452. Biochemistry
Winter. 4(4-0) 451.
Continuation of 451.

499. Research
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 12 credits. Approval of department.
A course designed to give qualified under­graduate students an opportunity to gain experience in biochemical research.

501. Medical Biochemistry
Fall, Winter. 3(3-0) One year organic chemistry, or CEM 242. Fall: Osteopathic Medicine, limited to graduate students in bio­medicine or CEM 242. Basic biochemistry principles and terminology of importance in medical biology.

801. Biochemical Research Methods
Fall. 1(0-3) One year of organic chemistry or CEM 242; BCH 451 or 811, or concurrently. Discussions and demonstrations of selected exper­imental techniques of wide application in biochemistry.

804. Advanced Biochemistry Laboratory
Fall. 2(1-6) Analytical chemistry; 801 and 811, or concurrently; biochemistry majors or approval of department. Experiments to be selected from a representa­tive group illustrating modern biochemical research.

805. Advanced Biochemistry Laboratory
Winter. 3(1-8) 804; 812 concurrently. Experiments to be selected from a representa­tive group illustrating modern biochemical research.

806. Advanced Biochemistry Laboratory
Spring. 3(1-8) 805; 812 concurrently. Special experiments in advanced laboratory techniques.

811. Advanced Biochemistry
Fall. 4(4-0) One year of organic chemistry, one year of physical chemistry, one term of introductory biochemistry, 801 taken previously or concurrently, or approval of department. Limited to graduate students in biochemistry or other students needing a similar professional preparation.
The structure and function of biomolecules, energy transformations and chemical reactions in living cells, regulation of cell reactions, and the replication of living organisms.

812. Advanced Biochemistry
Winter. 4(4-0) 811
Continuation of 811.

813. Advanced Biochemistry
Spring. 4(4-0) 812.
Continuation of 812.

855. Special Problems
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 12 credits. Approval of department.
Consideration of current problems.

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

899. Research
Fall, Spring. 4(4-2)
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 140. The structure and behavior of cells and their subunits, interactions of tissues, genetics, and the development, history and relations of organisms.

*212. General Biology
Winter. Spring. 4(4-3) Not open to stu­dents with credit in LBC 141.

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 actual classroom problems of the participants. Stress will be placed on field, laboratory and inquiry teaching.

408. Freshwater Ecology
(141.) 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.
Factors 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 Advancements in Biological Science
Fall, Winter, Spring, Summer. 2(3-0) May re-enroll for a maximum of 6 credits if different topic is taken. Approval of department.
A series of lectures by senior faculty on topics on the history, development, the most recent advances and the possible future and limits of the Biological Sciences.

421. Seminar on Man, "The Human Organism"
Fall, Winter, Spring, Summer. 2(3-0) Approval of department.
The importance of new discoveries in biology for our understanding of the human organism with emphasis from the fields of genetics, molecular biology, behavior, developmental biology, physiology, and ecology.

499. Research
Fall, Winter, Spring. 2 to 4 credits. May re-enroll for a maximum of 12 credits. Approval of department. 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.

*For prerequisite purposes, the introductory biology sequence in Lyman Briggs College, LBC 140, 141, 242, may be used instead of this sequence.
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.

491. 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 tissues.

825. Basic Neurobiology
Winter of odd-numbered years. 4(3-3)
Approval of department.
A comparative survey of fundamental principles of nervous organization will be undertaken in lectures. Laboratory will emphasize examination of proposed neuromaterial and a demonstration of important neurophysiological phenomena.

826. Cellular Biophysics
Spring. 4(3-2) 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
Fall. 3(3-0) Approval of department.
Membrane Biophysics will cover interfacial phenomena: Nernst-Planck equations, constant field membrane model, electromotive forces, and electrical activity of neurons. Membrane transport potential, voltage clamp experiments, Hodgkin-Huxley equations, computer simulation.

424. Materials in Biomedical Engineering
Winter. 3(3-0) PSL 331 or approval of department.

431. Biological Transport Mechanisms
Fall of even-numbered years. 4(3-2)
Fundamentals of transport processes in biological systems and to solution of biomedical problems.

*Established July 1, 1972.