



Department of Chemistry

College of Science

Salahaddin University - Erbil

Subject: Cell Biology

Course Book – Year 3

Lecturer names:

Shang Ziyad Abdulqadir, PhD/ Theory

Mukhlis Hamad Alli, Ph.D/ Theory

Awat Yaseen Hasan, M.Sc./ Practical

Azheen Subhi Abdulrahman, M.Sc./ Practical

Academic Year: 2023-2024

Course Book

1. Course name	Cell Biology
2. Lecturer in charge	Dr. Shang Ziyad Abdulqadir, Ph.D/ (Theory) Dr. Mukhlis Hamad Alli, Ph.D/ Theory Azheen Subhi Abdulrahman, M.Sc. (Practical) Awat Yaseen Hasan, M.Sc. (Practical)
3. Department/ College	Department of Chemistry/College of Science
4. Contacts	E-mails: Shang.abdulqadir@su.edu.krd Mukhlis.aali@su.edu.krd Azheen.abdulrahman@su.edu.krd Awat.hasan@su.edu.krd
5. Time (in hours) per week	Dr. Shang Z. Abdulqadir: 4 hrs theoretical & 8 hrs. practical supervision Dr. Mukhlis Hamad Aali: 4 hrs theoretical & 8 hrs. practical supervision
6. Office hours	TBD
7. Course code	Cell Biology
8. Teacher's academic profile	<ol style="list-style-type: none"> 1. I graduate from Salahaddin University/ College of Science/ Biology department in 2005. In 2005 I worked as assistant biology for 3 years and assisted in practical animal physiology lab., ecology lab., practical histology and embryology lab., practical molecular lab., and practical plant physiology lab. 2. In 2010 I completed my M.Sc. in Embryology and Histology and in same year I started as Assistant Lecturer Teaching Practical histology and embryology and microtechnique. 3. In 2015 I started my PhD. 4. In 2019 I completed my PhD in cell biology and histology. 5.
9. Keywords	Cell investigation, structure, internal organization, regulation, function
10. Course overview:	<p>This course covers elementary principles in cytology. It is designed to introduce third year chemistry students with cell regulation and function and linking it with the knowledge they obtain in this year from biochemistry course regarding macromolecules metabolism and how cells obtain their energy. In this case this course could fulfil the information and compile it with biochemistry course, in a way clarifies the whole picture of cellular functions from the biological viewpoints. It describes the internal organization and behaviour of cells. In addition, this course covers how genetic information in cells are stored, expressed and transduced. In this course the main experimental methods for investigating and analysing cells in unicellular, and multicellular systems are explained as well.</p>

11. Course objective:

The objectives of this course are:

1. Introduce 3rd year students with scientific terminologies used in cell biology.
2. Teach the students the methods used to perform a scientific review and research in cell biology.
3. Introduce the students to ways they can apply these teaching to their potential jobs in the future.

12. Student's obligation

- Attendance will be taken in the first 5min of each lecture. During which if you are not present, you will be recorded as an absentee.
- The students are required to keep their mobile devices quiet at all times during the lectures.
- The students are expected to remain respectful and civil to their fellow students.
- Any verbal and/or written form of cheating is not tolerated.
- The exams once set, will not be postponed. You will be reminded with a note on the students' note-board several days before the exam.
- English language is used in the lectures. Students are expected to answer exam questions in English language, only.

Students lab obligations:

Exam policy: Student Should take 2 exams during the course; There will be no make-up exams for absences students without medical report.

Quizzes: students are quizzed every week.

Seminar: during the course, the student will do seminar.

13. Forms of teaching

PowerPoint presentation, board, videos, in class activities, and sample identification

14. Assessment scheme

Student assessment will be based on scores obtained in the written exams. There will be at least two written exams. The scores will be announced as one annual quest grade on 50 (15 theoretical+ 35 practical).

15. Student learning outcome:

By completing this course, the students can:

1. Become familiarized with scientific vocabularies used in the science of cytology.
2. Be able to describe general differences between different types of cells.
3. Be able to characterize internal structures and functions of cells.
4. Obtain the knowledge as how cells in different tissues and organs behave for the interest of survival.
5. Understand how cellular mechanisms work in response to diseases and treatments.

16. Course Reading List and References:

Theory:

- Alberts, Bruce; Johnson, Alexander; Lewis, Julian; Morgan, David; Raff, Martin; Roberts, Keith; Walter, Peter. Molecular Biology of the Cell. W. W. Norton & Company.

Practical:

- Color atlas of cytology, histology and microscopic anatomy. 2003. Wolfgang Kuehnel. 4th edition.
- Cell imaging techniques, methods and protocols. 2006 Humana Press Inc. Edited by Douglas J. Taatjes and Brooke T. Mossman.
- Essential cell biology. 2009. Bruce Alberts , Dennis Bray, Karen Hopkin , Alexander Johnson , Julian Lewis , Martin Raff , Keith Roberts and Peter Walter. 3rd edition.
- Cell and Molecular Biology, Concepts and Experiments. 2007. Gerald Karp. 5th edition.
- Methods in Cell Biology. 2003. Edited by Leslie Wilson and Paul Matsudaira.
- The Cell a Molecular Approach. 1997. Geoffrey M. Cooper.
- Magazines and review (internet)

17. The Topics:	Timeline
Course book	Week 1
Introduction to Cells	Week2
Techniques used for studying the cell	Week3
Ultrastructural of the cell	Week4
Cell junctions and cell surface receptors	Week5
Mitochondria	Week6
Examination 1	Weeks7
Other organelles	Week8
The cytoskeleton structure	Week9
Cell signalling	Week10
The cell cycle	Week11
Cancer Biology	Week12
Stem Cell Biology	Week13
Examination 2	Weeks 14
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

Cell dimension: students will learn about using ocular micrometer, stage micrometer and how to determine cell dimension.	Week Three
Cell counting: Students will learn how to use different approaches to counts cells such as by haemocytometer and ocular grid.	Week Four
Electronmicroscopy (EM): Students will go over the specifics of EM technology and how EM samples can be prepared.	Week Five
How temperature changes the membrane integrity: students will use beet to show how different temperatures changes the cell membranes permeability.	Week Six
Examination 1	Week Seven
Mitochondrial ultrastructure in health and disease. Students will be shown various electronmicrographs (EM) of normal and abnormal mitochondria.	Week Eight
Cellular respiration: aerobic and anaerobic respiration and cellular respiration. Student use yeast as an experimental model to show the cellular respiration process.	Week Nine
Cell death: necrosis and programmed cell death (apoptosis), mechanism, cellular features. Students will be shown various electronmicrographs (EM) of necrosis and apoptosis process.	Week ten
Immunohistochemistry technique and applications in cell biology research.	Week eleven
Cancer Biology	Week twelve
Examination 2	Week Thirteen
19. Examinations:	
Theory:	
Exams will be mixture of the following styles:	
<ol style="list-style-type: none"> 1. Multiple choice 2. Short assay 3. True or false 4. Drawing 	
During Answering: the student should:	
<ol style="list-style-type: none"> 1. Understand the questions. 	

2. Answer the questions asked during the assigned exam time.

3. Answer should be precise.

Examples of exam questions

• The main role that actin filaments play in cells is

A. Energy generator B. structural function C. Secretory pathway D. Posttranslational modification

• How proteins regulate cellular functions?

▪ Draw a mitochondrion, and describe its contribution to cellular homeostasis.

▪ What is the function of the pointed part?

Practical:

1. I identify: include instruments, materials, cell shape....etc

Example: Identify the following

• Answer: Plastic block

2. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for...?, Why...?, How....?

Example: What do you know about osmium tetroxide?

• Answer: Osmium tetroxide is act as strainer and fixative which use in Routine TEM

3. True or false type of exams:

• In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence.

Example: The main part of the cell, which determines the cell shape, is cytoskeleton.

• Answer: True

4. Multiple choices:

• In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase.

20. Extra notes:

21. Peer review هاوهل پيداچوونهوهى

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).

ئهم كۆرسبووكه دهبيت له لايهن هاوهلئىكى ئەكادىمىهوه سهير بكرىت و ناوهروكى بابتهكانى كۆرسهكه پەسەند بكات و جهند ووشهيهك بنوسنىت لهسەر شياوى ناوهروكى كۆرسهكه و واژووى لهسەر بكات. هاوهل ئهو كەسهيه كه زانبارى ههبيت لهسەر كۆرسهكه و دهبيت پلهى زانستى له ماموستا كه متر نهبيت.

Peer reviewed by:

Mr. Mohammed Ali Salim

Ministry of Higher Education and Scientific research
Head of Biology Department