981. Accelerator Physics
Winter. 3(3-0) 497, 498

984. Advanced Readings in Physics
Fall, Winter, Spring, Summer. Variable credit.

987. 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.

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

PHYSIOLOGY

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

240. 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.

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

323. Physiology, Anatomy, and Hygiene of the Eye
Fall. Summer of even-numbered years. 3(3-2) 240; Elementary Education or Special Education major, or approval of department.
Basic course in anatomy, physiology, and hygiene of the visual system; includes discussion of normal visual functioning and abnormal visual functioning, with methods of correction and education implications.

331. Human Physiology
Winter. 4(3-2) ANT 316; CEM 132, or approval of department.

332. Human Physiology
Spring. 4(3-2) 321.

401. Comparative Physiology I
Fall, Spring. 4(3-4) 240 or B S 212 and CEM 122. Interdepartmental with Department of Zoology.
A comparison of oogenesis, digestion, respiration, and other physiological processes in a wide range of organisms.

402. Comparative Physiology II
Winter. 4(4-0) 401 or approval of department.

Physiology — Descriptions of Courses

416. Physiology of the Cell
Fall. 3(3-0) CEM 242 or 331.
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.

417. Physiology of the Cell
Summer. 4(3-3) 4(4-6) 5 weeks.
This is equivalent to 3 hours of lecture and 2 hours of laboratory on a ten-week basis. Approval of department.
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.

440. Avian Physiology
Spring of even-numbered years. 4(3-3) Approval of department. Interdepartmental and administered jointly with the Poultry Science Department.
A survey of the systemic physiology of birds emphasizing digestion, metabolism, the endocrine, and reproductive systems.

444. Milk Secretion
Winter. 4(3-2) Interdepartmental and administered jointly with the Dairy Science Department.

445. Endocrinology and Reproduction of Farm Animals
Fall. 4(3-2) 240. Interdepartmental and administered jointly with the Dairy Science Department.
Endocrine and reproductive systems are presented with emphasis upon characteristics which can be altered for economic benefit and upon causes, prevention, and treatment of endocrine abnormalities.

480. Special Problems
Fall, Winter, Spring, Summer. 1 to 5 credits. Approval of department.

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

502. Advanced Mammalian Physiology
Fall, Spring. 6(6-4) 501.
Continuation of 501; reproduction, blood and cardiovascular system; respiration and kidney.

508. Advanced Endocrinology
Winter. 3(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 contemporary principles of renal physiology and
related aspects of body fluid and electrolyte metabolism.

835. Neurophysiology
Winter of odd-numbered years, 3(1-4) 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
(430.) Fall, 3(3-0) Approval of department.
Application of radioactive tracer techniques to study of biological function. Determination of turnover rates and tissue constituents by
isotope dilution. Control of radiation hazards.

859. Analysis of Hormone Action
Spring, 4(4-0) ZOL 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(3-4) 501, 502.
Description of mechanisms of human disease states. Stimulation of research where especially
needed. Development of animal models to study these disease states. Lecture demonstrations illustrate methods of producing disease models.

890. 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) 502, approval of department.
Development of ideas leading to our present state of knowledge in respiration.

919. Cardiovascular System
Fall, Winter, Spring, Summer, 4(3-0) 502.
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.

980. 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, 4(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) Not open to majors.
Comparison of political systems in western and non-western nations.

160. International Relations
(260.) Fall, Winter, Spring, Summer, 4(3-0) Not open to majors.
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; historical foundations of democ­

dacy, 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) 290.
Design and execution of research in political behavior and institutions. Major emphasis on logic underlying various types of political re­
search, 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 process at the state government level. Comparison of state political systems.

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

303. Michigan Government
(401.) Spring, 4(3-0)
How Michigan government is organized and conducted and how policies are made; sources of executive-legislative conflict; politics of tax­
tation; 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 admin­
istration in the U.S.; theories of administrative organization, principles and methods of admin­
istrative management, executive leadership, intergovernmental 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 choice. Flu­
ing 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. Constitutional Politics
Winter, Spring, 4(3-0)
The political behavior of Supreme Court justices and their policy making. Focus on Court's role in formulating national policy, executive leadership and interaction relationships among the national, state, and local governments.

322. Constitutional Politics
Spring, Summer, 4(3-0)
Continuation of 321, with focus on public policy pertaining to civil rights and liberties, political freedom and social equality.

324. The American Legislative Process
(424.) Winter, 4(3-0)
Nature of legislative process in the United States; organization and procedure of legisla­
tive 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)
Origins, structure, and functions of political