Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Genetics and Bioengineering Department
2024-2025 Spring Semester

Syllabus	
Code/Name	GBM204 / MOLECULAR BIOLOGY AND GENETICS
Type	Required
Credit/ECTS	4/4
Hour per Week	3
Level/Year	Undergraduate/2
Semester	Spring
Classroom	N/A
Content	GBM204 Molecular Biology and Genetics covers molecular genetics comprehensively and introduces techniques used in molecular biology and recombinant DNA technology.
Prerequisites	N/A
Textbooks	***Primary*** Concepts of Genetics, 9th Edition, Klug, 2019 ***Supplementary*** Genetic Analysis and Integrated Approach, 3rd Edition, Bowman, 2019
Objectives	● To introduce students to the molecular mechanisms of gene expression and regulation ● To equip students with knowledge of advanced genetic technologies, ● To enhance students' skills in critically analyzing genetic data and scientific literature
Course Outcomes	CO1. Summarize the molecular basis of genetic information storage, transcription, and translation. CO2. Analyze the mechanisms of gene regulation in both prokaryotic and eukaryotic systems. CO3. Identify different types of genetic mutations and understand the mechanisms of DNA repair. CO4. Explain the applications and techniques of recombinant DNA technology. CO5. Evaluate methods of genomic analysis and their role in modern genetics. CO6. Apply knowledge of genetic engineering and biotechnology in practical scenarios.

Weekly Schedule of Topics

W	Topic	Content
1	The Genetic Code and Transcription	Structure and function of DNA, RNA, transcription and RNA processing
2	Translation and Proteins	Genetic code translation, protein synthesis, folding, and function
3	Gene Mutation, DNA Repair, Transposition	Mutations, DNA repair mechanisms, transposable elements and genetic diversity
4	Regulation of Gene Expression in Bacteria	Operon model (lac, trp operons), gene regulation in response to environmental factors
5	Transcriptional Regulation in Eukaryotes	Transcription factors, enhancers, chromatin remodeling and gene expression control.
6	Translational Regulation in Eukaryotes	Regulation at the level of mRNA stability and translation
7	Post-transcriptional Regulation in Eukaryotes	RNA interference (RNAi) and other post-transcriptional mechanisms
8	Epigenetic Regulation of Gene Expression	DNA methylation, histone modification, epigenetic inheritance

9	Recombinant DNA Technology	Cloning, PCR, and gene editing tools
10	Genomic Analysis	Bioinformatics and functional genomics
11	Applications of Genetic Engineering and Biotechnology	Genetic modification in healthcare
12	Developmental Genetics	Role of genes in development
13	Cancer Genetics	Oncogenes, tumor suppressor genes, and cancer therapies
14	CRISPR/Cas and Genome Editing + DNA Forensics	Gene-editing mechanism, DNA forensics

Professional Contribution	N/A

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	0	0	1	0	0	0	0	0	0
CO2	1	2	0	1	1	0	0	1	0	0	1
CO3	1	1	0	0	0	0	0	0	0	0	1
CO4	1	0	1	0	1	0	0	0	0	0	0
CO5	1	1	2	1	1	1	1	1	0	0	1
CO6	1	0	2	1	1	0	0	0	0	0	0

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

Special Conditions	N/A
Requirements	N/A
Course Policy	N/A
Cheating & Plagiarism	● Copying or letting someone copy anyone work on exams, assignments, or reports is cheating. ● Cutting and pasting text, figures and tables from web sources, AI or any other electronic source is plagiarism. ● The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Assignments (2x) 20% Midterm Exam 40% Final exam 40% Total 100%
Rubric	N/A

Instructor

Name/Surname	Enes Durgut	Email	**enes.durgut@alanya.edu.tr**
Room	321	Office Hours	Students can arrange meetings through Google Calendar

Prepared by Enes Durgut on November 6th, 2024