

Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering  
**Genetic and Bioengineering Department**  
 2023-2024 Spring Semester

### Syllabus

<b>Code/Name</b>	GBM 306 / Molecular Cell Biology
<b>Type</b>	Required
<b>Credit/ECTS</b>	5/5
<b>Hour per Week</b>	3 (3+0+0)
<b>Level/Year</b>	Undergraduate/3
<b>Semester</b>	Spring
<b>Classroom</b>	D305
<b>Content</b>	The individual living cell is the fundamental unit of life. Every cell is like a small city, with specialised structures and signals that work together to allow a cell to survive, move, reproduce, and communicate with its environment. Understanding these behaviors, their mechanisms, and their coordination is the goal of cell biology as a scientific discipline. In the 21st century, the structure and function of eukaryotic cells are investigated primarily at the molecular level, through a combination of biochemical, molecular-genetic and methods.
<b>Prerequisites</b>	-----
<b>Textbooks</b>	<b>Primary</b> Molecular Biology of the Cell. Alberts, B. et al. 7th edition, 2022. Garland Science. <b>Supplementary</b> Cell and Molecular Biology by Gerald Karp. 2007. John Wiley Inc. Molecular Cell Biology. Lodish, H. et al. 5th ed. 2004. W.H. Freeman and Company.
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• Apply his/her advanced knowledge on selected topics such as cellular organization, communication and basic genetic mechanisms, to produce solutions to hands on problems in related fields like cancer, genetic and metabolic diseases, development and etc.,</li> <li>• Analyze and critique original research articles in Molecular Cell Biology and related topic</li> <li>• Explain how extracellular and intracellular signals activate and repress the cellular genes and biosynthetic pathways</li> </ul>
<b>Course Outcomes</b>	CO1 Explain How molecular and cellular structure dictates cellular function CO2 Discuss How genes and genomes are organized and the mechanisms by which they evolve CO3 Explain How cells acquire and generate to energy to drive metabolic processes CO4 Explain Cytoskeletal and membrane structure and roles in movement, support and transport CO5 Analyze Cell communication with and response to its environment via signal transduction pathways. CO6 Explain The processes regulating the cell cycle, cell renewal, and cell death, How defects in cell cycle control lead to cell over-proliferation and cancer

### Weekly Schedule of Topics

W	Topic
1	Cell and Genom; Cell chemistry and biosynthesis; Proteins
2	Basic Genetic Mechanisms: Chromosomal DNA and packaging in the form of chromati General structural properties of chromosomes
3	DNA Replication, Repair and Recombination: Conservation of DNA sequences and Genetic Recombination
4	Expression of Cellular Genome: From DNA to Protein: Control of Gene Expression; Overview of Genetic Control
5	How Genetic Switches Work; Post-translational Control; How Genom evolved

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6	Basic Techniques Used in Molecular Cell Biology: Separation of the cells, growth in the culture, DNA isolation, cloning and sequencing
7	Intracellular Organization, Structure of cell membrane, lipid bilayer and membrane proteins
8	Transport of small molecules from cell membrane and electrical features of the membranes
9	Partition of the cells, transportation between nucleus and cytosol, transport of proteins into mitochondria and chloroplasts
10	Organelles, peroxisome, endoplasmic reticulum, golgi apparatus, sending proteins to work addresses, vesicles traffic, endocytosis and exocytosis
11	Energy conservation: Mitochondria and chloroplast
12	Cellular Communication: General principles of cellular communication and Cellular signal transduction
13	Signal transduction with G-protein coupled cell surface receptors
14	Signal transduction with enzyme associated cell surface receptors; signaling pathways linked to regulatable protein degradation

<b>Professional Contribution</b>	Ability to follow current scientific and technological innovations with the awareness of continuous learning and to apply them in the field.
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**Contribution to Program Outcomes\***

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	3	4	5	5	3	4	3	3	3	4
CO2	5	4	4	5	3	4	4	4	4	0	5
CO3	5	3	5	4	5	4	4	4	5	2	4
CO4	3	3	4	4	3	3	3	2	3	3	4
CO5	3	2	3	4	4	3	2	3	2	2	3
CO6	3	2	3	2	3	4	2	3	2	3	3

\* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

<b>Special Conditions</b>	<ul style="list-style-type: none"> <li>Students work in groups for project and presentations.</li> </ul>
<b>Requirements</b>	Basic knowledge of Cell Biology, General Genetics and Organic Chemistry
<b>Course Policy</b>	<ul style="list-style-type: none"> <li>Be in the class on time.</li> <li>English should always be used to communicate with one another.</li> <li>At least <b>70%</b> attendance is required, otherwise a grade of <b>DZ</b> will be assigned.</li> </ul>
<b>Cheating &amp; Plagiarism</b>	<ul style="list-style-type: none"> <li>Copying or letting someone copy your work on exams, assignments, or reports is cheating.</li> <li>Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism.</li> <li>The consequence of academic dishonesty is to receive a grade of <b>FF</b> for the course.</li> </ul>
<b>Evaluation</b>	Mid-term Exam 40% <u>Final Exam</u> 60% Total 100%
<b>Rubric</b>	-----

**Instructor**

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Room	330	Office Hours	W 13:30-15:30

Prepared by Dr. Ayşe Erdoğan-17.10.2024

