

**Descriptions – Biological Science  
of  
Courses**

**440. Man and Environment  
Workshop for Teachers**

Summer. 3 credits. Approval of department. Given at W. K. Kellogg Biological Station.

Discussions and practical work sessions concerning the development of ideas and activities for environmental studies in and outside the classroom. Designed for intermediate and secondary inservice teachers.

**450. Outdoor Environmental Studies**

Summer. 3 credits. May reenroll for a maximum of 9 credits when new topics are given. Teaching experience or approval of department. B S 451 must be taken same summer. Given at W. K. Kellogg Biological Station.

Emphasis on environmental understanding. Planning and developing interdisciplinary program for elementary and intermediate children.

**451. Outdoor Environmental Studies:  
Laboratory**

Summer. 5 credits. May reenroll for a maximum of 15 credits when new topics are given. Teaching experience, B S 450. Given at W. K. Kellogg Biological Station.

Perfecting lesson plans and materials developed in B S 450, while interacting with elementary and intermediate children in four week outdoor activity oriented programs. Emphasis on environmental understanding.

**499. Research**

Fall, Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of director of biological science program and student's adviser.

Undergraduates are invited on an individual basis into research laboratories of faculty in biological departments of the college. After three terms of research, a presentation in thesis form is produced and defended.

**800. Problems in Biological Science**

Fall, Winter, Spring. Variable credit. B.S. degree in biological Science.

**999. Research**

Fall, Winter, Spring. Variable credit. M.S. degree in biological science or equivalent. Research in some phase of biological science, data to form the basis for the thesis required for the doctoral degree in biological science.

**BIOMECHANICS**

**BIM**

**College of Osteopathic Medicine**

**580. Introduction to Athletic  
Medicine**

Fall, Winter. 3(3-0) Approval of department.

Health care of student athlete. Examination and evaluation of physical training sequences for high school athletes. Analyze functional role of musculoskeletal systems; illustrated in various high school sports.

**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.

**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.

**865. Advanced Neurobiology**

Spring. 3(3-0) BPY 827. Interdepartmental with the departments of Biophysics, Physiology, Psychology And Zoology.

Basic organization, structure and function of neural networks comprising sensory, motor, and autonomic systems including examples from invertebrates and vertebrates.

**880. Athletic Medical Systems**

(581.) Fall, Spring. 3(3-0) Bachelor's degree and involvement with secondary school athletics.

Health care systems for athletes in growth years. Physiological and psychological concepts applied to human development, training and care. Injury preventions, emergency medicine and rehabilitation stressed.

**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 238 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. 4(4-0) MTH 215, PHY 288.

Neurophysiology: basic organization, structure, function and electrical activity of neurons. Sub-threshold membrane phenomena: Nernst-Planck equations, constant field membrane model, electrotonus. Membrane action potentials: voltage clamp experiments, Hodgkin-Huxley equations, computer simulation.

**424. Materials in Biomedical  
Engineering**

Winter. 3(3-0) PSL 331 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**

**College of Osteopathic Medicine**

**400H. Honors Work in Biophysics**

Fall, Winter, Spring, Summer. 3 to 6 credits. May reenroll for a maximum of 6 credits. Approval of department.

Independent study and investigation under the direction of a faculty member.

**402. Introductory Biophysics:  
Molecular and Thermal**

Spring. 3(3-0) One year organic chemistry or biochemistry; 1 year biology, PHY 239, PHY 259, MTH 113, or approval of department.

Salient features of biophysics; principles and methods. Structure, function, and organization of biologic molecules; molecular biophysics; thermal biophysics; bioenergetics and photobiology.

**403. Introductory Biophysics:  
Membranes and Electrical**

Fall. 3(3-0) One year organic chemistry or biochemistry, PHY 239, PHY 259; MTH 113 or approval of department.

Salient features of biophysics, principles and methods; radiation biophysics; membrane biophysics; bioelectric phenomena; neurobiology; and psychophysics.

**IDC. Biological Membranes**

For course description see Interdisciplinary Courses.

**480. Special Topics in Biophysics**

Fall, Winter, Spring, Summer. 2 to 4 credits. Approval of department; BPY 402 recommended.

Special topics within five areas of biophysics: structure-function correlation, neurobiophysics, membrane biophysics, molecular biophysics, or theoretical biophysics.

**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.

**804A. Neuroscience Laboratory I**

Winter. 5(2-4) Approval of instructor. Interdepartmental with the departments of Physiology, Psychology and Zoology and 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.