

- 890 Independent Study in Packaging**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Open only to graduate students in Packaging. Approval of department; application required.  
Special investigations of unique packaging problems.
- 891 Selected Topics**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to graduate students in Packaging.  
Selected topics of interest to graduate packaging students.
- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in the Packaging major.  
Master's thesis research.
- 985 Analytical Solutions to Packaging Design**  
Spring of even years. 3(3-0) RB: (PKG 825)  
R: Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering or College of Natural Science. Approval of department; application required.  
Analytical and quantitative techniques for packaging design and evaluation.
- 990 Independent Study in Packaging**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to Ph.D. students in the School of Packaging. Approval of department; application required.  
Special investigations of unique packaging problems.
- 992 Packaging Seminar**  
Fall. 1(2-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to graduate students in packaging.  
Presentations of detailed studies on specialized aspects of packaging.
- 999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 50 credits in all enrollments for this course. R: Open only to Doctoral students in packaging.  
Doctoral dissertation research.

**PARK,  
RECREATION  
AND TOURISM  
RESOURCES**

**PRR**

**Department of Community,  
Agriculture, Recreation and  
Resource Studies  
College of Agriculture and  
Natural Resources**

- 100 Recreation in Michigan Natural Resources**  
Spring. 3(3-0)  
The scope and status of Michigan natural resources used for recreation. Historical and philosophical foundations of management and policy. Analysis of contemporary environmental and recreational policy issues.
- 200 Leisure and Society**  
Fall, Spring, Summer. 3(3-0)  
Leisure and recreation as part of daily life. Leisure as a social, psychological, political, economic and cultural force in the United States.
- 208 Physical Geography of the National Parks**  
Fall of odd years. 2(2-0) Interdepartmental with Geography. Administered by Department of Geography.  
Physical features such as geology, landforms, biota, and waters of United States and Canadian national parks, forests, seashores and lakeshores. Emphasis on formation and distribution.
- 210 Our National Parks and Recreation Lands**  
Fall, Spring, Summer. 3(3-0)  
Scope and history of federal recreation lands. Comparisons of national parks to other federal lands. Recreation land management in other nations. Future federal land management options.
- 213 Introduction to Parks, Recreation, and Leisure**  
Fall, Spring, Summer. 3(3-0)  
The scope and management of recreation services and resources. Historical and philosophical foundations. Influence of recreation behavior on state, national, international, economic, political and social institutions.
- 215 Recreation Program Management**  
Fall, Spring. 4(3-2)  
Programming and leadership principles for planning, management, and evaluation. Program design and conduct to service different clienteles, using leisure education, program development, and small group processes. Field trips required.
- 272 Recreational Boating Systems and the Boating Industry**  
Fall. 3(3-0)  
Boats and boaters, marinas, dealerships, boating agencies and organizations, emerging issues, and management methods. Field trips required.

- 293 Field Work in Park and Recreation Resources**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Approval of department.  
Professional field experience in a park or recreation setting.
- 295 Field Study in Park, Recreation and Tourism Resources Delivery Systems**  
Spring. 2 credits. P:M: (PRR 213 and PRR 215) R: Open only to sophomores or juniors or seniors. Approval of department; application required.  
Field course illustrating public, non-profit, and commercial recreation delivery systems. Interrelationships of recreation with natural resources, cultural resources, facilities, and communities. Partnerships and competition among providers. Field trips required.
- 302 Environmental Attitudes and Concepts**  
Fall. 3(3-0) RB: One ISS course or one PSY course or one SOC course. R: Not open to freshmen.  
History of attitudes and values associated with the environment, wilderness, environmentalism, environmental quality, conservation, and preservation. Perceptions and assessment of modern environmental problems.
- 351 Recreation and Natural Resources Communication (W)**  
Fall, Spring. 3(2-2) P:M: (PRR 213) and completion of Tier I writing requirement. R: Open only to students in the Department of Community, Agriculture, Recreation and Resource Studies. Not open to freshmen.  
Principles of communication for recreation and natural resource audiences. Application to various forms of interpretive media including verbal, graphic, and written. Field trips required.
- 370 Administration and Operation of Park and Recreation Systems**  
Fall. 3(3-0) P:M: (PRR 213 and PRR 215) RB: (PRR 293) R: Not open to freshmen or sophomores.  
Administration, operation and policy of park, recreation and tourism organizations. Legal foundations, concepts and responsibilities, ethical decision-making and personnel management.
- 371 Management of Park and Recreation Agencies and Organizations**  
Spring. 3(3-0) P:M: (PRR 213 and PRR 215) R: Not open to freshmen or sophomores.  
Management concepts and methods. Budgeting, service marketing, and strategic planning in park, recreation and tourism organizations.
- 388 Physical Resource Management in Parks, Recreation and Tourism**  
Fall. 3(2-2) P:M: (PRR 213 and PRR 215) RB: (PRR 293) R: Open only to sophomores or juniors or seniors.  
Relationships among natural resources, the environment, recreational use and site design and development. Principles to safeguard, maintain and restore recreation environments.

## Park, Recreation and Tourism Resources—PRR

- 389 Planning and Evaluation in Parks, Recreation and Tourism**  
Fall. 3(3-0) P:M: (PRR 215 and PRR 213)  
RB: (PRR 293) R: Open only to juniors or seniors.  
Planning, research and evaluation of recreation and tourism systems. Research methods, resource inventory and classification, use estimation, demand forecasting, marketing, and needs assessment. Formative, process, and summative evaluations using secondary data, surveys, observation, experiments, case studies and focus groups
- 393 Professional Seminar**  
Fall, Spring. 1(1-0) P:M: (PRR 293) R: Open only to students in the Department of Community, Agriculture, Recreation and Resource Studies.  
Linkage of field work and internship. Integration of course work with professional practice.
- 410 International Studies in Tourism, Parks and Recreation**  
Fall, Spring, Summer. 1 to 6 credits. Fall: Latin America, Europe. Spring: Latin America, Europe. Summer: Latin America, Europe, Africa, Australia. A student may earn a maximum of 6 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Approval of department; application required.  
Influence of tourism, and parks and recreation on social, economic, and political systems. Management of cultural, historical, and natural resources as they relate to tourism, and parks and recreation.
- 448 Foundations of Natural Resource Based Recreation Management**  
Spring. 3(3-0) P:M: (PRR 210 or PRR 302)  
RB: (ZOL 355) or Basic Ecology R: Open only to juniors or seniors or graduate students.  
History and current status of natural resource-based recreation. Integration of natural resource management, security, interpretation, and outdoor programming. Visitor and resource management tools and models.
- 449 Natural Resource Based Recreation Management Applications**  
Spring. 3(3-0) P:M: (PRR 448) RB: (PRR 388) and Ecology background. R: Open only to juniors or seniors or graduate students.  
Application of management principles to trail, camping and dispersed recreation activities and settings. Security of visitors, resources and support facilities. Case studies and integrated problem solving.
- 451 Park Interpretive Services and Visitor Information Systems**  
Spring. 3(2-2) R: Not open to freshmen or sophomores.  
Orientation, management, and education information systems. Influencing visitor behaviors. Goals and functions of interpretation. Types of services. Nature/visitor center programming and facility design and layout. Historical-cultural interpretation. Field trips required.
- 460 Natural Resource Economics**  
Spring. 3(3-0) Interdepartmental with Resource Development; Environmental Economics and Policy; Biosystems Engineering. Administered by Department of Community, Agriculture, Recreation and Resource Studies. P:M: (EC 201) and (RD 302 or EEP 255)  
Economic framework for analyzing natural resource management decisions. Spatial and inter-temporal allocation of renewable and nonrenewable resources. Special emphasis on institutions, externalities, and public interests in resource management.
- 466 Natural Resource Policy**  
Spring. 3(3-0) Interdepartmental with Forestry; Fisheries and Wildlife; Resource Development. Administered by Department of Forestry. R: Open only to seniors or graduate students in the Department of Forestry or the Department of Fisheries and Wildlife or the Department of Community, Agriculture, Recreation and Resource Studies.  
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.
- 473 Commercial Recreation and Tourism Businesses and Organizations**  
Fall. 3(3-0) RB: (PRR 370) R: Open only to juniors or seniors or graduate students.  
Start-up and management of commercial recreation and tourism businesses with an emphasis on small businesses. Roles and responsibilities of industry associations. Establishment and operation of tourism marketing organizations.
- 474 The Tourism System**  
Fall. 3(3-0) RB: (PRR 370 and PRR 371) R: Open only to juniors or seniors or graduate students.  
Major sectors and emerging types of tourism. Industry and market trends. Tourism and community development. Evaluating and managing the impact of tourism.
- 485 Legal Aspects of Community-Based Recreation**  
Fall. 3(3-0) P:M: (PRR 213 and PRR 215)  
R: Open only to juniors or seniors.  
Application of legal concepts to management and operation of programs, services, and facilities of private nonprofit and public entities. Legal strategies. Human rights and behaviors. Management of risk liability.
- 487 Community-Based Recreation Facility Management**  
Spring. 3(2-2) RB: (PRR 388 and PRR 485)  
R: Open only to seniors or graduate students.  
Analysis of the operation and maintenance of facilities and equipment used in the delivery of recreation programs and services. Management of human interaction within communities. Field trips required.
- 488 Community-Based Recreation Programming**  
Spring. 3(2-2) RB: (PRR 215 and PRR 370 and PRR 371 and PRR 388 and PRR 485)  
R: Open only to juniors or seniors or graduate students.  
Recreation programs and services in rural and urban settings. Nonprofit, public and private agencies. Delivery systems and research procedures. Effective community-based recreation in relation to human services.
- 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; Fisheries and Wildlife. Administered by Department of Zoology. R: Approval of department.  
Scientific writing and oral presentations related to zoo and aquarium studies.
- 490 Independent Study**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department; application required.  
Individualized readings and research compatible with students' interests and abilities under the guidance of a faculty member.
- 491 Special Topics in Park and Recreation Resources**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department; application required.  
Group studies for advanced undergraduate students having special interests in Park and Recreation Resources.
- 493 Professional Internship in Park, Recreation and Tourism Resources**  
Fall, Spring, Summer. 3 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (PRR 393 and PRR 293) R: Open only seniors in the Department of Community, Agriculture, Recreation and Resource Studies. 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 park, recreation and tourism resources.
- 498 Learning in Museums**  
Spring. 3(3-0) Interdepartmental with Arts and Letters; History of Art. Administered by College of Arts and Letters. RB: (AL 485) R: Open only to juniors or seniors or graduate students. SA: HA 487  
Theoretical and practical approaches to understanding and enhancing ways visitors experience museums, zoos, botanical gardens, and other informal learning environments. Creating educational programs, exhibits, and media.
- 815 Park and Recreation Program Services**  
Fall. 3(3-0)  
Concepts, theories, and philosophies of leisure and recreation. Role and function of delivery systems in communities. Management of the program-planning process and provision of recreation services to diverse groups.
- 816 Environmental Design Theory**  
Fall. 3(3-0) Interdepartmental with Landscape Architecture; Horticulture; Human Environment and Design. Administered by Department of Geography. RB: Undergraduate design degree recommended.  
Differences between normative theories, scientific theories, models, and constructs. Exploration of normative theories related to thesis or practicum.

- 817 Environmental Design Studio**  
Spring. 3(0-6) Interdepartmental with Landscape Architecture; Horticulture; Human Environment and Design. Administered by Department of Geography. P:M: (LA 816 and LA 883) RB: Undergraduate design degree.  
Development of a student-selected environmental design project in a collaborative setting.
- 829 The Economics of Environmental Resources**  
Fall. 3(3-0) Interdepartmental with Agricultural Economics; Economics; Forestry; Resource Development. Administered by Department of Agricultural Economics.  
Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, conservation, development, and global environmental issues.
- 840 Recreation and Tourism Economics**  
Fall. 3(3-0)  
Economic concepts in public and private sector recreation and tourism decisions. Non-market valuation techniques. Regional economic impact. Demand and supply. Forecasting consumption trends. Financial and benefit cost analysis.
- 841 Park and Recreation Administration and Policy**  
Fall. 3(3-0)  
Administration and management of park and recreation services in urban and rural environments. Policy development and evaluation. Planning, financing, staffing, operating and evaluating organizational structures.
- 842 Parks and Protected Areas Policy and Management**  
Spring of even years. 3(3-0)  
History of policies related to parks and protected areas. Current state and federal policies and agencies. Interaction between policy and management. Current US and international issues and applications.
- 844 Research Methods in Recreation, Parks, and Tourism**  
Spring. 3(3-0)  
Recreation research needs, techniques, assessment and application. Management problems and decision making.
- 848 The Law and Leisure Services**  
Spring. 3(3-0)  
Risk control. Legal audits. Human rights mandates. Legal information systems. Contracts and participant forms. Intentional tort and negligence concepts. Personnel legal processes.
- 870 Park, Recreation and Natural Resources Marketing**  
Fall. 3(3-0) R: Open only to graduate students in the Department of Park, Recreation and Tourism Resources or Department of Resource Development or Department of Forestry or Department of Fisheries and Wildlife.  
Integration of marketing concepts and methods into agency planning and decision making.
- 874 Leisure, Travel and Tourism**  
Fall. 3(3-0)  
Modern concepts of leisure, travel, and tourism. Historical antecedents and current concepts of leisure, travel, and tourism.

- 879 Case Studies in Park and Recreation Resources**  
Spring. 3(3-0)  
Integrated approach to policy, planning, and management problems.
- 883 Environmental Design Seminar**  
Fall. 3(3-0) Interdepartmental with Landscape Architecture; Horticulture; Human Environment and Design. Administered by Department of Geography. RB: Undergraduate design degree.  
Examination of the breadth of environmental design projects. Literature review of focused projects. Development of practicum or thesis proposals.
- 885 Leadership in Natural Resources and Environmental Management**  
Fall. 3(3-0) Interdepartmental with Fisheries and Wildlife; Forestry; Agricultural Economics. Administered by Department of Fisheries and Wildlife.  
Theory and practice of leadership in natural resource and environmental management. Integration across disciplinary and jurisdictional divisions.
- 890 Independent Study**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 7 credits in all enrollments for this course.  
Supervised individual study in an area of parks, recreation, leisure, or tourism.
- 891 Selected Topics**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
Selected topics in park and recreation resources of current interest and importance.
- 892 Park and Recreation Resources Seminar**  
Fall, Spring. 1 to 2 credits. A student may earn a maximum of 2 credits in all enrollments for this course.  
Current policy issues, problems and research in parks, recreation and tourism.
- 895 Coastal and Maritime Heritage and Management**  
Fall of even years. 3(3-0)  
Integrated management of coastal and maritime resources. Coastal tourism. Natural, historic and cultural resources. Legal, social and political contexts. History and lifeways. Commercial and recreational uses. Research, conservation and outreach. Field trip required.
- 898 Master's Project**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to master's students in Park, Recreation and Tourism Resources.  
Master's project research or practicum.
- 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 master's students in the Park, Recreation and Tourism Resources major. Approval of department.  
Master's thesis research.

- 923 Advanced Environmental and Resource Economics**  
Fall. 3(3-0) Interdepartmental with Agricultural Economics; Economics; Forestry; Resource Development. Administered by Department of Agricultural Economics. RB: (AEC 829 and EC 812A)  
Advanced economic theory of environmental management and policy. Treatment of externalities and market and non-market approaches to environmental improvement. Topics in conservation and sustainable economic growth. Applications to research and policy.
- 925 Advanced Natural Resource Economics**  
Spring. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Resource Development; Economics. Administered by Department of Agricultural Economics. RB: (EC 812A and AEC 829 and FOR 866) SA: AEC 991H  
Economic theory of managing nonrenewable and renewable resources, including optimal use, the incentives for use under decentralized markets, and public policy design. Analysis of the co-evolution of economic and ecological systems.
- 944 Advanced Research Methods**  
Summer. 3(3-0) RB: (PRR 844)  
Applications of advanced and specialized research methods to problems in recreation and tourism. Measurement, sampling, and research design.
- 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 Park and Recreational Resources.  
Doctoral dissertation research.

## PATHOLOGY

## PTH

### Department of Pathobiology and Diagnostic Investigation College of Veterinary Medicine

- 551 General Pathology**  
Spring. 3(2-2) R: Completion of Semester 1 of the graduate professional program in the College of Veterinary Medicine.  
Host responses to injury, including cell degeneration, necrosis, disturbances of growth and development, neoplasia, circulatory disturbances and inflammation.
- 553 Clinical and Systemic Pathology**  
Fall. 5(4-2) R: Completion of Semester 2 of the graduate professional program in the College of Veterinary Medicine.  
Hematology. Pathology of hematopoietic, lymphatic, digestive, urinary, respiratory, integumentary, cardiovascular, nervous, reproductive, musculoskeletal, endocrine, ocular, and otic systems.
- 630 Diagnostic Pathology Clerkship**  
Fall, Spring. 3 credits. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.  
Necropsy and surgical and clinical pathology. Interpretation of gross findings and laboratory data.