

Molecular Biology; Code: PHB 703

A-Basic Information

Programme(s) on which the course is given:	Master degree in Pharmaceutical Sciences (Biochemistry)
Department responsible for offering the course:	Department of Biochemistry and Molecular Biology.
Department responsible for teaching the course:	Department of Biochemistry and Molecular Biology.
Academic year:	2020/2021
Course title and code:	Molecular Biology; PHB 703
Contact hours (credit hours):	Lecture: 4 (4)
Course Coordinator:	Prof.Dr.Nadia Hamdy.

B- Professional Information

The course aim and intended learning outcomes are based on that mentioned in the programme specifications, with more course-related specific details.

1 - Overall Aims of Course

Upon successful completion of this course, The students:

- Will have the basic principles of molecular biology such as Apoptosis & Autophagy, Epigenetic Modifications, The cell cycle, The cell senescence, Gene silencing and Transcription factors regulation.
- Should be able to apply this knowledge correctly in understanding functions elaborated by these molecules and diseases resulting from their impairment.
- Master the fundamentals and methodologies of several important molecular biology techniques such as CRISPR and Next Generation sequencing and use various tools of scientific research.

2 -Intended Learning Outcomes of Course (ILOs)

a- Knowledge and Understanding:

The students should be able to:

- a1- Define the principles of molecular biology.
- a2- Explain biochemical pathways for synthesis and degradation of various nucleic acids, and regulation of gene expression.
- a3-Critically assess current theories of eukaryote chromosome organisation.
- a4- Discuss the role of molecular biology in gene therapy, gene discovery and diagnosis.
- a5-Record Different molecular biology techniques.

b-Intellectual Skills:

The students should be able to:

- b1-Assess biochemical information quickly on molecular basis.
- b2-Use and Apply of molecular biology knowledge in the field of genetic medicinal diseases.
- b3- Analyze scientific researches to solve the problems of the drug-DNA interaction and its application in controlling diseases.

c- Professional Skills:

The students should be able to:

- c1- Use of e-literature and genome-relevant data bases.

c2- Use different methods in analyzing gene and gene expression.

d- **General and Transferable Skills:**

d1-scientific thinking, drawing and writing.

d2-apply modern methodologies in communication and learning.

3 -Course Contents

Topics	No. of hours	Lecture
Tumor hypoxia in cancer therapy.	4	4
Mechanisms of cell senescence.	4	4
NGS; Next generation sequencing.	4	4
Epigenetic Modifications; DNA methylation, HDAC.	4	4
Exosomes and Mitochondria in Cancer.	4	4
RNA silencing.	4	4
Regenerative therapy and Cell-based therapy.	4	4
Chromosomal aberration.	4	4
Regulation of gene expression /Transcription factors.	4	4
The cell cycle and check points.	4	4
Apoptosis and Autophagy.	4	4
Molecular mechanism of cell signaling & epigenetics	4	4
Gene editing; CRISPR	4	4
Genome/Proteome databases	4	4
Gene Silencing	2	2
Primary Cell Culture vs Cell Line	2	2
Total	60	60

4 - Teaching and Learning Methods

4.1- Lectures (board, data show)

4.2- Online meetings and Interactive Course seminars

• 5- Student Assessment Methods

- Periodicals to assess professional, general and transferable skills
- Final exam to assess knowledge, understanding, intellect, professional, general and transferable skills
- Oral exam to assess knowledge and intellectual skills

Assessment Schedule

Assessment 1	Periodicals	
Assessment 2	Oral exam	Week 16
Assessment 3	Final written exam	Week 16

Weighting of Assessments

Final-term Examination	80.00 %
Oral Examination	10.00 %
Periodicals	10.00 %

Total 100 %

6- List of References

Essential books (text books)

Lippincott's illustrated reviews: Biochemistry, Sixth edition (2014). Lippincott-Williams and Wilkins.
Molecular Cloning: A Laboratory Manual (2001). Volume 1-3; Cold Spring Harbour Laboratory Press.
Genetics Analysis and Principles, Second edition (2005). McGraw-Hill

Periodicals, Web sites, ... etc
Journal of Molecular Biology
www.ncbi.nlm.nih.gov.

7- Facilities Required for Teaching and Learning
Study halls, Data Show, Books.

Course Coordinator: Prof. Dr. Nadia Hamdi.
Head of Department: Prof. Dr. Nadia Hamdi.

Prof. Nadia Hamdi

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Course matrix

Topic	مجلس قسم الكيمياء الحيوية	مجلس الكلية	مجلس الجامعة	مجلس الاعتماد	م2	b3	c1	c2	d1	d2
Tumor hypoxia in cancer therapy										
Mechanisms of cell senescence										
NGS; Next generation sequencing										
Epigenetic Modifications; DNA methylation, HDAC										
Exosomes and Mitochondria in Cancer										
RNA silencing										
Regenerative therapy and Cell-based therapy										
Chromosomal aberration										
Regulation of gene expression /Transcription factors										
The cell cycle and check points										
Apoptosis and Autophagy										
Molecular mechanism of cell signaling & epigenetics										
Gene editing; CRISPR										
Genome/Proteome databases										
Gene silencing										
Primary Cell culture vs cell line										

18/10/2020