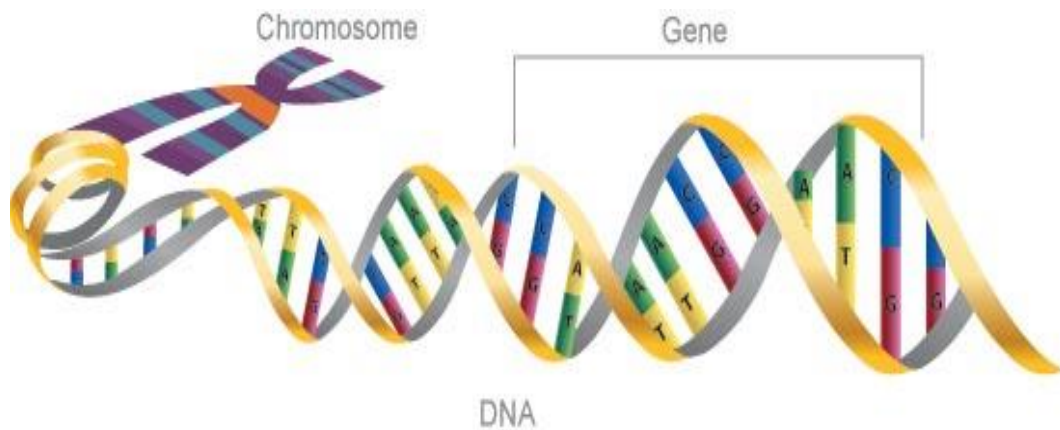




BIOTECHNOLOGY

Course for undergraduate students



2021-2022

by: Dr.sarween Omer Taha/PH.D. In Molecular Microbiology
Environmental science Department

Ministry of Higher Education and Scientific research

Department of Environmental science

College of SCIENCES



University of SALAHADDIN-HAWLER

Subject Biotechnology -Theory Course

Book — (4th Year Environmental science

Students) Lecturer's name (Theory):

Dr. Sarween Omer Taha

**Ph.D. in Molecular Microbiology at Salahaddin
university**

Academic Year: 2022-2023

Directorate of Quality Assurance and Accreditation

Course Book

1. Course name	Biotechnology-THEORY
2. Lecturer in charge	Dr. Sarween omer taha
3. Department/ College	Environmental science Dept. / COLLEGE OF SCIENCES
4. Contact	Email sarween.taha@su.edu.krd
5.. Time (in hours) per week	Theory: 2 hrs
5.. Office hours	To be Return to the schedule on the office door
6. Teacher's academic profile	<p>Dr. An got the Doctorate (PhD.1 degree in Molecular-Microbiology at salahaddin university 2020_ as a Lecturer, she is in charge in teaching Molecular Techniques Theory for 4th class students.</p> <p>In 2010 she got the M.S.c, degree and start as Assistant Lecturer Teaching Practical microbiology at Education college/biology department .</p>
8. Keywords	DNA, RNA, Genes, RNA, PCR Techniques,. Electrophoresis,
9. Course overview: The importance of studying the subject: There have been numerous advances made in many fields of the biosciences in recent years, and perhaps the most dramatic advances have been in our ability to investigate and define cellular processes at the molecular	

in molecular biology—nucleic acid, protein, and cell-based methodologies, in particular. The importance and goals behind this course program is to provide the students a clear overview about important subject areas in Applied Molecular Biology, but at a level that is suitable for undergraduate students. By the end of this course, students will be able to conduct many Novel Molecular Techniques which have been invented recently and are applicable in many well-constructed laboratories in our country.. to study many clinical problems and genetically disorders. Therefore, they will find a good chance to work in many Governmental and Private sector laboratories.

- **Understanding of the fundamental concepts of the course:**

To provide a detailed discussion of each topic in the restricted time available means, it has been necessary to assume a very fast fresher review of students understanding of Basic Molecular Biology, Basic Genetics, Chromosomal Structure and DNA replication, Transcription and Protein synthesis. This course book is therefore intended to complement your knowledge in this area of Bio-sciences.

- **Principles and theories of the course;**

This course tries to address topics that enhance students understanding the importance applying Molecular Techniques and Bioinformatics to study Biology in general and Molecular Biology, Biochemistry, Immunology and Microbiology in Particular via studying the Molecular and Genetic Revolution and a meaningful understanding of how living organisms function including an appreciation of how cells operate at the molecular level from cell division to DNA doubling then to Protein Synthesis.

- **A sound knowledge of the major areas of the subject:**

In writing this course book, I have attempted to combat the frustration because I and many others have faced difficulties when reading papers, reviews and other books, in finding that essential points are often spread over many pages of text and embellished to such an extent that the salient information is difficult to extract. In accordance with these aims, I have presented the below inter-related Topics for Molecular Techniques covering most recent Separation and Visualization methods, Nucleic Acids Amplifications, Fluorescent Hybridizations and Probing Methods, and also joining Bioinformatics with Biology.

- **Sufficient knowledge and understanding to secure employment:**

In order to get a comprehensible understanding of the course topics and objectives, students must have a basic knowledge about Molecular Biology, Chromosomes, Genes and Biochemistry.

Ii. Course objective.

This course will give students hands-on experience in modern molecular techniques for obtaining and analysing data in population genetics and systematic biology. Following completion of this course the successful student will have practical experience in modern molecular techniques used for evolutionary genetics including molecular systematics, genomics, molecular microbiology molecular diagnostic tools, and population/landscape genetics. Laboratories will give students hands-on experience performing techniques including polymerase chain reaction (PCR) and real-time PCR, DNA sequencing, molecular cloning, cDNA library construction, microsatellite library construction and screening, microsatellite analysis, single nucleotide polymorphism (SNPs), RFLP, AFLP and AGE among others, Lecture will focus on experimental design, data collection and analysis,

12. Student's obligation

***Exam policy:** Student should engage Grt 2 exams during the course, From the 3 exams, one will be collected from the weekly quizzes and assignments. Students will have to decide which one to be chosen for correction by the teacher before. There will be no make-up exams for absences students without medical report. By the end of the 2nd semester, students must do a final examination regarding this Material,

***Classroom polices:**

1- Attendance: You are strongly encouraged to attend class on a regular basis, as participation is important to your understanding of the material_ This is your opportunity to ask questions_ You are responsible for obtaining any Information you miss due to absence.

2- Lateness: Lateness to class is disruptive.

3- Electronic devices: All cell phones are to be turned silent at the beginning of class and put away IIOT

LPSED) during the entire class.

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

5- No Disrespectful to both the professor and to your fellow students.

.6- Every week Quizzes for previous lectures are obligatory.

1a. Forms of teaching

As in the Course book Text and power Point Lectures.. Different forms of teaching will be used to reach the objectives of the course; real-time teaching via white board, student integrations strategy, power point presentations for titles, sub- titles, figures,. flow charts and summarizing the lecture main topic. Daily quizzes,. students tutorials (15 minutes at least) and assignments will be established and will have their impact on the students final Marks.

14. Assessment scheme

Percent (theory)%		
Exam I st attempt	2022	10%
Exam PI attempt	2022	10%
Exam and attempt	2022	10%

Exam 4th attempt

Weekly quizzes and assignments D7 %

Respecting Classroom Policy
03%

Total {average of the 4 collective exams)

40%

15, Student learning outcome:

The importance and goals behind this course program is to provide the students a clear overview about important subject areas in Applied / Molecular Biology, but at a level that is suitable for undergraduate students. By the end of this course, students will be able to conduct many Novel Molecular Techniques which have been invented recently and are applicable in various well-constructed laboratories in our country. Laboratories will give students hands-on experience performing techniques including polymerase chain reaction (PCR) and real-time PCR, DNA sequencing, molecular cloning, cDNA library construction, microsatellite library construction and screening, microsatellite analysis, single nucleotide polymorphisms (SNPs), FCF P. ARS' and DGGE among others.

16. Course Reading List and References:

1. John M. Walker, 2005. Molecular Bio methods. Handbook Second Edition
2. M. Tevfik Dorak _ 2011:16, Real-time PCR. School of Clinical Medical Sciences (Child Health)
3. Gerald Karp. 2013. Cell and Molecular Biology, Concepts And Experiments. 7th Edition..
4. Nalini Chandar, 2010. Ippincott's Illustrated Reviews: Cell And Molecular biology.
5. David Clark. 2015_ MOLECULAR BIOLOGY. Southern Illinois University. Elsevier Academic Press
6. Eberhard Passa rge. 2007. Colour Atlas Of Genetics.

Useful websites / electronic sites):

1. U.S. National Center for Biotechnology Information Pub-Med <http://www.ncbi.nlm.nih.gov/pubmed>
2. University of California (<http://www.utdallas.edu>)
3. Biochemical Centre: <http://www.biorchemcentral.com/bmcmolb> 011.

Week 1	<i>Intr0duction of biotechnology</i>
Week 2	Restriction Enzymes
Week3	<i>Plasmid and vectors</i>
Week 4	<i>Recombinant DNA Technology</i>
Week5	<i>Recombinant DNA technology and Cloning</i>
Week 6	<i>Environmental biotechnology (Bioremediation- cleaning the environment)</i>
Week 7	Food Biotechnology
Week 8	<i>Forensic studies (DNA finger printing)</i>
Week 9	<i>Microbial Biotechnology</i>
Week 10	<i>Drug Biotechnology</i>
Week 11	<i>Overview of some Biotechnology and Molecular techniques</i>
Week 12	Antibiotics
Week 13	<i>cloning</i>
Week 14	<i>Gene therapy</i>
Week 15	<i>recombination</i>

Week 16	
Week 17	
Week 18	
Week 19	
Week 20	
Week 21	
Week 22	
Week 23	
Week 24	
Week 25	
Week 26	-
Week 27	
Week 28	
Week 29	
Week 30	

