

## Course E-Syllabus

1	Course title	Cell Biology
2	Course number	0334231
3	Credit hours	2-credit hours
	Contact hours (theory, practical)	(2,0)
4	Prerequisites/corequisites	0304101
5	Program title	B.Sc. Biological Sciences
6	Program code	04
7	Awarding institution	The University of Jordan
8	School	Science
9	Department	Biological Sciences
10	Level of course	2 <sup>nd</sup> year
11	Year of study and semester (s)	2020/2021 Fall Semester
12	Final Qualification	
13	Other department (s) involved in teaching the course	N/A
14	Language of Instruction	English
15	Teaching methodology	<input type="checkbox"/> Blended <input checked="" type="checkbox"/> Online
16	Electronic platform(s)	<input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
17	Date of production/revision	10 October 2020

### 18 Course Coordinator:

Name: Dr. Amer Imraish  
Office number: 301  
Phone number:  
Email: a.imraish@ju.edu.jo

### 19 Other instructors:

### 20 Course Description:

This course deals with the cell as a unit of structure of all living organisms. It includes: Cell theory. Principles and technology of microscopy, biological membranes: Ultrastructure and function and their role in controlling cellular responses to cell matrix. Intracellular compartments: Endoplasmic reticulum, Golgi complex, lysosomes and peroxisomes ultrastructure and function. Energy transformers: Mitochondria and chloroplasts. The course concentrates also on the nuclear ultrastructure. Chromatin and DNA packaging. Nucleolus and ribosome's biosynthesis. Cell cycle and mechanism of cell division. Also studies cellular junctions. Adhesions and extracellular structures. Cell-to-substratum interactions. Transient differentiations associated with surface activity. Motile cell processes. Plant cell wall and plasmodesmata and bacterial cell wall. The course investigates also the structural elements of cytoskeleton, microtubules, microfilaments and intermediate filaments ultrastructure and functions. Cellular movement: motility and contractility and cell-to cell signalling. The course deals also with cellular aspects of cancer, aging and death.

### 21 Course aims and outcomes:

**A- Aims:**

Students will have an understanding of the biology of cells, especially eukaryotic cells.

**B- Intended Learning Outcomes (ILOs):**

Upon successful completion of this course, students will be able to:

1. Describe the tools with which cells are studied
2. Understand the overall cellular and molecular components of cells.
3. Relate subcellular structure to function
4. Explain the main processes that occur within the eukaryotic cell
5. Understand the mechanisms of cell-matrix and cell-cell interaction.

**22. Topic Outline and Schedule:**

Topic	No. of lectures	Week	Reference
<b>Welcome, Introduction, Overview</b>	<b>1</b>		
Chapter 1: <b>A Preview of the Cell</b> Cell Theory Emergence of Modern Cell Biology	2	1	Becker, Ch.1
<b>Principles &amp; Techniques of Microscopy</b> The light Microscopes Transmission Electron Microscopy Scanning Electron Microscopy	2	2	Becker Appendix
<b>Membranes: Their Structure, Function &amp; Chemistry</b> 7.1 The Functions of Membrane 7.2 Models of Membrane Structure 7.3 Membrane Lipids: The Fluid Part of the Model 7.4 Membrane Proteins: The Mosaic Part of the Model	3	3-4	Becker, Ch.7
<b>Transport across Membranes: Overcoming the Permeability Barrier</b> 8.1 Cells and Transport Processes 8.2 Simple Diffusion: Unassisted Movement down the Gradient 8.3 Facilitated Diffusion: Protein-Mediated Movement down the Gradient 8.4 Active Transport: Protein-Mediated Movement up the Gradient 8.5 Examples of Active Transport	3	4-5	Becker, Ch.8
<b>Chemotrophic Energy Metabolism: Aerobic Respiration</b> 10.1 Cellular Respiration: Maximizing ATP Yields 10.2 The Mitochondrion: Where the Action Takes Place	2	6	Becker, Ch.10
<b>Phototrophic Energy Metabolism: Photosynthesis</b> 11.1 The Chloroplast is the photosynthetic Organelle in Eukaryotic Cells	2	7	Becker, Ch.11
<b>The Intracellular Compartments</b> 12.1 The Endoplasmic Reticulum 12.2 The Golgi Apparatus 12.3 Roles of ER & Golgi Apparatus in Protein Glycosylation 12.4 Roles of ER & Golgi Complex in Protein Trafficking 12.5 Exocytosis and Endocytosis: Transporting Material across the Plasma Membrane 12.6 Coated vesicles in Cellular Transport Processes 12.7 Lysosomes and Cellular Digestion 12.9 Peroxisomes	4	7-8	Becker, Ch.12
<b>Signal Transduction Mechanisms II: Messengers and Receptors</b> 23.1 Chemical Signals and Cellular Receptors	4	9-10	Becker, Ch.23

23.2 G Protein-Linked Receptors			
23.3 Protein Kinase-Associated Receptors			
<b>Cytoskeletal System</b> 13.1 The Major Structural Elements of the Cytoskeleton 13.2 Microtubules 13.3 Microfilaments 13.4 Intermediate filaments	2	11	Becker, Ch.13
<b>The Structural Basis of Cellular Information: DNA, Chromosomes, and the Nucleus</b> 16.3 DNA Packaging 16.4 The Nucleus	2	12	Becker, Ch.16
<b>The Cell Cycle and Mitosis</b> 24.1 Overview of the Cell Cycle 24.2 Nuclear and Cell Division 24.3 Regulation of the Cell Cycle	2	13	Becker, Ch.24
<b>Cancers Cells</b> 26.1 How Cancers Arise 26.2 How Cancers Spread 26.3 What Causes Cancers?	2	14	Becker, Ch.26

- **Teaching methods include: Synchronous lecturing/meeting using MS teams platform**
- **Evaluation methods include: Quiz, Exam**

### 23 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Mid-term	30	Chapters 1& Microscope & 7 & 8 &10& 11	TBD	TBD
Semester Works	20	Assignments & Quizzes	TBD	TBD
Final Exam	50	All material	TBD	TBD

### 24 Course Requirements (e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

Student are required to have access to the following:

- A computer (with webcam & microphone)
- Active and dependable internet connection
- E-Learning website (not the mobile application) works smoothly on their computer.
- Make sure to install the application (platform) which will be used by your instructor to conduct the live meetings.

### 25 Course Policies:

A- Attendance policies:

Absence from lectures should 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.

B- Absences from exams and submitting assignments on time:

You should contact your instructor as soon as possible if you miss an exam. All such cases will be dealt with according to the rules outlined in your student handbook.

C- Health and safety procedures: N/A

D- Honesty policy regarding cheating, plagiarism, misbehavior:

All violations pertaining to cheating, plagiarism, misbehavior will be dealt with in accordance to the rules outlined in your student handbook.

E- Grading policy:

All exams are made up of MCQ' and assay question and will be graded automatically.

F- Available university services that support achievement in the course:

- University of Jordan's E-Learning online educational portal ◊ <http://www.elearning.ju.edu.jo>
- Mobile application to access E-Learning platform (Moodle)
- University of Jordan's E-Exam portal ◊ LMSsystem.ju.edu.jo

## 26 References:

A- Required book(s), assigned reading and audio-visuals:

Textbook: **The World of the cell. Becker et al (2017). 9th Edition. Benjamin and Cummings Company, California.**

B- Recommended books, materials and media:

1. Cell & Molecular Biology: Concepts & Experiments 8th Edition. By: Gerald Karp, John Wiley & Sons, 2016.
2. The Cell: A Molecular Approach, Geoffrey M. Cooper and Robert E. Hausmann, 6th edition, Sinauer Associates, 2013.
3. Lodish et al (2005) Molecular Cell Biology. 5th ed. Scientific American Books.

## 27 Additional information:

Name of Course Coordinator: **Dr. Amer Imraish**      Signature: ----- Date: -----

Head of Curriculum Committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of Curriculum Committee/Faculty: ----- Signature: -----

Dean: ----- Signature: -----