

COURSE: CHEMISTRY 304: Biochemistry

DESCRIPTION: Examines structure and function of biological macromolecules-polysaccharides, proteins and nucleic acids; lipids; enzymes and metabolism; bioenergetics; control mechanisms; hormones; body fluids; nutrition; and biochemical pathology. Lecture.
Prerequisite: Biology 110, 111 and Chemistry 101, 102

RECOMMENDED TEXTS: David L. Nelson and Michael M. Cox, *Lehninger Principles of Biochemistry*, 4th edition, 2005. W.H. Freeman or Donald Voet and Judith G. Voet, *Biochemistry*, 3rd Edition, 2004. John Wiley and Sons Publishers. ISBN: 0-471-19350-X

FORMAT: Closed book exam consisting of 95 objective questions with a multiple-choice, matching and true/false format. In addition, there is a five-point essay question which will test the student's grasp of basic biochemical principles. Each objective question is worth one point. The essay question is worth five points.

GRADING: Students must receive a "C" (73-76) in order to receive credit for a course taken as a Challenge Exam.

TOPICS FOR STUDY

Amino acid structure

Protein structure and function

- Levels of structure
- Types of conjugated proteins
- Hemoglobin structure and function
- Collagen structure and function
- Denaturation

Enzymes

- Substrate specificity
- Coenzymes
- Enzyme kinetics
- Regulation of enzymatic activity

Carbohydrates

- Sugar structure and function
- Polysaccharide structure and function

Lipids

- Types of lipids
- Physical properties of lipids
- Biological membranes

Nucleic Acids

- Structure of DNA and RNA

Metabolism

- General principles of metabolism
- Oxidation-reduction reactions
- Glycolysis
- Citric acid cycle
- Electron transport system
- Oxidative phosphorylation
- Oxidation/Fatty acid
- Ketone body formation
- Amino acid deamination
- DNA replication
- DNA transcription
- Translation and the genetic code

Metabolic diseases or conditions

- Diabetes mellitus
- Atherosclerosis
- Ammonia intoxication
- Sickle cell anemia
- Lysosomal storage diseases