590. Special Problems  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 60 credits in all enrollments for this course.  
R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college. Individual study directed by a faculty member on an experimental, theoretical, or applied problem.  
QA: GST 590

PACKAGING PKG

School of Packaging
College of Agriculture and Natural Resources

210. Principles of Packaging  
Fall, Spring. 3(3-0)  
Packaging systems, materials and forms and their relationship to the needs and wants of society.  
QA: PKG 210

310. Technical Principles and Dynamics for Packaging  
Fall, Spring. 4(3-2)  
P: MTH 124 or MTH 132; PHY 232. R: Open only to Packaging students.  
Testing, evaluating, and predicting package performance under various environmental conditions. Methods of protection against shock, vibration, and other environmental hazards.  
QP: PHY 239, MTH 112 or MTH 122 QA: PKG 321, PKG 423

320. Plastic and Glass Packaging  
Fall, Spring. 4(3-2)  
P: CEM 143, PKG 310. R: Open only to Packaging students.  
Physical and chemical properties of plastic and glass and their relationship to selection, design, manufacture, performance and evaluation of packages.  
QP: PKG 321, CEM 143 QA: PKG 331

325. Paper and Metal Packaging  
Fall, Spring. 4(3-2)  
P: CEM 143, PKG 310. R: Open only to Packaging students.  
Physical and chemical properties, manufacture, conversion and use of wood, paper, paperboard, metal and related components. Design, use and evaluation of packages.  
QP: PKG 321, CEM 143 QA: PKG 332

330. Package Printing  
Fall. 3(3-0)  
P: PKG 310. R: Open only to Packaging students.  
Methods of printing packages including copy preparation, design, electronic imaging, aesthetics, camera use, and effects of package materials. Production of printed packages including quality control, economics, and environmental considerations.  
QP: PKG 321 QA: PKG 330

370. Packaging and the Environment  
Spring. 3(3-0)  
P: CEM 111 completion of Tier I writing requirement. R: Not open to freshmen and sophomores.  
QP: CEM 141 QA: PKG 340

415. Packaging Decision Systems  
Fall, Spring. 3(3-2)  
P: MTH 110 or MTH 115; CPS 160 or CPS 180 or CPS 131. R: Open only to majors in Packaging.  
Application of computer to analyze and solve problems in the management, specification, production, and testing of packaging systems.  
QA: PKG 467

432. Packaging Processes  
Fall, Spring. 4(3-2)  
P: PKG 320, PKG 325. R: Open only to Packaging students.  
QP: PKG 331, PKG 332 QA: PKG 430, PKG 425

440. Automation in Packaging  
Fall. 3(3-2)  
P: MTH 124. Not open to freshmen and sophomores.  
Automated systems: configuration, components, sensors, drive mechanisms, and control systems. Robotic safety, Material handling, line inspection, vision systems, automated storage and retrieval systems. Economics. Field trips required.  
QP: MTH 112 QA: PKG 465

452. Pharmaceutical Packaging  
Fall. 4(3-2)  
P: PKG 320 or PKG 325. Special requirements for packaging pharmaceuticals and medical devices. Evaluation of package systems and packaging procedures.  
QP: PKG 351 or PKG 392 QA: PKG 483

455. Food Packaging  
Spring. 3(3-1)  
P: PKG 350, PKG 325. R: Open only to Packaging majors.  
Food package systems related to specific products and processes. Product composition; problems and packaging solutions; shelf life considerations, and packaging lines.  
QP: PKG 331, PKG 392 QA: PKG 455

460. Distribution Packaging and Performance Testing  
Spring. 3(3-2)  
P: PKG 310. R: Open only to Packaging majors.  
Interrelationships between packaging and distribution systems. Transportation, material handling, warehousing, logistics and management systems. Performance testing and industry practices. Package container design and testing.  
QP: PKG 321, PKG 423 QA: PKG 435, PKG 493

475. Packaging Economics  
Fall. 3(3-0)  
P: EC 201 or EC 202.  
Economic issues in packaging as they relate to policies of the firm and of government. Relationships between economics and environmental issues.  
QP: EC 201 or EC 202 QA: PKG 429

490. Packaging Laws and Regulations  
Spring. 3(3-0)  
P: PKG 320 or PKG 325. R: Open only to Packaging majors.  
History and development of packaging laws and regulations. Relationships among law, government regulation and commercial regulation. Effect of current laws and regulations on packaging.  
QP: PKG 331 or PKG 332 QA: PKG 450

495. Packaging Systems Development  
Fall, Spring. 3(3-1)  
P: PKG 432. R: Open only to seniors or graduate students in Packaging.  
Package development including selection, design and implementation of package systems for protection, distribution, merchandising, use and disposal.  
QP: PKG 429, PKG 425 QA: PKG 426

499. Directed Studies in Packaging  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: PKG 320, PKG 325. R: Open only to Packaging majors. Approval of department; application required. Development of solutions to specific packaging problems. Supervised individual study.  
QP: PKG 331, PKG 332 QA: PKG 424

491. Special Topics  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
Selected topics of current interest.  
QA: PKG 440

492. Senior Seminar  
Fall, Spring. 1(2-0)  
P: Open only to seniors in Packaging.  
Seminar on current packaging issues, business organization and operations, and accepted practices in a corporate environment.  
QA: PKG 485

805. Advanced Packaging Dynamics  
Spring. 3(2-2)  
P: PKG 310.  
QP: PKG 423 QA: PKG 823

815. Permeability and Shelf Life  
Spring. 3(2-2)  
P: MTH 124 or MTH 132; PKG 320, PKG 325.  
Relationships between the storage life of packaged food and pharmaceutical products and the gas, moisture, and organic vapor permeability of packages in various environments.  
QP: PKG 331, PKG 332, MTH 112 QA: PKG 820

817. Instruments for Analysis of Packaging Materials  
Fall of even-numbered years. 3(2-2)  
P: PKG 320, PKG 330.  
QP: PKG 331, PKG 332 QA: PKG 820

825. Polymeric Packaging Materials  
Fall. 4(3-2)  
P: PKG 320.  
Physical and chemical properties of polymeric materials and structures used in packaging. Relationship of properties to performance.  
QP: PKG 331 QA: PKG 810

975. Stability and Recyclability of Packaging Materials  
Fall of odd-numbered years. 3(3-0)  
P: PKG 320, PKG 325.  
Interactions between packaging materials and environments: corrosion, degradation, stabilization, and recycling. Impacts of packaging disposal.  
QP: PKG 331, PKG 332

890. Independent Study in Packaging  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 4 credits in all enrollments for this course.  
P: Open only to graduate students in Packaging. Approval of department; application required. Special investigations of unique packaging problems.  
QA: PKG 834

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.  
P: Open only to graduate students in Packaging. Selected topics of interest to graduate packaging students.  
QA: PKG 840

899. Master's Thesis Research  
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 9 credits in all enrollments for this course.  
P: Open only to Master's students in Packaging.  
QA: PKG 869

PARK AND RECREATION RESOURCES PRR

College of Agriculture and Natural Resources

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.  
QA: PRR 200

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.  
QA: PRR 210