

BIOC GRADUATE COURSES

BIOC-B 501 Integrated Biochemistry (3-4.5 cr.) P: Undergraduate biochemistry (equivalent to C483 or C484) or consent of instructor. Basic principles and methodologies of biochemistry; essentials of macromolecular biosynthesis; mechanism-based examination of biochemical aspects of cell biology; material is presented with an integrative approach designed to illustrate the interrelationship of biochemical processes.

BIOC-B 502 Analysis of Biochemical Literature (1.5 cr.) P: Concurrent enrollment in B501 or consent of instructor. Critical evaluation of the biochemical literature, using selected papers as examples; development of written and oral communication skills in the context of literature analysis.

BIOC-B 506 Integrated Biochemistry II (1.5 cr.) P: B501 or permission of the instructor. Mechanism-based examination of biochemical aspects of control of protein folding and function, signal transduction, and systems biology.

BIOC-B 530 Macromolecular Structure and Function (1.5 cr.) P: B 501 or undergraduate biochemistry (equivalent to C483 or C484), one semester of undergraduate organic chemistry (equivalent to C341), or consent of instructor. Undergraduate (bio)physical chemistry (equivalent to C481 or C361) is strongly recommended. Stabilizing forces in macromolecular structures; protein structure analysis; nucleic acid structure and probing; structure determination by nmr and X-ray crystallographic analysis.

BIOC-B 531 Biomolecular Analysis and Interaction (1.5 cr.) P: B501 or undergraduate biochemistry (equivalent to C483 or C484), one semester of undergraduate organic chemistry (equivalent to C341), and B530 or consent of instructor. Undergraduate (bio)physical chemistry (equivalent to C481 or C361) is strongly recommended. Principles of inter- and intra-molecular interactions; thermodynamic and kinetic analysis of complex binding; experimental methods for analysis of macromolecular structure and binding.

BIOC-B 540 Fundamentals of Biochemical Catalysis (1.5 cr.) P: Undergraduate organic chemistry (equivalent to C342), undergraduate biochemistry (equivalent to C483 or C484), or consent of instructor. Theory and analysis of biochemical catalysis; enzyme kinetics and inhibition; intermediate detection; protein modification and bioorthogonal chemistry.

BIOC-B 541 Enzyme Mechanisms (1.5 cr.) P: Undergraduate organic, chemistry (equivalent to C342), undergraduate biochemistry (equivalent to C483 or C484), B540 or consent of instructor. Theory and analysis of biochemical catalysis; post-translational modifying enzymes; redox cofactors; natural product biosynthesis; P450 mechanism; proteomics.

BIOC-B 580 Introduction to Biochemical Research (3 cr.) P: Graduate standing. Objectives and techniques of biochemical research.

BIOC-B 600 Seminar in Biochemistry (1 cr.) P: B502 or consent of instructor. Advanced critical analysis of the current scientific literature and scientific presentations. Attendance and participation in the weekly biochemistry program seminar series is required.

BIOC-B 601 Advanced Nucleic Acid Biochemistry (1.5 cr.) P: B501 or consent of instructor. Mechanistic analysis of nucleic acid metabolism; specificity and role of DNA polymerases and repair pathways; DNA replication and recombination mechanisms; RNA structural motifs and physical properties; RNA synthesis and processing in gene expression; catalytic RNA molecules; applications of RNA molecules.

BIOC-B 602 Advanced Protein Biosynthesis and Processing (1.5 cr.) P: B501 or consent of instructor. Detailed analysis of protein synthesis, post-translational modification, and macromolecular assembly, including the role these modifications play in mature protein function, biosynthesis, structure, function, and analysis of complex oligosaccharides.

BIOC-B 603 Advanced Macromolecular Structure and Interactions (1.5 cr.) P: B503 or consent of instructor. Supplements and extends B503: emphasis on stability and folding mechanisms of proteins and nucleic acids and detailed thermodynamic analysis of binding interactions.

BIOC-B 604 Structural Methods (3 cr.) P: B503 or consent of instructor. In biology, structure and function are intimately connected. The aim of this class is to demystify macromolecular structure determination. We will examine X-ray crystallography and EM image reconstruction in detail, solving structures and studying the theoretical underpinnings of each technique. Class will be computer and mathematics intensive.

BIOC-B 605 Structure and Function of Biological Membranes (1.5 cr.) P: B501, B503, or consent of instructor. Biochemistry and biophysics of lipids, membranes and membrane proteins; fundamentals of membrane transport; interfacial catalysis; transmembrane signal transduction.

BIOC-B 680 Special Topics in Biochemistry (1.5-3 cr.) P: Consent of instructor. Topics vary yearly and include the following: physico-chemical techniques in the study of macromolecules; experimental methods in enzymology; organic chemistry of enzymatic reactions and enzyme models; conformational properties and macromolecules. Can be retaken for credit.

BIOC-B 880 Research: Biochemistry (arr. cr.) This course is eligible for a deferred grade.

BIOC-B 507 Biophysical Analysis of Macromolecules (1.5 cr.) P: B501 and B531 or permission of the instructor Theory, application and limitations of available instrumentation commonly used to solve biochemical problems; hands-on exposure to instruments available in the Physical Biochemistry Instrumentation Facility.

BIOC-B 511 Duplicating and Expressing the Genome (3 cr.) P: Graduate student status. Attain an advanced level of understanding of the molecular basis of DNA replication and its control; comprehend the molecular basis of gene expression and its control; understand the interplay between chromatin and nuclear structure and replication and transcription; evaluate primary literature in this field.