

492 Senior Seminar
Fall, Spring, Summer. 1(2-0) R: Open only to seniors in Packaging.

Seminar on current packaging issues, business organization and operations, and accepted practices in a corporate environment.

493 Professional Internship in Packaging
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (PKG 322 and PKG 323) R: 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, FIM 493, FW 493, HRT 493, PKG 493, PRM 493, PRR 493, and RD 493. Approval of school; application required.

Supervised professional experience in the field of packaging offered through corporations and other businesses throughout the U.S.

805 Advanced Packaging Dynamics
Spring. 3(2-2) P:NM: (PKG 410)

Shock and vibration. Distribution hazards and product fragility. Cushion performance and package design. Environmental measurement and simulation.

815 Permeability and Shelf Life
Spring. 3(2-2) P:NM: (MTH 124Q and MTH 132 and PKG 322 and PKG 323)

Relationship between the storage life of packaged food and pharmaceutical products and the gas, moisture, and organic vapor permeability of packages in various environments.

817 Instruments for Analysis of Packaging Materials
Fall of even years. 4(3-2) P:NM: (PKG 322 and PKG 323)

Analytical methods for packaging including spectrophotometry and chromatography. Material identification and characterization. Migration and permeation measurements.

825 Polymeric Packaging Materials
Fall. 4(3-2) P:NM: (PKG 323)

Physical and chemical properties of polymeric materials and structures used in packaging. Relationship of properties to performance.

875 Stability and Recyclability of Packaging Materials
Fall of odd years. 3(3-0) P:NM: (PKG 322 and PKG 323)

Interactions between packaging materials and environments: corrosion, degradation, stabilization, and recycling. Impacts of packaging disposal.

888 Master's Project
Fall, Spring, Summer. 2 credits. R: Open only to master's students in the School of Packaging. Approval of school, application required.

Master's degree Plan B project. Completion of a project related to packaging issues.

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) P:NM: (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.

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.

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 clientele, using leisure education, program development, and small group processes. 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.

300B Coaching Sports for Athletes with Disabilities
Spring of even years. 2(2-0) Interdepartmental with Kinesiology; Women's Studies; Forestry; Public Resource Management; Surgery. Administered by Department of Kinesiology. SA: PES 300B
Rules, strategies, and training. Developing and evaluating player skills. Planning, conducting, and evaluating sport practices. Health and safety concerns.

302 Environmental Attitudes and Concepts
Fall. 3(3-0) P:NM: 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.

PARK, RECREATION AND TOURISM RESOURCES

PRR

Department of Park, Recreation and Tourism Resources 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.

Park, Recreation and Tourism Resources-PRR

- 320 Human Behavior in Park and Recreation Settings**
Spring. 3(3-0) P:NM: One PSY course or one SOC course.
Antecedents, intervening conditions, and outcomes of human behavior in park, recreation, and leisure settings. Interactions between recreation behavior and the natural environment. Problem solving in recreation.
- 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 Park, Recreation and Tourism Resources. 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.
- 362 Recreation for Special Populations**
Spring. 3(3-0) R: Not open to freshmen.
Therapeutic recreation services emphasizing handicapped and geriatric characteristics. Chemical dependency issues. Leisure lifestyle issues. Philosophical foundations and service models. Integration, normalization, inclusion, and empowerment concepts.
- 370 Administration and Operation of Park and Recreation Systems**
Fall. 3(3-0) P:M: (PRR 213 and PRR 215) R: Not open to freshmen or sophomores.
Policy, administration, and operations of park, recreation and tourism organizations.
- 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.
- 393 Professional Seminar**
Fall, Spring. 1(1-0) P:M: (PRR 293) R: Open only to students in the Department of Park, Recreation and Tourism Resources.
Linkage of field work and internship. Integration of course work with professional practice.
- 410 International Studies in Tourism, Parks and Recreation**
Fall, Spring, Summer. 3(3-0) 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, parks and recreation on social, economic and political systems. Management of cultural, historical and natural resources as they relate to tourism, parks and recreation.
- 419 Applications of Geographic Information Systems to Natural Resources Management**
Spring. 4(2-4) Interdepartmental with Fisheries and Wildlife; Forestry; Geography; Resource Development; Biosystems Engineering. Administered by Department of Fisheries and Wildlife. P:NM: (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.
- 443 Park and Recreation Planning and Design Concepts**
Fall, Spring. 4(2-4) P:M: (PRR 351) R: Not open to freshmen or sophomores.
Planning models and design analysis, synthesis, and communication and recreation and tourism subsystem and supply analysis.
- 449 Management of Natural Resource Based Recreation**
Fall. 3(3-0) R: Not open to freshmen or sophomores.
The history of natural resource recreation management in the U.S. Techniques for dispersed and developed recreation management. Security of facilities, visitors, and personnel.
- 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 Resource and Environmental Economics**
Spring. 3(3-0) Interdepartmental with Resource Development; Public Resource Management; Biosystems Engineering. Administered by Department of Resource Development. P:M: (EC 201) P:NM: (RD 302 or PRM 255)
Economics of land and related environmental resources. Production and consumption processes. Resource allocations and scarcity. Market failure and externalities. Market and institutional remedial approaches.
- 464 Natural Resource Economics and Social Science (W)**
Fall. 3(2-2) Interdepartmental with Forestry; Fisheries and Wildlife; Resource Development. Administered by Department of Forestry. P:M: (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; Fisheries and Wildlife; 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.
- 467 Programming in Therapeutic Recreation**
Fall. 3(3-0) P:M: (PRR 362)
Comprehensive and individual program planning methods. Standards of practice, quality assurance, interview techniques, professional ethics, and terminology. Field trips required.
- 468 Therapeutic Recreation Techniques**
Spring. 3(3-0) P:M: (PRR 467)
Health care documentation. Leisure education. Facilitation techniques. Assistive recreation devices. Principles of pharmacology related to therapeutic recreation. Professional and certification issues.
- 473 Commercial Recreation and Tourism Enterprises**
Fall. 3(3-0) P:M: (EC 201 and PRR 371) R: Not open to freshmen or sophomores.
Management and operation of resort, recreation, and tourism enterprises. Emphasis on small business. Strategic planning, feasibility studies, market assessment, and quality assurance.
- 474 Community and Natural Resource Based Tourism**
Spring. 3(3-0) R: Not open to freshmen or sophomores.
Developing and sustaining tourism. Environmental, social, and economic considerations. Roles and responsibilities of agencies and organizations. Impact management. Tourism-based community and rural development.
- 475 Evaluation in Parks and Recreation**
Fall. 3(2-2) P:M: (STT 200 or STT 201 or STT 315 or PSY 295 or PLS 201) and (PRR 370 and PRR 371) R: Open only to seniors or graduate students.
Evaluation concepts, approaches, and methods. Evaluation in management and administrative functions.
- 485 Legal Aspects of Parks, Recreation, and Sport**
Fall. 3(3-0) P:M: (PRR 370 and PRR 371) R: Open only to seniors or graduate students.
Legal concepts in management and operation of public and private programs, areas and facilities. Tort liability and risk management planning. Rights and behavior constraints of clientele. Legal foundations of authority.
- 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 Park, Recreation and Tourism Resources. 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, FIM 493, FW 493, HRT 493, PKG 493, PRM 493, PRR 493, and RD 493.

Supervised professional experiences in agencies and businesses related to park, recreation and tourism resources.

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.

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.

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. 3 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.

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

Spring of even years. 3(3-0) Interdepartmental with Agricultural Economics; Economics; Forestry; Resource Development. Administered by Department of Agricultural Economics. P:NM: (AEC 829 and EC 805)

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 Environmental and Resource Economics Research

Spring of odd years. 3(3-0) Interdepartmental with Agricultural Economics; Forestry; Resource Development; Economics. Administered by Department of Agricultural Economics. P:NM: (AEC 829 and EC 805) SA: AEC 991H

Topics such as contingent or non-market valuation, institutional analysis, pollution prevention, environmental quality and location, recreational demand modeling, and environmental risk management. Research process in environmental and resource economics.

944 Advanced Research Methods
Summer. 3(3-0) P:NM: (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 Recreation Resources.

Doctoral dissertation research.

PATHOBIOLOGY AND DIAGNOSTIC INVESTIGATION PTH

Department of Pathobiology and Diagnostic Investigation College of Veterinary Medicine

525 Neuropathology Problem Solving Exercises

Fall, Spring, Summer. 2(0-4) R: Open only to graduate-professional students in College of Human Medicine or Osteopathic Medicine.

Independent study of 24 neuropathology problem solving exercises.

542 Basic Principles of Pathology

Spring. 2 credits. R: Graduate-professional students in colleges of Human and Osteopathic Medicine.

Fundamental pathologic processes; clinical applications.

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.