

**899. Master's Thesis Research**

Fall, Winter, Spring, 1 to 6 credits.  
May reenroll for a maximum of 15 credits. N E 576, approval of instructor.  
Clinical research problem related to primary health care.

**OBSTETRICS, GYNECOLOGY AND REPRODUCTIVE BIOLOGY OGR**

**College of Human Medicine**

**608. Obstetrics/Gynecology Clerkship**

Fall, Winter, Spring, Summer, 1 to 17 credits. May reenroll for a maximum of 43 credits. FMP 602.

Experience with gynecologic and obstetrical patients, in in-patient and out-patient settings, under the direction of community practitioners and members of the MSU faculty.

**609. Obstetrics and Gynecology Advanced Clerkship**

Fall, Winter, Spring, Summer, 4 to 16 credits. May reenroll for a maximum of 16 credits. OGR 608, approval of department and approval of community coordinator.

Advanced clinical experience in gynecology and/or obstetrics.

**OSTEOPATHIC MEDICINE OM**

**College of Osteopathic Medicine**

**590. Special Problems in Osteopathic Medicine**

Fall, Winter, Spring, Summer, 1 to 8 credits. May reenroll for a maximum of 32 credits. Approval of department.

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

**620. Directed Studies**

Fall, Winter, Spring, Summer, 2 to 24 credits. May reenroll for a maximum of 48 credits. Admission to a college of medicine or approval of department.

Individual or group work on special problems in medicine.

**651. Obstetrics—Gynecology Clerkship**

Fall, Winter, Spring, Summer, 8 credits. Grade P in all courses offered in terms 1 through 8.

Clinical exposure in obstetrics and gynecology. Program developed to achieve efficiency in obstetrical patient evaluation, management; motor skills, aptitudes; evaluation of postpartum patient; management of gynecologic problems.

**653. Surgery Clerkship**

Fall, Winter, Spring, Summer, 8 credits. Grade P in all courses offered in terms 1 through 8.

Clinical exposure in area of surgical diagnosis, management, treatment. Program structure developed to achieve proficiency in motor skills, aptitudes; comprehension of concepts and principles; patient evaluation, diagnosis, management, and therapy.

**654. Anesthesiology Clerkship**

Fall, Winter, Spring, Summer, 4 to 8 credits. Grade P in all courses offered in Terms 1 through 8.

Clinical exposure in the area of anesthesiology. Motor skills; concepts and principles; patient evaluation, management, and therapy.

**656. Orthopedics Clerkship**

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

Clinical exposure in area of orthopedics. Program structure developed to achieve proficiency in motor skills, aptitudes; comprehension of concepts and principles; patient evaluation, diagnosis, management, and therapy.

**658. Otorhinolaryngology Clerkship**

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

Clinical exposure in area of otorhinolaryngology. Program structure developed to achieve proficiency in motor skills, aptitudes; comprehension of concepts and principles; patient evaluation, diagnosis, management, and therapy.

**OSTEOPATHIC MEDICINE OST (COLLEGE OF)**

**500. Basic Concepts in Biomechanics**

Winter, 2(2-0) Admission to a college of medicine or approval of department. Interdepartmental with and administered by the Department of Biomechanics.

Basic concepts of biomechanics and their relationship to functional anatomy and osteopathic manipulative therapy.

**516. Medical Ethics**

Winter, 3(3-0) Interdepartmental with and administered by the College of Human Medicine.

Analysis and evaluation of the ethical elements of medical decision making. Topics include: patient rights, physician responsibilities, euthanasia, informed consent, parentalism, confidentiality, biomedical research, and allocation of scarce resources.

**520. Normal Endocrine Structure and Function**

Spring, 3 credits. BCH 502.

An integrated basic science course presenting a series of lectures and laboratories related to the normal structure and function of the endocrine organs. Prerequisite for studying endocrine diseases in systems biology.

**530. Comprehensive Patient Evaluation I**

Fall, 2 to 6 credits. Admission to a college of medicine. ANT 565 or concurrently.

Interdepartmental course in physical examination skills. Stresses comprehensive, osteopathic evaluation of the patient.

**531. Comprehensive Patient Evaluation II**

Winter, 2 to 6 credits. OST 530, ANT 565.

Continuation of OST 530.

**Osteopathic Medicine — Description of Courses**

**532. Comprehensive Patient Evaluation III**

Spring, 4 credits. OST 531.

Interdepartmental course in physical examination skills. Stresses application of comprehensive, osteopathic evaluation of the patient. Introduction to office procedures and physical diagnosis.

**533. Comprehensive Patient Evaluation IV**

Fall, 2 to 6 credits. OST 532.

Interdepartmental course in physical examination skills. Stresses comprehensive, osteopathic evaluation of the patient. Includes preceptorship and appropriate systems biology clinical experiences.

**552. Systems Biology - Integumentary**

Summer, 2 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502.

A multidisciplinary approach to the integumentary system providing a functional integration of basic science and clinical information.

**553. Systems Biology - Nervous System**

Fall, 10 credits. ANT 563, PSL 500A, PTH 502, BCH 502, PHM 521, MPH 521.

A multidisciplinary approach to the nervous system providing a functional integration of basic science and clinical information.

**554. Systems Biology - Cardiovascular**

Spring, 15 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502.

A multidisciplinary approach to the cardiovascular system providing functional integration of basic science and clinical information.

**555. Systems Biology - Respiratory**

Summer, 8 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502.

A multidisciplinary approach to the respiratory system providing functional integration of basic science and clinical information.

**556. Systems Biology - Urinary**

Fall, 7 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502.

A multidisciplinary approach to the urinary system providing functional integration of basic science and clinical information.

**557. Systems Biology - Gastrointestinal**

Winter, 13 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PHM 521, PTH 502.

A multidisciplinary approach to the gastrointestinal system providing functional integration of basic science and clinical information.

**558. Systems Biology - Growth and Development**

Fall, 5 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PTH 502.

A multidisciplinary approach to growth and development within the field of pediatrics providing functional integration of biological, behavioral and clinical sciences.

**559. Systems Biology - Reproductive**

Fall, 7 credits. ANT 560, ANT 565, PSL 500A, MPH 521, BCH 502, PTH 502.

A multidisciplinary approach to the male and female reproductive system providing functional integration of basic science and clinical information (includes obstetrics and gynecology).

**Description — Osteopathic Medicine  
of  
Courses**

**560. Systems Biology - Musculoskeletal**  
Summer. 6 credits. ANT 560, ANT 565; PSL 500A; MPH 521; BCH 502; PHM 521; PTH 502.

A multidisciplinary approach to the musculoskeletal system providing functional integration of basic science and clinical information.

**590. Special Problems**  
Fall, Winter, Spring, Summer. 1 to 8 credits. May reenroll for a maximum of 32 credits. Approval of department.

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

**610. Subspecialty Clerkship: Child Psychiatry**  
Fall, Winter, Spring, Summer. 4 to 16 credits. PSC 608. Interdepartmental with and administered by the Department of Psychiatry. Subspecialty experiences in psychiatry in clinical settings with child patients and their families.

**614. The Osteopathic Examination I**  
Winter, Spring. 1(0-4) OST 533 or approval of instructor.  
Emphasizes continuing development of palpatory diagnostic skills, neuromusculoskeletal patient assessment, selection and utilization of appropriate osteopathic manipulative treatment.

**615. The Osteopathic Examination II**  
Spring, Summer. 1(0-4) OST 614 or approval of instructor.  
Introductory clinical course in the application of neuromusculoskeletal assessment, palpatory diagnosis and osteopathic manipulative treatment in ambulatory clinics.

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

**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 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 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. Packaging Machinery**  
Spring. 4(4-0) PKG 331, PKG 332 or approval of school.  
The components for automated packaging lines, and auxiliary materials handling equipment, including consideration of design, selection, specification and operation of machinery for the package-making and package-filling operations.

**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.

**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.

**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.

**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.