



Jordan University of Science and Technology
Faculty of Engineering
Biomedical Engineering Department

BME551 Cell And Molecular Biotechnology

First Semester 2023-2024

Course Catalog

3 Credit Hours. 3 Credit hours (3 h lectures). Biotechnology in an engineering context, nucleic acid structure and function, DNA replication, transcription, translation, chromosome structure and remodeling, and regulation of gene expression, applications of such knowledge in laboratory instrumentation, gene sequencing and expression techniques, genetic and protein engineering and therapy

Text Book

Title	Molecular Biology of the Cell
Author(s)	Alberts, B., Johnson, A., Lewis, J. and Martin Raff
Edition	7th Edition
Short Name	Alberts
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
For Engineers	Applied Cell and Molecular Biology for Engineers	Waite, G.N., Waite, L.R., Balcavage, W.X., and Worrell, M.B	1st Edition	
Karp	Cell and Molecular Biology: Concepts and Experiments	Karp G	1st Edition	
Cell	The Cell: A Molecular Approach	Cooper, G.M., Hausman, R.E.,	1st Edition	

Instructor

Name	Prof. Ruba Khnouf
Office Location	C5 L2

Office Hours	Sun : 10:00 - 11:30 Mon : 11:30 - 14:30 Tue : 12:00 - 13:00 Wed : 10:00 - 11:00
Email	rekhnouf@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Mon, Wed : 17:30 - 18:30 Room: متزامن الحضور منصة الكترونية

Prerequisites		
Line Number	Course Name	Prerequisite Type
284400	BME440 Introduction To Biomedical Materials	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction, emergence and principles of Biotechnology	
Weeks 2, 3	Proteins (structure, function, folding, purification, and characterization), introduction to proteomics	
Weeks 4, 5	DNA (structure, transcription, replication, recombination), RNA decoding, and Protein Synthesis	
Week 7	DNA cloning and characterization, gene suppression and engineering	
Week 8	Eukaryotic gene structure and chromosomal organization	
Week 10	Special Topics 1: Cancer	
Week 11	Special Topics 2: Stem Cell	
Week 12	Special Topics 3: CRISPR- CAS9	
Weeks 13, 14	Class Presentations	

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
1.1. Appreciate the field and great advancement in molecular biology which led to emergence of the field of biotechnology [1SO1]	10%	
2.1. Understand the structure/ function relationship of biological molecules [1SO1]	15%	
Understand modern biotechniques that revolutionized biotechnology such as polymerase chain reaction, DNA sequencing techniques, and genetic engineering [1SO1]	20%	

Understand the physical and engineering principles of biotechniques [1SO1, 1SO7]	15%	
5.1. Understand the role of biotechniques in diagnostics and therapeutics with an emphasis on cancer [1SO1, 1SO2]	15%	
Apply modern engineering concepts such as BioMEMS, microfluidics, and microelectronics to the field of biotechnology to enhance the outcomes of the field [1SO1]	15%	
Encourage life long learning, foster teamwork and enhance student's communication skills [1SO1, 1SO3, 1SO5]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
78.33	7.5	3.33		3.33		7.5

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