

372. Speech Pathology I

Fall, Winter. 5(3-0) 276, 277.

Etiology, symptomatology, and rationale of therapy for speech and language problems.

373. Clinical Procedures in Speech Pathology and Audiology

Winter, Spring. 4(2-2) 2.00 grade-point average in 277 and 372 or approval of department.

Principles underlying the clinical interview and client relationships essential to diagnosis and therapy. Procedures in obtaining, recording, and evaluating test results and therapeutic methods.

444. Oral Language of Urban Areas

Winter, Summer. 3(3-0)

Concentration in the characteristics of language and human communication as these relate to studies and practices of those involved in urban affairs.

454. Audiology I

Fall, Spring. 5(4-1) 276, 277.

Fundamental aspects of hearing; nature, testing and rehabilitation.

460. Audiology II

Winter, Summer. 5(3-0) 454 or approval of department.

Theory and methodology in the teaching of lip-reading and auditory training to the acoustically handicapped.

470. Speech Correction for Teachers

Fall, Winter, Spring, Summer. 3(3-0)

Juniors. Not open to speech pathology and audiology majors.

Meeting needs of the speech handicapped child in classroom.

474. Clinical Practice in Speech Correction

Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for credit. Six credits required for certification. No more than 2 credits may be taken during the preprofessional program. 372.

476. Speech Pathology II: Diagnostics

(473.) Fall, Winter, Spring, Summer. 5(3-2) 474 or approval of department.

Test procedures and analysis; supervised clinical experience in language and speech evaluations and report writing.

477. Methods in Public School Speech and Hearing Therapy

Fall, Winter, Spring. 4(3-4) 372.

Must be taken prior to term of student teaching. Administration and organization, procedures and materials in public school speech and hearing therapy.

499. Independent Study

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

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
Summer. 4(3-0)

Longitudinal studies of stuttering theories and the therapies accompanying them.

F. CLEFT PALATE
Fall. 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 Bekey, 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

(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.

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

(875C.) 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

(875A.) 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

(875B.) 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

163. Biochemistry Laboratory

Spring. 2(0-6) Honors section of CEM 162, and approval of department.

Experimental aspects of biochemistry for biochemistry majors with an honors chemistry background.

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. Primarily for Medical Technology majors; not acceptable for a B.S. degree in biochemistry. 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
 Fall, Winter, Spring. 3(1-6) Analytical chemistry; 401 or 451. Experimental aspects of biochemistry.

451. Biochemistry
 Fall, Winter. 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. In the winter term, students in the College of Human Medicine are given enrollment priority and the course emphasizes examples from the mammalian organism in contrast to the more cellular approach used in the fall term.

452. Biochemistry
 Winter, Spring. 4(4-0) 451.

Continuation of 451. In the spring term, students in the College of Human Medicine are given enrollment priority and the course emphasizes examples from the mammalian organism in contrast to the more cellular approach used in the winter term.

478. Senior Seminar
 Fall, Winter, Spring. 0 or 1(1-0). May re-enroll for a maximum of 2 credits. Undergraduate biochemistry major or approval of department.

Discussion, by undergraduate students and staff, of recent advances in biochemistry.

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.

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

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, Winter. 4(4-2) Concepts relating to basic attributes and diversity of living things.

***211. General Biology**
 Winter, Spring. 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**
 Fall, Spring. 4(4-2) Not open to students with credit in LBC 141. Continuation of 211.

401. Biological Science for Teachers
 Fall. 4(3-3) Bachelor's degree.

Designed to show the nature of biological science in both its empirical and conceptual aspects. Emphasis is placed on life processes. The theories of the gene and of evolution are stressed. Macromorphology and micromorphology are covered as well as the topics of reproduction, metabolism, physiology, nutrition, enzymes, taxonomy and ecology. Quantitative developments are included whenever possible.

402. Biological Science for Teachers
 Fall, Winter. 4(3-3) 401. Continuation of 401.

403. Biological Science for Teachers
 Spring. 4(3-3) 402. Continuation of 402.

410. Biotic and Environmental Relationships
 Summer. 6 credits. Approval of department. Given at W. K. Kellogg Biological Station.

Interrelationship of the biota with its environment. Factors determining distribution and abundance. Interaction of organisms.

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.

*For prerequisite purposes, the introductory biology sequence in Lyman Briggs College, L8C, 140, 141, 242, may be used instead of this sequence.