

## PHYSIOLOGY

## PSL

Department of Physiology  
College of Natural Science

- 101 Frontiers in Physiology**  
Spring. 1(1-0) R: Open to freshmen or sophomores in the College of Natural Science or in the Lyman Briggs College.  
Introduction to the field of physiology and recent trends in physiological research, including an overview of biomedical careers. Campus and Internet resources to achieve academic success and career goals.
- 250 Introductory Physiology**  
Fall, Spring, Summer. 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, Spring, Summer. 4(4-0) P: BS 161 or BS 181H or LB 145 or ANTR 350 Not open to students with credit in PSL 431.  
Human organ system physiology with clinical applications for students entering health care fields.
- 311L Physiology Laboratory for Pre-Health Professionals**  
Fall, Spring. 2(0-4) P: (CEM 142 or CEM 152 or CEM 182H or LB 172) and ((PSL 310 or concurrently) or (PSL 432 or concurrently)) R: Not open to freshmen.  
Laboratory exercises in human and animal physiology, including neural, sensory, muscle, cardiovascular, and urinary function, with an emphasis on the integration of physiological systems. Laboratory exercises relevant for pre-health students and the development of data analysis and problem solving skills.
- 331 Concepts and Critical Thinking in Physiology**  
Fall, Spring. 3(3-0) P: BS 161 or BS 181H or LB 145 RB: (PSL 101) and (BS 162 or BS 182H or LB 144) R: Open to sophomores or juniors in the Physiology Major or in the Lyman Briggs Physiology Coordinate Major. Approval of department.  
Knowledge, skills, and approaches necessary to create deep understanding of biological concepts for success in advanced physiology courses
- 425 Physiological Biophysics**  
Fall, Spring. 3(3-0) P: PSL 250 or PSL 310 or (PSL 431 and PSL 432) RB: First semester calculus.  
The quantitative physical phenomena underlying kinetics and equilibria of physiological processes.
- 429 Biomedical Imaging Methods**  
Fall of even years. 3(3-0) P: (CEM 142 or CEM 152 or CEM 182H or LB 172) and (PHY 184 or PHY 184B or PHY 232 or PHY 294H or LB 274) RB: A course in physiology or gross anatomy.  
Overview of biomedical imaging techniques from theory to application, with emphasis on health care and research.
- 431 Human Physiology I**  
Fall. 4(4-0) P: (BS 161 or BS 181H or LB 145) and (CEM 142 or CEM 152 or CEM 182H or LB 172) RB: BS 162 or BS 182H or LB 144 R: Open to juniors or seniors.  
Molecular basis of physiological control systems, physiology of excitable cells, autonomic nervous system, function and regulation of cardiovascular and respiratory systems.
- 432 Human Physiology II**  
Spring. 4(4-0) P: (BS 161 or BS 181H or LB 145) and (CEM 142 or CEM 152 or CEM 182H or LB 172) and PSL 431 RB: BS 162 or BS 182H 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.
- 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.
- 460 Topics in Physiology (W)**  
Fall, Spring, Summer. 2(2-0) A student may earn a maximum of 4 credits in all enrollments for this course. P: (PSL 431 and (PSL 432 or concurrently)) and completion of Tier I writing requirement R: Open to seniors or juniors in the Physiology Major or in the Lyman Briggs Physiology Coordinate Major. SA: PSL 421, PSL 438, PSL 439, PSL 440, PSL 441, PSL 442, PSL 443, PSL 444, PSL 445, PSL 446, PSL 447, PSL 448, PSL 449  
In-depth exploration of contemporary areas of physiology and human disease, emphasizing scientific literacy and effective written and oral communication.
- 475L Capstone Laboratory in Physiology**  
Fall, Spring, Summer. 2(1-3) P: (PSL 431) and completion of Tier I writing requirement RB: (PSL 432) and anatomy and statistics R: Open to juniors or seniors in the Physiology Major or in the Lyman Briggs Physiology Coordinate Major.  
Laboratory exercises in human and animal physiology, including cardiovascular, respiratory, neural, muscle, sensory, and hormonal function, as well as systems physiology studies in exercise and systemic reflexes.
- 480 Special Problems in Physiology**  
Fall, Spring, Summer. 1 to 2 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.
- 490 Independent Research in Physiology**  
Fall, Spring, Summer. 1 to 2 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.
- 499 Physiology Senior Research Thesis**  
Fall, Spring, Summer. 2 to 8 credits. A student may earn a maximum of 12 credits combined between PSL 480 and PSL 499. R: Open to seniors in the Physiology Major or in the Lyman Briggs Physiology Coordinate Major. Approval of department; application required.  
Independent research with faculty supervision culminating in a thesis.
- 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.
- 536 Basic Principles of Cell Biology and Physiology**  
Fall. 3(2-2) Interdepartmental with Human Anatomy and Biochemistry and Molecular Biology. Administered by Physiology. R: Open to graduate-professional students in the College of Osteopathic Medicine.  
Modern concepts of cell biology as a basis for understanding the structure (histology) and function (physiology) of human tissues in health and disease.

## Physiology—PSL

- 539 Principles of Cell Biology and Pathophysiology**  
Fall. 4(3-2) Interdepartmental with Human Anatomy and Biochemistry and Molecular Biology and Microbiology and Molecular Genetics. Administered by Physiology. R: Open to graduate-professional students in the College of Osteopathic Medicine.  
Modern concepts of human cell biology as a basis for understanding integration of structure (histology) and function (physiology) in health and disease (pathology). Introduction to adaptive growth response, cell injury, inflammation, hemodynamic disorders, and tissue repair.
- 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.
- 813 Molecular Mechanism of Human Disease and Targeted Therapies**  
Fall. 3(3-0)  
Mechanisms and pathways underlying human disease and therapeutic strategies.
- 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 Integrative Biology and Neuroscience and Pharmacology and Toxicology. Administered by Pharmacology and Toxicology. R: Open to graduate students in the College of Natural Science or in the Department of Pharmacology and Toxicology or approval of department.  
Function of neurons and muscle at the cellular level: membrane biophysics and potentials, synaptic transmission, sensory nervous system function.
- 828 Cellular and Integrative Physiology I**  
Spring. 3(3-0)  
Cellular physiology as basis for understanding integrative functions of various body systems, including nervous, cardiovascular, respiratory, urinary, muscle and kidney.
- 829 Cellular and Integrative Physiology II**  
Fall. 3(3-0) RB: PSL 828  
Cellular physiology as basis for understanding functions of various body systems including blood, blood cells, endocrine, reproductive and gastrointestinal.
- 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.
- 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. R: Open to master's students in the Physiology major.  
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.
- 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 36 credits in all enrollments for this course. R: Open to graduate students in the Physiology major.  
Doctoral dissertation research.