



Philadelphia University
Faculty of Science
Department of Biotechnology and Genetic Engineering
Second Semester, 2009/2010

Course Syllabus

Course Title: General Biology (1)	Course code: 240101
Lecture Time: 8.15-9:45 Mon and Wed	

Academic Staff Specifics

Name	Rank	Office No.	Office Hours	E-mail Address
Dr. Fayez Haman	Assistant Prof.	823	10:00-11:00 Sun and Tue Mon & Wed 10:00-11:15	fhamam@philadelphia.edu.jo

Course module description:

The course includes concepts of biology; water and the fitness of the environment; the structure and function of macromolecules, cellular organelles and membrane; metabolism "cellular respiration and photosynthesis"; Mendelian genetics; molecular basis of inheritance; from gene to protein "gene expression"; viruses and biotechnology.

Course module objectives:

- The course will provide the students with the basic understanding of the fundamental principles of biology.
- The topics covered in this course will allow the students to better comprehend other courses during the following academic years.

Course/ module components

Title: Biology, 8th edition (2008).
 Author(s): Neil A. Campbell and Jane B. Reece
 Publisher: Benjamin Cumming's Publishing Company.
 Year of publication: 2008
 ISBN:0-8053-7146-x

Teaching methods:

- Lectures, discussion groups, tutorials, problem solving, debates, etc.
- The use of Power Point presentation, Illustration with models, educational animations, and movies.
- The publisher of the text book, Benjamin Cummings, provide a useful free website, which student can access upon purchase of the text book. This website contains several activities and applications that support the understanding of the biological concepts.

Learning outcomes:

- **Knowledge and understanding**

At the end of this module, students able to:

- * Describe the characteristics and compounds that make up living things.
- * Discuss how matter and energy are interrelated in photosynthesis and cell respiration.
- * Identify key cell organelles and relate their function and structure.
- * Compare and contrast mitosis and meiosis in term of their goals and outcome.
- * Gain knowledge of the anatomical structure and physiological functions of tissues and organ systems of the human.

- **Cognitive skills (thinking and analysis).**

- The Thinking and Meditation about the Great Ability of God in Creation of our body and the biological systems.
- The thinking skills will be developed by encouraging students to conclude answers to different questions that the instructor intends to use during the presentation of the scientific material.
- The instructor intends to stimulate the student's analytical thinking side via connections with general aspects in daily life or through questions, net searching, and home works.

- **Communication skills (personal and academic).**

- Gain Teamwork skills
- The students have the option to share open discussion and to ask questions during the class or any other times.
- Students have the opportunity to communicate with others especially professors, while searching answers for home works or through encouraging them to attend different scientific activities that are available in the department.

- **Practical and subject specific skills (Transferable Skills).**

- Improve the ability to search using the scientific ways to get the biological concepts.
- Improve the ability to analyze different terms or phrases to its basic parts.
- Enhance the using of the most appropriate ways for studying the text book material in order to benefit from the biological subjects for life.
- The students will be encouraged to convert the theoretical material to 3-dimensional models from simple available raw materials.

Allocation of Marks	
Assessment Instruments	Mark
First examination	15%
Second examination	15%
Final examination: 50 marks	50%
Reports, research projects, Quizzes, Home works.	20%
Total	100%

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed **15%**. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Course/module academic calendar

Week No.	Chapter No.	Topic	Pages
1-2	5	THE STRUCTURE AND FUNCTION OF LARGE BIOLOGICAL MOLECULES 5.1. Macromolecules are polymers built from monomers 5.2. Carbohydrates serves as fuel and building material 5.3. Lipids are a diverse group of hydrophobic Molecule 5.4. Proteins have many structures resulting in a wide range of Functions 5.5. Nucleic acids store and transmit hereditary information.	68-90
3-4	6	A TOUR OF THE CELL 6.2. Eukaryotic cells have internal membranes compartmentalize the functions 6.3. Eukaryotic cell's genetic instructions are housed in the nucleus and carried out by the ribosomes 6.4. The Endomembrane system regulates protein traffic and performs metabolic functions in the cell. 6.5. Mitochondria and chloroplasts change energy from one form to another 6.6. The Cytoskeleton is a network of fibers that organizes structures and activities in the cell (In Brief). 6.7. Extracellular components and connections between cells help coordinate activities.	98-124

5	7	<p>MEMBRANE STRUCTURE AND FUNCTION</p> <p>7.1. Cellular membranes are fluid mosaics of lipids and proteins.</p> <p>7.2. Membrane structures results in selective permeability</p> <p>7.3. Passive transport is diffusion of a substance across a membrane with no energy investment</p> <p>7.4. Active transport uses energy to move solutes against their gradients</p> <p>7.5. Bulk transport across the plasma membrane occurs by exocytosis and endocytosis</p>	125-141
6	8	<p>AN INTRODUCTION TO METABOLISM</p> <p>8.1. An Organism's metabolism transforms matter and energy subject to the laws of thermodynamics (In Brief).</p> <p>8.2 The Free energy change of a reaction tells us whether or not a reaction occurs spontaneously: Free energy and metabolism; Equilibrium and Metabolism.</p> <p>8.3. ATP powers cellular work by coupling exergonic reactions to endergonic reactions.</p> <p>8.4. Enzymes speed up metabolic reactions by lowering energy barriers.</p> <p>8.5. Rgulation of enzyme activity helps control metabolism.</p>	142-145 147-161
7-8	9	<p>CELLULAR RESPIRATION: HeARVESTING CHEMICAL ENERGY</p> <p>9.1. Catabolic pathways yield energy by oxidizing organic fuels</p> <p>9.2. Glycolysis harvests chemical energy by oxidizing glucose to pyruvate</p> <p>9.3. The citric acid cycle completes the energy -yielding oxidation of organic molecules</p> <p>9.4. During oxidation phosphorylation, chemiosmosis couples electron transport to ATP synthesis</p> <p>9.5. Fermentation enables some cells to produce ATP without the use of oxygen</p> <p>9.6. Glycolysis and citric acid cycle connect to many other metabolic pathways</p>	162-183
9	10	<p>PHOTOSYNTHESIS</p> <p>10.1. Photosynthesis converts light energy to the chemical energy of food</p> <p>10.2. The light reactions convert solar energy to the chemical energy of ATP and NADPH</p> <p>10.3. The Calvin cycle uses ATP and NADPH to convert CO₂ to sugar.</p>	185-199

Module references

Books

Title: Biology

Author(s) Neil A. Campbell and Jane B. Reece

Edition: 8th edition (2008)

Publisher: Benjamin Cumming's Publishing Company.

ISBN:**0-8053-7146-x**

In addition to the above, the students will be provided with handouts by the lecturer.

Students will be expected to give the same attention to these references as given to the Module textbook(s)

1. Karp, G. Cell and Molecular Biology, concepts and Experiments. 2002, 3rd edition, John Wiley publishing company, ISBN 0-471-38913-7.
2. Bruce, A., Bray, D., Hopkins, K., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P. Essential Cell Biology. 2004. Garland Publishing company. ISBN: 0-8153-3480-X.

Journals

(To be added)

Websites

www.campbellbiology.com (Use your own access code provided with the textbook)

www.biology.arizona.edu

www.cellsalive.com

www.ncbi.nlm.nih.gov

