616. The Osteopathic Examination III
Fall, Summer. 1(0-4) OST 615 or approval of instructor.
Introductory clinical course in the application of
eumomusculoskeletal assessment, palpatory
diagnosis, and osteopathic manipulative treat-
ment in the hospital setting.

PACKAGING

College of Agriculture and Natural
Resources

210. Principles of Packaging
Fall, Winter, Spring, Summer. 3(3-0)
A general course in packaging principles cover-
ing the growth and development of the field, and
the technological and motivational problems involved in present day packaging. Consider-
ations 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 337 or approval of school.
Relationships between packaging systems and dis-
tribution environments. Testing, evaluating and
predicting packaging performance under various envi-
ronmental influences.

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

331. Plastic and Glass Packaging
Fall, Winter, Spring. 4(3-2) PKG 211, 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 con-
tainer systems.

332. Paper and Metal Packaging
Fall, Winter, Spring. 4(3-2) PKG 381, 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)
A broad study of the effects of packaging on envi-
ronmental quality including solid waste man-
agement, air and water quality, laws, econ-
omics, energy considerations, resource con-
servation and environmental ethics.

423. Dynamics of Packaging
Fall, Winter, Spring. 4(3-2) PKG 311, PKG 332, PHY 339 or approval of school.
A study of the protective function of the packag-
ing 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 govern-
ment. 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 com-
ponents of packaging machinery. Industrial parts and processes. Basic machine mechanisms.
Application of pneumatics, hydraulics and electri-
city. Field trip required.

433. Packaging Performance Testing
Fall, Winter. 3(3-0) PKG 423.
Performance testing of package systems for fra-
gility, impact, vibration, compression, and
material performance in accordance with indus-
try practices. Package container design. Mea-
surement and simulation of distribution en-
vironment for handling, shipping, and storage of package systems.

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 pharma-
cuticals and medical devices. Evaluations of pack-
age systems and packaging procedures that meet these requirements.

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

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, govern-
ment regulation and commercial regulation. Effect of current laws and regulations on pack-
aging. Personal liability of the packaging profes-
sional.

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.

465. Automation in Packaging
Winter. 4(3-2) PKG 331, PKG 332.
Automated material handling systems: configu-
rations, components, sensors, vision systems. Robotic safety. Material handling, line inspec-
tion, automated guided vehicle systems, auto-
mated storage retrieval systems. Economic justi-
fication. Field trips required.

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 man-
agement, 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 perme-
ability 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. Multi-
ple degrees of freedom systems. Damping and
fashioning properties. Instrumentation in dynamic testing.

834. Special Investigations in Packaging
Fall, Winter, Spring, Summer. 1 to 4
 credits. May reenroll for a maximum of 6 credits. Approval of school.

540. 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.

599. 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(2-0)
Leisure and recreation as part of daily life. Leisure as a social, psychological and economic force in American culture.