BIOLOGICAL SCIENCE  B S

College of Natural Science
The content of courses 400, 405, and 420, as well as the research and problems courses 491, 500, and 890, may vary from term to term. Brochures giving detailed information about individual courses are available in the Office of the Assistant Dean for Lifelong Education in the College of Natural Science. These courses are primarily designed for in-service teachers and interested adults and are offered in off-campus locations.

202. Introductory Biology for Non-Science Majors
Fall, Winter, Spring, 4(3-3) 12 credits in general education natural science courses. Concepts, procedures, and perspectives appropriate to developing a basic literacy in biology with emphasis on fundamental biological principles and their relation to world society. Appropriate preparation for pre-service elementary teachers.

210. General Biology
Fall, Spring, 4(4-2) Not open to students with credit in LBS 141. Principles of biological organization: scientific method, biochemistry, cell biology, and evolution.

211. General Biology
Fall, Winter, 4(4-2) CEM 140 or high school chemistry. Not open to students with credit in LBS 242. Principles of biological regulation and integration: genetics, development, and selected physiological topics.

212. General Biology
Winter, Spring, 4(4-2) Not open to students with credit in LBS 141. Principles of biological diversity: taxonomy and systematics, comparative physiology, and ecology.

400. Biological Science for Teachers
Fall, Winter, Spring, 3 to 4 credits. May reenroll for a maximum of 12 credits. Teacher certification with science major or minor. A course for in-service teachers, topics will be selected from actual classroom problems of the participants. Stress will be placed on field laboratory and inquiry teaching.

405. Topics in Biological Science
Fall, Winter, Spring, 1 to 3 credits. May reenroll for a maximum of 6 credits if different topic is taken. Approval of department.

406. Seminar in Biochemistry
Fall, Winter, Spring, 1 to 3 credits. May reenroll for a maximum of 10 credits if different topics are taken. Approval of department.

499. Master’s Thesis Research
Fall, Winter, Spring. Variable credit. Approval of department.

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

420. Seminar in Recent Advances in Biological Science
Fall, Winter, Spring, 1 to 3 credits. May reenroll for a maximum of 6 credits if different topic is taken. Approval of department.

560. Ornithology for Teachers
Summer, 3 credits. A course in biology or approval of department. Not open to Zoology majors. Given at W. K. Kellogg Biological Station. Interdepartmental with and administered by the Department of Zoology. Distribution, breeding cycles, migration, food and feeding habits, voice and other important areas of avian biology. Emphasis on field identification and natural history.

595. Clinical Craniosacral Manipulative Therapy
Spring, 1 to 3 credits. Approval of department. Basic concepts of the craniosacral system, clinical applications.

590. Special Problems in Biomechanics
Fall, Winter, Spring, Summer, 1 to 8 credits. May reenroll for a maximum of 32 credits. Approval of department.

Each student will work under direction of a faculty member on an experimental, theoretical or applied problem.

BIOLOGICAL SCIENCE - Descriptions of Courses

College of Osteopathic Medicine

560. Acupuncture and Other Peripheral Stimulation Therapy
Winter, 1 to 3 credits. Approval of department. Clinical application of traditional Chinese acupuncture and related peripheral stimulation therapies.

561. Clinical Craniosacral Manipulative Therapy
Spring, 1 to 3 credits. Approval of department. Basic concepts of the craniosacral system, clinical applications.

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601. Osteopathic Manipulative Medicine Clerkship

Fall, Winter, Spring, Summer. 6 credits. May reenroll for a maximum of 12 credits. Grade P in all courses offered in terms 1 through 6. Advanced training in the diagnosis of musculoskeletal dysfunctions and application of osteopathic manipulative techniques in patient care.

620. Directed Studies

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 24 credits. Approval of department. Individual or group work on special problems related to biomechanics, neuromusculoskeletal system primarily.

890. Independent Study

Fall, Winter, Spring, Summer. 1 to 8 credits. May reenroll for a maximum of 32 credits. Approval of department. Individual or group work related to biomechanics and/or neuromusculoskeletal system.

BIOMEDICAL ENGINEERING BME

College of Engineering

410. Electronic Instrumentation in Biology and Medicine

Fall. 4(4-0) MTH 112, PHY 258 or approval of instructor. Electronic components and circuits. Physiological measurements. Transduction of physiological events to electrical signals. Detection of physiological events by electrical impedance measurements. Ultrasonic techniques in biomedical systems. Biomedical applications of lasers.

411. Electric Theory of Nerves

Winter of odd-numbered years. 4(4-0) MTH 310; PHY 258.

414. Clinical Instrumentation

Winter of even-numbered years. 3(3-0) BME 410.

424. Materials in Biomedical Engineering

Winter. 3(3-0) PSL 240 or PSL 431 or approval of department. Basics of materials science. Biocompatibility of metals, polymers and ceramics. Internal and external prosthetic materials.

431. Biological Transport Mechanisms

Spring. 3(3-0) MTH 215.
Mechanisms which govern transport or momentum, heat and mass. Application to mathematical description of transport processes in biological systems and to solution of biomedical problems.

481. Tissue Biomechanics

Fall. 3(3-0) ANT 316 or approval of department.
Fundamentals of continuum mechanics in relation to morphological classification of tissue. Mechanical properties of connective and muscle tissue.

499. Independent Study

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 9 credits. Approval of instructor.
Individual reading and research under the supervision of a member of the Biomedical Engineering Committee.

BIOPHYSICS BPY

College of Human Medicine

College of Natural Science

401. Introductory Biophysics: Molecular and Thermal Dynamics

Fall. 3(3-0) One year organic chemistry or biochemistry; 1 year biology, PHY 239, PHY 259, MTH 113, or approval of department.
Sedentary features of biophysics: principles and methods. Structure, function, and organization of biologic molecules; molecular biophysics; thermal biophysics; bioenergetics and photobiology.

402. Introductory Biophysics: Membranes and Electrical Physiology

Fall. 3(3-0) One year organic chemistry or biochemistry, PHY 239, PHY 259; MTH 113 or approval of department.
Sedentary features of biophysics, principles and methods; radiation biophysics; membrane biophysics; biophysical phenomena; neurobiology; and psychophysics.

410. Introduction to the Nervous System

Spring of even-numbered years. 3(3-0) PHY 221, PHY 222.
Neurostructure and function from protozoa (anergic) to mammals normal and abnormal in nature and learned behavior in animals and humans from the cellular level to the intact organism; emergence of mind and consciousness.

499. Independent Study

Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 15 credits. Approval of department.
Undergraduate research under one of our faculty.

804B. Neurosciences Laboratory II

Winter. 4(4-2) PSY 804A. Interdepartmental with the departments of Psychology, Physiology, and Zoology. Administered by the Department of Psychology. Continuation of PSY 804A.

821. Molecular Biophysics

Winter of even-numbered years. 4(4-0) Approval of department.

824. Membrane Biophysics

Winter of odd-numbered years. 4(3-2) Approval of department.
Membrane Biophysics will cover interfacial phenomena in biology and chemistry; structure and function of biomembranes and their theoretical and experimental models for biological membranes; membrane biochemistry. Labs will emphasize biomolecular lipid membrane (BLM) techniques.

826. Cellular Biophysics

Spring of odd-numbered years. 4(4-0) Approval of department.
Basic cell structure and function at the molecular level. Emphasis will be on genetic and molecular controls of cellular systems.

834. Membranes: Natural and Artificial Systems

Spring of odd-numbered years. 2 to 3 credits. May reenroll for a maximum of 3 credits. Approval of department.
Emphasis is placed on the biophysical and biochemical characterization of biological membranes and their theoretical and experimental models. Presentation and discussion by students and staff of recent advances in membrane research.

850. Simpler Systems Approaches to Learning and Memory

Winter of odd-numbered years. 4(4-0) PSY 450 or BPI 827.
Simpler invertebrate and vertebrate, nervous systems which have been or could be useful for electrophysiological and molecular approaches to learning and memory.

865. Advanced Neurobiology

(BIM 855) Spring. 4(4-0) BPI 855. Interdepartmental with the departments of Anatomy, Physiology, 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.

880. Special Topics in Biophysics

Fall, Winter, Spring. Variable credit. May reenroll for a maximum of 15 credits.
Special topics within the five subdivisions of biophysics; structure, organization and function of biological phenomena, sensory perception, and psychophysics and biomechanics.

890. Readings in Biophysics

Fall, Winter, Spring. 3 to 6 credits. Approval of department.
Reading course in special topics adapted to the individual preparation and needs of the student.