Advanced topics in vibration-rotation theory of polyatomic molecules.


Crystal symmetry, crystal binding, lattice vibrations and specific heat, one-electron theory; effective mass approximation. Deformations, selective states. Ionic crystals, Imperfections in crystals, plastic deformations, transitions, specific heat, specific heat, one-electron theory; Hartree-Fock equation, Brillouin zones.

3(3-0) 937. Molecular Structure and Spectra I
Fall of odd-numbered years. 3(3-0) 937.
Structure and spectra of diatomic molecules.

Winter of even-numbered years.

Advanced topics in vibration-rotation theory of polyatomic molecules.

937. Molecular Structure and Spectra I
Fall of odd-numbered years. 3(3-0) 937.
Structure and spectra of diatomic molecules.

938. Molecular Structure and Spectra II
Winter of even-numbered years.

Advanced topics in vibration-rotation theory of polyatomic molecules.

939. Molecular Structure and Spectra III
Spring of even-numbered years.

Advanced topics in vibration-rotation theory of polyatomic molecules.

940. Advanced Readings in Physics
Winter. 3(3-0) 940.
Experimental methods and instrumentation; nuclear reactions, interference scattering and particle transfer.

941. Solid State Physics I
Fall. 3(3-0) 941.
Crystal symmetry, crystal binding, lattice vibrations and specific heat, one-electron theory; Hartree-Fock equation, Brillouin zones.

942. Solid State Physics II
Winter. 3(3-0) 942.
Effective mass approximation. Exchange and correlation corrections. Theory of conductivity and related effects, metals and semiconductors.

943. Solid State Physics III
Spring. 3(3-0) 943.
Ionic crystals, imperfections in crystals, plastic deformations, color centers. Optical properties.

944. Nuclear Physics I
Fall. 3(3-0) 944.
Nucleon-nucleon scattering, nuclear sizes and shapes, multiple reactions; nuclei model; collective states.

945. Nuclear Physics II
Winter. 3(3-0) 945.
Nuclear reactions, beta decay, radiative capture and particle transfer.

946. Nuclear Physics III
Spring. 3(3-0) 946.
Many-body methods in nuclear physics; Bethe-Goldstone equation; effective interaction; nuclear models.

947. Techniques in Nuclear and Particle Physics
Fall. 3(3-0) 947.
Properties of accelerators and particle beams, passage of radiation through matter, particle detection, pulse electronics, statistical, on-line computation.

948. Accelerator Physics
Winter. 3(3-0) 948, 949.

949. Advanced Readings in Physics
Winter, Spring, Summer. Variable credit.

950. Advanced Topics in Physics
Fall, Winter, Spring. 3(3-0) or 4(4-0)
In any one term this course will be devoted to a single topic, such as advanced quantum theory, quantum electrodynamics, specialized topics in solid state physics, statistical mechanics, relativity theory and cosmology.

951. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Physiology — Descriptions of Courses

952. College of Human Medicine

College of Natural Science

College of Osteopathic Medicine

College of Veterinary Medicine

953. Introductory Physiology
Fall, Spring, Summer. 4(3-2) Sophomore or approval of department.
Survey of the physiology of circulatory system, excretion, nervous system and special senses, digestion, metabolism and endocrinology.

954. Introductory Physiology
Winter, Summer. 4(3-2) 240.
Continuation of 240. Physiology of muscle function and neuro-muscular relationships; excretion, respiration; changes in organ systems in relation to muscular exercise.

955. Principles of Endocrinology
Winter. 4(4-0) Organic chemistry; ZOL 317. Interdepartmental with and administered by the Zoology Department. Hormonal principles, illustrated by experimental observations, in vertebrates and invertebrates. Emphasis on cellular endocrinology. Group discussion, background in organic chemistry and cell biology strongly recommended. Term paper required.

956. Introduction to Pathology and Diagnosis
Fall, Winter, Spring, Summer. 5(5-0) 500A. Introductory Physiology for Medicine
Fall, Winter, Summer. 3(3-0) or 4(3-1) Approval of department.
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.

957. Introductory Biology
Summer. 3(3-0) or 4(3-1) Admission to the professional program in a college of medicine. Classical concepts and problems in physiology which form a basis for clinical physiology training in subsequent terms.

958. Introductory Physiology for Medicine
Fall. 3(3-0) or 4(3-1) Admission to the professional program in a college of medicine. Continuation of 500B.

959. Advanced Mammalian Physiology
Winter. 5(5-0) Approval of department.
Basic aspects of cellular physiology: membrane permeability, ionic equilibrium, kinesthetic phenomena, fluid and electrolyte environment of cells. Neuro-muscular physiology; reflexes, central and autonomic nervous systems; sensory physiology. Endocrine gland system; digestion and metabolism.

960. Advanced Mammalian Physiology
Spring. 6(5-4) 501.
Continuation of 501; reproduction, blood and cardiovascular system, respiration and kidney.
808. Advanced Endocrinology  
Winter. 4(3-0)  Approval of department. 
Current developments on anatomy, physiology, chemistry, and regulation of the major endocrine glands; nervous and hormonal control of reproduction and lactation.

812. Advanced Comparative Physiology  
Fall. 4(3-4)  B S 212 or approval of department. 
A study of organ function in a wide range of groups of animals with emphasis on evolutionary relationships and physiological basis of ecology.

815. Sensory Physiology  
Winter of even-numbered years. 3(2-2)  Not open to students with credit in 383. Approval of department. 
Physiology of sense organs for students in physiology, psychology and others.

819. Kidney Physiology and Electrolyte Metabolism  
Spring. 3(3-0)  502. 
Critical study of the literature on classical and comparative physiology of renal physiology and related aspects of body fluid and electrolyte metabolism.

835. Neurophysiology  
Winter of odd-numbered years. 4(2-4)  Approval of department. 
Functions and properties of the peripheral and central nervous systems.

836. Physical Principles of Biological Systems  
Winter. 3(3-0)  Application of laws and methods of physics to measurement and description of physiological phenomena.

837. Radiobiology  
(450.)  Fall. 3(3-0)  Approval of department. 
Application of radioactive tracer techniques to study of biological functions. Determination of turnover rates and tissue constituents by isotope dilution. Control of radiation hazards.

859. Analysis of Hormone Action  
Spring. 4(4-0)  Z01, 317, or approval of department. Interdepartmental with and administered by the Zoology Department. 
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.

870. Research Problems and Techniques in Pathologic Physiology  
Summer. 3(3-0)  501, 502. 
Description of mechanisms of human disease states. Utilization of research where especially needed. Development of animal models to study these disease states. Lecture demonstrations illustrate methods of producing disease models.

899. Research  
Fall, Winter, Spring, Summer. Variable credit.  Approval of department.

910. Seminar  
Fall, Winter, Spring. 1(1-0)  May re-enroll for a maximum of 2 credits for the Master's program and a maximum of 4 additional credits for either the Ph.D. or the diploma program.

915. Respiratory Physiology  
Winter. 4(3-2)  509, approval of department.

Development of ideas leading to our present state of knowledge in respiration.

919. Cardiovascular System  
Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for a maximum of 9 credits. Approval of department. 
Outstanding literature on physiology of heart, blood vessels and lymphatics, hemodynamics, cardiac output and circulation in special regions. Appropriate methodology discussed. Laboratory work illustrates principles of special procedures.

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

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

999. Research  
Fall, Winter, Spring, Summer. Variable credit.  Approval of department.

POLITICAL SCIENCE  PLS

College of Social Science

100. American National Government  
(300.)  Fall, Winter, Spring, Summer. 3(3-0)  Not open to majors. 
Major aspects of national government with emphasis on the policy-making process.

140. Comparative Politics  
Fall, Winter, Spring. 4(3-0) 
Comparison of political systems in western and non-western nations.

160. International Relations  
(280.)  Fall, Winter, Spring. 4(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 Isms  
Fall, Winter, Spring, Summer. 4(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. 4(3-0)  Acquaints the student with the theories, methods and concepts of political science. Emphasis is on ideology and interests in the political process.

290. Methods of Political Research  
Fall, Winter. 4(3-0)  200. 
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  
Winter, Spring. 4(3-0)  290. 
Analysis of political data, with major emphasis on quantitative techniques.

301. American State Government  
Fall, Winter, Spring, Summer. 4(3-0)  
Major aspects of policy-making processes at the state government level. Comparisons of state political systems.

302. American Urban Government  
Fall, Winter, Spring. 4(3-0)  
Urban political process in America. Politics of policy-making for urban functions; politics of intergovernmental relations.

303. Michigan Government  
(491.)  Spring. 4(3-0)  
How Michigan government is organized and conducted and how policies are made, sources of executive- legislative conflict, politics of taxation; role of the state in local affairs; balance of political forces in the state.

310. Public Bureaucracy in the Policy Process  
Fall, Spring. 4(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  
Winter. 4(3-0)  
Problems and methods in perception of public problems, determination of goals, generation and evaluation of alternatives, policy choices, planning and program budgeting, political and analytical methods of policy making compared.

320. The American Judicial Process  
Fall, Winter, Spring, Summer. 4(3-0)  
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 processes.

321. Judicial Policy Making  
Fall, Spring. 4(3-0)  
Consideration of behavioral theory of judges (especially Justices of Supreme Court) and their policy making. Focus on policy questions currently important, including civil liberties, national economic policy and intergovernmental relations between governmental units.

324. The American Legislative Process  
(434.)  Winter. 4(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  
(425.)  Spring. 4(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.

331. American Political Parties and Elections  
Fall. 4(3-0)  