

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

801. Advanced Study of Articulatory Behavior

Fall. 4(3-1) Approval of department.
Theoretical and pragmatic implications of the interrelationships of articulatory behavior and language production, especially as related to investigating procedures and results.

831. Speech and Hearing Problems of Adults

A. NEUROPATHOLOGIES OF SPEECH
Winter. 4(3-0)

Neuropathology, symptomatology, and speech and language rehabilitation of adults.

B. VOICE DISORDERS
Spring. 4(3-0)

Etiology, symptomatology, and therapeutic procedures for disorders of voice. Speech pathologist and audiologist in relation to other disciplines in the rehabilitation of adults with voice disorders.

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(2-0)

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 medico-legal problems.

D. ADVANCED AUDIOLOGICAL EVALUATION

Winter. 4(3-1)

Theory, administration and evaluation of selected tests including Bekezy, 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; habilitative 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

(854B.) Summer. 4(3-0)

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 re-enroll 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. 474. May re-enroll 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. 454. May re-enroll 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) 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) 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(2-0) 880C or approval of department.

Critical review of the literature in experimental phonetics with special reference to the historical development of the field and subsequent experimentation in physiological and acoustical phonetics.

899. Research

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

940. Seminar in Audiology and Speech Sciences

Spring, Summer. 4(2-0) May re-enroll for 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 200 and 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.

363. Clinical Biochemistry

Spring. 3(2-3) 401; CEM 162. Medical Technology majors. Not acceptable for a B.S. degree in biochemistry. Others: approval of department.

Quantitative clinical laboratory methods.

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 200 and 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; 401 or 451.

Experimental aspects of biochemistry.

451. Biochemistry

Fall. 4(4-0) Credit may not be earned in both 401 and 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) 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 students; Winter: Human Medicine students. Others: approval of department.
Basic biochemical 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. 3(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(1-6) 804; 812 concurrently.
Experiments to be selected from a representative group illustrating modern biochemical research.
- 806. Advanced Biochemistry Laboratory**
Spring. 3(1-6) 805; 813 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.

- 952. Plant Physiology and Biochemistry I**
Winter of odd-numbered years. 3(3-0)
Approval of department. Interdepartmental with the Botany and Plant Pathology Department.
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 Botany and Plant Pathology Department.
Metabolic pathways of unique significance to plants.
- 960. Selected Topics in Biochemistry**
Fall, Winter, Spring, Summer. 1(1-0) or 2(2-0) May re-enroll 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 re-enroll 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

- 200. Studies in Contemporary Biological Science**
Spring. 4(3-3) 12 credits in a Department of Natural Science sequence.
Biological topics impacting contemporary, American and world society are studied in the context of major biological themes and individual laboratory investigation of a self-chosen topic.
- 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)
Concepts relating to basic attributes and diversity of living things.

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

- *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(4-2) Not open to students with credit in LBC 141.
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 actual classroom problems of the participants. Stress will be placed on field, laboratory and inquiry teaching.
- 408. Freshwater Ecology**
(413.) 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. 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. 3(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 of 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. 3(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 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.

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