

BIOCHEMISTRY & MOLECULAR BIOL (GBCH)

GBCH 6010 Graduate Biochemistry (4)

The course objectives are to provide graduate level exposure to basic biochemistry, including the structure and function of proteins, membranes and lipids, the basis of enzyme function and metabolic cycles, glycoconjugate biochemistry, and DNA/RNA structure and function. Grades are assigned based on three exams given over the semester.

GBCH 6020 Biochemistry and Molecular Biology Seminar (1)

Students are required to attend and participate in the seminars given by the Department of Biochemistry and Molecular Biology.

GBCH 6110 Basic Medical Biochemistry (3)

The course focuses on topics, mechanisms, and analyses that are most relevant to human health and disease, including biomolecule structure and function, gene regulation, and metabolism in cancer, diabetes, and heart disease. Instructional methods include those currently employed in the Tulane Medical School, such as the flipped classroom and team-based learning. Students will be provided an array of learning aids, including instructional videos.

GBCH 7090 Seminar (1)

GBCH 7100 Seminar (1)

GBCH 7110 Selected Topics (1-4)

GBCH 7120 Special Problems (1-6)

GBCH 7130 Selected Topics (1-4)

GBCH 7140 Selected Topics (1-3)

GBCH 7150 Tutorial Topics (1-6)

GBCH 7160 Tutorial Topics (1-6)

GBCH 7170 Principles of Genetics (4)

This four credit-course on the Principle of Genetics textbook by Griffiths et al that proceed from the basic experiments that established the principles of genetic behavior and gene regulation to the molecular genetics of higher organisms. The course is intended to fill a gap of knowledge in our curriculum for molecular genetics that nicely show the foundations of current studies using the broad range of organisms that are still being used as model organisms. An increasing number of students lack this information which we consider vital for their current work and their future studies. We use the textbook by Griffiths et al that is a favorite since it moves from genetics to a greater focus on molecular genetics.

GBCH 7190 Seminar Presentation (2)

GBCH 7230 Introduction to Bioinformatics (3)

This three credit course on Introduction to Bioinformatics provides students with essential concepts, tools, and databases on integrating computer science with biology and medicine to access, format, manage, visualize, and analyze biological data, especially for genomics, transcriptomics, metagenomics, and epigenomics. A major focus is to help students gain detailed knowledge and hands-on computer skills on next-generation sequencing (NGS) data analyses, particularly DNaseSeq, RNASeq, small RNASeq, and epigenomics analyses. This course addresses the high demand of bioinformatics training for students who can apply critical software tools, data repositories, and analytical methods in their current student and future research.

Prerequisite(s): GBCH 6010.

GBCH 7250 Biomedical Statistics and Data Analysis (2)

The objective of this course is to provide biomedical graduate students with the knowledge needed to apply statistical tests and analyses to their own data and with the knowledge to understand the statistical analyses they are likely to encounter in the literature. Subjects include single and multiple parameter analyses for measured and counted variables, as well as linear and non-linear regression. Grades are based on exams that require students to apply what they learned to solving statistical problems.

GBCH 7330 Advanced Bioinformatics (3)

The goal of this course is to introduce foundational concepts, algorithms and applications of advanced bioinformatics, particularly machine learning and artificial intelligence (AI) in biomedical research. The major topics include machine learning, deep learning, and AI and their state-of-the-art applications in biomedicine. Students will acquire mathematical formulations and computer algorithms in regression modeling, data clustering and dimensionality reduction, data classifications (including deep learning), and reinforcement learning. Students will also gain detailed knowledge and hands-on experience in proteomics) and develop programming skills in applying open-source software programs in analyzing and interpreting omics data. Prerequisite: A Biochemistry course.

GBCH 7500 Human Medical Cellular Biochemistry (5)

The objectives and content of the Human Medical Cellular Biochemistry course are designed to provide students with a comprehensive understanding of cellular structure and function, and the manner by which cellular processes are normally integrated and regulated. This course stresses both the normal cellular function, and why disease states occur if normal cellular processes are disrupted.

GBCH 7520 Metabolic Biochemistry of Human Disease (5)

The objectives and content of the Metabolic Biochemistry of Human Disease course are designed to provide students with a comprehensive understanding of the metabolic pathways involving the four major metabolic compounds: carbohydrates, lipids, amino acids and nucleotides; and the manner by which metabolism is normally integrated and regulated. This course stresses both the normal metabolic function, and why disease states occur if normal metabolic processes are disrupted.

GBCH 7540 Medical Biochemistry Grand Rounds Externship (3)

Students are required to actively attend each of the Grand Rounds offered by the Department of Medicine and an elective seminar offered by the various departments in the School of Medicine, and to give a one-page report post Grand Round. This report will summarize clinical and research topics, background knowledge, major experimental/diagnostic/therapeutic approaches discussed, key results, conclusions and significance of the studies presented in each Grand Round, as well as some critiques on the Grand Round. A one-hour discussion section on Friday will follow the seminars. Grades are based on participation and reports.

GBCH 7550 Med Biochem Grand Rounds Exter (3)**GBCH 7560 Academic Writing & Critique (2)**

Students will review the structure and syntax of papers from the primary literature and of grant proposals, investigate and report the validity of an advertised health claim, prepare a two-page grant proposal, and review a grant proposal. Review activities will be carried out in small groups with facilitation by the instructor. The grade will be based on class participation, student feedback, the report, and the proposal.

GBCH 7570 Signal Transduction and Hormone Action (2)

Current molecular mechanisms for cellular signal transduction pathways and hormone action including membrane receptors and downstream pathways, second messenger systems, receptor-ion channels, kinase/phosphatases, extracellular matrix signaling, signaling and cell death, Wnt signaling pathways and nuclear receptor signaling.

GBCH 7580 Research Methods in Biochemistry and Molecular Biology (2)

Each student will work in a laboratory to learn how different methods are used to carry out research in Biochemistry and Molecular Biology. At the end of the semester, the student is required to write a 2 to 3-page report describing the principle of the methods and the results of the work. The grade will be based on the feedback of the laboratory PI and the report.

GBCH 7590 Cases in Research Ethics (2)

This course is to emphasize the importance of research ethics through the use of examples from real life. They will be a brief explanation of the case by the instructor, students will break up into groups, and decide on the appropriate response in their opinion and discuss that opinion.

GBCH 9980 Master's Research (0)

Course may be repeated up to unlimited credit hours.

Maximum Hours: 99

GBCH 9990 Dissertation Research (0)

Course may be repeated up to unlimited credit hours.

Maximum Hours: 99