BIOLOGICAL SCIENCE B S

College of Natural Science

The content of courses 400, 405, 420, 440, 450 and 451, as the research and problems courses 499, 590 and 599, may vary from term to term. Brochures giving detailed information about individual courses are available in the Science and Mathematics Teaching Center and the Office of the Assistant Dean for Lifelong Education. These courses are primarily designed for in-service teachers and interested adults and are offered in off-campus locations.

200. Studies in Contemporary Biological Science
Fall, Winter, Spring. 3(3-0) 12 credits in a Department of Natural Science sequence.

Biological topics relating directly to contemporary problems of world society are presented after an introduction to the uses and limitations of science and to the world of biology.

200L. Contemporary Biology Laboratory
Spring. 1(0-3) 200 or concurrently.

Students practice procedures and procedures of science in the laboratory, design and carry out a self-arranged investigation of a biological topic, report and evaluate reports of scientific work.

202. Biological Science for Elementary Teachers
Fall, Winter, Spring. 4(3-3)

Fundamental principles of biology which provide background appropriate for preparation for elementary education teaching.

*210. General Biology
Fall, Spring. 4(4-2) Not open to students with credit in LBC 141.

Concepts relating to basic attributes and diversity of living things.

*211. General Biology
Fall, Winter. 4(4-2) CEM 130 or high school chemistry. Not open to students with credit in LBC 242.

The structure and behavior of cells and their subunits, interactions of tissues, genetics, and the development, history and reactions of organisms.

*212. General Biology
Winter, Spring. 4(4-2) Not open to students with credit in LBC 140.

Continuation of 211.

400. Biological Science for Teachers
Fall, Winter, Spring. Summer. 3 to 4 credits. May re-enroll for a maximum of 12 credits. Teacher certification with science major or minor.

A course for in-service teachers, topics will be selected from usual classroom problems of the participants. Stress will be placed on field, laboratory and inquiry teaching.

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

Presentation of single topics from the biological sciences by senior faculty and guest lecturers. Topics are selected to facilitate development of strong biological science programs in schools.

408. Freshwater Ecology
(415.) Summer. 6 credits. 212 or approval of department. Given at W. K. Kellogg Biological Station. Interdepartmental with the departments of Zoology and Botany and Plant Pathology.

The ecology of freshwater ecosystems, their biotic structure and the functional interrelationships of environmental variables regulating population dynamics, productivity and community structure. Extensive field investigations.

410. Terrestrial Ecology
Summer. 6 credits. 212 or approval of department. Given at W. K. Kellogg Biological Station. Interdepartmental with the departments of Botany and Plant Pathology and Zoology.

Factor determining distribution and abundance. Interrelationships of plants, animals, and environment. Extensive field investigations of several types of terrestrial communities in light of current theory.

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

A series of lectures by senior faculty of topics on the history and development, the most recent advances and the possible future and limits of the Biological Sciences.

430. Introduction to Environmental Science
Fall, Winter. 3(3-0)

Environmental approaches appropriate for teaching kindergarten - 12. Genre will not emphasize teaching specific technical skills, but will cover many areas of environmental sciences awareness, understanding and implementation will be stressed with classroom applications. Approved through Winter term 1979.

431. Environmental Science for Teachers I
Winter, Spring. 4(3-3) 420.

Techniques of using equipment to collect data about the environment such as air, water and soil samples. Also the scientific methods used by professional environmental scientists. Approved through Spring term 1978.

432. Environmental Science for Teachers II
Fall, Spring. 4(3-3) 431.

Continuation of 431. Implementation of the techniques learned in 431 into the school program. Approved through Fall term 1978.

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 re-enroll for a maximum of 9 credits when new topics are given. Teaching experience or approval of department. 451 must be taken some summer. Given at W. K. Kellogg Biological Station. Emphasis on environmental understanding. Planning and developing interdisciplinary programs for elementary and intermediate children.

451. Outdoor Environmental Studies: Laboratory
Summer. 5 credits. May re-enroll for a maximum of 15 credits when new topics are given. Teaching experience. 450. Given at W. K. Kellogg Biological Station.

Perfecting lesson plans and materials developed in 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 re-enroll for a maximum of 12 credits. Approval of director of biological science program and student's adviser.

Undergraduates are required 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.

500. Problems in Biological Science
Fall, Winter, Spring. Variable credit.

B.S. degree in biological science.

599. 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— Descriptions of Courses

College of Osteopathic Medicine

500. Introduction to Athletic Medicine
Fall, Winter. 3(3-0) Approval of department.

Health care of student athletes. 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. 1 to 8 credits. May re-enroll 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 re-enroll for a maximum of 24 credits. Approval of department.

Individual or group work on special problems related to biomechanics, neuromusculoskeletal system primarily.

885. Advanced Neurobiology
Spring. 3(3-0) BPH 825. Interdepartmental with the departments of Biophysics, Physiology, Psychology and Zoology.

Basic organization, structure and function of neuron 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 athletes.

Health care systems for athletes in growth years. Physiological and psychological concepts applied to human development, training and care. Injury prevention, emergency medicine and rehabilitation stressed.
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<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>402.</td>
<td>Introductory Biophysics: Molecular and Thermal</td>
<td>Winter 3(3-0) One year organic chemistry or biochemistry; 1 year biology, PHY 235, 250, MTH 113, or approval of department.</td>
<td>3(3-0)</td>
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<td>403.</td>
<td>Introductory Biophysics: Membranes and Electrical</td>
<td>Spring 3(3-0) One year organic chemistry or biochemistry, PHY 235, 250; MTH 113 or approval of department.</td>
<td>3(3-0)</td>
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<tr>
<td>408.</td>
<td>Special Topics in Biophysics</td>
<td>Fall, Winter, Spring, Summer. 2 to 4 credits. Approval of department; 408 recommended.</td>
<td>2(2-0)</td>
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<td>409.</td>
<td>Independent Study</td>
<td>Fall, Winter, Spring, Summer. 1 to 5 credits. Approval of department. Undergraduate research.</td>
<td>1(1-0)</td>
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<td>412.</td>
<td>Charge Transport and Solid State Processes</td>
<td>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.</td>
<td>3(3-0)</td>
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<td>413.</td>
<td>Tissue Biomechanics</td>
<td>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.</td>
<td>3(3-0)</td>
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<td>427.</td>
<td>Materials in Biomedical Engineering</td>
<td>Winter 3(3-0) PSL 231 or approval of department. Basics of materials science. Biocompatibility of metals, polymers and ceramics. Internal and external prosthetic materials.</td>
<td>3(3-0)</td>
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<td>800.</td>
<td>Membranes; Natural and Artificial</td>
<td>Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll 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.</td>
<td>2(2-0)</td>
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<td>854.</td>
<td>Vertebrate Neural Systems I</td>
<td>Fall of odd-numbered years. 5(3-4) Approval of department: ANT 815 and PHY 835 recommended. Interdepartmental with the departments of Zoology, Physiology and Psychology and administered by the Department of Psychology.</td>
<td>5(3-4)</td>
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<tr>
<td>855.</td>
<td>Vertebrate Neural Systems II</td>
<td>Winter of even-numbered years. 5(3-4) PSY 885. Interdepartmental with the departments of Psychology, Physiology and Zoology and administered by the Department of Zoology. Continuation of 885. Major component systems of vertebrate brains, their evolution, ontogeny and comparative analysis in mammals, birds, amphibians and fish. Interrelation of behavioral, anatomical and physiological studies.</td>
<td>5(3-4)</td>
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<tr>
<td>880.</td>
<td>Readings in Biophysics</td>
<td>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.</td>
<td>3(3-0)</td>
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<td>899.</td>
<td>Research</td>
<td>Fall, Winter, Spring. Variable credits. Approval of department.</td>
<td>1(1-0)</td>
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<td>900.</td>
<td>Biophysics Seminar</td>
<td>Fall, Winter, Spring, Summer. 1 credit. May re-enroll for a maximum of 3 credits. Approval of department.</td>
<td>1(1-0)</td>
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