

972. Topics in Condensed Matter Physics (MTC)
Fall, Spring. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. P: PHY 831, PHY 852, PHY 871.
Advanced topics in many-body problems, disordered solids, superfluidity superconductivity magnetism, or macroscopic systems.

980. Advanced Reading in Physics
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Approval of department.

982. Topics in Nuclear Physics (MTC)
Fall, Spring. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. P: PHY 852, PHY 881.
Heavy ion reactions or nuclear structure.

992. Quantum Chromodynamics (MTC)
Fall. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. P: PHY 891.
Hadron-hadron interactions, interaction of hadrons with leptons.

999. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
R: Open only to graduate students in Physics.

PHYSIOLOGY **PSL**

**Department of Physiology
College of Human Medicine
College of Natural Science
College of Osteopathic Medicine
College of Veterinary Medicine**

101. Current Issues in Physiology
Fall. 2(2-0)
R: Not open to students with credit in PSL 250 or PSL 431 or PSL 432.
Physiological bases of health issues of broad social significance, and new approaches for the treatment of specific disorders.

250. Introductory Physiology
Fall, Spring. 4(4-0)
R: Not open to students in Physiology.
Function, regulation and integration of organs and organ systems of higher animals emphasizing human physiology.

323. Physiology and Hygiene of the Eye
Fall of odd-numbered years, Summer of even-numbered years. 3(3-0)
R: Not open to Physiology majors.
Basic anatomy, physiology, and hygiene of the visual system: normal and abnormal visual function, methods of correction, and educational implications.

410. Computational Problem Solving in Physiology
Fall, Spring. 3(3-0)
P: PSL 432. R: Approval of department.
Quantitative analysis of physiological data: mathematical models, curve fitting, data analysis and interpretation. Problem solving involving exponential and logistic growth. Cerebral blood flow, convective cooling, oxygen consumption, thermoregulation, other applications.

421. Hormones and Development
Fall. 3 credits. Interdepartmental with Zoology. Administered by Zoology.
P: ZOL 320. R: Completion of Tier I writing requirement.
Hormonal regulation of development, growth and cancer. Hormonal decline in aging.

431. Human Physiology I
Fall. 3(3-0)
P: BS 111, CEM 142.
Neural function including autonomic nervous system, physiological control systems, endocrinology, reproduction and digestive function.

432. Human Physiology II
Spring. 3(3-0)
P: PSL 431.
Continuation of PSL 431. Function and regulation of the cardiovascular, respiratory, and renal systems. Control of tissue blood flow, blood pressure, blood gases, body fluid volume and electrolytes.

440. Topics in Cell Physiology
Fall, Spring. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Critical discussion and evaluation of a selected problem of mammalian cell physiology including cell biophysics, molecular biology of the cell.

441. Topics in Endocrinology
Fall, Spring. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic on the role of hormones in the regulation of growth, metabolism, differentiation.

442. Topics in Cardiovascular Physiology
Fall. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic in blood flow physiology.

443. Topics in Respiratory Physiology
Fall of odd-numbered years. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic in the physiology of gas exchange and lung mechanics.

444. Topics in Renal Physiology
Spring of even-numbered years. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic in the function of the kidney, regulation of salt and water balance.

445. Topics in Environmental Physiology
Spring of odd-numbered years. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic in environmental physiology with an emphasis on thermoregulation.

446. Topics in Visual Physiology
Fall of even-numbered years. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic in the functioning of the visual system in health and disease.

447. Topics of Brain Function
Fall. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic on the functioning of the mammalian brain.

448. Topics in Gastrointestinal Physiology
Fall. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Selected topic in the physiology of the digestive system.

449. Developmental Neurophysiology
Fall. 2(2-0)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Development of the nervous system in invertebrate and vertebrate animals.

450. Laboratory in Human Physiology
Fall. 2(1-3)
P: PSL 432. R: Open only to Physiology majors. Completion of Tier I writing requirement.
Demonstration of fundamental physiological processes. Sensory input response. Data collection and analysis.

475. Capstone Laboratory in Physiology
Spring. 2(1-3)
P: PSL 432. R: Open only to Physiology majors.
Laboratory exercises in animal physiology including osmoregulation, receptor mediated regulation, nervous and hormonal control of function.

480. Special Problems
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 5 credits in all enrollments for this course.
P: PSL 432. R: Open only to Physiology majors.
Independent study under the auspices of a faculty member.

483. Environmental Physiology
Spring. 4 credits. Interdepartmental with Zoology. Administered by Zoology.
P: ZOL 328 or ZOL 355. R: Completion of Tier I writing requirement.
Aspects of physiology important to the environmental relations of vertebrates and invertebrates: energetics, thermal relations, osmotic-ionic relations, and exercise physiology.

501. Introductory Medical Physiology
Fall. 3(3-0)
R: Graduate-professional students in colleges of Human and Osteopathic Medicine.
Physiological basis of medical practice.

511. Veterinary Physiology
Spring. 5(5-0)
R: Open only to graduate-professional students in College of Veterinary Medicine.
Physiology of the nervous, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive systems. Homeostasis.

552. Medical Neuroscience
Spring. 4(3-2) Interdepartmental with Anatomy and Radiology. Administered by Anatomy.
R: Graduate-professional students in colleges of Human and Osteopathic Medicine.
Correlation of normal structure and function of the human nervous system with clinical testing, classical lesions, and common diseases.

611. Research Problems in Physiology Clerkship
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
P: PSL 511 R: Open only to graduate professional students in College of Veterinary Medicine.
Individual work on a research problem.

Descriptions —Physiology of Courses

- 811. Cellular and Neurophysiology**
Fall. 6(6-0) Interdepartmental with Zoology.
P: BCH 462, PSL 432.
Advanced bioenergetics, transport, regulation of metabolic reactions, specialized cell functions, and neurophysiology.
- 812. Advanced Systems Physiology**
Spring. 6(6-0)
P: PSL 811.
Cardiovascular, renal, respiratory, endocrine, reproductive, and gastrointestinal physiology.
- 825. Cell Structure and Function**
Spring. 3(3-0) Interdepartmental with Biochemistry and Microbiology. Administered by Biochemistry.
P: BCH 401 or BCH 461.
Molecular basis of structure and function. Cell properties: reproduction, dynamic organization, integration, programmed and integrative information transfer. Original investigations in all five kingdoms.
- 827. Advanced Neurobiology**
Fall. 4 credits. Interdepartmental with Pharmacology and Toxicology, and Zoology. Administered by Pharmacology and Toxicology.
Nervous system function at the cellular level: membrane biophysics and potentials, synaptic transmission.
- 839. Systems Neuroscience**
Spring of odd-numbered years. 4(4-0) Interdepartmental with Anatomy, and Pharmacology and Toxicology. Administered by Anatomy.
R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Agriculture and Natural Resources, Natural Science, and Veterinary Medicine.
Anatomy, pharmacology, and physiology of multicellular neural systems. Sensory, motor, autonomic, and chemo-regulatory systems in vertebrate brains.
- 841. Advanced Endocrine Physiology and Pharmacology**
Fall. 4(4-0) Interdepartmental with Animal Science, Pharmacology and Toxicology, and Psychology.
P: BCH 461, PSL 432. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources.
Basic and advanced concepts of endocrine and reproductive physiology and pharmacology.
- 850. Research Topics in Physiology**
Spring. 1 credit.
P: PSL 432, PSL 910. R: Open only to graduate students in Physiology.
Readings, presentations and discussions of selected research literature in physiology.
- 885. Vertebrate Neural Systems**
Spring of odd-numbered years. 3(2-2) Interdepartmental with Anatomy. Administered by Anatomy.
Comparative analysis of major component systems of vertebrate brains. Evolution, ontogeny, structure, and function in fish, amphibians, reptiles, birds and mammals.
- 890. Readings in Biophysics**
Fall, Spring, Summer. 3 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Approval of department.
Individual study of membrane phenomena or other topics in biophysics.

- 899. Master's Thesis Research**
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 24 credits in all enrollments for this course.

- 901. Investigating the Lung**
Fall of even-numbered years. 3(3-0) Interdepartmental with Large Animal Clinical Sciences and Pathology. 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.

- 910. Cellular and Molecular Physiology**
Fall. 4(4-0)
P: BCH 802; PSL 432 or PSL 501 or PSL 511; one calculus course. R: Open only to graduate students in Physiology or Pharmacology and Toxicology.
Readings in cell physiology and physiological aspects of molecular biology.

- 919. Cardiovascular System**
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.
R: Approval of department.
Classical and current literature on the physiology of the heart, circulation or microcirculation.

- 950. Topics in Physiology**
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.
Classical and modern concepts in selected areas of physiology.

- 980. Problems in Physiology**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
R: Approval of department.
Individual research problems in physiology.

- 999. Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 credits in all enrollments for this course.

POLITICAL SCIENCE PLS

Department of Political Science College of Social Science

- 100. Introduction to American National Government**
Fall, Spring, Summer. 3(3-0)
The policymaking process in national government, with emphasis on political participation, the presidency, Congress, Supreme Court, bureaucracy, and civil rights and civil liberties.
- 140. Introduction to Comparative Politics**
Fall, Spring, Summer. 3(3-0)
Comparative analysis of political systems in first, second, and third-world countries. Alternative methods for comparative cross-cultural analyses of political systems.
- 160. Introduction to International Relations**
Fall, Spring, Summer. 3(3-0)
R: Not open to students with credit in MC 220 or MC 221.
Dynamics of conflict and cooperation. Processes of foreign policy decision making. Major international economic issues. Basic future trends. Primary analytical approaches for studying world politics.

- 170. Introduction to Political Philosophy**
Fall, Spring, Summer. 3(3-0)

Basic questions of political philosophy as considered from ancient to modern times. Primary focus on the origins, defense, and radical critiques of modern liberal democracy.

- 200. Introduction to Political Science**
Fall, Spring, Summer. 4(4-0)

The science of politics. Theory construction, model building, empirical testing, and inductive inference. Examples from American, international and comparative politics.

- 201. Introduction to Methods of Political Analysis**
Fall, Spring, Summer. 4(4-0)

P: PLS 200.
Philosophy of social science. Principles of research design, measurement, hypothesis testing, measures of association, cross tabulations, and regression analysis.

- 301. American State Government**
Spring. 3(3-0)

Structure and processes of American state government. Interstate differences. Constitutions, elections, political parties, interest groups, and intergovernmental relations. Policy focus on education, welfare, and criminal justice.

- 302. Urban Politics**
Fall. 3(3-0)

Structure and processes of American urban politics. Relationship of cities to U.S. federal system. Interstate variations. Policy focus on public education, crime, social welfare, and economic development.

- 304. Minority Politics**
Fall. 3(3-0)

Minority groups and the political process in the United States. Civil rights movements, political organizations, legal decisions, political participation, and legislative politics.

- 305. Environmental Politics**
Fall. 3(3-0)

The impact of political and legal institutions on U.S. environmental policy. Public opinion, environmental interest groups, and the environmental movement. The politics of air and water pollution, toxic wastes, public lands, risk assessment, and environmental justice.

- 310. Public Bureaucracy in the Policy Process**
Fall, Spring. 3(3-0)

Role of public bureaucracy in the U.S. Theories of administrative behavior and the impact of hierarchy on policymaking. Relations with the president, Congress, interest groups, and the public. Administrative functions, responsiveness, and ethics.

- 313. Public Policy Analysis**
Fall, Spring, Summer. 3(3-0)

R: Not open to students with credit in MC 444.
Political and economic concepts for evaluating the consequences of government decision making. Issues of problem identification, policy adoption, and implementation affecting program evaluation.

- 320. The American Judicial Process**
Fall, Spring. 3(3-0)

R: Not open to freshmen or sophomores.
Analysis of the structure and functions of judicial systems. Organization, administration, and politics of judicial bureaucracies. Roles of judges, juries, counsel, litigants, and interest groups in the adjudication process.