



Department of Biology

College of science

University of Salahaddin

Subject: Molecular biology

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

Lecturer's name:

Theory: Dr.Bushra Karim Amin

Dr.Fairuz Hassan Abdullah

Practical: M.Sc Aabdullah Abubakir Shareef

M.Sc Mustafa Fahmi Rajab

Academic Year: 2022/2023

1. Course name	Molecular Biology Theory and practical
2. Lecturer in charge	Theory: Dr.Bushra Karim Amin Dr.Fairuz Hassan Abdullah Practical: M.Sc Aabdullah Abubakir Shareef M.Sc Mustafa Fahmi Rajab
3. Department/ College	Biology/Science
4. Contact	e-mail: bushra.amin@su.edu.krd fairuz.abdullah@su.edu.krd Mustafa.rajab@su.edu.krd abdullah.shareef@su.edu.krd
5. Time (in hours) per week	2 hrs./week (theory) , 6 hrs./week (Practical)
6. Office hours	To be Return to the schedule on the office door
7. Course code	GBio 302
8. Teacher's academic profile	<ul style="list-style-type: none"> • MY Academic Profile (Mustafa Fahmi Rajab) • 2020- Now: Teaching as Assistant lecturer at Salahaddin University - Biology Department • 2018- 2020: Working as biology assistant in Salahaddin University- College of Science, Biology department. • 2015-2018: Master degree in Genetics and Molecular Biology in both Ankara University and Middle East Technical University in Ankara /Turkey. GPA 3.78/4, (93.40% /100%) • 2013-2015: Working as biology assistant in Salahaddin University /college of science /Biology Department, Erbil-Iraq. • 2009-2013: BSc in Biological science at Salahaddin University. Rank (3) over whole University students. Average grade: 86.3% /100%. • 2003-2009: Studied preparatory school in Hawler Typical Secondary School in English language.
9. Keywords	Macromolecules, DNA, RNA, PCR, Gel electrophoresis, FISH Analysis
10. Course overview: The course will cover Practical Molecular Biology . Molecular Biology is that branch of biology that studies the structure and activity of macromolecules essential to life (and especially with their genetic role) and it is helping to diagnose and treat major human diseases (human	

health), provide solutions for a cleaner environment and produce new pharmaceutical bio products and processes either on the molecular level (genetics, gene splicing, or use of recombinant deoxyribonucleic acid [DNA]) or in more visible areas such as cattle breeding. These have been called DNA Marker Technology.

So molecular biology sometimes studies this process back word; e.g. if there was a problem in the function of defence cells of immune system we look to the immune cell at a molecular level and see what protein this cell is having problem with, and what and how the amino acids of the protein is changed and what nucleic acid sequence is responsible for the production of this malfunctioned protein (amino acids).

Through this semester we discuss some of the methods and applications of **Molecular Biology**. We'll look at the techniques biologists use in the lab to manipulate DNA and see how to alter the genetic material present in an organism. There are many practical uses for **Molecular Biology**, and we'll touch on some of them. We'll also discuss the practical and ethical questions raised by the ability to alter an organism's genetic make-up.

11. Course objective:

At the end of this course students should be able to demonstrate a clear understanding of the facts and basic concepts of molecular biology which are covered in lecture and laboratory, including;

1. To enable candidates to acquire the knowledge and develop an understanding of how materials are provided by biological agents to provide goods and services.
2. To appreciate the role played by biotechnology in improving health care for human beings.
3. To understand the interdisciplinary nature of this subject.

4. To develop the ability to appreciate biological phenomenon in nature and the contribution of biotechnology to human welfare.

Our students gain a wide range of laboratory-based skills and techniques, which both provide the practical basis for their studies and provide a useful portfolio of employability skills. These skills, plus associated research experience gained in the final year Honours project, have enabled our **Molecular biology** graduates to establish an excellent reputation in medical, industrial and research laboratories.

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, scientific videos, Student centre learning, etc...

14. Assessment scheme

Practical (35 marks)

Exam 25 pts

Quiz 5 pts

Seminar 3 pts

Homework 2 pts

Theory (15 marks)

Final (50 marks)

15. Student learning outcome:

After completion of this course,

- Students will understand the structure of macromolecules, e.g. DNA and RNA.
- How to extract DNA, RNA from various cell types and tissues
- Main techniques in Molecular biology like PCR, Gel electrophoresis.
- How to design a primer for any purpose?
- Importance of molecular biology techniques in our daily life.
- New techniques and procedures used nowadays, e.g. Fish technique

16. Course Reading List and References:

- *Molecular Biology and Biotechnology: A Guide for Students, (3rd Edition) by Helen Kreuzer & Adrienne Massey.*

Book ISBN or Item Number: 978-1-55581-472-4

Publisher: ASM Press

Paperback, 498 pages, two-color throughout with full-color insert,

Illustrations, glossary, index. Publication Date: Oct 2007

And any other **Molecular Biology books** published.

17. Theory Topics

18. Practical Topics

<p>Basic Concept About Practical Molecular Biology (Preparation of Solutions).</p>	<p>Week One</p>
<p>DNA Extraction From Eukaryotic Cells (Human Blood Cells).</p>	<p>Week Two</p>

RNA Extraction from Different Tissues (Bovine Spleen, Liver and Plant).	Week Three
Basic Concept Polymerase Chain Reaction (PCR)	Week Four
How to design a primer? Running a PCR test in Lab.	Week Five
DNA and RNA Concentration and Quantification By UV Spectro-NanoDrop Method.	Week Six
Types of PCR, Applying Student center learning technique.	Week Eight
Agarose Gel Electrophoresis	Week Nine
Running agarose gel electrophoresis in the lab.	Week ten
Molecular cytogenetics <i>Fluorescent in situ Hybridisation (FISH)</i> <i>Comparative Genomic Hybridisation (CGH)</i>	Week eleven
Micro array technique and NIPT process	Week twelve

19. Examinations:

Q1. Define the following(s).

Q2. Write the purpose of using the following(s).

Q3. What is the principle of a technique?

Q4. Write the reason of the following?

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 كۆرسىبووكە دەبىت لەلایەن ھاوھلێكى ئەكادىمىيەو سەير بىكرىت و ناوھرۆكى بابەتەكانى كۆرسەكە پەسەند بىكات و جەند وشەپەك بنووسىت لەسەر شىاوى ناوھرۆكى كۆرسەكە و واژووى لەسەر بىكات.
ھاوھل ئەو كەسەپە كە زانىارى ھەبىت لەسەر كۆرسەكە و دەبىت پلەى زانستى لە مامۇستا كەمتر نەبىت.

