



Department of Biology

College of science

University of Salahaddin

Subject: Cell Biology

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

Lecturer's name:

Theory: Khder Hussein Rasul

Chnar Nnajmadeen Fathullah

Practical: Mustafa Fahmi Rajab

Abdullah Abubakir Shareef

Academic Year: 2023/2024

| | |
|-------------------------------|---|
| 1. Course name | Cell Biology Theory and practical |
| 2. Lecturer in charge | Khder Hussein Rasul Mustafa Fahmi Rajab Abdullah Abubakir Shareef |
| 3. Department/ College | Biology/Science |
| 4. Contact | e-mail: khder.rasul@su.edu.krd Mustafa.rajab@su.edu.krd abdullah.shareef@su.edu.krd |
| 5. Time (in hours) per week | 2 hrs./week (theory) , 12 hrs./week (Practical) |
| 6. Office hours | To be Return to the schedule on the office door |
| 7. Course code | SBio 202 |
| 8. Teacher's academic profile | <ul style="list-style-type: none"> • Khder Hussein Rasul I graduated from Salahaddin University in 2007 (Ranked 1st 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. • For 3 years (Between 2012-2015) I had worked as a Member of the Examination Committee for College of Science. • My scientific title changed to lecturer on September 2016 by submitting 3 research articles • From 2016-2019, I worked in Zanco Journal as editor. • PhD in molecular genetics, October 2022 • Mustafa Fahmi Rajab MSc degree in molecular biology and genetics. I got my master's degree at Ankara and METU Universities between 2015-2018. • Abdullah Abubaker Shareef I graduated from Salahaddin University in 2013, where I ranked 2nd in my class. Following my graduation, I worked as an assistant in the field of biology for three years. At the end of 2019, I completed my M.Sc. degree in Molecular Genetics. Subsequently, I began my career as an Assistant Lecturer, teaching practical courses in cell biology and cytogenetics |
| 9. Keywords | Cell, organelles, cell death, cancer, cellular respiration, proteins and stem cells. |

10. Course overview:

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.

11. Course objective:

- Understanding the cell organelles and their function
- Learn about cell cycle
- Students being familiar with cancer and its causes
- Improving lab techniques and protocols

12. Student's obligation

*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

***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.

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

Pre final (50 marks)

Practical (35 marks)

Exam 15

Quiz 6

Report 8

Assignment 6

Theory (15 marks)

Exam = 10 marks

Quizzes, seminar and attendance = 5 marks

Final

Theory (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- ER, protein synthesis and protein modifications
- 7- Golgi and ribosomes
- 8- Lysosome and Peroxisome
- 9- Mitochondrial structure and function
- 10- Cellular respiration
- 11- Cytoskeleton
- 12- Cell junction
- 13- Cell Cycle
- 14- Cell death

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

15- The biology of cancer cell

16- The biology of stem cells

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 |
| Introduction to cells: 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. | Week Two |
| How temperature changes the membrane integrity: students will use beet to show how different temperatures changes the cell membranes permeability. | Week Three |
| Cellular respiration: aerobic and anaerobic respiration and cellular respiration. Student use yeast as an experimental model to show the cellular respiration process. | Week Four |
| Electronmicroscopy (EM): Students will go over the specifics of EM technology and how EM samples can be prepared. | Week Five |
| Cell dimension: students will learn about using ocular micrometer, stage micrometer and how to determine cell dimension. | Week Six |
| Electron Micrograph Images: Measuring the dimension of cells taken by electron Microscopes. | Week Seven |
| Cell counting: Students will learn how to use different approaches to counts cells such as by haemocytometer and ocular grid. | Week Eight |
| Mid-Term Exam | Week Nine |

| | |
|---|--------------------|
| Immunohistochemistry technique and applications in cell biology research. | Week ten |
| Cell death: necrosis and programmed cell death (apoptosis), mechanism, cellular features. Students will be shown various electronmicrographs (EM) of necrosis and apoptosis process. | Week Eleven |
| Organelle related disorders (Student center learning) | Week Twelve |

19. Examinations:

Q1\ Fill with suitable answer:

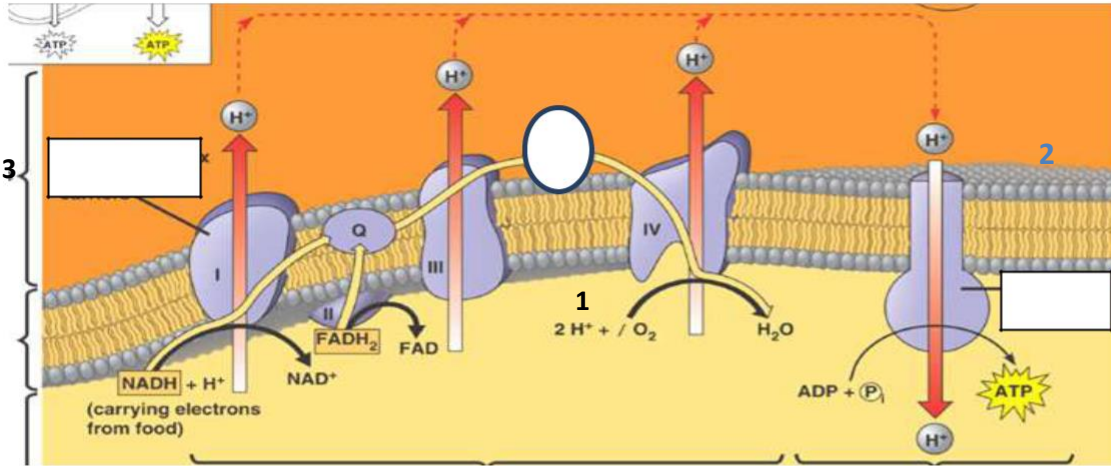
1. From Kreb’ s cycle we gainATP andFADH₂
2. Apoptosis is needed for proper development, examples are
 - a)
 - b)
 - c)
 - d)
3.is a nematode which became a model for studying of apoptosis
4. Pluripotent stem cells arewhile totipotent cells are

Q2\ Write about the following:

1. Angiogenesis
2. Matrix Metalloproteinases

Q3\ From the following figure, identify:

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



Q4) Write the differences between:

Growth of normal cells and cancer cells in culture

1)

P53 and TNF-

2)

Multipotent and unipotent stem cells

3)

20. Extra notes:

21. Peer review پیداچوونھوی ھاوھل

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).

نھم کورسبووکه دھبیت لھاالیھن ھاوھلیکی نھکادیمیھوہ سھیر بکریت و ناوھرۆکی بابھتھکانی کورسھکه پھسھند بکات و جھند وو شھیکھ بنووسیت لھسھر شباوی ناوھرۆکی کورسھکه و واژووی لھسھر بکات. ھاوھل نھو کھسھیه که زانیاری ھبیت لھسھر کورسھکه و دھبیت پلھی زانستی له ماموستا کھمتر نھبیت.

Course Book