

- 491 Topics in Finance**  
Fall of even years. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course. P: (FI 311) R: Open only to juniors or seniors.  
Current and emerging issues in finance to supplement and enrich existing courses.
- 801 Managerial Finance**  
Fall. 3(3-0) RB: (ACC 800) R: Open only to students in the Program in Professional Accounting and to students in programs for which FI 801 is a catalog-listed requirement. Short-, intermediate- and long-term problems. Financial planning and control. Applications in domestic and international settings.
- 805 Managerial Finance for Manufacturing and Innovation**  
Spring. 2(2-0) R: Open only to students in the Master of Science in Manufacturing and Innovation. Not open to students with credit in FI 801 or FI 862.  
Introduction to business finance. Current institutional environment, financial planning, risk and return, capital budgeting and capital structure, including cost of capital. Basic tools for analyzing and interpreting financial data. Coverage of both for-profit and not-for-profit entities.
- 812 Financial Management and Strategy**  
Summer. 3(3-0) Summer: Exec Develop Center. RB: undergraduate degree in Accounting R: Open only to Master of Science students in Accounting and Business Processes.  
Financial planning and control using financial theory and management techniques. Analysis of financial markets and risks and how they affect short- and long-term investment and financing. Applications in domestic and international settings.
- 844 Corporate Financial Strategies**  
Spring. 3(3-0) P:M: (MBA 822) RB: (FI 851 or FI 845) R: Open only to MBA students or approval of department.  
Managerial decision-making applied to key corporate financial strategic policies. Case studies.
- 845 Financial Modeling and Simulation**  
Fall. 3(3-0) P:M: (MBA 822) RB: (FI 851) R: Open only to MBA students or approval of department.  
Applications of financial theory through computer modeling. Forecasting, cash flow modeling, valuation, portfolio optimization, risk measurement, and option pricing.
- 851 Introduction to Investments**  
Fall, Spring. 3(3-0) P:M: (MBA 822) R: Open only to MBA students or approval of department.  
Security risk and return concepts. Portfolio analysis and concepts of market efficiency. Equity investments, bonds, options, futures, and international securities.
- 852 Financial Markets and Strategies**  
Spring. 3(3-0) P:M: (MBA 822 and FI 851) R: Open only to MBA students or approval of department.  
Theories of domestic and international financial markets and instruments. Effects of risk and maturity on prices. Arrangement of business and portfolio risk and returns with options and futures.

- 853 Debt and Money Instruments and Markets**  
Fall. 3(3-0) P:M: (MBA 822 and FI 851) R: Open to MBA students or approval of department.  
Fixed-income security markets. Valuation of instruments traded.
- 857 Security Analysis**  
Fall, Spring. 3(3-0) P:M: (MBA 822 and FI 851) R: Open only to MBA students or approval of department.  
Fundamental analysis of individual stocks. Discounted cash flow valuation, relative valuation, special situations. Portfolio implications.
- 860 International Financial Management**  
Fall. 3(3-0) P:M: (MBA 822) R: Open only to MBA students or approval of department.  
Cross-border capital budgeting, capital structure, cash management, corporate governance, foreign currency and Eurocurrency markets, and currency risk management.
- 862 Advanced Managerial Finance**  
Spring. 3(3-0) P:M: (MBA 822) R: Open only to MBA students or approval of department.  
Financial planning and control using financial theory and management techniques. Applications in international settings. Business cases.
- 863 Corporate Governance and Restructuring**  
Fall. 3(3-0) P:M: (MBA 822) RB: (FI 851) R: MBA Students or approval of department.  
Corporate governance and restructuring. Corporate control and governance, mergers and acquisitions, corporate divestitures, financial distress and bankruptcy. International comparisons and real-world cases.
- 878 Bank Management**  
Spring. 3(3-0) P:M: (MBA 822) R: Open only to MBA students or approval of department.  
Nature, structure, and management of commercial banks. Products and services offered, risks, policies, and strategies. Applications in domestic and international settings.
- 890 Independent Study**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: (MBA 822) R: Open only to graduate students in Business. Approval of department.  
Faculty-guided research projects.
- 891 Topics In Finance**  
Fall of even years. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course. P:M: (FI 801 or MBA 822) or (PIM 841 and PIM 842)  
Current and emerging issues in corporate finance, investments, and financial modeling to supplement and enrich existing courses.
- 980 Theory of Finance**  
Fall. 3(3-0) R: Open only to Ph.D. students in Business or approval of department.  
Introduction to the financial theory of the firm. Theoretical models dealing with capital structure, cost of capital, dividend policy and leasing.
- 981 Corporate Finance Theory**  
Spring of odd years. 3(3-0) RB: (FI 980) R: Open only to Ph.D. students in Business.  
Theoretical foundations. Recent empirical research in capital structure, dividend policy, and agency theory.

- 982 Investment Theory**  
Spring of even years. 3(3-0) RB: (FI 980) R: Open only to Ph.D. students in Business.  
Market efficiency, stochastic processes, option pricing, efficient set mathematics, intertemporal asset pricing and arbitrage pricing theory.
- 983 Financial Econometrics**  
Spring. 3(3-0) P:M: (EC 818) and (EC 821 or concurrently) and (EC 822 or concurrently) R: Open only to Ph.D. students in Business and Economics.  
Econometric techniques of relevance to problems in finance: asset pricing. Interpretation of the results and limitations of recent empirical finance research.
- 993 Finance Workshop**  
Fall. 3(3-0) RB: (FI 980) R: Open only to Ph.D. students in Finance.  
Critical evaluation of original research papers by faculty and students.
- 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 Ph.D. students in Finance and Insurance.  
Doctoral dissertation research.

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

## Fisheries and Wildlife—FW

- 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 Resource Development.  
Living aquatic resources of the Great Lakes: environmental history, 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 Forestry; Environmental Economics and Policy; Resource Development; Women's Studies. 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.
- 275 Seafood Systems Management**  
Spring. 3(3-0) Interdepartmental with Food Science; Animal Science.  
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. Field trips required.
- 324 Wildlife Biometry**  
Spring. 3(2-3) P: (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.
- 326 Introduction to Waste Management**  
Fall. 3(3-0) Interdepartmental with Resource Development. Administered by Department of Community, Agriculture, Recreation and Resource Studies. RB: (RD 200)  
Waste management definitions, techniques, technologies, and strategies. Integrative approach to waste management as an environmental, social, and political subject.
- 341 Writing Nature and the Nature of Writing**  
Fall. 3(3-0) Interdepartmental with Writing, Rhetoric and American Cultures. Administered by Department of Writing, Rhetoric and American Cultures. P: 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: (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 Zoology; Landscape Architecture; Veterinary Medicine. Administered by Department of Zoology. P: (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 Zoology; Geography. Administered by Department of Zoology. P: (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 Program. 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: (ZOL 355 or FOR 404) and completion of Tier I writing requirement. RB: (FW 364) for students in FW major.  
Analysis and management of upland ecosystems to meet wildlife management and biodiversity objectives. Mitigation of human impact.
- 412 Wetland Ecosystem Management**  
Fall. 3(3-0) P: (ZOL 355) and completion of Tier I writing requirement. RB: (FW 364) for students in FW major.  
Ecosystem components and processes applied to wetland management. Mitigation of human impact.
- 413 Wildlife Research and Management Techniques**  
Fall, Summer. 4(2-4) Summer: Given only at W.K. Kellogg Biological Station. 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. Experiential learning methods.
- 414 Aquatic Ecosystem Management**  
Fall. 3(3-0) P: (ZOL 355) and completion of Tier I writing requirement. RB: (FW 364) 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: (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.
- 419 Applications of Geographic Information Systems to Natural Resources Management**  
Spring. 4(2-4) Interdepartmental with Forestry; Geography; Park, Recreation and Tourism Resources; Resource Development; Biosystems Engineering. RB: (GEO 221)  
The 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. P: (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; Zoology. Administered by Department of Entomology. P: (BS 110) SA: ENT 420  
Biology, ecology and systematics of aquatic insects in streams, rivers and lakes. Field trips and aquatic insect collection required.
- 424 Population Analysis and Management**  
Fall. 4(3-2) P: (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.
- 431 Comparative Limnology**  
Summer. 4(2-6) Given only at W.K. Kellogg Biological Station Interdepartmental with Zoology; Plant Biology. Administered by Department of Zoology. P: (CEM 141 or CEM 151) and (ZOL 355) 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.
- 434 Human Dimensions of Fisheries and Wildlife Management**  
Spring. 3(2-2) P: (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.

- 443 Restoration Ecology**  
 Spring. 3(2-2) Interdepartmental with Bio-systems Engineering; Zoology. 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. Field trips required.
- 444 Conservation Biology**  
 Fall. 3(3-0) Interdepartmental with Zoology. P: (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.
- 452 Watershed Concepts**  
 Fall, Spring, Summer. 3(3-0) Interdepartmental with Resource Development; Bio-systems Engineering; Crop and Soil Sciences; Forestry. Administered by Department of Community, Agriculture, Recreation and Resource Studies. P: (RD 324 and ZOL 355) RB: organic chemistry  
 Watershed hydrology and management. The hydrologic cycle, water quality, aquatic ecosystems and social systems. Laws and institutions for managing water resources.
- 462 Ecology and Management of Invertebrates**  
 Spring. 4(3-3) P: (BS 110 or LBS 144 or LBS 148H) RB: (ZOL 355)  
 Ecology, conservation, and management of selected non-insect invertebrate species including commercially important, exotic, non-game, and selected threatened and endangered species.
- 464 Natural Resource Economics and Social Science (W)**  
 Fall. 3(2-2) Interdepartmental with Forestry; Park, Recreation and Tourism Resources; Resource Development. Administered by Department of Forestry. P: (EC 201 or EC 202) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores.  
 Application of economic and social science principles and techniques to production and consumption of natural resources. Benefit-cost analysis. Regional impact analysis. Social impact assessment.
- 466 Natural Resources Planning and Policy**  
 Spring. 3(2-2) Interdepartmental with Forestry; Park, Recreation and Tourism Resources; Resource Development. Administered by Department of Forestry. R: Open only to seniors or graduate students in the Department of Forestry or Department of Fisheries and Wildlife or Department of Park, Recreation and Tourism Resources or Department of Resource Development.  
 Scientific, environmental, social, and institutional factors affecting planning and policy-making. Focus on ecosystem-based planning and policy issues through development of a multiple-use plan. Case studies.
- 468 Great Lakes Water Policy**  
 Fall. 2(2-0) Interdepartmental with James Madison College. P: (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 only 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) Summer: Given only at W.K. Kellogg Biological Station. Interdepartmental with Entomology. Administered by Department of Entomology. P: (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. P: (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. P: (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. P: (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. P: (FW 472 or FW 414 or concurrently)  
 Field and laboratory investigations of physical, chemical, and biological parameters of lakes and streams. Field trips required.
- 475 Aquaculture**  
 Spring. 3(3-0) Interdepartmental with Animal Science. 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 Entomology; Crop and Soil Sciences; Horticulture. Administered by Department of 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 Entomology; Crop and Soil Sciences; Forestry; Horticulture. Administered by Department of Entomology. P: (ENT 404 or ENT 470 or PLP 405 or CSS 402 or FW 328) 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: (FW 424) and (FW 414 or FW 472)  
 Manipulation of aquatic populations and their habitats to achieve societal goals for fishery resources. Management of human impact and biotic diversity.
- 480 International Studies in Fisheries and Wildlife**  
 Summer. 3 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: (ZOL 355) R: Not open to freshmen; 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.
- 484 Environmental Education**  
 Spring. 3(2-2) P: (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. Field trips required.
- 485 Environmental Science Senior Seminar**  
 Spring. 1(2-0) P: (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 Zoology; Park, Recreation and Tourism Resources. Administered by Department of 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.

## Fisheries and Wildlife—FW

- 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. P: (FW 100 or FW 203 or FW 205) R: Open only to sophomores or juniors or seniors. Approval of department; application required. 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.  
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 Zoology; Landscape Architecture. Administered by Department of 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 graduate students or to seniors with 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.
- 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.
- 826 Ecology and Management of Waterfowl**  
Fall of even years. 3(2-3) RB: (FW 412 and FW 424)  
Physiological, behavioral, and population characteristics of waterfowl. Current issues and management.
- 828 Conservation and Genetics**  
Fall of even years. 3(2-2) Interdepartmental with Plant Biology; Zoology. 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.
- 830 Wetlands Law and Policy**  
Spring of odd years. 3(3-0) Interdepartmental with Resource Development; Agricultural Economics; Forestry. Administered by Department of Community, Agriculture, Recreation and Resource Studies. RB: (RD 801) Prior exposure to environmental and natural resource economics, management, policy, or law. An ability to do legal and other library-based research.  
Origin and development of wetlands law and policy. Wetland functions, mitigation, and banking. Legal, economic, political, and administrative perspectives. Cases, statutes and regulations.
- 835 Biogeography**  
Spring of odd years. 3(3-0) Interdepartmental with Geography; Zoology; Plant Biology. 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.
- 842 Population Genetics, Genealogy and Genomics**  
Fall. 3(3-0) Interdepartmental with Forestry; Animal Science; Crop and Soil Sciences; Genetics; Horticulture. Administered by Department of 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**  
Fall. 4(3-2) Interdepartmental with Statistics and Probability. 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; Forestry; Resource Development. 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; Forestry; Resource Development; Zoology. RB: (FW 820 or BE 486 or ZOL 851) 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) and (FW 434)  
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 Zoology; Plant Biology. 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**  
Spring of odd years. 3(3-0) Interdepartmental with Anthropology; Forestry; Resource Development; Sociology; Geography. 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; Forestry; Resource Development; Sociology; Geography. Administered by Department of 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 Sociology; Resource Development. Administered by Department of 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; Crop and Soil Sciences; Forestry; Horticulture. Administered by Department of Animal Science. RB: (STT 464) R: Open only to graduate students in the College of Agriculture and Natural Resources. SA: ANS 943 Not open to students with credit in 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.

**FOOD INDUSTRY FIM  
MANAGEMENT MANAGEMENT**

**Department of Agricultural  
Economics  
College of Agriculture and  
Natural Resources**

- 100 Decision-making in the Agri-Food System**  
Fall, Spring. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. SA: FSM 200  
Organization and operation of the agri-food system. Economic analysis of agri-food firms and consumers. Management functions and decision-making of agri-food firms.
- 210 Professional Seminar in Food Industry Management**  
Spring. 1(1-0) P: (ABM 100 or concurrently or ABM 130 or concurrently) R: Open only to Food Industry Management majors.  
Industry trends in food industry management. Verbal, written, and visual communication techniques applied to professional situations, including professional development and career planning.
- 220 Food Product Marketing**  
Fall. 3(3-0) P: (ABM 100 or concurrently)  
Structure of the food marketing system including food processors, manufacturers, retailers and food service. Impact of consumer behavior and buying patterns. International food product marketing. Strategic planning in food marketing.
- 222 Agribusiness and Food Industry Sales (W)**  
Fall, Spring. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. P: (ABM 100 or ABM 130 or EC 201 or EC 202) and completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors. SA: FSM 320  
Selling processes and activities within agribusiness and food firms. Principles and techniques of sales. Operation of sales organizations.
- 335 Food Marketing Management**  
Spring. 3(3-0) P: (FIM 220 or MSC 300) and (MSC 303) SA: ML 335, MTA 335, FSM 335  
Management decision-making in food industry organizations (processors, wholesalers, retailers). Marketing and sales in response to customer and consumer needs. Distribution and merchandising systems in domestic and international contexts.
- 337 Labor and Personnel Management in the Agri-Food System**  
Fall. 3(3-0) Interdepartmental with Agribusiness Management. P: (ABM 100 or ABM 130) R: Open only to juniors or seniors. SA: FSM 325  
Human resource management principles for farms, agribusinesses and food firms: planning, recruiting, training, scheduling, motivating, supervising and evaluating. Labor regulations, compensation and records.

- 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. Field trips required.
- 874 Advanced Fisheries Ecology and Food Web Management**  
Spring of odd years. 3(3-0) RB: (ZOL 355) and (FW 472) and (FW 479)  
Application of food web theory to fisheries management. Evaluation of abiotic and biotic mechanisms as they affect aquatic community structure and food web dynamics.
- 875 Advanced Aquaculture**  
Fall of odd years. 3(3-0) RB: (FW 475)  
Adaptations and responses of aquatic organisms to environmental change in aquaculture systems. Research methods and applications for aquaculture planning and management decisions.
- 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) Fall: Virtual University. Spring: Virtual University. Summer: Virtual University. Interdepartmental with Resource Development; Forestry. Administered by Department of Community, Agriculture, Recreation and Resource Studies. 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) Fall: Virtual University. Spring: Virtual University. Summer: Virtual University. Interdepartmental with Resource Development; Forestry. Administered by Department of Community, Agriculture, Recreation and Resource Studies. RB: (RD 452 and RD 881)  
Techniques for assessing and predicting physical, chemical, biological, and socioeconomic conditions within a watershed. Water quality monitoring. Bio-assessment 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. 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 Forestry; Park, Recreation and Tourism Resources; Agricultural Economics.  
Theory and practice of leadership in natural resource and environmental management. Integration across disciplinary and jurisdictional divisions.
- 891 Advanced Topics**  
Fall, Spring, Summer. 2 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 Department of 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 7 credits in all enrollments for this course.  
Study and research in advanced problems and current development in fisheries and wildlife.
- 897 Ecosystem Ecology**  
Spring. 4(4-0) Interdepartmental with Zoology; Plant Biology. Administered by Department of 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 level graduate students in Fisheries and Wildlife.  
Doctoral dissertation research.