

Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Genetics and Bioengineering Department
2026-2027 Fall Semester
SYLLABUS

Course Information

Code/Name	GBM 305L / GENETIC ENGINEERING I LAB
Type	Required
Credit/ECTS	2/2
Hour per Week	4 (0+4)
Level/Year	Undergraduate/3
Semester	Fall
Classroom	FFF L114

Content

Introduction of genetic engineering laboratory content, chemical solution preparation, medium preparation and laboratory sterilization, transformation application, PCR application, DNA isolation, Primer-Probe design and Quantitative PCR application

Prerequisites

Textbooks - Primary: Laboratory textbook prepared by the faculty members of our department

Supplementary: Research article published in such library as PUBMED, ELSEVIER

Objectives

- To apply genetic engineering laboratory techniques and follow lab rules.
- To calculate and prepare chemical solutions using correct mathematical methods.
- To demonstrate medium preparation and sterilization techniques.
- To conduct transformation processes in detail.
- To execute PCR applications.
- To design primers and probes and perform Quantitative PCR.

Course Outcomes

In this course you will be able to:

- CO1. Operate and manage a genetic engineering laboratory following established procedures.
CO2. Prepare and calculate chemical solutions accurately in the laboratory.
CO3. Perform and evaluate media preparation and sterilization under laboratory conditions.
CO4. Conduct and analyze experiments related to DNA isolation, PCR, and Quantitative PCR applications.
CO5. Identify and address problems that may occur during laboratory experiments.

Weekly Schedule of Topics

Week	Topic / Laboratory Experiment
1	Introduction, Organizing study groups, General Information
2	Solution Preparation
3	Medium preparation, sterilization
4	E. coli plasmid DNA isolation
5	Genomic DNA isolation (E. coli)
6	Genomic DNA isolation (Plant)
7	Genomic DNA isolation (Blood)
8	Determination of DNA concentration
9	Restriction Endonuclease Digestion Reaction and Agarose gel
10	E. coli competent cell preparation and transformation
11	Colony PCR (Polymerase Chain Reaction)
12	Visualization of PCR products on agarose gel
13	Quantitative PCR (qPCR)
14	General review lesson

Professional Contribution

Comprehending the techniques used in genetic engineering

Contribution to Program Outcomes*

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

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

Special Conditions

- Students work in groups.
- Experimental studies are reported using MS Word or PDF format

Requirements - Course Policy

- Students must arrive in the class or laboratory on time.
- Both students and the lecturer must communicate in English.
- Students should prepare by reading lab notes and assigned articles prior to the lab session each week.
- At least 80% attendance is required; otherwise, a grade of DZ will be assigned.

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

Midterm Exam	30%
Reports	30%
Final Exam	40%

Throughout the course, students are required to submit a laboratory report each week.

Rubric

For the reports, rubric will be provided during the first week.

Instructor

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Prepared by Büşra Perihan Yücel.