831 Physiological Biochemistry
Spring of even years. 4(4-0) P:NM: BMB 401 or BMB 462. SA: BCH 831
Mammalian physiological biochemistry. Metabolic interpretation of normal and altered physiological states of humans and other mammals.

855 Special Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department. SA: BCH 855
Laboratory or library research on special problems in biochemistry.

856 Plant Molecular Biology
Spring. 3(3-0) Interdepartmental with Botany and Plant Pathology. Administered by Department of Botany and Plant Pathology. P:NM: (ZOL 341)
Recent advances in genetics and molecular biology of higher plants.

864 Plant Biochemistry
Spring. 3(3-0) Interdepartmental with Botany and Plant Pathology. P:NM: BMB 401 or BMB 462. SA: BCH 864
Biochemistry unique to photosynthetic organisms. Photosynthetic and respiratory electron transport, nitrogen fixation, carbon dioxide fixation, lipid metabolism, carbon partitioning, cell walls, biosynthesis of plant hormones.

888 Laboratory Rotation
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to graduate students in Biochemistry. SA: BCH 888
Participation in research laboratories to learn experimental techniques and approaches, broaden research experience, and assess research interests prior to selecting a thesis or dissertation adviser.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to master's students in Biochemistry. SA: BCH 899
Master's thesis research.

960 Selected Topics in Biochemistry I
Fall, Spring. 1 to 2 credits. A student may earn a maximum of 7 credits in all enrollments for this course. R: Open only to graduate students in Biochemistry or approval of department. SA: BCH 960
Contemporary biochemical research topics in such areas as biochemical genetics, biochemistry of development, biochemical evolution, complex proteins, or lipid metabolism.

961 Selected Topics in Biochemistry II
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 7 credits in all enrollments for this course. R: Open only to graduate students in the Department of Biochemistry. SA: BCH 961
Contemporary biochemical research topics in such areas as bioenergetics, bioinstrumentation, complex carbohydrates, mass spectrometry, biomolecular spectroscopy or computer-based modeling and analysis of DNA and protein sequences and structures.

978 Seminar in Biochemistry
Fall, Spring. 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to graduate students in Biochemistry. SA: BCH 978
Seminars on biochemistry research mainly with visiting scientists.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in Biochemistry. SA: BCH 999
Doctoral dissertation research.

BIOLOGICAL SCIENCE BS

College of Natural Science

110 Organisms and Populations
Fall, Spring. 4(3-3) Not open to students with credit in LBS 144 or LBS 148H.
Biological diversity and organismal biology. Principles of evolution, population biology, and community structure.

111 Cells and Molecules
Fall, Spring, Summer. 3(3-0) P:M: (CEM 141 or CEM 151 or LBS 171 or CEM 181H) Not open to students with credit in LBS 145 or LBS 149H.
Macromolecular synthesis; energy metabolism; molecular aspects of development; principles of genetics.

111L Cell and Molecular Biology Laboratory
Fall, Spring, Summer. 2(1-3) Interdepartmental with Microbiology and Molecular Genetics; Botany and Plant Pathology; Zoology. P:M: (BS111 or concurrently) Not open to students with credit in LBS 159H.
Principles and applications of common techniques used in cell and molecular biology.

148H Honors Organismal Biology
Fall. 3(3-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. R: Honors College student or approval of school. Not open to students with credit in BS 110 or LBS 144.
Diversity and basic properties of organisms, with emphasis on genetic principles, ecological interactions, and the evolutionary process. Historical approach to knowledge discovery.

149H Honors Cell and Molecular Biology
Spring. 3(3-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. P:M: (CEM 141 or concurrently or CEM 151 or concurrently or CEM 181H or concurrently or LBS 171 or concurrently) R: Honors College student or approval of school. Not open to students with credit in BS 111 or LBS 145.
Exploration of the physicochemical and molecular organization of cells as the unifying framework for genetics, evolution, and the social relevance of biology.

158H Honors Organismal Biology Laboratory
Fall. 2(1-3) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. Not open to students with credit in BS 110 or LBS 144. C: LBS 148H concurrently.
Basic procedures used by organismal biologists, including experimental design and statistical methods. Development and implementation of research projects to test hypotheses in genetics, ecology, and evolution.

159H Honors Cell and Molecular Biology Laboratory
Spring. 2(1-3) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. Not open to students with credit in BS 111L or LBS 145. C: LBS 149H concurrently.
Basic techniques of cellular and molecular biology including experimental design and hypothesis formulation. Student-initiated projects to test hypothesis-driven projects in biochemistry, molecular biology or genetics.

BIOMEDICAL ENGINEERING BME

Department of Materials Science and Mechanics
College of Engineering

424 Biomaterials and Biocompatibility
Spring of even years. 3(3-0) Interdepartmental with Materials Science and Mechanics. Administered by Department of Materials Science and Mechanics. P:M: (PSL 250 and MSM 250)
Materials science of human implants. Design requirements imposed by the body's milieu and the need to protect the body.

441 Tissue Mechanics
Spring of odd years. 3(3-0) Interdepartmental with Materials Science and Mechanics. Administered by Department of Materials Science and Mechanics. P:M: (MSM 211)
Application of solid mechanics to understanding mechanical responses of biological tissues. Microstructure and biological function for soft and hard connective tissues and muscle.

442 Biodynamics
Fall. 3(2-2) Interdepartmental with Materials Science and Mechanics. Administered by Department of Materials Science and Mechanics. P:M: (MSM 306) R: Open only to students in the Engineering Mechanics major.
Fundamentals of motion analysis of human movement and its application to the study of function and dysfunction of the musculoskeletal system. Solution methods of the inverse dynamics problem.