

**633. Transfusion Medicine**  
Fall, Spring, 3 credits.  
R: Completion of 5 semesters of the graduate-professional program in the College of Veterinary Medicine. Management of blood donors, blood banking, and cross match technologies. Administration of blood components. Blood typing in large and small animals.

**812. Advanced Clinical Chemistry**  
Spring of even-numbered years. 2(2-0) Interdepartmental with Medical Technology. Administered by Medical Technology.  
P: BCH 462, MT 414, MT 416.  
Biochemical basis of selected pathologic conditions including inborn errors of metabolism, endocrine and other genetic disorders. Emphasis on current diagnostic techniques.

**820. Advanced Human Hematology**  
Fall of even-numbered years. 2(2-0) Interdepartmental with Medical Technology. Administered by Medical Technology.  
P: MT 422.  
Selected topics in hematology including pathogenesis, mechanisms and morphological pictures. Emphasis on laboratory tests and interpretation of results.

**830. Concepts in Molecular Biology**  
Spring of odd-numbered years. 2(2-0) Interdepartmental with Medical Technology. Administered by Medical Technology.  
P: One course in Biochemistry or concurrently.  
Techniques and theories of molecular biology, nucleic acid synthesis and isolation, enzymatic digestion and modification, electrophoresis, hybridization, amplification, library construction, and cloning.

**840. Advanced Hemostasis**  
Fall of odd-numbered years. 2(2-0) Interdepartmental with Medical Technology. Administered by Medical Technology.  
P: BCH 462, MT 422.  
Physiology, pathophysiology, and laboratory evaluation of hemostatic disorders.

**851. Advanced General Pathology**  
Fall of even-numbered years. 3(3-0)  
P: PTH 852 concurrently. R: Approval of department.  
Fundamental concepts of cell injury, inflammation, and oncogenesis. Mechanisms of disease.

**852. Advanced General Pathology Laboratory**  
Fall of even-numbered years. 1 credit.  
P: PTH 851 concurrently.  
Histopathologic and ultrastructural study of general morphologic patterns of inflammation cell injury and neoplasm.

**853. Advanced Systemic Pathology**  
Spring of odd-numbered years. 4(3-2)  
R: Approval of department.  
Pathological aspects of the nervous, endocrine, cardiovascular, respiratory, urinary, genital, musculoskeletal, integumentary and special sense systems.

**854. Advanced Clinical Pathology**  
Spring of even-numbered years. 3(3-0)  
P: PTH 540, PTH 552, PTH 609, PTH 651. R: Approval of department.  
Hematology including anemias, leukocyte responses and hemostasis. Clinical chemistry including tests to evaluate organs.

**855. Proseminar**  
Fall of odd-numbered years. 2(2-0)  
R: Approval of department.  
Preparation, editing, and review of research manuscripts and grants. Critique of oral presentations. Illustrations of research data and thesis preparation. Philosophy and methods of research.

**856. Pathotoxicology**  
Summer of odd-numbered years. 3(3-0)  
R: Approval of department.  
Pathologic changes in tissues of animals used in toxicologic studies. Clinical pathologic assessments. Gross, histologic, and ultrastructural changes in organ systems.

**857. Correlative Diagnostic Pathology**  
Fall, Spring, Summer. 3 credits.  
R: Approval of department.  
Diagnosis of animal diseases by necropsy, biopsy, or clinical pathology. Correlation of diagnostic test results with history, laboratory data and morphologic findings. Compiled and formal presentation of findings.

**858. Pathology of Avian Diseases**  
Spring of even-numbered years. 2(2-0)  
C: Pathology students must take PTH 859 concurrently.  
R: Approval of department.  
An overview of disease and pathology affecting domestic poultry, pet birds, and wild birds.

**859. Avian Histopathology Laboratory**  
Spring of even-numbered years. 1 credit.  
C: Pathology students must take PTH 858 concurrently.  
R: Approval of department.  
Recognition and description of microscopic lesions of avian diseases.

**860. Clinical Laboratory Diagnosis of Infectious Diseases**  
Spring of even-numbered years. 2(2-0) Interdepartmental with Medical Technology. Administered by Medical Technology.  
P: MIC 451, MIC 464.  
Laboratory techniques for diagnosing infectious diseases in humans. Emphasis on differential diagnosis and correlation of microbiological results with serology, hematology, and clinical chemistry.

**890. Problems in Veterinary Pathology**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Approval of department.  
Faculty supervised work on an experimental, theoretical or applied problem in veterinary pathology.

**891. Problems in Pathology**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Approval of department.  
Faculty supervised work on an experimental, theoretical or applied problem in pathology.

**892. Pathology Seminar**  
Fall, Spring. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course.  
R: Approval of department.  
Presentation and discussion of current topics in pathology by departmental graduate students, faculty or outside speakers.

**899. Master's Thesis Research**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 10 credits in all enrollments for this course.  
R: Approval of department.

**901. Investigating the Lung**  
Fall of even-numbered years. 3(3-0) Interdepartmental with Large Animal Clinical Sciences and Physiology. Administered by Large Animal Clinical Sciences.  
R: Open only to M.S. and Ph.D. students in Large Animal Clinical Sciences, Small Animal Clinical Sciences, Physiology, and Pathology. Approval of department.  
Classic and current concepts of respiratory structure and function in health and disease. Mechanisms of lung injury.

**999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course.  
R: Admission to doctoral program in Pathology.

## PEDIATRICS PED

### Department of Pediatrics College of Osteopathic Medicine

**590. Special Problems in Pediatrics**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 48 credits in all enrollments for this course.  
R: Open only to graduate-professional students in the College of Osteopathic Medicine. Approval of department.  
Experimental, theoretical, or applied problems under faculty direction.

**600. Pediatrics Clerkship**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Open only to graduate-professional students in the colleges of Osteopathic Medicine and Human Medicine upon completion of Units I and II.  
Practical clinical exposure in the area of pediatrics.

**619. Ambulatory Care Clerkship**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 15 credits in all enrollments for this course. Interdepartmental with Family Practice and Medicine. Administered by Family Practice.  
P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine.  
Continuous and comprehensive patient care under supervision of appropriate physicians.

**620. Directed Studies**  
Fall, Spring, Summer. 1 to 30 credits. A student may earn a maximum of 30 credits in all enrollments for this course.  
P: PED 600. R: Open only to graduate-professional students in the College of Osteopathic Medicine. Approval of department.  
Study in general or specialty pediatrics.

## PEDIATRICS AND HUMAN DEVELOPMENT PHD

### Department of Pediatrics and Human Development College of Human Medicine

**523. Genetics for Medical Practice**  
Summer. 1(1-0) Interdepartmental with Biochemistry.  
R: Graduate-professional students in colleges of Human and Osteopathic Medicine.  
Basic principles of genetics for medical students.

**524. Genetics Clinic**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
P: PHD 523. R: Graduate-professional students in colleges of Human and Osteopathic Medicine.  
Role of genetics in health care delivery under the direction of a faculty member.

**591. Special Problems in Human Development**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Graduate-professional students in colleges of Human and Osteopathic Medicine.  
Work under the direction of a faculty member on an experimental, theoretical, or applied problem.

## Descriptions — Pediatrics and Human Development of Courses

**600. Pediatric Specialty Clerkship**  
Fall, Spring, Summer. 6 to 24 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to graduate-professional students in College of Human Medicine. Completion of preclinical CHM curriculum.

Multidisciplinary approach to children and their families in a health care setting. Integrated biological, behavioral, and clinical sciences in assessing and planning children's health care needs.

**601. Human Development and Pediatric Sub-specialties**  
Fall, Spring, Summer. 6 to 24 credits. A student may earn a maximum of 24 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Experience in clinical, behavioral, and basic sciences related to pediatrics and human development.

**602. Ambulatory Pediatrics**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Clinical experience in outpatient and community setting involving ongoing child health care.

**603. Pediatric Infectious Diseases Clerkship**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Office, clinic, and inpatient experiences in evaluating and managing pediatric patients with infectious diseases.

**604. Neonatology**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Clinical experiences: modern neonatal techniques and care patterns for neonates including follow up.

**605. Pediatric Cardiology Clerkship**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Office, clinic, and hospital experience in diagnostic and therapeutic pediatric cardiology including special diagnostic procedures.

**606. Pediatric Endocrinology and Metabolism Clerkship**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Clinic and hospital experience in evaluating patients with endocrine and metabolic disorders.

**607. Pediatric Hematology and Oncology**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate professional students in College of Human Medicine. Clinical experience in evaluating and managing pediatric patients with common hematologic and oncologic disorders

**608. Pediatric Pulmonary Disease Clerkship**  
Fall, Spring, Summer. 6 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHD 600. R: Open only to graduate-professional students in College of Human Medicine. Inpatient and outpatient clinical experiences in evaluating and managing pediatric patients with pulmonary problems. Diagnostic procedures, clinically relevant physiology, current research.

**635. Core Competencies I**  
Fall. 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Human Medicine, Medicine, and Family Practice. Administered by Human Medicine.

P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine. A weekly seminar addressing core knowledge and skills from an interdisciplinary perspective.

**637. Core Competencies III**  
Spring, Summer. 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Human Medicine; Medicine; Family Practice; Surgery; and Obstetrics, Gynecology and Reproductive Biology. Administered by Human Medicine.

P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine. A weekly seminar addressing core knowledge and skills from an interdisciplinary perspective.

**640. Advanced Comprehensive Care**  
Fall, Spring, Summer. 6 credits. A student may earn a maximum of 18 credits in all enrollments for this course. Interdepartmental with Human Medicine; Medicine; Family Practice; and Obstetrics, Gynecology and Reproductive Biology. Administered by Human Medicine.

P: FMP 608, PHD 600, MED 608. R: Open only to graduate-professional students in College of Human Medicine. Clinical experience in community-oriented primary care. Emphasis on urban and rural underserved populations.

## PHARMACOLOGY AND TOXICOLOGY PHM

### Department of Pharmacology and Toxicology College of Human Medicine College of Osteopathic Medicine College of Veterinary Medicine

**350. Introductory Human Pharmacology**  
Fall, Spring. 3(3-0)  
P: PSL 250. R: Not open to freshmen. General principles of pharmacology. Central and autonomic nervous systems. Cardiovascular and renal drugs. Chemotherapy. Anti-infective drugs and endocrine agents.

**430. Drug Abuse**  
Fall of odd-numbered years. 3(3-0)  
R: Not open to freshmen and sophomores. Pharmacology, physiology, and neuroscience related to the pharmacodynamics of drugs of abuse.

**450. Introduction to Chemical Toxicology**  
Spring. 3(3-0)  
P: BS 110, BS 111, CEM 251. R: Not open to freshmen and sophomores. Mammalian toxicology. Disposition of chemicals in the body, detoxication, elimination, and mechanisms of toxicity in major organ systems. Selected toxic agents.

**480. Special Problems**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course.  
R: Approval of department. Not open to students with credit in PHM 350 or PHM 430. Individual work on selected research problems.

**556. Veterinary Pharmacology**  
Fall. 5(5-0)  
R: Completion of 2 semesters of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in PHM 554 or PHM 555. Drug absorption, disposition, biotransformation, excretion, pharmacokinetics. Pharmacologic agents of the autonomic nervous, cardiovascular, renal, central nervous, endocrine, and gastrointestinal systems.

**557. Veterinary Toxicology**  
Spring. 2(2-0)  
R: Completion of 3 semesters of the graduate-professional program in the College of Veterinary Medicine. Not open to students with credit in PHM 594. Determinants of toxic responses, analytical toxicology, genetic toxicology, and toxin management. Diagnosis, prevention, and treatment of common toxicoses.

**563. Medical Pharmacology**  
Summer. 3(3-0)  
R: Graduate-professional students in colleges of Human and Osteopathic Medicine. General principles of pharmacology and selected drugs. Rational drug therapy.

**658. Research Problems in Pharmacology and Toxicology**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Completion of 4 semesters of the graduate-professional program in the College of Veterinary Medicine. Approval of department. Selected research problems in pharmacology or toxicology.

**810. Synaptic Transmission**  
Spring of odd-numbered years. 3(3-0)  
R: Approval of department. Chemical and electrical aspects of nerve impulse transmission at synaptic and neuroeffector junctions. Influence of drugs.

**813. Cardiovascular Pharmacology**  
Spring of even-numbered years. 3(3-0)  
R: Approval of department. Cardiovascular signal transduction and control in normal and pathophysiological states.

**814. Advanced Principles of Toxicology**  
Spring of even-numbered years. 3(3-0)  
P: PHM 819. Biochemical, molecular and physiological mechanisms of toxicology. Responses of major organ systems to chemical insult. Mechanisms of mutagenesis and carcinogenesis.

**815. Concepts in Tumorigenesis**  
Spring of odd-numbered years. 2(2-0)  
P: BCH 462, PSL 432, PSL 460. R: Approval of department. Examination and discussion of literature in tumorigenesis.

**817. Advanced Neurotoxicology**  
Summer of odd-numbered years. 3(3-0) Interdepartmental with Animal Science.  
P: PHM 814 or ZOL 827. Types of damage occurring in the nervous system. Unique forms of neurotoxicity associated with specific groups of neurotoxicants.