PACKAGING PKG

College of Agriculture and Natural Resources

210. Principles of Packaging
Fall, Winter, Spring, Summer. 3(3-0)
A general course in packaging principles covering the growth and development of the field, and the technological and motivational problems involved in present day packaging. Consideration will be given to the basic functions of the package and their relation to the needs and wants of our society.

321. Technical Principles for Packaging
Fall, Winter, Spring. 4(3-2) PKG 210, PHY 237, PHY 238 or approval of school.
Relationships between package systems and distribution environments. Testing, evaluating and predicting package performance under various environmental influences.

330. Package Printing
Winter. 3(3-0) PKG 321 or approval of school.
Basic printing processes used for packaging materials. Advantages, disadvantages and identification of these printing methods.

331. Plastic and Glass Packaging
Fall, Winter, Spring. 4(3-2) PKG 321, CEM 143, CEM 161 or approval of school.
Physical and chemical properties of plastics and glass and their relationship to selection, design, manufacture, performance and evaluation of container systems.

332. Paper and Metal Packaging
Fall, Winter, Spring. 4(3-2) PKG 321, CEM 143, CEM 161 or approval of school.
Physical and chemical properties, manufacture, conversion and use of wood, paper, paperboard, metals, metal foils and related components. Design, use and evaluation of packages made from these materials.

340. Packaging and the Environment
Winter. 3(3-0)
Broad study of the effects of packaging on environmental quality including solid waste management, air and water quality, laws, economics, energy considerations, resource conservation and environmental ethics.

423. Dynamics of Packaging
Fall, Winter, Spring. 4(3-2) PKG 331, PKG 332, PHY 239 or approval of school.
A study of the protective function of the packaging systems in relation to their environment and shock and vibration isolation methods. A one-day field trip is required.

424. Packaging Problems
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. PKG 331, PKG 332, 2.50 grade-point average, approval of school.
Development of solutions to specific packaging problems.

425. Packaging Process Analysis
Fall, Winter, Spring. 4(3-2) PKG 331, PKG 332.
The integrated study of the operation, structure and control of packaging and package-making processes. A one-day field trip is required.

428. Packaging Development
Fall, Winter, Spring. 4(3-2) PKG 423, PKG 425, Seniors.
Development of packages to meet present-day requirements of protection and merchandising.

429. Packaging Economics
Winter. 3(3-0) PKG 331, PKG 332, EC 202, ACC 201 or approval of school.
Examination of economic issues in packaging as they relate to policies of the firm and of government. Relationships between economic policy and social issues.

430. Elements of Packaging Machinery
Spring. 4(4-0) PKG 331, PKG 332 or approval of school.
Design, selection, specification and operation of components of packaging machinery. Industrial parts and processes. Basic machine mechanisms. Application of pneumatics, hydraulics and electricity. Field trip required.

435. Distribution Packaging
Fall, Winter, Spring. 3(3-0) EC 202, PKG 331, PKG 332, Juniors or approval of school.
Interrelationships between packaging and other segments of the distribution system. Market related issues in packaging: materials handling, transportation, and inventory control.

438. Pharmaceutical Packaging
Winter. 4(3-2) PKG 331, PKG 332.
Special requirements for packaging pharmaceuticals and medical devices. Evaluations of package systems and packaging procedures that meet these requirements.

440. Special Topics (MTC)
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits if different topics are taken. Juniors or approval of school.

448. Design of Shipping Containers
Spring. 2(1-2) PKG 423.
Students design, build and test a shipping package system for an industrial product. Lectures by industry personnel on specific shipping containers not discussed in other packaging courses.
Approved through Winter 1989.

450. Packaging Laws and Regulations
Spring. 3(3-0) PKG 331, PKG 332 or approval of school.
History and development of packaging laws and regulations. Relationships among law, government regulation and commercial regulation. Effect of current laws and regulations on packaging. Personal liability of the packaging professional.

455. Food Packaging
Fall. 4(3-2) PKG 331, PKG 332 or approval of school.
Food packaging systems and their relationship to specific products, processes, regulations and equipment.

463. Seminar
Fall. 2(0-4) Senior Majors.
Discussions on current packaging problems.

467. Packaging Decision Systems
Fall, Winter, Spring. 3(2-2) PKG 331, PKG 332, CPS 115, EC 202.
Structure and use of decision systems for management, specification, production and testing. Use of microcomputers to support decisions.

801. Packaging Systems
Fall. 4(3-3)
Analysis of various existing packaging systems; problem solving exercises.

810. Advanced Packaging Materials
Spring. 3(2-2) PKG 331, PKG 332 or approval of school.
Physical and chemical properties of packaging materials. Relationship between properties of materials and performance of packages.

820. Permeability and Shelf Life
Winter. 4(3-3) PKG 331, PKG 332, MTH 113, CPS 115 or approval of school.
Comprehensive study of the relationship of the storage life of packaged food and agricultural products and the gas, moisture, and vapor permeability of packages in various environments. Computer aided package design.

822. Seminar
Fall. 1(1-0) Approval of department.
Discussions of recent advances in packaging and reports by graduate students and faculty on research problems. Field trips required.

823. Advanced Packaging Dynamics
Spring. 3(2-2) PKG 423 or approval of school.
Shock simulation, random vibration, power spectral density, modeling of non-linear systems. Fourier decomposition. Modal analysis. Multiple degree of freedom systems. Damping and cushioning properties. Instrumentation in dynamic testing.

834. Special Investigations in Packaging
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits. Approval of school.

840. Selected Topics
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits if different topics are taken. Approval of department.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of school.

PARK AND RECREATION RESOURCES PRR

College of Agriculture and Natural Resources

200. Leisure and Society
Fall, Winter, Spring. 3(3-0)
Leisure and recreation as part of daily life. Leisure as a social, psychological and economic force in American culture.

210. Our National Parks
Fall, Spring. 3(3-0) Not open to majors.
Heritage, management, and future of U.S. National Parks. Conflicts inherent in preservation of natural and historic resources for public enjoyment.

213. Leisure and Recreation Resources
(PRR 344.) Fall, Winter, Spring. 3(3-0)
Leisure in relation to park and recreation resources. History and philosophy, significance in modern society, and impact on urban and natural resource developments.

215. *Recreation Programming and Leadership*
(PRR 201.) Fall, Winter. 4(3-2)
Recreation leadership and programming. Recreation program service settings, design and conduct of programs to serve different clientele groups.

302. *Environmental Attitudes and Concepts*
Fall. 3(3-0)
History of development of attitudes and values about the environment in western civilization. Wilderness, environmentalism, environmental quality, economic development, conservation. Environmental perception and environment-behavior relationships.

304. *Recreation Planning and Design*
Fall, Spring. 3(3-0) Approval of department.
Basic planning and design concepts applied to recreation areas, facilities, and programs. Planning process, public involvement, population and resource analysis, aesthetic and functional considerations in park design.

310. *Camp Counseling and Administration*
Spring. 3(3-0)
Camp counseling techniques, leadership roles and responsibilities, campcraft skills, programming camp activities, organization and administration of youth camps.

315. *Recreation Program Management*
(PRR 313.) Winter, Spring. 4(3-2) PRR 215.
Application of recreation programming and leadership principles to program planning, management and evaluation. Development of recreation programs utilizing leisure education format and small group process.

351. *Park Interpretation and Visitor Information Services I: Principles*
Fall, Winter. 3(3-0)
Communication principles applied to park and recreation resource interpretation and other information services. Principles of audience analysis, brochure and exhibit design, public relations, natural/cultural interpretation, visitor information centers.

362. *Recreation for Special Populations*
Fall, Spring. 3(3-0) PRR 215.
Therapeutic recreation, recreation services for special populations. Physical, social, and psychological disabilities as they relate to leisure services. Field trip required.

384. *Junior Proseminar*
(PRR 484.) Fall, Spring. 1(1-0) Juniors.
Seminars on current professional problems and literature.

403. *Fieldwork in Park and Recreation*
Fall, Winter, Spring. 1 to 8 credits. May reenroll for a maximum of 8 credits. Approval of department.
Fieldwork course in which student acts as a leader under supervision in community park and recreation programs.

422. *Leisure Theory and Philosophy*
Fall, Spring. 3(3-0) PRR 213 or approval of department.
Classical and modern leisure theories and philosophies. Personal and societal attitudes toward leisure, work, and recreation. Changing values, leisure and culture, future perspectives.

440. *Park and Recreation Administration*
Winter, Spring. 4(4-0)
Park and recreation organization, administration and policy at municipal, county, and regional level. Field trip required.

442A. *Park and Recreation Resource Policy*
(PRR 442.) Spring. 3(3-0) PRR 213 or approval of department. May not receive credit for both PRR 442A and PRR 442B.
History and significance of recreation resource policy in the United States. Policy process, case studies of recreation policy development.

442B. *Leisure Services Policy*
(442.) Spring. 3(3-0) PRR 315 or PRR 362. May not receive credit for both PRR 442A and PRR 442B.
History and significance of recreation policy affecting leisure services and special populations in the U.S. Studies of recreation policy development. Professional certification.

444. *Park and Recreation Area Design*
Winter. 4(2-4) PRR 304 or approval of department.
Planning and design principles of space, scale, and circulation applied to the use of park and recreation areas and facilities. Field trip required.

445. *Comprehensive Recreation Planning*
Fall. 4(4-0) PRR 304 or approval of department.
Comprehensive planning techniques for recreation resources at national, state, and local levels. Supply-demand analysis, forecasting, impact assessment, survey methods and citizen input for recreation system planning.

446. *Park and Recreation Area Operations*
Winter, Spring. 3(3-0) Approval of department.
Operations and maintenance of park and recreation areas and facilities. Preparation and implementation of maintenance plans, standards, scheduling, budget estimating. Selection and operation of maintenance equipment, supplies, and materials.

449. *Recreation Land Management*
Winter. 3(3-0) Not open to majors.
Fundamentals of outdoor recreation resource management. Planning, development, and administration of programs and facilities.

450. *Natural Resource Administration*
Spring. 4(4-0) Seniors. Interdepartmental with Agriculture and Natural Resources and the departments of Fisheries and Wildlife, Forestry, and Resource Development. Administered by the Department of Forestry.
Concepts and methods of administering wildland properties. The legal, economic and social environment. Benefit-cost analysis of management changes. Unit organization, personnel management and accounting. Presents a systems view of administration.

451. *Park Interpretation and Visitor Information Services II: Methods*
Spring. 4(4-0) PRR 351.
Methods used in information services for park and recreation areas. Audiovisual programs, exhibit technology, interpretation issues, interpretive planning and program development. Field trip required.

455. *Natural Resource Economics*
Fall. 4(3-2) EC 200 or EC 201. Interdepartmental with Agriculture and Natural Resources and the departments of Fisheries and Wildlife, Forestry, and Resource Development. Administered by the Department of Forestry.
Basic economic and institutional principles and techniques that govern the production and consumption of renewable natural resources. Natural resource evaluation, project analysis, and distributional considerations.

466. *Natural Resource Planning*
Winter. 3(2-2) FOR 455 or R D 417 or approval of department. Interdepartmental with the departments of Forestry and Resource Development. Administered by the Department of Forestry.
Natural resource planning concepts and techniques applicable to area-level and subarea-level planning. Case studies in comprehensive, multiple resource public planning and single resource private planning.

467. *Therapeutic Recreation Principles*
Fall. 3(3-0) PRR 362.
Planning, implementation, and evaluation of therapeutic recreation services. Individual disabilities, review of health care models and related therapies. Field trip required.

468. *Therapeutic Recreation Techniques*
Winter. 3(2-2) PRR 467.
Instructional, intervention, and interaction techniques in therapeutic recreation. Treatment planning, terminology, documentation, and leisure counseling. Field trip required.

470. *Commercial Recreation Enterprises*
Fall. 4(4-0) EC 201; ACC 230 or approval of department.
Management methods and problems in commercial recreation enterprises with an emphasis on small business.

471. *Recreation Products Consumption*
Winter. 4(4-0) EC 201; ACC 230 or ACC 202; or approval of department.
Recreation, economic and personality theories of consumption. Specific recreation product industry case studies.

480. *Supervised Study*
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 10 credits. Approval of department.
Seminars on current problems. Supervised readings. Individual undergraduate research on selected topics.

801. *Dimensions of Recreation and Leisure*
Fall. 3(3-0) Approval of department.
Concepts of recreation and leisure in the United States and their implications for professional development. Extensive reading into concepts, definitions, values, educational components and historic roots of recreation and leisure.

840. *Recreation Economics*
Spring. 4(4-0) FOR 809 or approval of instructor. Interdepartmental with the departments of Forestry and Resource Development.
Applications of economic analysis to recreation resource problems including measurement of demand and supply, valuation of recreation resources, determination of economic impact, economic decision making and policy considerations.

842. *Park and Recreation Policy*

Winter. 3(3-0) Interdepartmental with the Department of Resource Development.

Recreation, leisure and work concepts. Determination of needs for recreation facilities. Factors affecting public and private allocation of resources for provision of needed facilities.

844. *Recreation Research Methods*

Winter. 4(4-0) Approval of department.

Relate recreation research to broader context of social scientific investigation and to the nature and philosophy of social scientific research. Examine the theoretical and methodological approaches in recreation research.

846. *Urban and Regional Recreation Resource Planning*

Fall. 4(4-0) Approval of department.

Evaluation and application of recreation planning techniques at urban and regional levels. Analysis of programs, policies, land areas, facilities, and populations as they pertain to leisure service delivery systems.

848. *Recreation Resource Law*

Spring. 3(3-0)

Legal basis for public recreation. Methods of acquiring recreational resources, including contracts and condemnation procedures. Administrative problems, including zoning, liability, civil rights and law enforcement. Study of cases and statutes.

871. *Selected Topics*

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

Selected topics in recreation resource planning, administration, management, policy, and research.

880. *Special Problems*

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 10 credits. Approval of department.

Independent study in recreation, leisure, recreation travel, and tourism.

889. *Applied Professional Project*

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 4 credits. PRR 844, approval of department.

Master's degree Plan B research paper.

899. *Master's Thesis Research*

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

999. *Doctoral Dissertation Research*

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

PATHOLOGY PTH

College of Human Medicine
College of Osteopathic Medicine
College of Veterinary Medicine

410. *General Pathology*

Spring. 3(3-0) ANT 316; PSL 432 or concurrently. Interdepartmental with and administered by Medical Technology.

Features of lethal and sublethal cell injury and inflammation and repair process. Definition of the major causes of pathologic change with a consideration of specific associated diseases.

411. *Basic Histopathology*

Spring. 2(1-2) ANT 420, PSL 432; M T 410 or concurrently. Interdepartmental with and administered by Medical Technology.

Microscopic examination of cell injury and death, inflammation and tissue repair. Pathologic tissue changes in diseases resulting from degenerative changes, abnormal metabolism, neoplasia, immunologic processes, infection, mechanical trauma and malnutrition.

501. *Introduction to Human Pathology*

Spring. 2(1-2) Admission to the College of Human Medicine and ANT 543; or approval of department.

Pathologic processes and specific disease syndromes with emphasis on clinical applications. Concepts of disease. Pathologic processes in selected common diseases or conditions.

502. *Human Pathology I*

Winter. 2 to 5 credits. Admission to a college of medicine or approval of department. ANT 560 for College of Osteopathic Medicine students.

Pathologic processes and specific disease syndromes with emphasis on clinical applications. Concepts of disease and pathologic process in selected common diseases or conditions for the beginning medical student with a limited knowledge of anatomy, physiology and biochemistry.

507. *Human Pathology I*

Fall. 5(4-2) PTH 501.

Diseases of the cardiovascular and endocrine systems. Laboratory sessions will emphasize gross and microscopic morphology and clinical pathologic techniques.

508. *Human Pathology II*

Winter. 4(3-2) PTH 501.

Diseases of the respiratory, gastrointestinal, urinary and male reproductive systems. Laboratories will emphasize gross and microscopic study of lesions and a problem solving approach to disorders.

509. *Human Pathology III*

Spring. 3(3-1) PTH 501.

Diseases of female reproductive system, bone, skin and blood forming organs. Laboratory sessions will emphasize gross and microscopic lesions.

510. *Human Pathology IV*

Spring. 2(2-0) PTH 501.

Diseases of nervous system and muscle. Problem solving exercises will be utilized.

525. *Neuropathology Problem Solving Exercises*

Fall, Winter, Spring, Summer. 2(0-4) Medical student or approval of instructor.

Independent study of 24 neuropathology problem solving exercises, including clinical history and brain specimens.

540. *Introduction to Laboratory Medicine*

(OST 551.) Winter. 2 credits. ANT 560, BCH 501, PTH 502.

Introduction to laboratory medicine leading to proficiency in patient evaluation and diagnosis through understanding of common pathologies and basic laboratory procedures in blood, urine and feces analysis.

550. *Veterinary Pathology*

Fall. 5(3-4) Second year Veterinary Medicine students or approval of department.

Principles of pathology, including causes of disease, disturbances of cell growth and metabolism, necrosis, circulatory changes, inflammation and neoplasia.

552. *Veterinary Clinical Pathology*

Winter. 4(3-3) Fifth-term Veterinary Medicine students or approval of department.

Technical aspects, principles and interpretation of selected laboratory procedures in hematology, chemistry, cytology and related areas.

590. *Special Problems in Pathology*

Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 12 credits if different topics are taken. Admission to a professional program in the College of Osteopathic Medicine or Human Medicine; approval of department.

Each student will work under direction of a faculty member on an experimental, theoretical or applied problem in pathology.

592. *Special Problems in Veterinary Pathology*

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Admission to the professional program in the College of Veterinary Medicine.

Each student will work under direction of a faculty member on an experimental, theoretical or applied problem in pathology.

608. *Pathology Clerkship*

Fall, Winter, Spring, Summer. 3 to 17 credits. May reenroll for a maximum of 17 credits. Grade P in all courses offered in terms 1 through 8.

Anatomic and clinical pathology, with emphasis on clinical-pathological correlations. Conducted in the pathology departments of affiliated hospitals.

609. *Laboratory Medicine Clerkship*

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Grade P in all courses in terms 1 through 8.

Current laboratory procedures. Correlation of data from patients with clinical disease, to morphologic abnormalities and altered pathophysiology.

621. *Histopathology Clerkship*

Winter. 3 credits. Completion of 9 terms of professional program, approval of department.

Supervised instruction in the examination and interpretation of histologic lesions caused by animal diseases.

651. *Veterinary Clinical Pathology Clerkship*

Fall, Summer. 4 credits. Satisfactory completion of term 8 of the professional veterinary curriculum, approval of department.

Concepts in laboratory interpretation and diagnosis.

652. *Veterinary Necropsy Clerkship*

Fall, Winter, Spring. 4 credits. Satisfactory completion of term 8 of the professional veterinary curriculum, approval of department.

Supervised necropsy and interpretation of findings.

656. *Problems in Veterinary Necropsy*

Winter, Spring. 3 credits. PTH 652, approval of department.

Problems related to necropsy and interpretation of findings.