



**Department of Biology**

**College of science**

**University of Salahaddin**

**Subject: Cell Biology**

**Course Book – (Second stage of General and  
Medical biology Dept.)**

**Lecturer's name:**

**Theory: Khder Hussein Rasul**

**Chnar Nnajmadeen Fathullah**

**Practical: Mustafa Fahmi Rajab**

**Aabdullah Abubakir Shareef**

**Academic Year: 2022/2023**

<b>1. Course name</b>	<b>Cell Biology Theory and practical</b>
<b>2. Lecturer in charge</b>	<b>Khder Hussein Rasul Chnar Nnajmadeen Fathullah Mustafa Fahmi Rajab Aabdullah Abubakir Shareef</b>
<b>3. Department/ College</b>	<b>Biology/Science</b>
<b>4. Contact</b>	<b>e-mail: khder.rasul@su.edu.krd chnar.fathulla@su.edu.krd Mustafa.rajab@su.edu.krd abdullah.shareef@su.edu.krd</b>
<b>5. Time (in hours) per week</b>	<b>2 hrs./week (theory) , 12 hrs./week (Practical)</b>
<b>6. Office hours</b>	<b>To be Return to the schedule on the office door</b>
<b>7. Course code</b>	<b>SBio 202</b>
<b>8. Teacher's academic profile</b>	<ul style="list-style-type: none"> <li>• I graduated from Salahaddin University in 2007 (Ranked 1<sup>st</sup> in collage), first, I worked as assistant of biology for two years and assist in practical Immunology lab., practical virology lab., practical physiology lab., practical molecular biology lab. At the end of 2011, I finished my M.Sc. degree in cell biology and have started as assistant Lecturer, teaching practical cell biology and microtechnique.</li> <li>• For 3 years (Between 2012-2015) I had worked as a Member of the Examination Committee for College of Science.</li> <li>• My scientific title changed to lecturer on September 2016 by submitting 3 research articles</li> <li>• From 2016-2019, I worked in Zanco Journal as editor.</li> <li>• I am PhD student since 2018.</li> </ul>
<b>9. Keywords</b>	Cell, organelles, cell death, cancer, cellular respiration, proteins and stem cells
<b>10. Course overview:</b>	
<p>The world of biology was evolved by recognizing the cell first time, because it's basic structural and functional unit of living organism. During the course, students will understand fundamentals of Cell Biology Concepts and they will learn about their importance in scope of biology.</p>	
<b>11. Course objective:</b>	
<p>-Understanding the cell organelles and their function -Learn about cell cycle -Students being familiar with cancer and its causes -Improving lab techniques and protocols</p>	

## 12. Student's obligation

\***Exam policy:** Student Should take at least one exam during the course; There will be no make-up exams for absences students without medical report.

\***Seminar:** during the course, the student will do seminar

\***Classroom polices:**

**1- Attendance:** students are strongly encouraged to attend in class on a regular basis, as participation is important to understanding of the material. This is student's opportunity to ask questions. **Students are responsible for obtaining any information during the class which provided.**

**2- Lateness:** Lateness to class is disruptive

**3- Electronic devices:** All cell phones are to be turned off at the beginning of class and put away during the entire class and don't allow to use internet.

**4-Talking:** During class please refrain from side conversations. These can be disruptive to your fellow students

## 13. Forms of teaching

-Using power point, whiteboard and scientific animations during teaching time

-students will have the complete lecture contents every week

## 14. Assessment scheme

Breakdown of overall assessment and examination

### Sub final marks

#### Practical (35 marks)

Exam 25

Quiz 4,

Seminar 4,

Homework 2.

#### Theory (15 marks)

**Exam = 10 marks**

**Quizzes, seminar and attendance = 5 marks**

### Final

#### Laboratory (50 marks)

**15. Student learning outcome:**

After completion of this course,

- Students will understand about the cell organelles and their functions
- Give information and define different terms of cell biology and about the history of the discovery of the cell and cell development.
- Give detail about the composition of the cell and
- The function of different parts of the cell
- Learn about different process, which happens with the cell.
- Students will get skills of lab techniques

**16. Course Reading List and References:**

- GOODMAN, S. R. 2008. *Medical cell biology*, Elsevier Inc.
- LODISH, H., BERK, A., ZIPURSKY, S. L., MATSUDAIRA, P., BALTIMORE, D. & DARNELL, J. 2000. *Molecular cell biology*, WH Freeman New York.
- HALL, J. E. 2010. *Guyton and Hall textbook of medical physiology*, Elsevier Health Sciences.

**17. Theory Topics**

- 1- Course book and introduction to cell biology
- 2- Cells: the fundamental unit of life
- 3- Membranes of the cell
- 4- Transport across cell membranes
- 5- Nuclear structure and function
- 6- Mitochondrial structure and function
- 7- Cellular respiration
- 8- Golgi and ribosomes
- 9- ER, protein synthesis and protein modifications
- 10- Lysosome and Peroxisome
- 11- Cytoskeleton
- 12- Cell junction
- 13- Cell Cycle
- 14- Cell death
- 15- The biology of cancer cell
- 16- The biology of stem cells

Lecturer's name  
Khder Hussein Rasul  
(2 hrs for each one)

**18. Practical Topics**

**Course introduction:** a brief history of cell discovery and cell theory. Students will obtain a good grasp about the topics of the practical cell biology course (coursebook description)

**Week One**

<p><b>Introduction to cells:</b> prokaryote and eukaryote cells, general structure of the animal and plant cells and shape of the cells. (Slides of various samples should be shown and onion tissue and leaf (guardian cells) samples should be prepared by the students.</p>	<p><b>Week Two</b></p>
<p><b>Cell dimension:</b> students will learn about using ocular micrometer, stage micrometer and how to determine cell dimension.</p>	<p><b>Week Three</b></p>
<p><b>Cell counting:</b> Students will learn how to use different approaches to counts cells such as by haemocytometer and ocular grid.</p>	<p><b>Week Four</b></p>
<p><b>Electronmicroscopy (EM):</b> Students will go over the specifics of EM technology and how EM samples can be prepared.</p>	<p><b>Week Five</b></p>
<p><b>How temperature changes the membrane integrity:</b> students will use beet to show how different temperatures changes the cell membranes permeability.</p>	<p><b>Week Six</b></p>
<p><b>Mitochondrial ultrastructure in health and disease.</b> Students will be shown various electronmicrographs (EM) of normal and abnormal mitochondria.</p>	<p><b>Week Eight</b></p>
<p><b>Cellular respiration:</b> aerobic and anaerobic respiration and cellular respiration. Student use yeast as an experimental model to show the cellular respiration process.</p>	<p><b>Week Nine</b></p>
<p><b>Cell death:</b> necrosis and programmed cell death (apoptosis), mechanism, cellular features. Students will be shown various electronmicrographs (EM) of necrosis and apoptosis process.</p>	<p><b>Week ten</b></p>
<p>Immunohistochemistry technique and applications in cell biology research.</p>	<p><b>Week eleven</b></p>
<p>Cancer Biology</p>	<p><b>Week twelve</b></p>

**19. Examinations:**

Q1\ Fill with suitable answer:

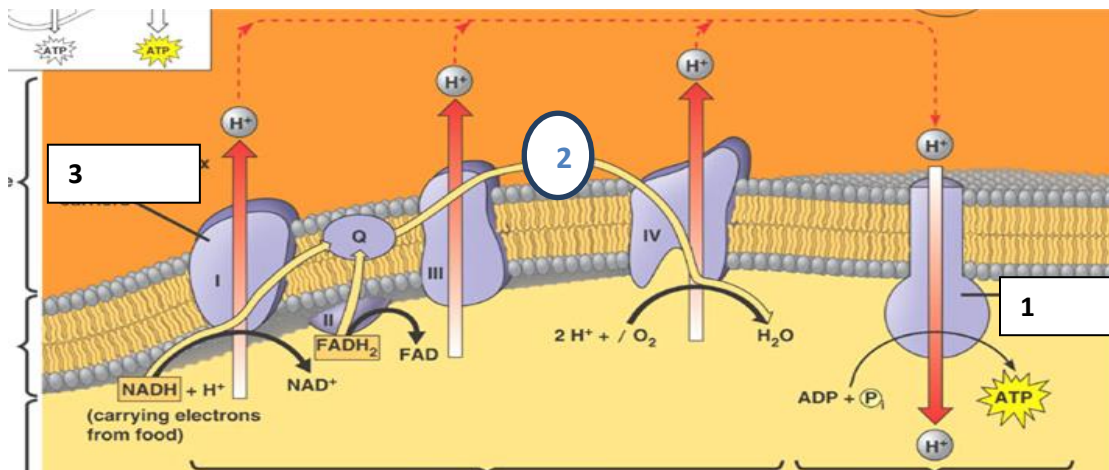
1. From Kreb' s cycle we gain .....ATP and .....FADH<sub>2</sub>
2. Apoptosis is needed for proper development, examples are
  - a) .....
  - b) .....
  - c) .....
  - d) .....
3. ....is a nematode which became a model for studying of apoptosis
4. Pluripotent stem cells are .....while totipotent cells are .....

Q2\ Write about the following:

1. Angiogenesis
2. Matrix Metalloproteinases

Q3\ From the following figure, identify:

1.....2.....3.....



Q4) Write the differences between:

- 1) Growth of normal cells and cancer cells in culture
- 2) P53 and **TNF- $\alpha$**
- 3) Multipotent and unipotent stem cells

**20. Extra notes:**

**21. Peer review**

پیداچوونہوہی ھاوہل

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*

ئەم كۆرسبووكە دەبىت لەلایەن ھاوئێكى ئەكادىمىيەو سەير بكرىت و ناوهرۆكى بابەتەكانى كۆرسەكە پەسەند بكات و جەند وشەيەك بنوسىت لەسەر شياوى ناوهرۆكى كۆرسەكە و واژووى لەسەر بكات.  
ھاوئەل ئەو كەسەيە كە زانبارى ھەبىت لەسەر كۆرسەكە و دەبىت پلەى زانستى لە ماموستا كەمتر نەبىت.

## Course Book