



Department	Science & Technology
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Course Name	General Biology	Course No.	120151
Prerequisite	-----	Credit Hours	3
Number & date of course plan approval	Second semester 2016-2017	Brief Description	See form QF02/0409

Course Objectives	<p>Students will gain knowledge in the followings:</p> <ol style="list-style-type: none"> 1. Biological Hierarchy and molecular aspects of life, water and its properties and biological macromolecules (structure and function) 2. Cellular organization (structure and function) 3. Cellular Membrane and the traffic in and out of the cell 4. Cellular divisions and their role in organisms growth and reproduction 5. Molecular aspects of DNA and its duplication 6. Gene expression and protein synthesis. 7. Animal tissues
Intended Learning Outcomes	<p>1. Knowledge and Understanding: Students will have an understanding of the</p> <ol style="list-style-type: none"> A. A description of the characteristics of life, followed by a discussion of the human species integration into the highly-diverse biosphere. Taxonomic classification, the system by which all organisms are categorized, is discussed. Water and its properties will be discussed. B. A description of the various types of microscopes and their uses precedes a detailed study of cell structure and function. The organelles and their activities are discussed for both prokaryotic and eukaryotic cells. Various human diseases associated with organelle dysfunction are mentioned. C. The complex structure and function of the plasma membrane are described, along with the macromolecules that comprise the membrane. The mechanisms by which substances move in and out of cells are discussed, as are the general chemical processes of diffusion and osmosis. Important cell surface modifications and their significance (e.g., in cellular junctions) are also detailed. D. The history of the research recognizing and elaborating gene action is discussed. The processes of transcription and translation are described in detail, and are accompanied with detailed graphics. The chemical nature of the RNAs and their roles in gene expression are outlined. The construction and interpretation of a chromosome map is outlined. The abnormal situations of chromosome number change (e.g., monosomy, trisomy, etc.) are described, as are the situations of chromosome structural change (e.g., deletion, translocation, etc.). Many human diseases involving chromosomal abnormalities are described. E. Animal tissues and the principles of Homeostasis will be discussed. <p>2. Cognitive / Intellectual Analysis: Students will be able to critically assess primary and applied knowledge relating to structure& function</p>



	3. Subject-specific and practical skills: Students will be able to discuss topics relating to diversity of life, complexity of the human body with others in a meaningful way.		
Course Topics	<ol style="list-style-type: none"> 1. The Chemistry of Water. 2. The Structure and Function of Large Biological Molecules. 3. Cell Structure and Function. 4. The Cell cycle and Mitosis. 5. Sexual Life cycles and Meiosis. 6. The Molecular Basis of Inheritance. 7. Expression of Genes. 8. An Introduction to Animal Tissues and Homeostasis. 		
Text Books	Campbell Biology 10 th Ed. (2014). Reece, J. B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V. & Jackson, R.B. Pearson Benjamin Cummings.		
References			
Grade Determination	<input type="checkbox"/> 1 st Exam = 25% <input type="checkbox"/> 2 nd Exam = 25% <input type="checkbox"/> Final Exam = 50%	<input type="checkbox"/> Practical Course <input type="checkbox"/> Grade <input type="checkbox"/> Determination	<input type="checkbox"/> Course Work = 50% <input type="checkbox"/> (Reports, Term Papers, Quizes) <input type="checkbox"/> Final Exam = 50%

Course Outline

Week	Hours	Subjects	Chapters in Textbook	Notes
1-2	1	Introduction	3	44-50
	3	Water and Life 3.1. The polarity covalent bonds in water molecules result in hydrogen bonding 3.2. Four emergent properties of water contribute to Earth's suitability for life		
2	1	Carbon and the Molecular Diversity of Life Carbon: The backbone of Life 4.3 A few chemical groups are key to molecular function The Chemical Groups Most Important in the Processes of Life ATP: An Important Source of Energy for Cellular Processes	4	56 62-64



2-4	6	<p>The Structure and Function of Large Biological Molecules</p> <p>5.1. Macromolecules are polymers, built from monomers 5.2. Carbohydrates serve as fuel and building material 5.3. Lipids are a diverse group of hydrophobic molecules 5.4. Proteins include a diversity of structures, resulting in a wide range of functions 5.5. Nucleic acids store, transmit, and help express hereditary information</p>	5	66-87
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Week	Hours	Subjects	Chapters in Textbook	Notes
4-6	7	<p>A Tour of the Cell</p> <p>6.1. Biologists use microscopes and the tools of biochemistry to study cells (<i>Figure 6.3 is not included</i>). 6.2. Eukaryotic cells have internal membranes that compartmentalize their functions 6.3. The 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 6.7. Extracellular components and connections between cells help coordinate cellular activities.</p>	6	93-122
7-8	5	<p>Membrane Structure and Function</p> <p>7.1. Cellular membranes are fluid mosaics of lipids and proteins. (Membrane models are not included). 7.2. Membrane structure results in selective permeability 7.3. Passive transport is diffusion of a substance across a membrane with no energy investment 7.4. Active transport uses energy to move solutes against their gradients 7.5. Bulk transport across the plasma membrane occurs by exocytosis and endocytosis</p>	7	124-138



8-9	2	<p>The Cell Cycle</p> <p>12.1. Most cell division results in genetically identical daughter cells.</p> <p>12.2. The mitotic phase alternates with interphase in the cell cycle. (The evolution of mitosis is not included)</p> <p>12.3 The eukaryotic cell cycle is regulated by a molecular control system (In brief) (<i>The Cell Cycle Clock and The Loss of Cell Cycle Controls in Cancer Cells are not included</i>).</p>	12	232-243
9-10	4	<p>Meiosis and Sexual Life cycles</p> <p>13.1 Offspring acquire genes from parents by inheriting chromosomes.</p> <p>13.2. Fertilization and meiosis alternate in sexual life cycles. (The variety of sexual life cycles is not included).</p> <p>13.3. Meiosis reduces the number of chromosome sets from diploid to haploid.</p>	13	252-262
Week	Hours	Subjects	Chapters in Textbook	Notes
10-12	5	<p>The Molecular Basis of Inheritance</p> <p>16.1. DNA is the genetic material</p> <p>16.2. Many proteins work together in DNA replication and repair (<i>Evolutionary significance of altered DNA nucleotides are not included</i>).</p> <p>16.3 A chromosome consists of a DNA molecule packed together with proteins</p> <p>15.4 Alterations of chromosome number or structure cause some genetic disorders</p>	16 15	312-330 306-307
12-14	6	<p>Gene Expression: From Gene to Protein</p> <p>17.1. Genes specify proteins via transcription and translation</p> <p>17.2. Transcription is the DNA-directed synthesis of RNA: a closer look</p> <p>17.3. Eukaryotic cells modify RNA after transcription (The functional and evolutionary importance of introns is not included)</p> <p>17.4. Translation is the RNA-directed synthesis of a polypeptide: a closer look</p> <p>17.5. Mutations of one or a few nucleotides can affect protein structure and function</p>	17	333-348 350-354



Course Detailed Description – Procedures of the Course Plan Committee /Faculty of Pharmacy	QF02/0408–2.1E
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14	2	Basic Principles of Animal Form and Function Hierarchical Organization of Body Plans <i>Figure 40.5: Structure and Function in Animal Tissues</i> 40.2 Feedback control maintains the internal environment in many animals	40	870-877
15-16		Final Examination		

Approved by Dept. Chair		Date of Approval	
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Extra Information: (Updated every semester and filled by course instructor)

Course Instructor	Ameen Al-assi
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