remote sensing, and global positioning systems to integrated planning and management for fish, wildlife, and related resources.

420 Stream Ecology
Fall. 3(3-0) Interdepartmental with Zoology. Administered by Fisheries and Wildlife. P:M: BS 110 or LBS 144 or LBS 148H RB: (CEM 141 and ZOL 355)
Biological and environmental factors determining structure and function of stream ecosystems.

422 Aquatic Entomology
Fall of odd years. 3(2-3) Interdepartmental with Entomology and Zoology. Administered by Entomology. P:M: BS 110 SA: ENT 420
Biology, ecology and systematics of aquatic insects in streams, rivers and lakes. Field trips and aquatic insect collection required.

423 Principles of Fish and Wildlife Disease
Spring of odd years. 3(3-0) Interdepartmental with Large Animal Clinical Sciences. Administered by Fisheries and Wildlife. P:M: BS 110 or LBS 144 or LBS 148H RB: Additional course work in ecology, zoology, microbiology or environmental science. R: Open only to juniors or seniors or graduate students in the College of Agriculture and Natural Resources, the College of Natural Science, or the College of Veterinary Medicine.
Diseases of fish and wildlife species. Disease detection and diagnosis. Ecological and epidemiological analysis and management of major classes of wildlife diseases. Threatened and endangered species, game species, and fish and wildlife species that serve as vectors or reservoirs of human and domestic animal diseases.

423L Principles of Fish and Wildlife Disease Laboratory
Spring of odd years. 1(0-3) Interdepartmental with Large Animal Clinical Sciences. Administered by Fisheries and Wildlife. RB: Additional laboratory course work in ecology, zoology, microbiology or environmental sciences. C: FW 423 concurrently.
Tools for diagnosis and assessment of disease in fish and wildlife populations.

424 Population Analysis and Management
Fall. 4(3-2) P:M: ZOL 355 and (FW 324 or STT 201 or STT 231 or STT 421) and (MTH 124 or MTH 132 or LBS 118)
Statistical, ecological and management concepts and methods needed to analyze and interpret demographic data and manage fish and wildlife populations.

434 Human Dimensions of Fisheries and Wildlife Management
Spring. 3(2-2) P:M: FW 424 and (FW 410 or FW 412 or FW 414) R: Open only to seniors in the Department of Fisheries and Wildlife.
Sociological implications of public policy and planning processes in fisheries and wildlife management.

435 Integrated Communications for the Fisheries and Wildlife Professional
Fall. 3(3-0) P:M: Completion of Tier I writing requirement. R: Open to juniors or seniors or graduate students.
Role and practical application of communications for fisheries and wildlife professionals, which integrates public and media relations, community relations, social marketing, and courtroom testimony using a variety of communication tools including news releases, direct mail, storyboards, and business writing.

443 Restoration Ecology
Spring. 3(2-2) Interdepartmental with Biosystems Engineering and Zoology. Administered by Fisheries and Wildlife. RB: (CSS 210 or BE 230) and (FOR 404 or FW 364 or ZOL 355)
Principles of ecological restoration of disturbed or damaged ecosystems. Design, implementation, and presentation of restoration plans.

444 Conservation Biology
Fall. 3(3-0) Interdepartmental with Zoology. Administered by Fisheries and Wildlife. P:M: (ZOL 355 or FOR 404) and completion of Tier I writing requirement.
Ecological theories and methodologies to manage species, communities and genetic diversity on a local and global scale.

450 International Environmental Policy
Fall of even years. 3(3-0) Interdepartmental with James Madison College. Administered by James Madison College. P:M: EC 201 or EC 202 RB: FW 181 and EC 340
Overview of concepts, actors, norms, laws, and institutions related to international environmental policy. Case studies on current global environmental issues.

466 Natural Resource Policy
Spring. 3(3-0) Interdepartmental with Forestry and Park, Recreation and Tourism Resources and Resource Development. Administered by Forestry. R: Not open to freshmen or sophomores.
Natural resources policy-making in the context of scientific, environmental, social, and legal-institutional factors. Historical evolution of policies and case studies of contemporary policy issues.

468 Great Lakes Water Policy
Fall. 2(2-0) P:M: BS 110 or BS 148H or ISB 200 or ISB 202 or ISB 204 or ISB 206H or LBS 148H or LBS 144 RB: Familiarity with biological and ecological science and environmental planning and policy issues. R: Open to juniors or seniors.
Environmental policy issues associated with the use, management, and protection of the binational Great Lakes basin ecosystem.

469 Biomonitoring of Streams and Rivers
Summer of even years. 3(2-3) Interdepartmental with Entomology. Administered by Entomology. P:M: BS 110
Practical field and lab rapid bioassessment methodologies used to sample and assess the biota of streams and rivers. Sampling and identification of fish, macroinvertebrates and other biota will be emphasized.

471 Ichthyology
Fall. 4(3-3) Interdepartmental with Zoology. Administered by Fisheries and Wildlife. P:M: (BS 110 or LBS 144 or LBS 148H) and completion of Tier I writing requirement.
Fish morphology and physiology. Development, behavior, evolution, and ecology. World fishes with emphasis on freshwater fishes.

472 Limnology
Spring. 3(3-0) Interdepartmental with Zoology. Administered by Fisheries and Wildlife. P:M: (CEM 141 or LBS 171) and ZOL 355 Not open to students with credit in BOT 431 or FW 431 or ZOL 431.
Ecology of lakes with emphasis on interacting physical, chemical, and biological factors affecting their structure and function.

473 Environmental Fish Physiology
Spring of odd years. 3(3-0) Interdepartmental with Physiology. Administered by Fisheries and Wildlife. P:M: BS 111 or LBS 145 or LBS 149H R: Not open to freshmen or sophomores.
Physiological adaptations of fish to environmental factors; bioenergetics, homeostasis, senses adaptations to diverse and extreme aquatic environments.

474 Limnological and Fisheries Techniques
Fall. 3(1-6) Interdepartmental with Zoology. Administered by Fisheries and Wildlife. P:M: FW 472 or (FW 414 or concurrently)
Field and laboratory investigations of physical, chemical, and biological parameters of lakes and streams.

475 Aquaculture
Spring. 3(3-0) Interdepartmental with Animal Science. Administered by Fisheries and Wildlife. RB: ANS 313 or ZOL 355
Propagation and rearing of aquatic organisms used for food, bait and recreational fisheries management. Culture principles and techniques for important aquatic species. Commercial potential.

477 Pest Management I: Pesticides in Management Systems
Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences and Entomology and Horticulture. Administered by Entomology. RB: (CEM 143 or CEM 251) and (BOT 405 and CSS 402) and (ENT 404 or ENT 470 or FW 328)
Chemistry, efficient use, and environmental fate of pesticides. Legal and social aspects of pesticide use.

478 Pest Management II: Biological Components of Management Systems (W)
Spring of even years. 3(2-3) Interdepartmental with Crop and Soil Sciences and Entomology and Forestry and Horticulture. Administered by Entomology. P:M: (ENT 404 or ENT 470 or PLP 405 or CSS 402) and completion of Tier I writing requirement
Principles of host plant resistance and biological control and their relationship to the design of agroecosystems. Classification of insect biological control agents.

479 Fisheries Management
Spring. 3(2-2) P:M: ZOL 355
Quantitative analysis of fish populations. Case study of ecological interactions linking fish to aquatic ecosystems and the challenge of balancing multiple human values in managing fisheries resources.

480 International Studies in Fisheries and Wildlife
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: ZOL 355 R: Approval of department; application required.
Fisheries and wildlife ecology and management study in regions beyond the United States. Ecological, economic, social, and cultural influences on fisheries and wildlife resources.

481 Global Issues in Fisheries and Wildlife
Spring. 3(3-0) Interdepartmental with James Madison College. Administered by Fisheries and Wildlife. P:M: (ZOL 355 or FW 205) and (EC 201 or EC 202) R: Open only to juniors or seniors or graduate students.
Global issues and their impacts on implications for the management of fisheries and wildlife resources.

484 Environmental Education
Spring. 3(2-2) P:M: AEE 101 or AEE 110 or PRR 351 or RD 300 or TE 150 R: Not open to freshmen or sophomores.
Methods, materials and theory for teaching environmental education in formal and non-formal educational settings.

485 Environmental Science Senior Seminar
Spring. 1(2-0) P:M: FW 484 or concurrently R: Open only to seniors in the Environmental Science minor.
Ecological principles, population growth, resource utilization and lifestyle choices.

489 Seminar in Zoo and Aquarium Science
Fall, Spring. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. Interdepartmental with Landscape Architecture and Park, Recreation and Tourism Resources and Zoology. Administered by Zoology. R: Approval of department.
Scientific writing and oral presentations related to zoo and aquarium studies.

490 Independent Study in Fisheries and Wildlife
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 5 credits in all enrollments for this course. RB: BS 110 R: Not open to freshmen or sophomores. Approval of department; application required.
Supervised individual research and study in fisheries and wildlife.

491 Special Topics in Fisheries and Wildlife
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 5 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Approval of department; application required.
Selected topics of current interest and importance in fisheries and wildlife.

493 Professional Internship in Fisheries and Wildlife
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. A student may earn a maximum of 6 credits in all enrollments for any or all of these courses: ABM 493, AEE 493, ANR 493, ANS 493, CSS 493, EEP 493, FIM 493, FW 493, HRT 493, PKG 493, PLP 493, PRR 493, and RD 493. P:M: FW 100 or FW 203 or FW 205 R: Open only to sophomores or juniors or seniors. Approval of department; application required.
Supervised professional experiences in agencies and businesses related to fisheries and wildlife professions.

498 Internship in Zoo and Aquarium Science
Fall, Spring, Summer. 3 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Landscape Architecture and Zoology. Administered by Zoology. R: Open only to juniors or seniors. Approval of department.
Application of zoological experience in a zoo or aquarium setting outside the university.

810 Human Dimensions Research in Fisheries and Wildlife
Fall of even years. 3(3-0)
Methods of surveying, educating and involving the public to achieve fish and wildlife management goals. Review of human dimensions research and current case studies.

811 Fisheries and Wildlife Laws and Regulation
Fall of odd years. 3(3-0) R: Open only to seniors or graduate students or approval of department.
Legal and regulatory systems related to fisheries and wildlife management. State, federal and international laws, policies and agencies. Nongovernmental organizations. Conservation of biodiversity and endangered species.

822 Aquatic Animal Medicine
Fall. 3(2-2) Interdepartmental with Pathobiology and Diagnostic Investigation and Veterinary Medicine. Administered by Fisheries and Wildlife. RB: (FW 423) or prior course work in animal ecology, microbiology, parasitology or pathology
Health management techniques and pathobiological processes relating to the etiology, diagnosis, and control of diseases affecting aquatic animal populations and communities.

823 Wildlife Disease Ecology and Management
Summer of even years. 3(2-3) Interdepartmental with Large Animal Clinical Sciences and Small Animal Clinical Sciences. Administered by Fisheries and Wildlife. RB: (FW 423) or previous course work in vertebrate ecology, epidemiology or animal disease management. R: Open only to graduate students in the College of Agriculture and Natural Resources or the College of Natural Science or the College of Veterinary Medicine.
Ecological and epidemiological principles of wildlife disease investigation and management.

824 Analysis of Wildlife Populations
Spring of even years. 3(2-3)
Statistical and ecological concepts, methods and computer techniques needed to analyze and interpret demographic data from fish and wildlife studies.

828 Conservation and Genetics
Fall of even years. 3(2-2) Interdepartmental with Plant Biology and Zoology. Administered by Fisheries and Wildlife. RB: ZOL 341 or CSS 350 or ANS 314
Population and evolutionary genetic principles applied to ecology, conservation, and management of fish and wildlife at the individual, population, and species level.

829 The Economics of Environmental Resources
Spring. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Agricultural Economics and Economics and Forestry and Park, Recreation and Tourism Resources. Administered by Agricultural Economics. RB: Graduate Status
Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, fish and wildlife, conservation, development, and global environmental issues.

835 Biogeography
Spring of odd years. 3(3-0) Interdepartmental with Geography and Plant Biology and Zoology. Administered by Fisheries and Wildlife. RB: Courses in evolution and ecology at undergraduate level.
Geographical distributions of plants and animals; biogeographic realms. Ecological and evolutionary mechanisms determining distributional patterns. Application of biogeography to conservation problems.

840 Landscape Ecology
Fall of odd years. 3(2-2) RB: Knowledge or course work in the natural sciences, particularly ecological concepts, as well as exposure to GIS and data analysis.
Ecological patterns and processes. Spatial variation in landscapes at multiple scales as affected by natural causes and human activity. Landscape ecology in natural resource decision-making and management.

842 Population Genetics, Genealogy and Genomics
Fall. 3(3-0) Interdepartmental with Animal Science and Crop and Soil Sciences and Forestry and Genetics and Horticulture. Administered by Forestry. RB: Pre-calculus, basic genetics
Population genetic processes underlying patterns of molecular genetic variation. Genealogical approaches to the study of genomic diversity, phylogenetic reconstruction, and molecular ecology.

850 Applied Multivariate Statistical Methods
Spring. 4(3-2) Interdepartmental with Statistics and Probability. Administered by Fisheries and Wildlife. RB: (STT 422 or concurrently) and MTH 314 SA: FOR 976
Application of multivariate methods to research problems. Hotelling's T-test, profile analysis, discriminant analysis, canonical correlation, principal components, principal coordinates, correspondence analysis, and cluster analysis.

852 Systems Modeling and Simulation
Fall of even years. 3(3-0) Interdepartmental with Biosystems Engineering and Forestry and Resource Development. Administered by Fisheries and Wildlife. RB: STT 422 or STT 442 or STT 464 or GEO 463
General systems theory and concepts. Modeling and simulation methods. Applications of systems approach and techniques to natural resource management, and to ecological and agricultural research.

853 Applied Systems Modeling and Simulation for Natural Resource Management
Spring of odd years. 3(2-2) Interdepartmental with Biosystems Engineering and Forestry and Resource Development and Zoology. Administered by Fisheries and Wildlife. RB: (FW 820 or BE 486 or ZOL 851) or or approval of department. R: Open only to seniors and graduate students
Mathematical models for evaluating resource management strategies. Stochastic and deterministic simulation for optimization. System control structures. Team modelling approach.

854 Adaptive Management of Natural Resource Systems
Fall of odd years. 3(2-2) RB: ZOL 355
Principles and practices of adaptive environmental assessment and management. Applications to ecosystem and natural resource management.

857 Theoretical Ecology
Spring of even years. 3(2-2) Interdepartmental with Plant Biology and Zoology. Administered by Fisheries and Wildlife. RB: One course in ecology and calculus. Programming experience helpful.
Theoretical ecology of animal behavior, population dynamics, and multispecies communities. Basic mathematical approaches and use of modeling software to perform mathematical functions and develop models.

858 Gender, Justice and Environmental Change : Issues and Concepts
Fall. 3(3-0) Interdepartmental with Anthropology and Environmental Studies and Applications and Forestry and Geography and Sociology. Administered by Fisheries and Wildlife. RB: Background in social science, environmental science, or natural resources.
Issues and concepts related to gender, ecology, and environmental studies. Key debates and theoretical approaches to addressing environmental issues from a gender and social justice perspective. Gender and environment issues and processes from a global perspective.

859 Gender, Justice, and Environmental Change: Methods and Application
Spring of even years. 3(3-0) Interdepartmental with Anthropology and Forestry and Geography and Resource Development and Sociology. Administered by Anthropology. RB: Background in social science, environmental science, or natural resources.
Methods and case studies related to gender, ecology, and environmental studies. Methodological and fieldwork issues from a feminist perspective in international and intercultural contexts. Qualitative and quantitative methods for integrating social and environmental data.

860 Wildlife Nutrition
Fall of odd years. 3(2-2) R: Open only to graduate students in the Colleges of Agriculture and Natural Resources, and Natural Science.
Nutritional ecology of wild species. Techniques for analyzing and improving nutritional qualities.

869 Community and Conservation
Fall of even years, Summer of even years. 3 credits. Interdepartmental with Resource Development and Sociology. Administered by Sociology. RB: Social Science methods, social science theory and environmental coursework.
Use of experiential, participatory, field-based mode of inquiry to develop understanding of social and cultural issues associated with conservation. Understanding of different social positions and perspectives.

870 Techniques of Analyzing Unbalanced Research Data
Spring. 4(4-0) Interdepartmental with Animal Science and Crop and Soil Sciences and Forestry and Horticulture. Administered by Animal Science. RB: STT 464 R: Open only to graduate students in the College of Agriculture and Natural Resources. SA: ANS 943
Linear model techniques to analyze biological research data characterized by missing and unequal number of observations in classes. Simultaneous consideration of multiple factors. Prediction of breeding values and estimation of population parameters from variance and covariance components.

873 Plankton Biology
Spring of odd years. 3(2-3) RB: FW 472
Biology of plankton organisms in freshwater and marine systems. Field and laboratory methods. Individual research projects.

877 Fish Population Dynamics
Fall of even years. 3(2-2) R: Open only to graduate students in the College of Agriculture and Natural Resources or College of Natural Science.
Quantitative analysis of fish populations. Evaluation, causes, and impacts of the rates of change in survival, growth, reproduction, and recruitment for fish populations and their yield.

879 Advanced Limnology
Spring of even years. 3(3-0) RB: FW 472 or ZOL 431
Theory and management of streams, rivers, lakes, reservoirs, and other deepwater habitats from ecosystem and landscape perspectives.

881 Building and Implementing Watershed Management Plans
Fall, Spring, Summer. 3(3-0) Interdepartmental with Forestry and Resource Development. Administered by Resource Development. RB: RD 324 and ZOL 355 and RD 452 Not open to students with credit in RD 824.
Problem definition. Data collection. Public consultation. Program evaluation. Case studies include watershed planning in the Great Lakes region.

882 Watershed Assessments and Tools
Fall, Spring, Summer. 3(3-0) Interdepartmental with Forestry and Resource Development. Administered by Resource Development. RB: RD 452 and RD 881
Techniques for assessing and predicting physical, chemical, biological, and socioeconomic conditions within a watershed. Water quality monitoring. Bioassessment protocols. Pollutant loading models.

884 Outreach in Fisheries, Wildlife and Natural Resources Management
Spring of odd years. 3(3-0) Interdepartmental with ANR Education and Communication Systems. Administered by Fisheries and Wildlife. RB: Previous course in communications recommended.
Theory, research, practice and current issues in using outreach in fisheries, wildlife and natural resource management.

885 Leadership in Natural Resources and Environmental Management
Fall. 3(3-0) Interdepartmental with Agricultural Economics and Forestry and Park, Recreation and Tourism Resources. Administered by Fisheries and Wildlife.
Theory and practice of leadership in natural resource and environmental management. Integration across disciplinary and jurisdictional divisions.

891 Advanced Topics
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.
In-depth study of advanced topics in fisheries and wildlife.

892 Biodiversity
Spring. 2(2-0) A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Zoology. Administered by Zoology. RB: 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.

893 Seminar in Fisheries and Wildlife
Fall, Spring. 1(1-0) A student may earn a maximum of 15 credits in all enrollments for this course.
Study and research in advanced problems and current developments in fisheries and wildlife.

897 Ecosystem Ecology
Spring. 4(4-0) Interdepartmental with Plant Biology and Zoology. Administered by Zoology.
Structure and function of natural ecosystems. Succession, food web analysis, energy flow, nutrient cycling, and effects of human activities on ecosystems. Global environmental change. Ecosystem management and restoration.

898 Master's Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in the Fisheries and Wildlife major.
Master's degree Plan B research paper.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to graduate students in the Fisheries and Wildlife major.
Master's thesis research.

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. R: Open only to doctoral students in the Department of Fisheries and Wildlife.
Doctoral dissertation research.