



**Jordan University of Science and Technology**  
**Faculty of Science & Arts**  
**Applied Biological Sciences Department**

BIO712 Advanced Cell Biology

First Semester 2017-2018

**Course Catalog**

3 Credit Hours. This course aims to give the fundamentals of animal cell culture, and in depth knowledge of the responses of cells to stress and toxic molecules. The latter is important because practically all types of illnesses begin with changes in cellular molecules or structures. Students will study adaptations of cellular growth and differentiation, the morphologic alterations in cell injury, mechanisms of cell injury and death (necrosis, apoptosis, autophagy), as well as, the symptoms of cellular disease, namely, intracellular accumulations and pathology of cellular organelles and the cytoskeleton.

**Text Book**

<b>Title</b>	1. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications
<b>Author(s)</b>	Freshney RI
<b>Edition</b>	7th Edition
<b>Short Name</b>	1
<b>Other Information</b>	2016, Wiley ? Liss publishing.

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
2	Cells, Tissues, and Disease: Principles of General Pathology	Majno G, Joris I, 2004	2nd Edition	2004, Oxford University Press
3	Robbins Basic Pathology	Kumar V, Abbas A and Aster J.	10th Edition	2017, Elsevier.

**Instructor**

Name	<b>Prof. Homa Darmani</b>
Office Location	PH1L1

Office Hours	Sun : 11:30 - 12:30 Mon : 12:30 - 14:30 Wed : 12:30 - 14:30 Thu : 12:30 - 13:30
Email	darmani@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Mon, Wed : 14:30 - 16:00 Room: NF39

Tentative List of Topics Covered		
Weeks	Topic	References
Weeks 1, 2	Introduction	<b>Chapter 1</b> From <b>1</b>
Weeks 3, 4	Biology of Cultured Cells	<b>Chapter 2</b> From <b>1</b>
Week 5	Aseptic Technique	<b>Chapter 5</b> From <b>1</b>
Weeks 6, 7	Safety, Bioethics and Validation	<b>Chapter 6</b> From <b>1</b>
Week 8	Culture Vessels and Substrates	<b>Chapter 7</b> From <b>1</b>
Week 9	Primary Culture	<b>Chapter 11</b> From <b>1</b>
Week 10	Subculture and Cell Lines	<b>Chapter 12</b> From <b>1</b>
Week 11	Cellular Responses to Stress and Noxious Stimuli	<b>Chapter 2</b> From <b>2</b> , <b>Chapter 1</b> From <b>3</b>
Week 12	Symptoms of Cellular Disease: Intracellular accumulations	<b>Chapter 3</b> From <b>2</b> , <b>Chapter 1</b> From <b>3</b>
Week 13	Pathology of Cellular Organelles	<b>Chapter 4</b> From <b>2</b> , <b>Chapter 1</b> From <b>3</b>
Weeks 14, 15	Overview of Cell Injury and Cell Death	<b>Chapter 5</b> From <b>2</b> , <b>Chapter 1</b> From <b>3</b>

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Historical events in the development of animal cell culture technology; how the microenvironment of cultured cells is different from that in vivo; importance of the extracellular matrix and cell-cell adhesion; importance of aseptic technique and proper handling of cells classified under different levels of biological safety [1A]	20%	First Exam

Techniques of primary culture, subculture and propagation of adherent and non-adherent cell lines; safety precautions of handling and disposing of toxic and biohazardous materials; bioethics, validation of cell lines and culturing cells on different types of substrates as well as new biomaterials used for 2 & 3-D constructs in tissue engineering. [1A]	20%	Second Exam
Extra topics of interest selected and presented during the class [1D]	10%	Presentations
The student should understand the cell as a basic unit of health and disease and intracellular adaptations to stress and toxic stimuli; the symptoms of cellular disease in the form of intracellular accumulations. [1A]	25%	Final Exam
Pathological manifestations of diseased cells including cell membranes, mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, peroxisomes as well as the cytoskeleton; Cell injury and death- including the pathways to Necrotic and Apoptotic Cell Death. [1A]	25%	Final Exam

Relationship to Program Student Outcomes (Out of 100%)					
A	B	C	D	E	F
90			10		

Evaluation	
Assessment Tool	Weight
First Exam	20%
Second Exam	20%
Presentations	10%
Final Exam	50%

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