

# BIOCHEMISTRY (BCHM)

## **BCHM 210 Biochemistry Laboratory Techniques 2 Credit Hours**

Biochemical Laboratory Techniques in an introduction to the equipment, procedures, and concepts used in the biochemistry laboratory. The class will cover topics such as scientific literature, keeping a laboratory notebook, statistical analysis and computer programs, as they relate to biochemistry. (W,YR)

**Prerequisite(s):** CHEM 134 or CHEM 144 and CHEM 136 or CHEM 146 and BIOL 140

**Restriction(s):**

Can enroll if Major is Biochemistry

## **BCHM 352 Introduction to Toxicology 3 Credit Hours**

An introduction to the principles of toxicology with an emphasis on environmental toxicology. Major topics include toxic agents, toxicological mechanisms, and use of toxicological reference literature. Discussion of chemical carcinogenesis, genetic toxicology, immunotoxicology, teratology, and toxic responses of the skin, eyes, and nervous system. Three hours lecture. (AY).

**Prerequisite(s):** CHEM 225

## **BCHM 370 Principles of Biochemistry 3 Credit Hours**

A concise but comprehensive survey of various areas of biochemistry designed for non-biochemistry majors. The course follows the standard approach to the subject including a description of cells, their structure and constituent macromolecules (proteins, nucleic acids, carbohydrates and lipids), enzymology, bioenergetics, intermediary metabolism, and gene regulation. Students cannot take both Biochemistry 370 and 470 or 471 for any combination of concentration, cognate or minor requirement. Three hours lecture. (F).

**Prerequisite(s):** BIOL 140 and CHEM 226

## **BCHM 390 Current Topics in Biochemistry 1 to 3 Credit Hours**

Special topics current to the field of biochemistry. Topics and format for the course may vary. See Schedule of Classes for current topic. Permission of instructor. (OC).

**Prerequisite(s):** (BCHM 370\* or BIOL 370\* or CHEM 370\*) or (BCHM 470\* or BIOL 470\* or CHEM 470\*)

## **BCHM 404 Mech. Chronic Human Disease 3 Credit Hours**

This course focuses on the biochemical, molecular and cellular mechanisms underlying the progression of chronic diseases, such as diabetes mellitus and atherosclerosis. Techniques in epidemiology, pathology, genetics, molecular biology, and biochemistry are used to understand how relevant physiological processes become pathological. The examination of chronic diseases provides an opportunity to understand biological processes across many scales of life, from extracellular matrix proteins to cells in blood vessel walls to risk factors in patient populations to the pharmacology of treatments. Use of primary literature is emphasized. Three hour lecture.

**Prerequisite(s):** BIOL 301 or BIOL 306 or BIOL 357 or BCHM 370 or BIOL 370 or CHEM 370 or BCHM 471 or BIOL 471 or CHEM 471

**Restriction(s):**

Can enroll if Class is Junior or Senior

## **BCHM 430 Bioinorganic Chemistry 3 Credit Hours**

This course examines the roles that metals play in biological systems, including the chemical principles that make metal ions well-suited for roles in protein structure, in redox catalysis and in acid base chemistry. The physical and experimental techniques that are applied to explore the structure and function of metals systems will be introduced using case studies from the primary scientific literature in the field. BCHM 370 or its equivalent are strongly recommended but not required.

**Prerequisite(s):** CHEM 136 and BIOL 140

## **BCHM 470 Biochemistry I 3 Credit Hours**

Life processes from a chemical viewpoint: structure/function relationships of biomolecules with emphasis on proteins, enzyme kinetics, and mechanisms of action. Three hours lecture. (W).

**Prerequisite(s):** (BIOL 130 and BIOL 140 and CHEM 134) or (CHEM 144 and CHEM 136) or (CHEM 146 and CHEM 225)

## **BCHM 471 Biochemistry II 3 Credit Hours**

Intermediary metabolism, bioenergetics, energy transformation, metabolic interrelationships, biochemical regulation, highly structured subcellular biochemical systems. Three hours lecture. (W).

**Prerequisite(s):** BCHM 470 or CHEM 470 or BIOL 470

## **BCHM 472 Biochemistry Laboratory I 1 Credit Hour**

The techniques of preparative and analytical biochemistry. Preparation and characterization of proteins and nucleic acids. Physical and chemical properties of proteins and nucleic acids. Four hours laboratory. CHEM 344 Recommended. (F).

**Prerequisite(s):** (BIOL 470\* or BCHM 470\* or CHEM 470\*) and CHEM 227

## **BCHM 473 Biochemistry Laboratory II 1 Credit Hour**

The techniques of preparative and analytical biochemistry. Preparation and characterization of lipids and carbohydrates. Methods in metabolism. Four hours laboratory. (W).

**Prerequisite(s):** (BCHM 471\* or BIOL 471\* or CHEM 471\*) and (BCHM 472\* or BIOL 472\* or CHEM 472\*)

## **BCHM 474 Molecular Biology 4 Credit Hours**

This course will emphasize the molecular biology of eukaryotes, and topics will include genome organization and complexity, chromatin structure and function, gene expression, DNA replication and repair, genetic rearrangements, and the molecular biology of development. The laboratory will emphasize the application of recombinant DNA technology to the study of biological problems. Three hours lecture, four hours laboratory. (W).

**Prerequisite(s):** (BCHM 470 or CHEM 470 or BIOL 470) or (BCHM 370 or BIOL 370 or CHEM 370) and CHEM 227

**Corequisite(s):** BCHM 474L

## **BCHM 480 Biochemical Pharmacology 3 Credit Hours**

Pharmacology is a study of drugs. In this course, the biochemical and molecular basis of drug action will be emphasized. Different categories of drugs, their use, abuse, and side effects will be presented. Three hours lecture. Permission of instructor. (OC).

**Prerequisite(s):** CHEM 370 or BCHM 370 or BIOL 370 or BCHM 470 or CHEM 470 or BIOL 470

## **BCHM 485 Nutrition and Metabolism 3 Credit Hours**

Full Course Title: The Biochemistry of Human Nutrition and Metabolism Human Nutrition and Metabolism is an introduction to the relationship between food and nutrients, and their integration in the metabolic pathways. An understanding of the molecular basis of nutrition, related diseases, and overall health will be built on previous knowledge of cell biology and biochemistry. (AY)

**Prerequisite(s):** (BCHM 471 or BIOL 471 or CHEM 471) or (BCHM 370 or BIOL 370 or CHEM 370)

**BCHM 490 Topics in Biochemistry 1 to 3 Credit Hours**

A course in special topics that examines research problems of current interest in biochemistry. Topics and format may vary. See current Schedule of Classes. One to three hours seminar. (W).

**BCHM 495 Off-Campus Research in Biochem 1 to 3 Credit Hours**

Participation in ongoing research at an off-campus laboratory. No more than 6 hours combined from any Natural Science courses numbered 495, 498, and 499 may be credited toward the 120 hours required for a degree. Four to twelve hours laboratory. Permission of concentration advisor. (F,W,S).

**BCHM 496 Complex Systems 3 Credit Hours**

Full Title: Biochemistry Capstone: Complex systems in Biochemistry  
A complex system is defined as a system featuring a large number of interacting variables whose combined activity is non-linear and whose seemingly random behavior leads to self-organization. Current topics \*\* are used to explore how complex systems function in biology. All reading material in the class are taken from the scientific literature giving students a chance to become familiar with how biochemists convey ideas and report their findings. Each student will present a paper to the class to demonstrate the ability to communicate concepts of Biochemistry effectively. Students will also learn the process of proposal writing and will have the opportunity to research and write their own proposal and have it peer-reviewed by their classmates. \*\*The topics for this course will change each year, depending on the instructor, and the focus of current advances in Biochemistry/Complex systems. (W,YR)

**Prerequisite(s):** BCHM 470 and BCHM 472 and BCHM 474

**Restriction(s):**

Can enroll if Class is Senior

**BCHM 497 Seminar in Biochemistry 1 Credit Hour**

A seminar course that examines research problems of current interest in biochemistry. The course format may include training students to read and present scientific papers, guest lecturers, and lectures by the instructor on a selected topic. One hour seminar. Permission of instructor. (W).

**Prerequisite(s):** (BCHM 470 or BIOL 470 or CHEM 470) and (BCHM 474 or BIOL 474)

**BCHM 498 Directed Reading in Biochem 1 to 3 Credit Hours**

Library research in a specific area of biochemistry performed under the direction of a faculty member. No more than six hours combined from departmental courses numbered 495, 498, and 499 may be credited toward the 120 hours required for a degree. Four to twelve hours readings. Permission of instructor. (F,W,S).

**BCHM 499 Laboratory Research in Biochem 1 to 3 Credit Hours**

Directed laboratory research performed under the supervision of a faculty member. Research training is encouraged. No more than six hours combined from departmental courses numbered 495, 498, and 499 may be credited toward the 120 hours required for graduation. Four to twelve hours laboratory. Permission of instructor. (F,W,S).

\* An asterisk denotes that a course may be taken concurrently.

Frequency of Offering

The following abbreviations are used to denote the frequency of offering: (F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally