Description — Physics and Astronomy

Courses

327. Practical Astronomy
Spring. 3(3-0) AST 230.

442. Radiation Astrophysics
Winter of even-numbered years. 3(3-0)
PHY 365.
Emission, absorption and transfer of radiation in an astrophysical context. Stellar atmospheres, line formation, plasma diagnostics. Synchrotron radiation.

443. Astrophysical Fluid Dynamics
Spring of even-numbered years. 3(3-0)
PHY 396.
Dynamics of fluids in an astrophysical context. Fundamental equations. Applications to stellar structure, interstellar medium, and compact objects.

462. Galactic Astronomy
Winter of odd-numbered years. 3(3-0)
PHY 427.

463. Extra-galactic Astronomy
Spring of odd-numbered years. 3(3-0)
AST 463.

490. Special Problems
Fall, Winter, Spring. 1 to 5 credits. May reenroll for a maximum of 10 credits. Approval of department. Individual study or project under the direction of a faculty member. An oral report on the work may be required in department seminar.

PHYSIOLOGY

College of Human Medicine
College of Natural Science
College of Osteopathic Medicine
College of Veterinary Medicine

240. Introductory Physiology
Fall, Spring. 4(4-0) Sophomores or approval of department.
Physiology of the cell, nerve and reflex activity, skeletal muscle, brain, and cardiovascular system emphasizing environmental influences such as disease and exercise.

241. Introductory Physiology
Winter. Summer of even-numbered years. 4(4-0) PSL 240 or approval of department.
Continuation of PLS 240. Physiology of respiration, digestion, metabolism, kidney, endocrinology, and reproduction.

323. Physiology, Anatomy, and Hygiene of the Eye
Fall. Summer of even-numbered years. 3(2-2) PSL 323 or approval of department.
Basic course in anatomy, physiology, and hygiene of visual system; includes discussion of normal visual functioning and abnormal visual functioning, with methods of correction and education implications.

401. Comparative Physiology I
Fall. 4(4-0) PSL 240 or B S 212, CEM 131 or CEM 141, Interdepartmental with the Department of Zoology.
A comparison of osmoregulation, digestion, respiration, and other physiological processes in a wide range of organisms.

402. Comparative Physiology II
Winter. 4(4-0) PSL 401 or approval of department. Interdepartmental with and administered by the Department of Zoology.
A comparison of sensory, motor, endocrine and other integrative mechanisms in animals.

410. Computational Problem Solving in Physiology
Fall, Spring, Summer. 3(3-0) PSL 240 or PSL 431 or PSL 811, approval of instructor.
Utilization of existing computer software and designing custom programs for statistical functions to solve complex sets of equations in physiology.

416. Physiology of the Cell
Fall. Summer of odd-numbered years. 3(3-0) BCH 401 or BCH 451.
Physiologic mechanisms common to all living cells with emphasis on those of the vertebrates. The functions of the cell membrane and cytoplasm are studied as the basis for the physiologic behavior of vertebrate organs and systems.

431. Human Physiology
Winter. 4(4-0) One year of biological science or ANT 316, CEM 131 or CEM 141.
Physiology of the digestive, endocrine, nervous, and reproductive systems.

432. Human Physiology
Spring. 4(4-0) PSL 431 or approval of department.
Physiology of the autonomic nervous, cardiovascular, renal, and respiratory systems.

435. Comparative Physiology
Spring. 1(0-3) PSL 435, PSL 432 or concurrently or approval of department.
Human and vertebrate animal experiments demonstrate fundamental physiological processes. Responses to sensory inputs are systematically studied; numerical data are tabulated and analyzed.

435. Mammary Physiology
Fall. 4(3-3) PSL 241, BCH 200 or BCH 401, Interdepartmental with and administered by the Department of Animal Science.

455. Principles of Animal Reproduction
Winter. 4(5-0) PSL 241, BCH 200 or BCH 401, Interdepartmental with and administered by the Department of Animal Science.
Processes of reproduction and endocrinology with special emphasis on anatomy of reproductive systems, folliculogenesis, gametogenesis, reproductive cycle, fertilization, sex determination, gestation and artificial regulation of these reproductive events for economic benefit.

465. Avian Physiology
Spring. 4(3-3) Approval of department. Interdepartmental and administered by the Department of Animal Science.
Systemic physiology of birds emphasizing respiration, circulation, temperature regulation, the endocrine, and reproduction.
The chemistry, physics and mathematics of the elys is included.

480. Special
470. discussion of theoretical and experimental mod­
471. Complex permeability, energy transductions and surface
482. administered by the Department of Zoology.

804B. Neuroscience Laboratory I
Continuation of
804A. Neuroscience Laboratory II
Continuation of

500A. Introductory Physiology for Medicine
Spring. (5-0) Admission to the professional program in a college of medicine.
Concepts and problems in physiology to be followed by supplemental physiology instruction during subsequent phases of medical training.

500B. Introductory Physiology for Medicine
Fall. (4-0) Admission to the professional program in a college of medicine.
Principles of systemic physiology germane to the practice of medicine with introduction to clinical physiopathology.

500C. Introductory Physiology for Medicine
Winter. (5-0) Admission to the professional program in a college of medicine.
Continuation of PSL 500B.

500D. Introductory Physiology for Medicine
Winter. (5-5-0) Admission to a college of medicine or approval of department.
Concepts and problems in physiology germane to the practice of medicine.

500E. Introductory Physiology for Medicine
Spring. (5-0) Admission to a college of medicine or approval of department.
Continuation of PSL 500D.

804A. Neuroscience Laboratory I
Winter. (4-2) ZOL S27 and approval of instructor. Interdepartmental with the departments of Psychology and Zoology. Administered by the Department of Psychology. Development of skills in the methods, techniques and instrumentation necessary for research in a variety of areas concerned with neuroscience.

804B. Neuroscience Laboratory II
Spring. (4-2) PST 804A. Interdepartmental with the departments of Psychology and Zoology. Administered by the Department of Psychology.
Continuation of PSL 804A.

811. Advanced Cell Physiology
(PSL 801) Fall. (6-6) PSL 831, PSL 432 or PSL 401, PSL 402; BCH 453 or concurrently, or approval of department, or permission of course coordinator. Interdepartmental with the Department of Zoology.
Concepts in advanced cellular physiology, including bioenergetics, transport, regulation of metabolic reactions, and specialized cell functions including nerve, muscle, secretary, epithelial and lymphocyte.

812. Advanced Systems Physiology I
Winter. (6-6) PSL 811 or approval of the course coordinator.
Basic and advanced physiologic concepts of the cardiovascular, renal, central nervous systems.

813. Advanced Systems Physiology II
Spring. (6-6) PSL 812 or approval of the course coordinator.
Basic and advanced physiologic concepts of the endocrine, gastrointestinal and respiratory systems.

825. Cell Structure and Function
Spring. (4-4) BCH 451 or BCH 401 or approval of instructor. Interdepartmental with the departments of Biochemistry, and Microbiology and Public Health. Administered by the Department of Biochemistry.
Molecular basis of structure and function of cells. Fundamental properties of cells: reproduction, dynamic organization, integration, programmed and interactive information transfer considered through original investigations in all five kingdoms.

83A. Systems Neuroscience
Winter of odd-numbered years. 5(4-2) Approval of department. Interdepartmental with the departments of Anatomy, and Pharmacology and Toxicology. Administered by the Department of Anatomy.
Physiology, anatomy and pharmacology of sensory, somatomotor and autonomic neural systems.

841. Advanced Endocrine Physiology and Pharmacology
Fall of odd-numbered years. 5(6-0) PSL 500E or approval of course coordinator. Interdepartmental with the Department of Pharmacology and Toxicology. Basic and advanced physiologic and pharmacologic concepts of general endocrinology, including reproductive endocrinology.

859. Analysis of Hormone Action
Spring. (4-4) ZOL 317, or approval of department. Interdepartmental with and administered by the Department of Zoology.
Discussion of recent work on the molecular and developmental aspects of hormone action in vertebrates and invertebrates. Selected topics to vary from year to year.

865. Advanced Neurobiology
Spring. (4-4) ZOL 827. Interdepartmental with the departments of Anatomy, Psychology, and Zoology. Administered by the Department of Anatomy.
Basic organization, structure and function of neural networks comprising sensory, motor and autonomic systems including examples from invertebrates and vertebrates. Attendance at neuroscience seminar is required.

875. Advanced Physiology Laboratory I
Summer. (4-2-5) PSL 811, PSL 812, PSL 813. Approval of department.
Experiments in animal and human physiology, data collection, analysis and interpretation.

885. Vertebrate Neural Systems I
(PST 885) Winter of odd-numbered years. 5(4-4) ANT 815, ANT 850 recommended. Interdepartmental with the departments of Anatomy, Psychology, and Zoology. Administered by the Department of Anatomy.
Structure and function of major component systems of vertebrate brains, their evolution, ontogeny and comparative analysis in mammals, birds, reptiles, amphibians and fish. Interrelation of behavioral, anatomical and physiological studies.

886. Vertebrate Neural Systems II
(ZOL 888) Spring of odd-numbered years. 5(3-4) ANT 885. Interdepartmental with the departments of Anatomy, Psychology, and Zoology. Administered by the Department of Anatomy.
Continuation of ANT 885. Major component systems of vertebrate brains, their evolution, ontogeny, and comparative analysis in mammals, birds, reptiles, amphibians and fish. Interrelation of behavioral, anatomical, and physiological studies.

890. Readings in Biophysics
(BFY 890) Fall, Winter, Spring, Summer. 3 to 6 credits. Approval of department.
Reading course in special topics adapted to the individual preparation and needs of the student.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

901. Investigating the Lung
Fall of even-numbered years. 3(3-0) Approval of department. Interdepartmental with the departments of Large Animal Clinical Sciences, and Pathology. Administered by the Department of Large Animal Clinical Sciences.
Classic and current concepts of respiratory structure and function in health and disease and mechanisms of lung injury.

919. Cardiovascular System
Fall. 4(3-3) May reenroll for a maximum of 12 credits if different topics are taken. PSL 840. Classical and current literature on physiology of heart, circulation, and microcirculation. Each fall a different one of these three topics will be discussed. Laboratory work illustrates methodology and special procedures.

950. Topics in Physiology
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department.
Classical and modern concepts in selected areas of physiology.

980. Problems
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department. Limited amounts of individual work on selected research problems.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
POLITICAL SCIENCE

Description — Political Science of Courses

College of Social Science

100. American National Government Fall, Winter, Spring, Summer. 3(3-0)
Major aspects of national government with emphasis on the policy-making process.

140. Comparative Politics Fall, Winter, Spring. 3(3-0)
Comparison of political systems in western and non-western nations.

160. International Relations Fall, Winter, Spring, Summer. 3(3-0)
Contemporary world affairs surveyed. The struggle for power, the nation-state system; factors creating harmony and hostility among nations. War and peace in our time.

170. The I sans Fall, Winter, Spring, Summer. 3(3-0)
Introduction to basic contemporary political ideologies; theoretical foundations of democracy, socialism, communism, political elitism, and nationalism. Special attention to ideology underlying contemporary political problems.

200. Introduction to Political Science Fall, Winter, Spring, Summer. 3(3-0)
Acquaints the student with the theories, methods and concepts of political science. Emphasis is on ideology and interests in the political process.

228. Politics of the Western Hemisphere (MTC) Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits if different subtitles are taken. Interdepartmental with and administered by James Madison College.
Developing areas of the western hemisphere: historical development of the societies; contemporary political and economic status; international relationships with other area countries, the United States, the wider world community.

251. Human Values and Politics: On Liberty (S) Fall. 4(4-0)
Liberty as a basic value underlying public issues of life or death; right to live; rights of women and children; slavery, justification of war and terrorism; capital punishment; biological planning.

253. Human Values and Politics: Authority and the Individual (S) Spring. 4(4-0)
Individualism and authority as basic values underlying public issues; free speech; rights of minorities; right of privacy; community norms and individual preferences.

IDC. Introduction to Contemporary China Fall, Winter, Spring. 3(3-0)
For course description, see Interdisciplinary Courses.

290. Methods of Political Research Fall, Winter, Spring, Summer. 3(3-0)
Design and execution of research in political behavior and institutions. Major emphasis on logic underlying various types of political research, on identification of appropriate data sources and field methods.

291. Methods of Political Research Fall, Winter, Spring. 4(4-0) FLS 290.
Analysis of political data, with major emphasis on quantitative techniques.

301. American State Government Fall, Winter, Spring, Summer. 3(3-0)
Major aspects of policy-making process at the state government level. Comparison of state political systems.

302. American Urban Government Fall, Winter, Spring, Summer. 3(3-0)
Urban political process in America. Politics of policymaking for urban functions; politics of intergovernmental relations.

310. Public Bureaucracy in the Policy Process Fall, Winter, Spring, Summer. 3(3-0)
Introduces student to following major areas of public administration: development of administration in the U.S.; theories of administrative organization; principles and methods of administrative management; executive leadership; interpersonal and intergroup relationships; levels of decision making, ethics and responsibility.

313. Public Policy Analysis Fall, Winter, Spring. 3(3-0)
Problems and methods in perception of public problems, determination of goals, generation and evaluation of alternatives, policy choice, planning and program budgeting, political and analytical methods of policymaking compared.

320. The American Judicial Process Fall, Winter, Spring, Summer. 3(3-0)
Analysis of the structure and functions of judicial systems. Organization, administration, and politics of judicial bureaucracy. Roles of judges, juries, counsel, litigants, and interest groups in adjudication processes.

321. Judicial Policymaking Fall, Winter, Spring. 3(3-0)
Consideration of political behavior of judges (especially Justices of Supreme Court) and their policymaking. Focus on policy questions currently important, including civil liberties, national economic policy and interrelationships among governmental units.

324. The American Legislative Process Fall, Winter. 3(3-0)
Nature of legislative process in the United States; organization and procedure of legislative bodies; direct legislation; relationship of legislative branch to other branches of government.

325. The American Executive Process Spring. 3(3-0)
Role of the president, state governors, and municipal executives in the American system of government. Analysis and discussion of constitutional status and powers, selection, administrative responsibilities, legislative and political leadership, accountability and responsibility of chief executives.

330. Government and the Mass Media Spring. 3(3-0) Juniors.
How press, radio, television and journals shape public opinion and government policy; examines questions of influence and linkage, regulation vs. free comment, and the media as an interest group.

331. American Political Parties Fall, Winter, Spring. 3(3-0)
Origins, structure, and functions of political parties. Dynamics of the two-party system. Role of third parties.

332. Interest Groups and Political Movements Fall, Winter. 3(3-0)
Group theory and politics. Growth of organizations and associations to represent the interests of business, labor, agricultural, professional, veterans, and other groups. Internal politics of private associations and their impact on public policy.

333. Political Opinion and Voting Behavior Fall, Winter, Spring. 3(3-0)
Development of political attitudes, ideology, and partisanship and their relation to voting behavior; political participation; comparisons of mass and elite attitudes and behavior, representation of public opinion in the political system.

334. Campaigns and Elections Fall, Winter, Spring. 3(3-0)
Methods of campaigning. Nomination process and recruitment of candidates. Formation of electoral coalitions and analysis of election results. Examination of trends and changes in electoral support.

335. Comparative Parties and Pressure Groups Spring. 3(3-0)
Dynamics of political party and pressure group behavior in selected political systems. Comparative analysis of organization, ideologies, membership, leadership, tactics, power and influence of parties.

336. Political Violence and Revolutions Spring. 3(3-0)
Causes, processes, and outcomes of internal conflict, such as political protest, urban riots, insurrections, terrorism and revolutions; selected empirical studies.

339. Political Socialization Fall. 3(3-0)
The development of political attitudes in children; changes in content over time; the influence of the family, school, peers; group differences in political attitudes; political socialization through the life cycle.

340. Theories of Comparative Politics Fall. 3(3-0)
Alternative methods for comparative cross-cultural analyses of political systems. Political structures, functions, cultures, stability and change. The problem of equivalence.

IDC. Contemporary South Asia
For course description, see Interdisciplinary Courses.

344. The Politics of Developing Areas Spring. 3(3-0)
Process of political growth in emergent societies of the world, stresses of change and flux resulting from economic development in relation to the structure and dynamism of government.