

**825. Cell Structure and Function**  
Spring. 4(4-0) BCH 451 or BCH 401 or approval of instructor. Interdepartmental with the departments of Microbiology and Public Health, and Physiology.

Molecular basis of structure and function of cells. Fundamental properties of cells: reproduction, dynamic organization, integration, programmed and interactive information transfer considered through original investigations in all five kingdoms.

**831. Physiological Biochemistry I**  
Winter. 3(3-0) BCH 401.

Physiological biochemistry, with emphasis on metabolic interpretation of normal and altered physiological states of the human organism and appropriate animal models.

**832. Physiological Biochemistry II**  
Spring. 3(3-0) BCH 831.

Continuation of BCH 831.

**855. Special Problems**

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.

Consideration of current problems.

**856. Plant Genetics and Molecular Biology**

Spring of even-numbered years. 3(3-0) Approval of department and a course in introductory genetics. Interdepartmental with Genetics and the Department of Botany and Plant Pathology. Administered by the Department of Botany and Plant Pathology.

Recent advances in genetics and molecular biology of higher plants.

**864. Plant Biochemistry**

Spring. 4(4-0) BCH 401, BOT 301 or approval of department. Interdepartmental with the Department of Botany and Plant Pathology.

Metabolism of nitrogen-compounds, carbohydrates, and lipids unique to plants' cell organelles; photosynthesis; photorespiration; dark respiration; cell walls; lectins; nitrogen cycle including nitrogen fixation; sulfur cycle.

**888. Laboratory Rotation**

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 18 credits. Graduate student majors; approval of department.

Participation in research laboratories to learn experimental techniques and research approaches, broaden research experience, and assess research interests prior to selecting a thesis adviser.

**899. Master's Thesis Research**

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

**960. Selected Topics 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.

Topics will be selected from the areas of biochemical genetics, biochemistry of development, biochemical evolution, complex proteins, lipid metabolism, immunochemistry, hormones, control mechanisms and structure of biological macromolecules.

**961. Selected Topics 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.

Topics will be selected from the areas of bioenergetics, bioinstrumentation, complex carbohydrates, mechanisms of enzyme action, natural products, carbohydrate metabolism, mass spectrometry and biochemistry of isoprenoid compounds.

**978. Seminar in Biochemistry**

Fall, Winter, Spring. 1(1-0). May reenroll for a maximum of 8 credits. Approval of department.

**999. Doctoral Dissertation Research**

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

## BIOLOGICAL SCIENCE      B S

### College of Natural Science

The content of courses 400 and 405, as well as the research and problems courses 499, 800 and 899, 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. The 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, Summer. 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, Spring, Summer. 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, Summer. 4(4-2) Not open to students with credit in LBS 140.

Principles of biological diversity: taxonomy and systematics, comparative physiology, and ecology.

**400. Biological Science for Teachers**

Fall, Winter, Spring, Summer. 1 to 6 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, Summer. 1 to 4 credits. May reenroll for a maximum of 8 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.

**418. Field Biology for Teachers**

Fall, Winter, Spring, Summer. 4 credits. Biology course or approval of department.

Field investigation and interpretation of prairie, dune, forest and wetland communities. An ecosystem approach to ecological concepts. Natural history and identification of key species. Field trips required.

**460. 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.

**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, Summer. 1 to 6 credits. May reenroll for a maximum of 18 credits. B.S. degree in biological science.

**805. Outdoor Environmental Studies**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 9 credits if different topics are taken. B S 418 or ZOL 460 or approval of department.

Emphasis on environmental understanding. Development of educational materials through team research and testing. Trials of materials with elementary, middle, secondary school or college students.

**899. Master's Thesis Research**

Fall, Winter, Spring. Variable credit. Approval of department.

## BIOMECHANICS      BIM

### College of Osteopathic Medicine

**500. Basic Concepts in Biomechanics**

Winter. 2(2-0) Admission to a college of medicine or approval of department. Interdepartmental with the College of Osteopathic Medicine.

Basic concepts of biomechanics and their relationship to functional anatomy and osteopathic manipulative therapy.

**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.