

BIO1.2: BIOCHEMISTRY

I. Course description:

1. Credit points: 3 ECTS

2. Time commitment:

Items	Lecture	Tutorial	Practical	Total
No. of hours	24	3	3	30

3. Prerequisites: High school biology and chemistry

4. Recommended background knowledge: High school biology and chemistry

5. Subject description:

This course involves the study of the molecular composition of living cells, the organization of biological molecules within the cell, and the structure and function of these biological molecules. The biological macromolecules which this course focuses on are proteins, polynucleic acids (DNA and RNA), polysaccharides, and lipids. During the course we will concentrate on the structures of these molecules, their functions. Other topics to be examined in the course include the study of biomembranes and transport, metabolism and metabolic pathways. Methods and approaches used in biochemical research will be presented.

6. Objectives & Outcome:

The overall goal of this course (through the lectures, tutorials, lab works, problem sets, exams, and quizzes) is for the students to gain a basic knowledge of biochemical concepts and techniques which will be necessary for future scientific endeavors. Upon completion of the course, the student should achieve an understanding of the following:

- basic concepts in biochemistry;
- the basic elements of protein structure and function;
- structure and basic function of nucleotides and nucleic acids;
- structure of carbohydrates, lipids and their roles in biological systems.
- metabolism and metabolic pathways.

7. Assessment/ Evaluation

Component	Attendance	Exercises	Assignments	Reports	Midterm	Final
Percentage %	10	0	20	0	20	50

8. Prescribed Textbook(s):

[1] David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry, 5th edition, W.H. Freeman and Co., NY, 2008 (<http://www.filestube.com/9REtDIO7wUOSMBadRoFFkh/Principles-of-Biochemistry-5e-Lehninger.html>); http://www.worthpublishers.com/lehninger/con_index.htm?99bwl);

[2] Reginald H. Garrett, Charles M. Grisham, Biochemistry, 2nd Edition, Harcourt Brace College Publishers. ISBN: 0-03-022318-0 (<http://www.web.virginia.edu/Heidi/home.htm>);

[4] Jeremy M Berg, John L Tymoczko, and Lubert Stryer, **Biochemistry**, 5th edition, New York, [W H Freeman](http://www.wiley.com), 2002, ISBN-10: 0-7167-3051-0

II. Course content & schedule:

1. Topic 1: Introduction to the course; Basic Concepts of Biochemistry
2. Topic 2: Amino Acids, Peptides, and Proteins
3. Topic 3: Protein Structure & Functions
4. Topic 4: Protein Purification and Characterization
5. Topic 5: Nucleotides and Nucleic Acids and Protein Synthesis
6. Topic 6: Lipids, Biological Membrane and Transport
7. Topic 7: Metabolism, Metabolic Pathways

III. Reference Literature:

[1]. David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry, 5th edition, W.H. Freeman and Co., NY, 2008

[2]. Dr. Henry Jakubowski, Biochemistry Online: An Approach Based on Chemical Logic, <http://employees.csbsju.edu/hjakubowski/classes/ch331/bcintro/default.html>

[3]. The ExPASy (Expert Protein Analysis System), <http://www.expasy.org>

[4]. Richard J. Simpson, Proteins and Proteomics: A Laboratory Manual, Cold Spring Harbor Laboratory (2002)

[5]. Reiner Westermeier, Tom Naven, Proteomics in Practice: A Laboratory Manual of Proteome Analysis, Wiley-VCH, 2002