

**Descriptions—Osteopathic Medicine
of
Courses**

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: OST 590

PACKAGING PKG

**School of Packaging
College of Agriculture and Natural
Resources**

210. Principles of Packaging
Fall, Spring, Summer. 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 foils 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 141; completion of Tier I writing requirement. R: Not open to freshmen and sophomores.
Effects of packaging on environmental quality. Solid waste. Air and water quality. Laws, economics and energy. Resource use and conservation.
QP: CEM 141 QA: PKG 340

415. Packaging Decision Systems
Fall, Spring. 3(2-2)
P: MTH 110 or MTH 116; CPS 100 or CPS 130 or CPS 131. R: Open only to majors in Packaging.
Application of computers 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.
Integrated study of machines, organization and control of packaging processes. Application of pneumatics, hydraulics and electricity. Interrelationship of product, packaging and machinery.
QP: PKG 331, PKG 332 QA: PKG 430, PKG 425

440. Automation in Packaging
Fall. 3(2-2)
P: MTH 124. R: Not open to freshmen and sophomores.
Automated systems: configurations, 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 331 or PKG 332 QA: PKG 438

455. Food Packaging
Spring. 3(3-1)
P: PKG 320, 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 332 QA: PKG 455

460. Distribution Packaging and Performance Testing
Spring. 3(2-2)
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 433

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 economic policy and societal issues.
QP: EC 201 or EC 202 QA: PKG 429

480. 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

485. 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 423, PKG 425 QA: PKG 428

490. 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)
R: Open only to seniors in Packaging.
Seminar on current packaging issues, business organization and operations, and accepted practices in a corporate environment.
QA: PKG 463

805. Advanced Packaging Dynamics
Spring. 3(2-2)
P: PKG 310.
Shock and vibration. Distribution hazards and product fragility. Cushion performance and package design. Environmental measurement and simulation.
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.
Relationship 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. 4(3-2)
P: PKG 320, PKG 325.
Analytical methods for packaging including spectrophotometry and chromatography. Material identification and characterization. Migration and permeation measurements.
QP: PKG 331, PKG 332 QA: PKG 830

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

875. 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 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.
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.
R: 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 99 credits in all enrollments for this course.
R: Open only to Master's students in Packaging.
QA: PKG 899

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