

**GRANDE PRAIRIE REGIONAL COLLEGE**  
**SCIENCE AND TECHNOLOGY DEPARTMENT**

<b>Course :</b>	BC 2030 - Introduction Biochemistry I		
<b>Prerequisites :</b>	Chemistry 1010, Chemistry 1610 or Chemistry 2610; and Chemistry 1630 or Chemistry 2630		
<b>Sections :</b>	One lecture section will be offered in the fall term. A2 3(3-0-0) UT		
<b>Transferability :</b>	U of A - BIOCH 203		
<b>Description :</b>	The course includes: structure and chemistry of the cell; protein structure and function; enzyme kinetics; chemistry of carbohydrates; intermediary metabolism.		
<b>Requirements :</b>	i). Attendance of lectures/seminars and completion of course work as outlined in the Academic Guidelines of the College. ii). Two Midterm Exams iii). Final Lecture Exam		
<b>Evaluation :</b>	Midterm Exam I	- 25%	
	Midterm Exam II	- 25%	
	Final Exam	- 50%	
<b>Textbook :</b>	Donald Voet and Judith G. Voet, <u>Biochemistry</u> (Second Edition), John Wiley and Sons Inc. Publishers, 1995. ISBN: 0-471-58651-X		

# Introduction Biochemistry I - BC 2030

## Topic Outline

### Introduction

1. General introduction and format BC 2030: exams; mark distribution; textbook
2. Introduction to biochemistry
3. Description of cells: basic functions; organization, specific cellular organelles, principal chemical constituents

### Proteins

1. Ubiquitous nature of proteins in cells; classification; examples of physiological roles
2. Amino acids: chemical structures; review acid/base properties of ampholytes
3. Primary level of protein structure; peptide bond
4. Amino acid composition analysis; sequence determination methodologies
5. Protein folding; forces stabilizing polypeptides; secondary, tertiary, quaternary levels of protein structure
6. Molecular size and shape characterization; chromatography, electrophoresis
7. X-ray crystallography / 2-D NMR to deduce 3-dimensional structure
8. Overview haemoglobin, myoglobin structure and function

### Enzymes

1. General characteristics: biological catalysis; activation energetics; specificity; classification
2. Enzyme kinetics; Michaelis-Menten equation; Lineweaver-Burk plot
3. Active site of enzymes; coenzymes and cofactors
4. Illustration of mechanism: lysozyme, serine proteinase
5. Regulation of enzyme activity: inhibition, competitive / non-competitive; allosterism; covalent modification; zymogen activation, blood clotting

### Carbohydrate metabolism

1. Introduction to metabolism
2. Brief review of carbohydrate chemistry
3. Energy changes in biochemical reactions; ATP; vitamins
4. Glycolysis
5. Anaerobic and aerobic fates of pyruvate; mitochondria
6. The citric acid cycle
7. Electron transport and oxidative phosphorylation; ATP generation; shuttles
8. Pentose phosphate pathway
9. Gluconeogenesis
10. Glycogen metabolism
11. Regulation and integration of carbohydrate metabolism; allosterism; hormones
12. Other topics of carbohydrate metabolism: glyoxylate pathway; lactose metabolism; sucrose metabolism; diabetic ketoacidosis