

PHYSICS

**881\*.** **Subatomic Physics**  
 Fall. 3(3-0)  
 P: PHY 851  
 Application of conservation laws and physical principles to basic quantum mechanical problems in MeV energy range and femtometer size range. Application to nuclear data.  
 QP: PHY 838 QA: PHY 881

**891\*.** **Elementary Particle Physics**  
 Fall. 3(3-0)  
 P: PHY 853  
 Nonabelian gauge theory, spontaneously broken gauge theory, electroweak interaction, QCD, W and Z boson coupling to quarks and leptons, charm, top and bottom quarks, particle generations.  
 QP: PHY 867 QA: PHY 927 PHY 928

**899\*.** **Master's Thesis Research**  
 Fall, Spring, Summer. 1 to 6 credits.  
 May reenroll for a maximum of 24 credits.  
 R: Open only to graduate students in Physics.  
 QA: PHY 899

**972\*.** **Topics in Condensed Matter Physics(MTC)**  
 Fall. 3(3-0)  
 P: PHY 831, PHY 852  
 Advanced topics in many-body problems, disordered solids, superfluidity and superconductivity magnetism.  
 QP: PHY 883 QA: PHY 941

**972A\*.** **Topics in Condensed Matter Physics: Many-Body Problems**  
 Fall. 3(3-0)  
 P: PHY 871  
 Advanced topics in many-body problems, disordered solids, superfluidity and superconductivity, magnetism.  
 QP: PHY 883 QA: PHY 941

**972B\*.** **Topics in Condensed Matter Physics: Disordered Solids**  
 Fall. 3(3-0)  
 P: PHY 871  
 Advanced topics in many-body problems, disordered solids, superfluidity and superconductivity, magnetism.  
 QP: PHY 883 QA: PHY 941

**972C\*.** **Topics in Condensed Matter Physics: Superfluidity and Superconductivity**  
 Fall. 3(3-0)  
 P: PHY 831, PHY 852  
 Advanced topics in many-body problems, disordered solids, superfluidity and superconductivity, magnetism.  
 QP: PHY 883 QA: PHY 941

**972D\*.** **Topics in Condensed Matter Physics: Magnetism**  
 Fall. 3(3-0)  
 P: PHY 831, PHY 852  
 Advanced topics in many-body problems, disordered solids, superfluidity and superconductivity, magnetism.  
 QP: PHY 883 QA: PHY 941

**972E\*.** **Topics in Condensed Matter Physics: Physics of Macroscopic Systems**  
 Fall. 3(3-0)  
 P: PHY 831, PHY 852  
 Advanced topics in many-body problems, disordered solids, superfluidity, and superconductivity, magnetism.  
 QP: PHY 883 QA: PHY 941

**980\*.** **Advanced Reading in Physics**  
 Fall, Spring, Summer. 1 to 3 credits.  
 May reenroll for a maximum of 4 credits.  
 R: Permission of department.  
 QA: PHY 984

**982\*.** **Topics in Nuclear Physics(MTC)**  
 Spring. 3(3-0)  
 P: PHY 881, PHY 852  
 A special topics course in nuclear physics.  
 QP: PHY 881 PHY 839 QA: PHY 951 PHY 952

**982A\*.** **Topics in Nuclear Physics: Heavy Ion Reactions**  
 Spring. 3(3-0)  
 P: PHY 852, PHY 881, PHY 831  
 Scattering, particle transfer, resonance reactions, fission, time-dependent Hartree-Fock, Vlasov equation, nuclear transport equations, particle production, nuclear liquid-gas phase transition, quark-gluon plasma.  
 QP: PHY 839 PHY 881PHY 871

**982B\*.** **Topics in Nuclear Physics: Nuclear Structure**  
 Spring. 3(3-0)  
 P: PHY 881, PHY 852  
 Special topics course in nuclear structure, nuclear forces, nuclear matter, nuclear-structure models, and few-nucleon systems.  
 QP: PHY 881 QA: PHY 951 PHY 952

**992\*.** **Quantum Chromodynamics(MTC)**  
 Spring. 3(3-0)  
 P: PHY 891  
 Current topics in quantum chromodynamics, hadron-hadron interactions, interaction of hadrons with leptons.  
 QP: PHY 927 QA: PHY 928 PHY 929

**992A\*.** **Quantum Chromodynamics: Hadron Interactions**  
 Spring of even-numbered years. 3(3-0)  
 P: PHY 891 R: X  
 Current topics in quantum chromodynamics, hadron-hadron interactions, interaction of hadrons with leptons.  
 QP: PHY 927 QA: PHY 928 PHY 929

**992B\*.** **Quantum Chromodynamics: Lepton-Hadron Interactions**  
 Spring of odd-numbered years. 3(3-0)  
 P: PHY 891  
 Current topics in quantum chromodynamics, hadron-hadron interactions, interaction of hadrons with leptons.  
 QP: PHY 927 QA: PHY 928 PHY 929

**999\*.** **Doctoral Dissertation Research**  
 Fall, Spring, Summer. 0(-) May reenroll for a maximum of 99 credits.  
 R: Physics  
 QA: PHY 999

PHYSIOLOGY PSL

**250.** **Introductory Physiology**  
 Fall, Spring. 4(4-0)  
 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.  
 QA: PSL 323

**410\*.** **Computational Problem Solving in Physiology**  
 Fall, Spring. 3(03-00)  
 P: PSL 432.  
 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, o  
 QP: PSL 432 QA: PSL 410

**431\*.** **Human Physiology I**  
 Fall. 3(03-00)  
 P: BS 111, CEM 142.  
 Neural function including autonomic nervous system, physiological control systems, endocrinology, reproduction and digestive function.  
 QP: BS 210 BS 211 QA: PSL 431

**432\*.** **Human Physiology II**  
 Spring. 3(03-00)  
 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.  
 QP: PSL 431 QA: PSL 432

**440\*.** **Topics in Cell Physiology**  
 Fall, Spring. 2(02-00)  
 P: 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.  
 QP: PSL 431 PSL 432

**441\*.** **Topics in Endocrinology**  
 Fall, Spring. 2(02-00)  
 P: PSL 432. R: Open only to Physiology majors.  
 Selected topic on the role of hormones in the regulation of growth, metabolism, differentiation.  
 QP: PSL 431 PSL 432

**442\*.** **Topics in Cardiovascular Physiology**  
 Fall. 2(2-00)  
 P: PSL 432. R: Open only to Physiology majors.  
 Selected topic in blood flow physiology.  
 QP: PSL 431 PSL 432

**443\*.** **Topics in Respiratory Physiology**  
 Fall of odd-numbered years. 2(02-00)  
 P: PSL 432. R: Open only to Physiology majors.  
 Selected topic in the physiology of gas exchange and lung mechanics.  
 QP: PSL 431 PSL 432

**444\*.** **Topics in Renal Physiology**  
 Spring of even-numbered years. 2(02-00)  
 P: PSL 432. R: Open only to Physiology majors.  
 Selected topic in the function of the kidney, regulation of salt and water balance.  
 QP: PSL 431 PSL 432

**445\*.** **Topics in Environmental Physiology**  
 Spring of odd-numbered years. 2(02-00)  
 P: PSL 432. R: Open only to Physiology majors.  
 Selected topic in environmental physiology with an emphasis on thermoregulation.  
 QP: PSL 431 PSL 432

**446\*.** **Topics in Visual Physiology**  
 Fall of even-numbered years. 2(2-00)  
 P: PSL 432. R: Open only to Physiology majors.  
 Selected topic in the functioning of the visual system in health and disease.  
 QP: PSL 431 PSL 432

**PHYSIOLOGY**

- 447\*.** **Topics of Brain Function**  
Fall. 2(02-00)  
P: PSL 432. R: Open only to Physiology majors.  
Selected topic on the functioning of the mammalian brain.  
QP: PSL 431 PSL 432
- 448\*.** **Topics in Gastrointestinal Physiology**  
Fall. 2(02-00)  
P: PSL 432. R: Open only to Physiology majors.  
Selected topic in the physiology of the digestive system.  
QP: PSL 431 PSL 432
- 449\*.** **Developmental Neurophysiology**  
Fall. 2(02-00)  
P: PSL 432. R: Open only to Physiology majors.  
Development of the nervous system in invertebrate and vertebrate animals.  
QP: PSL 431 PSL 432
- 450\*.** **Laboratory in Human Physiology**  
Fall. 2(01-03)  
P: PSL 432. R: Open only to Physiology majors.  
Demonstration of fundamental physiological processes. Sensory input response. Data collection and analysis.  
QP: PSL 431 PSL 432 QA: PSL 433
- 475\*.** **Capstone Laboratory in Physiology**  
Spring. 2(00-06)  
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.  
QP: PSL 431 PSL 432
- 480\*.** **Special Problems**  
Fall, Spring, Summer. 1 to 3 credits.  
May reenroll for a maximum of 5 credits.  
P: PSL 432. R: Open only to Physiology majors.  
Independent study under the auspices of a faculty member.  
QA: PSL 480
- 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)  
P: Admission to the College of Veterinary Medicine. R: College of Veterinary Medicine Veterinary Medicine none  
Physiology of the nervous, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive systems and homeostasis.
- 811\*.** **Cellular and Neurophysiology**  
Fall. 6(6-0) Interdepartmental with the Department(s) of Zoology.  
P: PSL 431, 432 or 401; BCH 462.  
Concepts of advanced cellular and neurophysiology including bioenergetics, transport, regulation of metabolic reactions, specialized cell functions and neurophysiology.  
QP: PSL 431 PSL 432ORPSL 401PSL 402  
QA: PSL 811 PSL 812
- 812\*.** **Advanced Systems Physiology**  
Spring. 6(6-0)  
P: Psl 811  
Basic and advanced concepts of systems physiology including cardiovascular, renal, respiratory, endocrine, reproduction, and gastrointestinal physiology. Continuation of Psl 811.  
QA: PSL 812 PSL 813

- 841\*.** **Advanced Endocrine Physiology and Pharmacology**  
Fall. 4(4-0) Interdepartmental with the Department(s) of Animal Science, Pharmacology and Toxicology, Psychology.  
P: PSL 431, 432; BCH 461  
Basic and advanced concepts of endocrine and reproductive physiology and pharmacology.  
QA: PSL 841
- 890\*.** **Readings in Biophysics**  
Fall, Spring, Summer. 3 to 6 credits.  
May reenroll for a maximum of 6 credits.  
P: Junior Standing R: Juniors or above  
Readings in biophysics.  
QA: PSL 890
- 899\*.** **Master's Thesis Research**  
Fall, Spring, Summer. 1 to 6 credits.  
May reenroll for a maximum of 24 credits.  
P: approval of department  
Master's research thesis.  
QA: PSL 899
- 901\*.** **Investigating the Lung**  
Fall. 3(3-0) Interdepartmental with the Department(s) of Large Animal Clinical Sciences.  
Classic and current concepts of respiratory structure and function in health and disease and mechanisms of lung injury.  
QA: PSL 901 LCS 901
- 919\*.** **Cardiovascular System**  
Fall. 3(3-0) May reenroll for a maximum of 9 credits.  
R: approval of department  
Classical and current literature on physiology of heart, circulation and microcirculation. Each fall a different one of these topics will be discussed.  
QA: PSL 919
- 950\*.** **Topics in Physiology**  
Fall, Spring, Summer. 1 to 3 credits.  
May reenroll for a maximum of 9 credits.  
R: Approval of department  
Classical and modern concepts in selected areas of physiology.  
QA: PSL 950
- 980\*.** **Problems in Physiology**  
Fall, Spring, Summer. 1 to 4 credits.  
May reenroll for a maximum of 8 credits.  
P: Approval of department  
Individual work on selected research problems in physiology.  
QA: PSL 980
- 999\*.** **Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 6 credits.  
May reenroll for a maximum of 48 credits.  
R: Approval of department  
Doctoral dissertation research  
QA: PSL 999

**POLITICAL SCIENCE PLS**

- 100.** **Introduction to American National Government**  
Fall, Spring, Summer. 3(3-0)  
R: NONE NONE NONE NONE  
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)  
R: NONE NONE NONE NONE  
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: NONE NONE NONE NONE  
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)  
R: NONE NONE NONE NONE  
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)  
R: NONE NONE NONE NONE  
The science of politics. theory construction, model building, empirical testing, and inductive inference. Examples from American, international and comparative politics.  
QP: PLS 290
- 201.** **Introduction to Methods of Political Analysis**  
Fall, Spring, Summer. 4(4-0)  
P: PLS 200. R: NONE NONE NONE  
NONE  
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)  
P: PLS 100.  
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.  
QP: PLS 100 QA: PLS 301
- 310\*.** **Public Bureaucracy in the Policy Process**  
Fall, Spring. 3(3-0)  
P: PLS 100. R: None None None None  
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.  
QP: PLS 100 QA: PLS 310
- 313\*.** **Public Policy Analysis**  
Fall, Spring, Summer. 3(3-0)  
P: PLS 100. R: None None None None  
Political and economic concepts for evaluating the consequences of government decision making. Issues of problem identification, policy adoption, and implementation affecting program evaluation.  
QP: PLS 100 QA: PLS 313
- 320\*.** **The American Judicial Process**  
Fall, Spring. 3(3-0)  
P: PLS 100. R: Not open to freshmen and 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 adjudication process.  
QP: PLS100 QA: 320