

## PHYSIOLOGY

## PSL

Department of Physiology  
College of Natural Science**250 Introductory Physiology**

Fall, Spring. 4(4-0) R: Not open to students in the Physiology major. Not open to students with credit in PSL 310.

Function, regulation and integration of organs and organ systems of higher animals emphasizing human physiology.

**310 Physiology for Pre-Health Professionals**

Fall. 4(4-0) P: BS 111 or LB 145 or BS 149H or ANTR 350 Not open to students with credit in PSL 250 or PSL 431 or PSL 432.

Fundamental concepts of human physiology with an emphasis on physiology related to health careers.

**410 Computational Problem Solving in Physiology**

Fall, Spring, Summer. 3(3-0) P: PSL 431 RB: PSL 432 R: Open to juniors or seniors.

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.

**420 Membrane Biophysics: An Introduction**

Fall, Spring. 2(2-0) RB: One year of college physics or chemistry, and one year of college mathematics.

Biophysical and chemical aspects of biomembranes. Experimental model membrane systems including planar lipid bilayers and liposomes. Biotechnological applications of lipid bilayer sensors.

**421 Adult and Embryonic Stem Cells (W)**

Spring of even years. 2(2-0) P: (PSL 431) and completion of Tier I writing requirement RB: PSL 432 R: Open to seniors in the Physiology major or in the Lyman Briggs Physiology Coordinate Major.

Topics in the physiology, cell biology, genetics, and developmental potential of adult and embryonic stem cells.

**425 Physiological Biophysics**

Fall. 3(3-0) P: PSL 250 or PSL 310 or PSL 431 RB: College Algebra, Differential Calculus

The quantitative physical phenomena underlying kinetics and equilibria of physiological processes.

**426 Computational Problem Solving in Physiology II (W)**

Fall, Spring, Summer. 2(2-0) P: (PSL 410 and PSL 431) and completion of Tier I writing requirement RB: PSL 432 R: Open to seniors in the Lyman Briggs Physiology Coordinate Major or in the Physiology major. Approval of department.

Present advanced computational and computer programming strategies and techniques appropriate to problem solving in biology, physiology and medicine.

**431 Human Physiology I**

Fall. 3(3-0) P: (BS 111 or LB 145) and (CEM 142 or CEM 152 or CEM 182H or LB 172) RB: BS 110 or LB 144 R: Open to juniors or seniors.

Molecular basis of physiological control systems, neural function including autonomic nervous system, and cardiovascular and respiratory systems.

**432 Human Physiology II**

Spring. 3(3-0) P: (BS 111 or LB 145) and (CEM 142 or CEM 152 or CEM 182H or LB 172) and PSL 431 RB: BS 110 or LB 144 R: Open to juniors or seniors.

Continuation of PSL 431. Function and regulation of the digestive, endocrine, renal, and reproductive systems. Integration of physiological responses.

**439 Special Topics in Physiology (W)**

Fall. 2(2-0) A student may earn a maximum of 4 credits in all enrollments for this course. P: (PSL 431) and completion of Tier I writing requirement RB: PSL 432 R: Open to seniors in the Lyman Briggs Physiology Coordinate Major or in the Physiology major.

Special topics in physiology, focusing on the process of biomedical discovery, alternative medicine, autoimmunity, or other selected topics of interest related to careers in health care or biomedical research.

**440 Topics in Cell Physiology**

Fall, Spring. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

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: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic on the role of hormones in the regulation of growth, metabolism, differentiation.

**442 Topics in Cardiovascular Physiology**

Fall. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic in blood flow physiology.

**443 Topics in Respiratory Physiology**

Fall of odd years. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic in the physiology of gas exchange and lung mechanics.

**444 Topics in Reproductive Physiology (W)**

Spring of odd years. 2(2-0) P: (PSL 431 and PSL 432) and completion of Tier I writing requirement R: Open to seniors in the Physiology major or in the Lyman Briggs Physiology Coordinate Major.

Selected topics in the physiology of the reproductive system.

**445 Topics in Environmental Physiology**

Spring of odd years. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic in environmental physiology with an emphasis on thermoregulation.

**446 Topics in Visual Physiology**

Fall of even years. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic in the functioning of the visual system in health and disease.

**447 Topics of Brain Function**

Fall. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic on the functioning of the mammalian brain.

**448 Topics in Gastrointestinal Physiology**

Fall. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Selected topic in the physiology of the digestive system.

**449 Developmental Neurophysiology**

Fall. 2(2-0) P: Completion of Tier I writing requirement. RB: PSL 432 R: Open only to Physiology majors.

Development of the nervous system in invertebrate and vertebrate animals.

**450 Physiology in Health and Disease**

Fall. 3(3-0) P: (PSL 431 and PSL 432) and Completion of Tier I Writing Requirement R: Open to juniors or seniors in the Lyman Briggs Physiology Coordinate Major or in the Physiology major.

Advanced topics in normal and abnormal physiology. Chronic diseases, disease progression, and animal models of disease.

**473 Environmental Fish Physiology**

Spring of odd years. 3(3-0) Interdepartmental with Fisheries and Wildlife. Administered by Fisheries and Wildlife. P: BS 111 or BS 149H or LB 145 R: Not open to freshmen or sophomores.

Physiological adaptations of fish to environmental factors; bioenergetics, homeostasis, senses adaptations to diverse and extreme aquatic environments.

**475L Capstone Laboratory in Physiology**

Fall, Spring, Summer. 2(1-3) P: PSL 431 RB: PSL 432 R: Open to juniors or seniors in the Physiology major.

Laboratory exercises in animal and human physiology, including cardiovascular and respiratory function, nerve and muscle function, osmoregulation receptor-mediated regulation, neural and hormonal control.

**480 Special Problems in Physiology**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course. RB: (PSL 431 and PSL 432) and completion of Tier I Writing requirement R: Open to undergraduate students in the Physiology major. Approval of department.

Independent study under the supervision of a faculty member.

**483 Environmental Physiology (W)**

Spring. 4(4-0) Interdepartmental with Zoology. Administered by Zoology. P: ((BS 110 or LB 144 or BS 148H) and completion of Tier I writing requirement) and (BS 111 or LB 145 or BS 149H) and (CEM 141 or CEM 151 or CEM 181H or LB 171)

Aspects of physiology important to the environmental relations of vertebrates and invertebrates: energetics, thermal relations, osmotic-ionic relations, and exercise physiology.

**490 Independent Research in Physiology**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course. RB: PSL 431 and PSL 432 R: Open to undergraduate students in the Physiology major. Approval of department.

Supervised laboratory research in physiology under the direction of a faculty member.

## Physiology—PSL

- 513 Animal Physiology for Veterinarians**  
Spring. 4(4-0) R: Open to graduate-professional students in the College of Veterinary Medicine.  
Physiology of the neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive systems, and thermoregulation.
- 534 Cell Biology and Physiology I**  
Fall. 3 credits. Interdepartmental with Human Anatomy and Biochemistry and Molecular Biology. Administered by Physiology. R: Open only to graduate-professional students in the College of Human Medicine or College of Osteopathic Medicine.  
Modern concepts of cell biology as a basis for understanding the physiology of human tissues and organ systems in health and disease.
- 535 Cell Biology and Physiology II**  
Spring. 4 credits. Interdepartmental with Human Anatomy and Biochemistry and Molecular Biology. Administered by Physiology. R: Open only to graduate-professional students in the College of Human Medicine or the College of Osteopathic Medicine.  
Modern concepts of cell biology as a basis for understanding the physiology of human tissues and organ systems in health and disease. Continuation of PSL 534.
- 552 Medical Neuroscience**  
Spring. 4(3-2) Interdepartmental with Human Anatomy and Neurology and Ophthalmology and Radiology. Administered by Neurology and Ophthalmology. R: Open only to graduate-professional students in the Colleges of Human Medicine and Osteopathic Medicine. SA: ANT 552  
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. RB: (PSL 511) and Completion of Semester 5 in the graduate professional program in the College of Veterinary Medicine.  
Individual work on a research problem.
- 825 Cell Structure and Function**  
Spring. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology and Microbiology and Molecular Genetics. Administered by Biochemistry and Molecular Biology. RB: BMB 401 or BMB 461. SA: BCH 825  
Molecular basis of structure and function. Cell properties: reproduction, dynamic organization, integration, programmed and integrative information transfer. Original investigations in all five kingdoms.
- 827 Physiology and Pharmacology of Excitable Cells**  
Fall. 4(4-0) Interdepartmental with Neuroscience and Pharmacology and Toxicology and Zoology. Administered by Pharmacology and Toxicology. RB: PSL 431 or PSL 432 or BMB 401 or BMB 461 or ZOL 402  
Function of neurons and muscle at the cellular level: membrane biophysics and potentials, synaptic transmission, sensory nervous system function.
- 828 Cellular and Integrative Physiology**  
Spring. 4(4-0) RB: PSL 827  
Cellular physiology as basis for understanding integrative functions of various body systems, including nervous, cardiovascular, respiratory, urinary, gastrointestinal, endocrine, reproductive, and immune.
- 839 Systems Neuroscience**  
Spring. 4(4-0) Interdepartmental with Human Anatomy and Neuroscience and Pharmacology and Toxicology and Psychology and Zoology. Administered by Neuroscience. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Agriculture and Natural Resources, Natural Science, Social Science, and Veterinary Medicine. SA: ANT 839  
Anatomy, pharmacology, and physiology of multicellular neural systems. Sensory, motor, autonomic, and chemo-regulatory systems in vertebrate brains.
- 885 Vertebrate Neural Systems**  
Spring of odd years. 3(2-2) Interdepartmental with Human Anatomy and Neuroscience. Administered by Neuroscience. SA: ANT 885  
Comparative analysis of major component systems of vertebrate brains. Evolution, ontogeny, structure, and function in fish, amphibians, reptiles, birds and mammals.
- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 36 credits in all enrollments for this course.  
Master's thesis research.
- 901 Investigating the Lung**  
Fall of even years. 2(2-0) Interdepartmental with Large Animal Clinical Sciences and Pathobiology and Diagnostic Investigation. Administered by Large Animal Clinical Sciences. R: Open to graduate students.  
Integrative biology of the lung. Structure and function. Molecular, cellular, and organ responses to injury.
- 910 Cellular and Molecular Physiology**  
Fall. 4(4-0) RB: BMB 802; PSL 432 or PSL 501 or PSL 511; one calculus course. R: Open only to graduate students in the Department of Physiology or Department of Pharmacology and Toxicology.  
Readings in cell physiology and physiological aspects of molecular biology.
- 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 24 credits. A student may earn a maximum of 120 credits in all enrollments for this course.  
Doctoral dissertation research.