Course Syllabus

1	**Course title**	Advanced Cell Biology
2	**Course number**	0354781
3	**Credit hours**	3
	Contact hours (theory, practical)	3 hours theory
4	**Prerequisites/corequisites**	-
5	**Program title**	M.Sc. Biological Sciences
6	**Program code**	
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Biological Sciences
10	**Course level**	
11	**Year of study and semester (s)**	First semester 2024/2025
12	**Other department (s) involved in teaching the course**	
13	**Main teaching language**	English
14	**Delivery method**	X Face to face learning ☐Blended ☐Fully online
15	**Online platforms(s)**	☐Moodle ☐Microsoft Teams ☐Skype ☐Zoom ☐Others……
16	**Issuing/Revision Date**	05/10/2021

17 Course Coordinator:

Name: Dr. Amer Imraish

Contact hours:

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18 Other instructors:

19 Course Description:

As stated in the approved study plan.

Cellular structure and function. New methodology in studying cells. Molecular structure and function of biological membranes, internal cellular organization and the synthesis of macromolecules. Extracellular matrix, cell-cell interaction and chemical signaling between cells, hormones and receptors. Cytoskeleton, intracellular transport, cellular motility and contractility. Cellular and molecular aspects of cancer, cell aging and death.

20 Course aims and outcomes:

A- Aims:

1. Students will understand the principles underlying the application of several laboratory techniques in cell biology research.

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

3. Students will be able to critically assess primary and applied research relating to the biology of cells.

Students will be able to discuss topics relating to cell biology with others in a meaningful way.

B- Students Learning Outcomes (SLOs):

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

1) Knowledge and Understanding Advanced methodology ,Cell structure ,Gene structure and activity, Cell division.

2) Professional Skills Reading and explanation of light and electron micrographs

3) Competences (Transferable skill and attributes) Writing scientific reports.

21. Topic Outline and Schedule:

Week	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	**Introduction to cell biology:** *Basic Properties of the cells *Two fundemntally differed classes of cells *Cell differentiation *Model organisms		Face to Face	Synchronous	Exams and seminars	Karp Chapter 1
2-4	**Cellular organells and membrane trafficking:** *A few approaches to the study of endomembranes *The endoplasmic reticulum *Function of the rough endoplasmic reticulum *Membrane biosynthesis in the ER *Glycosylation in the RER *Mechanisms that ensure the destruction of misfolded protein *ER to Golgi vesicular transport *The Golgi complex *Types of vesicle transport and their functions *Sorting protein at the TGN *Targeting vesicles to a particular compartment *Exocytosis *Lysosomes *Endocytosis		Face to Face	Synchronous	Exams and seminars	Karp Chapter12
5-6	**Cell Division** *The cell cycle *Regulation of the cell cycle *Control of the cycle: The role of protein kinases *Control of the cell cycle: check points, Cdk inhibitors, and cellular responses		Face to Face	Synchronous	Exams and seminars	Karp Chapter 14
7-9	**Cell signaling pathways:** *The basic elements of cell signaling systems		Face to Face	Synchronous	Exams and seminars	Karp Chapter 15

	*A survey of extracellular messengers and their receptors *GPCR *Second messengers *Regulation of blood glucose levels *Protein tyrosine kinase *The Ras-MAP kinase pathway *Signaling by the insulin receptor *Convergence, divergence, and cross-talk among different signaling pathway					
10-11	**Cell death and cell renewal** *The events of apoptosis *Caspases *Central regulators of apoptosis *signaling pathways that regulate apoptosis *Alternative pathways of apoptosis *Stem cells and the maintenance of adult tissues *proliferation of differentiated cells *stem cells *Medical applications of adult stem cells		Face to Face	Synchronous	Exams and seminars	Cooper Chapter
	Autophagy * Summary of Key Autophagy Players * Types of Autophagy * Proteins Involved in the Autophagy Pathway * Description of Autophagy Proteins According to Their Participation in the Autophagy Stages - Induction - Nucleation - Elongation - Autophagosome - Autophagolysosome		Face to Face	Synchronous	Exams and seminars	Latest Reviews
12-13	**Cancer** *How cancer arise *How cancer spread *Oncogenes and tumor suppressor genes		Face to Face	Synchronous	Exams and seminars	Becker Chapter 26

14-15	Seminars		Face to Face	Synchronous		

22 Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Mid-term Exam	40	TBD		TBD	
Final Exam	40	TBD		TBD	
Seminars and in class discussion	20	TBD		TBD	

23 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:

- E-Learning website (not the mobile application) works smoothly on their computer.

24 Course 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 questions 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
- Optional mobile application to access E-Learning platform (Moodle)

25 References:

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

Karp's Cell Biology . 8th edition (Global Edition). By: Iwasa and Marshal, John Wiley & Sons, 2016.

B- Recommended books, materials, and media:

1. The Cell: A Molecular Approach, Geoffrey M. Cooper and Robert E. Hausmann, 6th edition, Sinauer Associates, 2013.
2. The World of the cell. Becker et al (2017). 9th Edition. Benjamin and Cummings Company, California.
3. Nakatogawa, H. Mechanisms governing autophagosome biogenesis. *Nat Rev Mol Cell Biol* **21**, 439–458 (2020). https://doi.org/10.1038/s41580-020-0241-0

26 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: ----------