



## UNIVERSITI TEKNOLOGI MARA

### BIO721: ADVANCES IN MOLECULAR BIOLOGY

<b>Course Name (English)</b>	ADVANCES IN MOLECULAR BIOLOGY <b>APPROVED</b>
<b>Course Code</b>	BIO721
<b>MQF Credit</b>	3
<b>Course Description</b>	Advances in Molecular Biology is an upper level course, designed to give a good background in current Molecular Biology. The major themes are DNA replication, chromosomal structure and function, gene structure and function, several methods on manipulating DNA. Students will learn the proteome analysis and medical genetics. Students will also learn from current papers in the scientific literature, and will be expected to use concepts developed in the course in class and in tests.
<b>Transferable Skills</b>	Criticism, thinking, communication
<b>Teaching Methodologies</b>	Lectures, Field Trip, Presentation, Directed Self-learning , Journal/Article Critique
<b>CLO</b>	<p>CLO1 To express how our genomes function, including gene activation and deactivation, RNA synthesis and protein biosynthesis and be able to use this knowledge in their work.</p> <p>CLO2 To explain molecular biology-based methods that are applied to the diagnosis of diseases.</p> <p>CLO3 To evaluate related materials that are available, such as scientific journals (e.g. Cell, Nature, Scientific American), newspapers, magazines and television programs that relate to course topics.</p> <p>CLO4 To explain values, ethics, moral and professionalism related to the advancements of molecular biology.</p>
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	<p><b>1. DNA replication, repair and recombination</b> 1.1) 1.1 DNA Replication 1.2) 1.2 DNA Repair 1.3) 1.3 DNA Recombination</p> <p><b>2. Chromosome structure and function, chromatin, prokaryotic operon</b> 2.1) 2.1 Chromosome Structure and Function 2.2) 2.2 Chromatin 2.3) 2.3 The Prokaryotic Operon</p> <p><b>3. The eukaryotic operon structure and function, gene clusters</b> 3.1) 3.1 The Eukaryotic Operon 3.2) 3.2 The Eukaryotic Operon: Gene Clusters 3.3) 3.3 Genes in Organelles</p> <p><b>4. Manipulating DNA, methods</b> 4.1) 4.1 Manipulating RNA, methods 4.2) 4.2 Manipulating Protein, methods 4.3) 4.3 Molecular Biology of Cancer 4.4) 4.4 Molecular Biology of Stem Cells 4.5) 4.5 Molecular Biology of Germ Cells</p>

**5. Proteome analysis**

- 5.1) 5.1 Characterization of Proteins by SDS-PAGE and 2D Gel Electrophoresis
- 5.2) 5.2 Purification of proteins by FPLC
- 5.3) 5.3 Immunological methods:
- 5.4) Agglutination (ABO/Bacterial),
- 5.5) Precipitation,
- 5.6) Immunodiffusion,
- 5.7) Immunoelectrophoresis,
- 5.8) ELISA and Western blotting.

**6. Medical Genetics**

- 6.1) 6.1 Organization of human genome
- 6.2) 6.2 Human Genome Project
- 6.3) 6.3 Identifying human disease genes
- 6.4) 6.4 Cancer genetics- oncogenes, tumour suppressor genes.
- 6.5) 6.5 Gene therapy and other molecular based therapeutic
- 6.6) approaches.

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Students need to review journals/articles/news related to the subject.	10%	CLO3
	Presentation	Students will be given special topics to present about values, ethics and professionalism related to molecular biology.	5%	CLO4
	Presentation	Students will be given special topics to present to the class.	15%	CLO1
	Test	Students will be given an open book test after every topics.	60%	CLO1
	Written Report	Students require to write a report on their virtual academic visit.	10%	CLO2

Reading List	Recommended Text
	<ul style="list-style-type: none"> <li>• Robert Franklin Weaver 2008, <i>Molecular Biology</i>, McGraw-Hill Europe [ISBN: 9780071275484]</li> <li>• Gerald Karp, <i>Cell and Molecular Biology</i> [ISBN: 9780470169612]</li> <li>• William Goodwin, Adrian Linacre, Sibte Hadi 2007, <i>An Introduction to Forensic Genetics</i>, John Wiley &amp; Sons [ISBN: 9780470010266]</li> </ul>

<b>Article/Paper List</b>	This Course does not have any article/paper resources
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<b>Other References</b>	This Course does not have any other resources
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