



Philadelphia University
Faculty of Science
Department of Biotechnology
Fall semester, 2014/2015

Course Syllabus	
Course code: 240107	Course Title: General Biology II
Course Level: First year students	Course prerequisite (s): General Biology I (240101)
Lecture Time: 9:10 – 10:00 (Sunday, Tuesday & Thursday) Credit hours: 3 hours Lecture Hall: 1001	Co requisite (s): Practical General Biology II (240108)

Academic Staff Specifics				
Name	Rank	Office Number	Office Hours	Email Address
Dr. Lolita Qouta	Assistant Professor	816	12:0-13:0 Sunday, Tuesday & Thursday	lqouta@philadelphia.edu.jo

Course module description

This module is required for all the students at the department of "Biotechnology and Genetic Engineering". It is a 3 credit hour course in which 3 lectures each of 50 minutes will be given per a week. The course is designed to continue the subjects covered in Biology (101) to expose the students to the basic fundamental principles of biological sciences. The topics covered in this course will allow the students to better comprehend other advanced courses during the following academic years. The Students are encouraged to take both of this module and the practical module # 240108 in the same term.

Course module objectives

During this course, the students should acquire a basic understanding of :

- The basic principles in plant anatomy, physiology and reproduction.
- The basic principles of animal structure and function mainly human anatomy and physiology.

Course/ module components Text books and web Sites

Teaching methods:

- Lectures, discussion groups, tutorials, problem solving, debates, etc.
- The use of colored transparent Slides, power point presentation, illustration with models and educational animations.
- The publisher of the text book, Benjamin Cummings, provides a useful free website, which students can access upon the purchase of the text book. This website contains several activities and applications that support the understanding of all the biological concepts discussed in class. All the students are requested to buy/borrow the text to study and prepare the assigned topics.

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

Books

Please note that the Campbell Biology, 10 Edition is in the market now, all the students are encouraged to buy/use the new one However for this semester, the outline will be running according to the 9th Edition Title:

Campbell Biology

Author(s) Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V. and Jackson, R.B.

Edition: 9th edition (2011)

Publisher: Benjamin Cummings Publishing Company.

ISBN: 978-0-321-73975-9

Please note that earlier editions are o.k. to use, However, page numbers could be a little different

Websites

www.campbellbiology.com

Learning outcomes

Upon completion of this course, the students should've developed an understanding of:

- The role of root and shoot systems in the acquisition and transport of resources
- Reproduction of flowering plants and controversies surrounding plant biotechnology.
- Plant responses to internal and external signals.
- The physiology of mammalian reproduction.
- The basic stages of embryonic development common to most animals
- The role of circulatory and respiratory systems in homeostasis under a range of internal and external environmental conditions.
- Transport and gas exchange mechanisms in animals
- The process of sensing and acting
- The physiology of a nerve impulse
- The structural and functional link between osmoregulation and excretion
- The properties of innate and acquired immune system.

Communication skills (personal and academic).

The students will be trained to analyze data and interpret observations through connections with general aspects in daily life, assignments and home works performed using the net or doing additional readings at the library. The spirit of working groups will be encouraged in order to increase the students' capacities to work in teams.

Assessment instruments

Assessment Instruments	Mark
First hour exam	20
Second hour examination	20
Quizzes (3 short quizzes)	20
Final examination	40
Total	100

Course Schedule

Date	Subject
<p>October 19, 21, 23, 26 & 28</p> <p>Chapter 36 Pages 813-828</p>	<p><u>Resource acquisition and transport in vascular plants</u></p> <p>36.2 Transport occurs by short-distance diffusion or active transport and long-distance bulk flow Diffusion and active transport of solutes, diffusion of water (osmosis), how solutes and pressure affect water potential, measuring water potential, aquaporins: facilitating diffusion of water, three major pathways of transport, bulk flow in long-distance transport.</p> <p>36.3 Water and minerals are transported from roots to shoots Absorption of water and minerals by root cells, transport of water and minerals into the xylem, bulk flow driven by negative pressure in the xylem, pushing xylem sap, pulling xylem sap, Cohesion and adhesion in the ascent of xylem sap, Xylem Sap Ascent by bulk flow: A review</p> <p>36.4 Stomata help regulate the rate of transpiration Stomata: major pathways for water loss, mechanisms of stomatal opening and closing, stimuli for stomatal opening and closing, effect of transpiration on wilting and leaf temperature</p> <p>36.5 Sugars are transported from leaves and other sources to sites of use or storage Movement from sugar sources to sugar sinks, bulk flow by positive pressure: the mechanism of translocation in Angiosperms</p> <p>36.6 The symplast is highly dynamic Changes in Plasmodesmata</p>
<p>October 30 & November 2</p> <p>Chapter 38 Pages 847-855</p>	<p><u>Angiosperm reproduction & biotechnology</u></p> <p>38.1 Flowers, double fertilization, and fruits are unique features of the angiosperm life cycle Flower Structure and Function, Development of Male Gametophytes in Pollen Grains, Development of Female Gametophytes (Embryo Sacs), Pollination, Double fertilization Seed development, form and function, Endosperm development, Embryo development, Structure of the mature seed, Seed Germination and seedling development</p>
<p>November 4, 6 & 9</p> <p>Chapter 39 Pages 867-881</p>	<p><u>Plant responses to internal and external signals</u></p> <p>39.1 Signal transduction pathways link signal reception to response Reception, transduction and response</p> <p>39.2 Plant hormones help coordinate growth, development and response to stimuli</p>

	The discovery of plant hormones, a survey of plant hormones.
<p>November 11, 13, 16 & 18</p> <p>Chapter 46 Pages 1048- 1064</p>	<p><u>Animal reproduction</u></p> <p>46.3 Reproductive organs produce and transport gametes Female reproductive anatomy, male reproductive anatomy, Spermatogenesis and Oogenesis.</p> <p>46.4 The interplay of tropic and sex hormones regulates mammalian reproduction Hormonal control of the male reproductive system, the reproductive cycles of females.</p> <p>46.5 In placental mammals, an embryo develops fully within the mother's uterus Conception, embryonic development and birth, first, second and third trimesters, lactation</p>
<p>November 20, 23 & 25</p> <p>Chapter 47 Pages 1067-1081</p>	<p><u>Animal development</u></p> <p>47.1 Fertilization and cleavage initiates embryonic development Fertilization, the acrosomal and cortical reactions, egg activation, fertilization in mammals, cleavage.</p> <p>47.2 Morphogenesis in animals involves specific changes in cell shape, position, and survival. Gastrulation, developmental adaptations in amniotes, organogenesis and mechanisms of morphogenesis.</p>
<p>November 27, 30 & December 2, 4, 7 & 9</p> <p>Chapter 42 Pages 943-972</p>	<p><u>Circulation and gas exchange</u></p> <p>42.1 Circulatory systems link exchange surfaces with cells throughout the body Organization of vertebrate circulatory systems, Single and double circulations, Adaptations of double circulatory systems (Amphibians, reptiles, mammals and birds)</p> <p>42.2 Coordinated cycles of heart contraction drive double circulation in mammals Mammalian circulation, the mammalian heart: a closer look, maintaining the heart's rhythmic beat</p> <p>42.3 Patterns of blood pressure and flow reflect the structure and arrangement of blood vessels Blood vessels structure and function, blood flow velocity, blood pressure, capillary function, fluid return by the lymphatic system</p> <p>42.4 Blood components function in exchange, transport and defense Blood composition and function, blood clotting, stem cells and replacement of</p>

	<p>cellular elements, cardiovascular diseases</p> <p>42.5 Gas exchange occurs across specialized respiratory surfaces Partial pressure gradients in gas exchange, Mammalian Respiratory Systems: A closer look</p> <p>42.6 Breathing Ventilates the Lungs How a mammal breathes, control of breathing in human</p> <p>42.7 Adaptations for gas exchange include pigments that bind and transport gases Coordination of circulation and gas exchange, Respiratory Pigments, Hemoglobin, Carbon Dioxide Transport</p>
<p>December 11, 14, 16, 18 & 21</p> <p>Chapter 43 Pages 975 - 992</p>	<p><u>The immune system</u></p> <p>43.1 In innate immunity, recognition and response rely on shared traits of pathogens Innate immunity of vertebrates, barrier defenses, cellular innate defences, antimicrobial peptides and proteins, inflammatory responses, natural killer cells</p> <p>43.2 In adaptive immunity, lymphocyte receptors provide pathogen-specific recognition Acquired immunity: An overview, Antigen recognition by lymphocytes, Amplifying lymphocytes by clonal selection</p> <p>43.3 Adaptive immunity defends against infection of body cells and fluids Helper T cells: a response to nearly all antigens, cytotoxic T cells: a response to infected cells, B cells: a response to extracellular pathogens, active and passive immunization, immune rejection</p>
<p>December 23, 28, 30 * January 1</p> <p>Chapter 44 Pages 999-9014</p>	<p><u>Osmoregulation and excretion</u></p> <p>44.2 Animals nitrogenous wastes reflects its phylogeny and habitat</p> <p>44.3 Diverse excretory systems are variations on tubular theme Structure of the mammalian excretory system.</p> <p>44.4 The nephron is organized for stepwise processing of blood filtrate From blood filtrate to urine, Solute gradients and water conservation.</p>
<p>January 4, 6, 8</p> <p>Chapter 45 Pages 1020- 1039</p>	<p><u>Hormones and the endocrine system</u></p> <p>45.1 Hormones and other signaling molecules bind to target receptors, triggering specific response pathways Types of secreted signaling molecules, chemical classes of hormones, hormone receptor location: scientific inquiry, cellular response pathways, multiple effects of hormones, signaling by local regulators</p>

	<p>45.2 Negative feedback and antagonistic hormone pairs are common features of the endocrine system Insulin and glucagon: control of blood glucose</p> <p>45.3 The hypothalamus and pituitary are central to endocrine regulation Coordination of endocrine and nervous systems in vertebrates, Posterior pituitary hormones, Anterior pituitary hormones.</p> <p>45.4. Endocrine glands respond to diverse stimuli in regulating metabolism, homeostasis, development and behaviour Thyroid hormone: control of metabolism and development, parathyroid hormone and vitamin D: control of blood calcium, adrenal hormones: response to stress, gonadal sex hormones.</p>
<p>January 11, 13 & 15</p> <p>Chapter 48 Pages 1091- 1106</p>	<p><u>Neurons, synapses and signalling</u></p> <p>48.1 Neuron organization and structure reflect function in information transfer Introduction to information processing, neuron structure and function</p> <p>48.2 Ion pumps and ion channels maintain resting potential Formation of the resting potential, modelling of resting potential.</p> <p>48.3 Action potentials are the signals conducted by axons Production of action potentials, generation of action potentials: a closer look, conduction of action potentials</p> <p>48.4 Neurons communicate with other cells at synapses Generation of postsynaptic potentials, summation of postsynaptic potentials, modulated synaptic transmission, neurotransmitters</p>
<p>January 18, 20 & 22</p> <p>Chapter 50 Pages 1131- 1111</p>	<p><u>Sensory and motor mechanisms</u></p> <p>50.1 Sensory receptors transduce stimulus energy and transmit signals to the central nervous system Sensory pathways, types of sensory receptors.</p> <p>50.5 The physical interaction of protein filaments is required for muscle function Vertebrate skeletal muscle, other types of muscle.</p>
<p>January 25, 27 & 29</p> <p>Chapter 41 Pages 929- 935</p>	<p><u>Animal nutrition</u></p> <p>41.3 Organs specialized for sequential stages of food processing form the mammalian digestive system The oral cavity, pharynx and esophagus, digestion in the stomach, digestion in the small intestine, absorption in the small intestine, absorption in the large intestine.</p>

Important dates for your calendar	<p>*****19-27/11/ 2014 period of First Hour Exams *****</p> <p>***** Thursday 25/12/2015 Christmas Holiday *****</p> <p>***** 28-6/1/2015 period of Second Hour Exams *****</p> <p>***** Thursday 1/1/2015 New Year Holiday*****</p> <p>***** Thursday 22/1/2015 Last day to withdraw *****</p> <p>***** 1-9/2/2015 Final Exams *****</p>
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Attendance policy

Students are expected to attend all lectures. Absence from lectures should not exceed 15% (6 lectures). Students, who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the Faculty of Science will receive a mark of zero for 1 course.

Expected workload

The students are encouraged to attend all the lectures and keep good notes of every topic discussed in class. Reading the covered material in advance will definitely enrich the student's vocabulary and enable him/her to follow the items discussed in the lecture. Every student is expected to spend 15 hours per week to prepare and/or study the assigned material. Take careful notes during the lecture; rewrite your notes during the first 24-48 hrs following the lecture. Review and ask about what seems unclear to you, never delay your questions to the exam night.