

# General Biochemistry (BCH 202) Course content

Dr. Nat. Med Arwa Khayyat

Biochemistry Department

Email: [aalkhyyat@ksu.edu.sa](mailto:aalkhyyat@ksu.edu.sa)

Office 226

# BCH 202

## General Biochemistry

- Course Symbol & No. : BCH 202
- Credit Hours : 4 (3+1)
- Prerequisite : --
- Class schedule : Sunday, Tuesday, Thursday  
11:00 am to 11:50 am.
- Class location :
- Examinations : Continuous Assessment Tests (CAT)
  - First (15 Marks), Sunday, 1<sup>st</sup> of Oct. 2023
  - Second (15 Marks), Sunday, 26<sup>th</sup> of Nov. 2023
  - Practical (25 Marks) + 5 Marks
  - Final (40 Marks)

# Course Objectives

- **To familiarize students with the basic biochemical knowledge necessary to meet the institutional objectives and goals for general biochemistry, like:**
  - i. building blocks of cellular components
  - ii. monosaccharides, oligosaccharides and polysaccharides,
  - iii. lipids, vitamins,
  - iv. nucleic acids and
  - v. Introduction to general metabolic pathways of different macromolecules

Topics	No of Weeks	Lectures
<b>Introduction</b> Living matter Cell, Functional groups	1	2-4
<ul style="list-style-type: none"> <li>● <b>Carbohydrates:</b></li> <li>● Function and classification:               <ul style="list-style-type: none"> <li>- Monosaccharides structure, epimers, optical activity, solubility, cyclic structure, anomers, reducing sugars, monosaccharide derivatives.</li> <li>- Functions of glucose, fructose and galactose</li> </ul> </li> <li>- Reactions of simple sugars</li> </ul>	1.33	5-8
<ul style="list-style-type: none"> <li>● Glycosidic bonds (Types and structure)</li> <li>- oligosaccharides: structure of disaccharides (e.g. maltose, lactose, sucrose),</li> <li>- structure of trisaccharides</li> <li>- polysaccharides: classification, structure and Function.</li> </ul> Storage polysaccharides: starch. glycogen Structural Polysaccharides:, cellulose, chitin,	1.33	9-12
<ul style="list-style-type: none"> <li>● Functional polysaccharides: glycosaminoglycans and heparin.</li> </ul> Glycoproteins and there functions : adhesion immunology, recognition Introduction to sugar metabolism	1.33	13-15

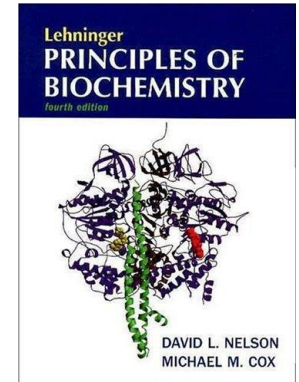
Topics	No of Weeks	Lectures
<ul style="list-style-type: none"> <li>● <b>Lipids:</b></li> <li>● Definition, function, fatty acids, classification:               <ul style="list-style-type: none"> <li>-simple lipids: structure and function (TAG, waxes)</li> <li>-compound lipids: structure and function (phospholipids, sphingolipids)</li> <li>-derived lipids: structure and function (cholesterol, bile acids)</li> </ul> </li> <li>● Lipoproteins, micelle, membrane structure.</li> </ul>	1.33	16-19
<ul style="list-style-type: none"> <li>● Glycerophospholipids (classifications, types&amp; function)</li> <li>● Sphingolipids (classifications, types&amp; function)</li> <li>● Triglycerides</li> <li>● Steroids ( structure,properties,&amp;functions;cholesterol, terpenes, vitamins&amp; steroid hormones)</li> </ul>	1.33	20-23
<ul style="list-style-type: none"> <li>● Lipoproteins</li> </ul>	0.66	24-25
<ul style="list-style-type: none"> <li>● Introduction to biomembranes and adipocytes               <ul style="list-style-type: none"> <li>Assembly of lipid molecules (membrane and adipose tissue)</li> <li>Fluid mosaic model and types of membrane proteins</li> <li>Fat storage &amp; mobilization in adipose tissue</li> </ul> </li> </ul>	1	26-28
<ul style="list-style-type: none"> <li>● Introduction to lipid metabolism</li> </ul>	0.33	29

Topics	No of Weeks	Lectures
<ul style="list-style-type: none"> <li>● <b>Nucleic acids:</b></li> <li><b>Structure of a nucleotide,</b></li> <li>- types of nitrogen bases,</li> <li>- structure of nucleosides</li> <li>- nomenclature of nucleosides and nucleotides,</li> <li>- phosphodiester bonds,</li> <li>- properties of nitrogen bases,</li> <li>- Roles of functional nucleotides</li> </ul>	0.66	30-31
<ul style="list-style-type: none"> <li>- <b>Nucleotides derivatives ( NAD, NADP, FAD, FMN, c AMP, c GMP)</b></li> </ul>	0.66	32-33
<ul style="list-style-type: none"> <li>● <b>Over view of DNA and RNA.</b></li> <li>- DNA primary structure: Description and orientation of bonds.</li> <li>- RNA: Types, role and structure.</li> <li>- Secondary structure of DNA (double helix)</li> <li>- Double helix properties, base pairing, reading, stabilizing forces.</li> <li>- DNA denaturation : significance and factors</li> <li>- Tertiary structure of DNA (relaxed, coiled and associated proteins; histones, protamines).</li> </ul> <p><b>Genetic code, exon and introns: Gene, genome and chromosome</b></p> <p><b>Introduction to replication, transcription and translation and important enzymes</b></p>	1.66	34-38
<p><b>Introduction to:</b></p> <p>Vitamins, Co-enzymes, Heme and minerals Hormones</p>	1.33	39-42

# References

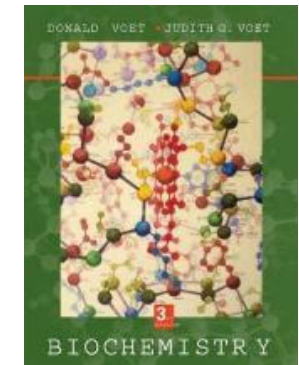
- **Lehninger: Principles of Biochemistry**

by DL. Nelson and MI. Cox (latest edition)

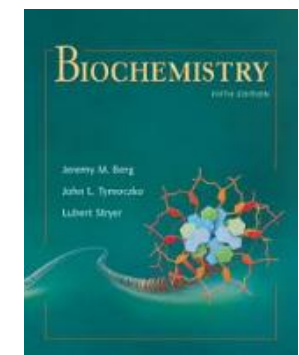


- **Biochemistry**

by D. Voet and J. Voet (latest edition)



- **Biochemistry** by Stryer (latest edition)



# The Practical part of BCH 202

Topic	No of Weeks	(hour)
Safety in the laboratory	1	2
Tutorial on writing experiment reports and introduction to the most commonly used instruments in biochemistry	1	2
Buffer: titration of a weak acid, pH, pKa and buffer capacity	1	2
Determination of total of carbohydrates	1	2
Hydrolysis of amylose and quantitative estimation of glucose	1	2
General characterization and qualitative tests for lipids	1	2
Determination of the iodine number of fat	1	2
DNA characterization, absorption spectrum, 260/280 ratio, reaction with diphenylamine (Quantitative), and measuring DNA melting	2	4
RNA characterization, absorption spectrum, 260/280 ratio, reaction with Orcinol (Quantitative)	2	4