

BIOCHEMISTRY & MOLECULAR BIOLOGY (BMB)

BMB 801 FUNDAMENTALS OF BIOMOLECULES 3 Credit Hours

Introduction to concepts in the biochemistry of macromolecules, including the structure and function of proteins and nucleic acids, sugars and lipids. Basic material related to acid-base, buffers, intermolecular interactions, and enzymology lead to discussion of synthesis, folding, and degradation of proteins. Basic information on the structure of DNA and RNA leads to discussion of the mechanisms of replication, repair, recombination, restriction, transcription-translation and regulation of chromatin structure/gene expression.

Prerequisite: all IGPBS students or Pharm Sci PhD students Graduate students from certain programs

Typically Offered: FALL/SPR

BMB 815 METABOLISM 2 Credit Hours

The objective of BIOC 815 is to teach the basics of metabolism including carbohydrate, amino acid, lipid, and integrated metabolism to first year graduate students in order to help prepare them for the comprehensive exam and their careers in biochemistry or other biomedical disciplines. The 2 credit course will build upon the concept of enzymes and equilibrium covered in the IPBS series to provide an understanding of metabolism important in modern biochemistry and other biomedical sciences.

Typically Offered: SPRING

BMB 840 SEMINAR WITH DISCUSSION 2 Credit Hours

The objective of BMB 840 is to provide a broad basis of exposure to topics in Biochemistry and Molecular Biology, and support understanding of the topics presented. This 2-credit course fulfills the requirement of Graduate Studies that students be involved in the seminar series of their home department. By providing facilitated discussion immediately following the seminars, students will achieve a deeper comprehension of the topics covered in the seminar series. Pre-req: Enrollment in the M.S. program in Biochemistry and Molecular Biology

Typically Offered: FALL/SPR

BMB 843 LABORATORY TRAINING IN BIOCHEMISTRY & MOLECULAR BIOLOGY: BASIC 1-3 Credit Hours

The objective of this course is to provide students with an introduction to bench science in Biochemistry and molecular Biology. This variable credit course will prepare students for a career or further graduate coursework. The student will be hosted in a research laboratory, and will participate in on-going projects in that laboratory. Because this is a laboratory course, and there are very limited outside expectations of study and/or homework, contact hours are 4 hours/credit hour.

Typically Offered: FALL/SP/SU

BMB 844 ADVANCED LABORATORY TRAINING IN BIOCHEMISTRY & MOLECULAR BIOLOGY 1-10 Credit Hours

The objective of this course is to provide students with an advanced experience of bench science in biochemistry and molecular biology. This will prepare them for a career or further graduate coursework in the subject. The student will be hosted in a research laboratory and will participate in ongoing projects in that laboratory. Since this is a laboratory course, and there are very limited outside expectations of study and/or homework, contact hours are 4 hours/credit hour during the fall and spring. Contact hours/credit hour are more during the summer sessions since these are condensed sections of the course.

Prerequisite: 3 credit hours BMB 843 Laboratory Training in Biochemistry Molecular Biology: Basic

Typically Offered: FALL/SP/SU

BMB 880 PRINCIPLES AND METHODOLOGIES IN CANCER RESEARCH 2-3 Credit Hours

A survey of the biology and biochemical mechanisms underlying cancer development, prevention, and therapy.

Prerequisite: Permission of instructor.

Cross List: CRGP 880, PAMM 880, PHSC 880.

Typically Offered: FALL/SPR

BMB 896 RSCH OTHER THAN THESIS 1-8 Credit Hours

Student research that is clearly distinct from ongoing or planned thesis/dissertation work, or research/lab rotations performed prior to selecting a permanent advisor or supervisor.

Typically Offered: FALL/SP/SU

BMB 899 MASTERS THESIS 1-9 Credit Hours

Independent student research related to the masters thesis.

Typically Offered: FALL/SP/SU

BMB 915 PROTEINS & NUCLEIC ACID 3 Credit Hours

The objective of this course is to teach advanced topics regarding nucleic acid/protein structure, function, and experimental methodologies to first-year graduate students. The other major goal of this course to foster application of fundamental biochemistry concepts to understand papers from the relevant scientific literature and to promote active and critical scientific discussion. This 3 credit course will provide in-dept material in the areas of nucleic acid and protein function that are not provided in the IGPBS curriculum.

Typically Offered: SPRING

BMB 919 MICROBIOME 1 Credit Hour

The objective of BMB 919 is to foster a literature-based appreciation of the impact of the microbiome upon health and homeostasis. This 1-credit course will be entirely based on articles from the scientific literature chosen on the basis of merit, interest of the participants, and coverage of the breadth of this rapidly-evolving topic. Analysis of scientific articles and critical thinking are skills that will be emphasized.

Prerequisite: IPBS 801, 802 and 803 or instructor permission

Instructor: Laurey Steinke, PhD

Typically Offered: SUMMER

BMB 921 BIOPHYSICAL CHEMISTRY 3 Credit Hours

The biophysical chemistry of nucleic acids and proteins, including the study of these molecules using NMR, calorimetry and fluorescence.

Prerequisite: Permission of instructor.

Cross List: PHSC 921.

Typically Offered: SPRING

BMB 940 SPECIAL TOPICS 1-3 Credit Hours

Presented at intervals depending upon the interest of the faculty or the request of students. A course description with its prerequisites is announced at the time the course is offered.

Prerequisite: BMB 815 and BMB 915

Typically Offered: SUM/FALL

BMB 970 SEMINAR 1 Credit Hour

The seminar program includes participation and presentations by graduate students, faculty and visiting biochemists. Topics presented are on the speakers own research or are reviews of current advances in the biochemistry and related areas.

Typically Offered: FALL/SPR

BMB 975 CRITICAL THINKING AND APPLICATIONS IN BIOCHEMISTRY AND MOLECULAR BIOLOGY 3 Credit Hours

The goal of BIOC 975 is to teach advanced topics in biochemistry and molecular biology second-year graduate students. The main purpose of this course is to provide coverage of important topics in biochemistry and molecular biology, while fostering discussion and critical thinking of conceptual and technological issues. Students are expected to significantly enhance their familiarity with the scientific literature in a broad range of topics and receive instruction and direction in developing critical thinking. This 3 h, 3-credit course will provide in-depth material related to focus topics such as vesicular transport, advanced techniques in microscopy, protein structure-function, mechanisms of autophagy, various types of cell-cell junctions, cancer immunology and stem cells, signaling, and cancer and exosomes. Pre-requisites: IPBS 801, IPBS 802, IPBS 803 or permission to take the course.

Typically Offered: SUM/FALL

BMB 980 CRITICAL THINKING IN ADVANCED METABOLISM 1 Credit Hour

The purpose of this one-credit-hour course is to prepare graduate students to apply critical thinking to a range of topics in metabolism. This course focuses on critical evaluation of recent research articles and advanced topics on carbohydrate, amino acid, and fatty acid metabolism as well as disorders related to these metabolisms. This unit provides cutting-edge (classic or high impact research and review articles) material about metabolism and will teach students to apply critical thinking skills to analyze data and experimental designs.

Instructor: Course Director: Moorthy P. Ponnusamy, PhD, Associate Professor, Department of Biochemistry and Molecular Biology, College of Medicine, Office: DRC1 7050, Phone: 402-559-1170, Email: mpalanim@unmc.edu. Instructors: Maneesh Jain, PhD, Professor, Department of Biochemistry and Molecular Biology, College of Medicine, Office: DRC1 7048, Phone: 402-559-7667, Email: mjain@unmc.edu; Sarathy Seshacharyulu, PhD, Assistant Professor, Department of Biochemistry and Molecular Biology, College of Medicine, Office: DRC1 7051, Phone: 402-559-7754, Email: p.seshacharyulu@unmc.edu

Typically Offered: SPRING

BMB 999 DOCTORAL DISSERTATION 1-15 Credit Hours

Independent student research related to the PhD dissertation. This course may be utilized before or after successful completion of the comprehensive exam.

Typically Offered: FALL/SP/SU