

658. Otorhinolaryngology Clerkship
Fall, Spring, Summer. 1 to 20 credits. A student may earn a maximum of 30 credits in all enrollments for this course.
R: Open only to graduate-professional students in the College of Osteopathic Medicine upon completion of Units I and II.
Develop proficiency in motor skills, aptitudes, comprehension of concepts and principles, patient evaluation, diagnosis, management, and therapy.
QA: OM 658

516. Systems Biology: Behavior I
Fall. 3(3-0)
P: OST 511, PHM 563. R: Open only to graduate-professional students in College of Osteopathic Medicine. A multidisciplinary approach to behavior. Focus on normal human development, behavioral and cultural medicine, and medical ethics.
QA: PSC 520

517. Systems Biology: Behavior II
Spring. 3(3-0)
P: OST 516. R: Open only to graduate-professional students in College of Osteopathic Medicine. A multidisciplinary approach to behavior. Focus on psychopathology, chronic illness and disability, health policy and terminal care.
QP: PSC 520 QA: PSC 521, PED 580

518. Systems Biology: Behavior III
Summer. 2(2-0)
P: OST 517. R: Open only to graduate-professional students in College of Osteopathic Medicine. A multidisciplinary approach to behavior. Focus on substance abuse and child abuse.
QA: CMS 513

521. Systems Biology: Hematopoietic
Fall. 2(2-0)
P: ANT 551, ANT 563; BCH 521, MPH 522, PHM 563, PTH 542. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the hematopoietic system. Emphasis on hematopoiesis, clotting, and hematopoietic pathologies. Integration of clinical and basic science information.
QA: PTH 540, OST 554

522. Systems Biology: Gastrointestinal
Fall. 6(6-0)
P: ANT 551, ANT 562, BCH 521, MPH 522, PHM 563, PSL 501, PTH 542. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the gastrointestinal system emphasizing normal structure and function, and pathologies. Integration of basic science and clinical information.
QP: ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 520, PTH 502 QA: OST 557

523. Systems Biology: Genitourinary
Summer. 5(5-0)
P: ANT 551, ANT 562, MPH 522, PHM 563, PSL 501, PTH 542. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the urinary system. Emphasis on normal structure and function, and pathologies, of the urinary and male reproductive systems. Integration of basic science and clinical information.
QP: ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502 QA: OST 556

524. Systems Biology: Cardiovascular
Spring. 7(6-2)
P: ANT 551, ANT 553, BCH 551; MPH 522, PHM 563, PSL 551, PTH 542. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the cardiovascular system emphasizing normal structure and function, and pathologies. Integration of basic science and clinical information.
QA: OST 554

525. Systems Biology: Respiratory
Spring. 5(4-2)
P: ANT 551, BCH 521, MPH 522, PHM 563, PSL 501. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the respiratory system emphasizing normal structure and function, and pathologies. Integration of basic science and clinical information.
QP: ANT 565, PSL 500A, MPH 521, BCH 502, PHM 520, PTH 502, RAD 525 QA: OST 555

526. Systems Biology: Integumentary
Summer. 2(2-0)
P: ANT 551, ANT 562, MPH 522, PHM 563, PTH 542. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the integumentary system. Emphasis on diagnosis and treatment of integumentary pathologies. Integration of basic science and clinical information.
QP: ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502 QA: OST 552

527. Systems Biology: Female Reproductive
Summer. 5(5-0)
P: ANT 551, ANT 562, BCH 521, MPH 522, PHM 563, PSL 501. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the female reproductive system emphasizing normal structure and function, and pathologies. Integration of basic science and clinical information in obstetrics and gynecology.
QP: ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PTH 502 QA: OST 559

528. Systems Biology: Growth and Development
Summer. 2(2-0)
P: ANT 551, ANT 562, BCH 521, MPH 522, PHM 563, PSL 501; C: OST 546 R: Open only to graduate-professional students in College of Osteopathic Medicine. A multidisciplinary approach to growth and development. Emphasis on normal structure and function, and pathologies. Integration of basic science and clinical information.
QP: ANT 590, ANT 565, MPH 521, BCH 502 QA: OST 558

529. Systems Biology: Endocrinology
Fall. 2(2-0)
P: PSL 501; ANT 553; BCH 551. R: Open only to graduate professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to endocrinology. Emphasis on normal endocrine function and the principles of diagnosis and treatment of endocrine disorders. Integration of basic science and clinical information.
QA: OST 520

541. Integrative Clinical Correlations I
Fall. 1(0-2)
R: Graduate-professional students in College of Osteopathic Medicine.
Application of basic science information, problem-solving, and clinical skills in an integrated clinical case format. Case presentations by students and faculty.

542. Integrative Clinical Correlations II
Spring. 1(0-2)
P: OST 541.
Application of basic science information, problem-solving, and clinical skills in an integrated clinical case format. Case presentations by students and faculty.

543. Integrative Clinical Correlations III
Summer. 1(0-2)
P: OST 542.
Application of basic science information, problem-solving, and clinical skills in an integrated clinical case format. Case presentations by students and faculty.

544. Integrative Clinical Correlations IV
Fall. 1(0-2)
P: OST 543. R: Approval of college.
Application of systems biology information, problem-solving, and clinical skills in an integrated clinical case format. Case presentations by students and faculty.

545. Integrative Clinical Correlations V
Spring. 1(0-2)
P: OST 544. R: Approval of college.
Application of systems biology information, problem-solving, and clinical skills in an integrated clinical case format. Case presentations by students and faculty.

546. Integrative Clinical Correlations VI
Summer. 1(0-2)
P: OST 545. R: Approval of college.
Application of systems biology information, problem-solving, and clinical skills in an integrated clinical case format. Case presentations by students and faculty.

OSTEOPATHIC MEDICINE **OST**
College of Osteopathic Medicine

501. Clinical Skills I
Fall. 3(1-4)
R: Graduate-professional students in College of Osteopathic Medicine.
Introduction to osteopathic physical examination.
QP: OST 5300, ST 531

502. Clinical Skills II
Spring. 3(1-4)
P: OST 501 R: Graduate-professional students in College of Osteopathic Medicine.
Continuation of OST 501.
QP: OST 531

504. Doctor/Patient Relationship I
Fall. 1(0-2)
R: Graduate-professional students in College of Osteopathic Medicine.
Basics of interpersonal communication related to physician interaction with patients.
QP: OST 5300, ST 531

505. Doctor/Patient Relationship II
Spring. 1(0-12)
P: OST 504 R: Graduate-professional students in College of Osteopathic Medicine.
Skills of interviewing patients for the purposes of gathering information, giving information, and patient motivation.
QP: OST 5310, ST 532

511. Systems Biology: Neuromusculoskeletal I
Summer. 7(5-4)
P: ANT 551, ANT 552, OST 501, OST 502, PSL 501. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the peripheral neuromusculoskeletal system. Integration of basic science and clinical information with osteopathic manual medicine.

512. Systems Biology: Neuromusculoskeletal II
Fall. 6(4-4)
P: OST 511. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
A multidisciplinary approach to the neuromusculoskeletal system. Emphasis on the central nervous system. Integration of basic science and clinical information with osteopathic manual medicine.
QA: OST 560, OST 553, OST 614, OST 615, OST 616

513. Systems Biology: Neuromusculoskeletal III
Spring. 5(3-4)
P: OST 512. R: Open only to graduate-professional students in College of Osteopathic Medicine. Approval of college.
Multidisciplinary approach to the neuromusculoskeletal system. Emphasis on ophthalmology, rheumatology, and orthopedics. Integration of basic science and clinical information with osteopathic manual medicine.
QA: OST 560, OST 553, OST 614, OST 616

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