

**Descriptions – Audiology and Speech Sciences  
of  
Courses**

**832. Speech and Hearing Evaluation and Therapy**

**A. Hearing Handicap**  
Summer. 4(2-2)

A theoretical approach to the study of the aural rehabilitative process.

**B. Cerebral Palsy**  
Spring. 4(3-0)

Etiology, symptomatology, structural and functional consideration of cerebral palsy. Therapeutic procedures for the speech of the cerebral palsied.

**C. Delayed Language Development**  
Winter. 4(3-0)

Evaluative techniques including audiometry, psychometry, and case history as aids to the differential evaluation of delayed language development.

**D. Mental Retardation**  
Summer. 4(3-0)

Language behavior and speech development of the mentally retarded as related to all facets of personal-social development and adjustment.

**E. Stuttering**  
Fall. 4(3-0)

Longitudinal studies of stuttering theories and the therapies accompanying them.

**F. Cleft Palate**  
Summer. 4(3-1)

Etiology, symptomatology, structural and functional consideration of cleft palate. Therapeutic procedures for the speech habilitation of cleft palate individuals.

**833. Specialized Clinical Audiology**

**A. Differential Audiometry**  
Fall. 4(3-0)

Pure tone audiometric tests as an aid to the otologist in evaluating the pathology of hearing loss; including the development of norms. Consideration of nonorganic loss.

**B. Speech Audiometry and Evaluation of Hearing Aids**  
Fall. 4(4-0)

Speech audiometry; principles and methods in the selection of hearing aids; physical characteristics of hearing aids.

**C. Industrial Audiology**  
Spring. 4(2-2)

Evaluation of the role of the audiologist in industry emphasizing identification procedures, damage-risk criteria, measurement and control of noise, conservation procedures, and medicolegal problems.

**D. Advanced Audiological Evaluation**  
Winter. 4(3-1)

Theory, administration and evaluation of selected tests including Bekesy, EDR, EEG, and advanced speech-audiometric tests.

**E. Pediatric Audiology**  
Winter. 4(2-2)

Evaluative procedures including play audiometry, language assessment, and case studies as aids to the differential diagnosis of auditory disorders in children; rehabilitative procedures for the acoustically handicapped child.

**853. Speech Perception: Theory and Measurement**

Spring. 4(4-0) Approval of department.

Evaluation and analysis of various theories of speech perception and their implications for speech and language pathologists, audiologists, and speech and hearing scientists.

**854. Psychophysics and Theories of Audition**

Winter. 4(4-0) Approval of instructor.

Nature of auditory stimuli and the results of psychophysical experimentation in audition.

**874. Speech and Hearing Problems in Public Schools**

Summer. 4(3-0) May reenroll for a maximum of 16 credits.

Graduate seminar in speech and hearing involving problems that arise in relation to speech and hearing therapy in the public schools.

**875A. Clinical Practicum in Speech and Language Pathology**

Fall, Winter, Spring, Summer. 1 credit. ASC 474. May reenroll for a maximum of 8 credits.

Directed diagnostic, therapeutic, and prognostic experience in speech and language pathology.

**875B. Clinical Practicum in Audiology**

Fall, Winter, Spring, Summer. 1 credit. ASC 454. May reenroll for a maximum of 8 credits.

Directed diagnostic, therapeutic and prognostic experience in audiology in various clinical settings.

**876. Communication Disorders: Neuroanatomy-Neurophysiology**

Fall. 4(3-1) Approval of department.

Neuroanatomical and neurophysiological correlates of speech, language, and hearing.

**880A. Algorithms for Speech and Hearing Sciences**

Fall. 4(4-0)

A discussion of useful algorithms applicable to quantification of phenomena related to audiology and speech sciences.

**880B. Acoustic Phonetics**

Winter. 4(2-2) ASC 880A or approval of department.

An analytic study of the acoustics of speech.

**880C. Instruments and Electronics for Audiology and Speech Sciences**

Spring. 4(3-3) ASC 880B or approval of department.

A discussion of the electronic principles and instruments necessary to measure parameters related to hearing and speech processes.

**880D. Experimental Phonetics**

Summer. 4(4-0) ASC 880C or approval of department.

Critical review of the literature in experimental phonetics. Selected papers on acoustic and physiological phonetics and related fields are presented in seminar fashion.

**899. Research**

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

**940. Seminar in Audiology and Speech Sciences**

Spring, Summer. 4(2-0) May reenroll for a maximum of 16 credits.

**990. Special Problems in Audiology and Speech Sciences**

Fall, Winter, Spring, Summer. 1 to 6 credits.

Special projects in audiology and speech sciences.

**999. Research**

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

**BIOCHEMISTRY BCH**

**College of Agriculture and Natural Resources**

**College of Human Medicine**

**College of Natural Science**

**College of Osteopathic Medicine**

**200. Introduction to Biochemistry**

Winter, Summer. 5(5-0) Credit may not be earned in both BCH 200 and BCH 401. General chemistry; one term organic chemistry. Not acceptable for a B.S. degree in biochemistry. Survey of biochemistry emphasizing the major metabolic activities of living organisms.

**400H. Honors Work**

Fall, Winter, Spring. Variable credit. Approval of department. Assigned reading and experimentation.

**401. Basic Biochemistry**

Fall, Spring. 5(5-0) Credit may not be earned in both BCH 200 and BCH 401. One year organic chemistry or CEM 242; not open to biochemistry majors.

A one-term presentation of biochemistry emphasizing structure and function of major biomolecules, metabolism and regulation. Examples used for illustrative purposes will emphasize the mammalian organism.

**404. General Biochemistry Laboratory**

Winter, Spring. 3(1-6) Analytical chemistry; BCH 401 or BCH 451. Experimental aspects of biochemistry.

**412. Clinical Biochemistry**

(363.) Winter, Summer. 4(2-3) BCH 401; CEM 162. Medical Technology majors. Not acceptable for a B.S. degree in biochemistry. Others: approval of department. Quantitative clinical laboratory methods.

**451. Biochemistry**

Fall. 4(4-0) Credit may not be earned in both BCH 401 and BCH 451. One year organic chemistry or CEM 242.

A comprehensive presentation of biochemistry designed for undergraduate biochemistry majors, students of medicine, and other students desiring an intensive treatment of the subject.

**452. Biochemistry**

Winter. 4(4-0) BCH 451. Continuation of BCH 451.

**IDC. Biological Membranes**

For course description see Interdisciplinary Courses.

**499. Research**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll 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**

Winter, Summer. 3(3-0) or 5(5-0) May enroll for a maximum of 5 credits in BCH 501 and BCH 502 combined. Winter: College of Human Medicine students; Summer: College of Osteopathic Medicine students.

Basic biochemical principles and terminology of importance in medical biology.

**502. Medical Biochemistry**  
Fall. 2(2-0) Three credits in BCH 501.  
Not open to students with five credits in BCH 501.  
A continuation of BCH 501.

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

**804. Advanced Biochemistry Laboratory**  
Fall. 3(0-8) Analytical chemistry; BCH 801 and BCH 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(0-8) BCH 804; BCH 812 or concurrently; biochemistry majors or approval of department.  
Experiments to be selected from a representative group illustrating modern biochemical research.

**806. Advanced Biochemistry Laboratory**  
Spring. 3(0-8) BCH 805; BCH 813 or concurrently; biochemistry majors or approval of department.  
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, BCH 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) BCH 811.  
Continuation of BCH 811.

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

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

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

**952. Plant Physiology and Biochemistry I**  
Winter of odd-numbered years. 3(3-0) Approval of department. Interdepartmental with the Department of Botany and Plant Pathology.  
Selected topics concerning photosynthesis and related processes.

**955. Plant Physiology and Biochemistry II**  
Winter of even-numbered years. 3(3-0) Approval of department. Interdepartmental with the Department of Botany and Plant Pathology.  
Metabolic pathways of unique significance to plants.

**960. Selected Topics in Biochemistry**  
Fall, Winter, Spring, Summer. 1(1-0) or 2(2-0) May reenroll for a maximum of 6 credits if a different topic is 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, Summer. 1(1-0) or 2(2-0) May reenroll for a maximum of 6 credits if a different topic is 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. 0 or 1(1-0).  
Presentation and discussion of reports by graduate students on biochemical topics of current interest.

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

## BIOLOGICAL SCIENCE B S

### College of Natural Science

The content of courses 400, 405, 420, 440, 450 and 451, as well as the research and problems courses 499, 800 and 999, 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**  
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 processes and procedures of science in the laboratory, design and carry out a self-selected laboratory 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.

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

**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 relations 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 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 3 credits. May reenroll 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**  
Summer. 6 credits. B S 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. B S 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. Interrelationship 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, Summer. 1 to 3 credits. May reenroll 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, development, the most recent advances and the possible future and limits of the Biological Sciences.