

COURSE RECORD

Code	BENG618
Name	RECOMBINANT DNA TECHNOLOGY
Hour per week	3 (3 + 0)
Credit	3
ECTS	10
Level/Year	Graduate
Semester	Fall and Springs
Type	Elective
Location	TBA
Prerequisites	None. However, students are expected to be familiar with cell/molecular biology
Special Conditions	-
Coordinator(s)	Dr. AYSUN ADAN
Webpage	-
Content	DNA modifying enzymes, cloning strategies, vector types, selection and screening of recombinants, nucleic acid labeling techniques, genomic and cDNA library preparation, whole genome sequencing, the methods for site-directed mutagenesis and sequencing of cloned genomic fragments will be covered. Software permitting <i>in-silico</i> manipulation and annotation of DNA sequences for efficient design, tracking, and management of cloning experiments and the application of recombinant DNA technology in biotechnological research will be discussed.
Objectives	<ul style="list-style-type: none"> - Theoretical knowledge of modern tools and techniques for manipulation and analysis of genomic sequences will be discussed - Differences and pros or cons of techniques will be discussed to allow students to choose the most suitable one for a particular experimental set up - Research methodologies employing genetic engineering techniques will be provided for students to strategize their own research - The application of recombinant DNA technology in biotechnological research will be emphasized
Learning Outcomes	<p>L01: to make the students familiar with versatile tools and techniques employed in genetic engineering and recombinant DNA technology</p> <p>L02: to be able to design and conduct experiments involving genetic manipulation.</p> <p>L03: methodological knowledge provided in this class allows students to understand how these are applied in basic and applied experimental biological research</p>
Requirements	This class will require reading and active participation.
Reading List	<ul style="list-style-type: none"> -K. Wilson, J. Walker. Principles and Techniques of Biochemistry and Molecular Biology (Cambridge University Press, ed. 7, 2010, main book) -Molecular Biology of the Cell. 2014. Garland Science. Bruce Alberts and Alexander Johnson (Might be helpful for basic understanding) - M. R. Green, J. Sambrook. Molecular Cloning: A Laboratory Manual (Cold Spring Harbor
Ethical Rules and Course Policy	

LEARNING ACTIVITIES *Please, use this one as a reference for your course*

Activities	Number	Weight (%)
Lecture	14	30%
Scientific paper discussions by students	14	35%
Term paper drafts	7	35%
Total		100

ASSESSMENT

Evaluation Criteria	Weight (%)	
Term paper drafts (every two weeks)	10%	
Term paper presentation and final draft (at the end of semester)	30%	
Scientific paper discussions during the term	15%	
Attendance/Participation	5%	
Final Exam	40%	
Total		100%

For a detailed description of grading policy and scale, please refer to the website <https://goo.gl/HbPM2y> section 28.

COURSE LOAD *Please, use this one as a reference for your course*

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities (lecture)	2	14	28
Required paper readings before the class	5	14	70
Paper presentations (in class)	1	7	7
Research (web, library)	5	14	70
Pre-work for Presentation	4	7	28
Term paper drafts	5	7	35
Term paper submission and presentation	2	1	2
Final	15	1	15
General Sum			255

ECTS: 10 (255/25)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
L01	4	4	4					
L02	5	5	5					
L03	5	5	5					

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

WEEKLY SCHEDULE

W	Topic	Outcomes
1	The manipulation of nucleic acids – basic tools and techniques : Types and examples of typical enzymes used in the manipulation of nucleic acids Activity: No activity	L01, L02, L03
2	Isolation and separation of nucleic acids Activity: No activity	L01, L02, L03
3	Molecular analysis of nucleic acid sequences Activity: No activity	L01, L02, L03
4	Polymerase Chain Reaction Activity: No activity	L01, L02, L03
5	Nucleic acid sequencing methodologies Activity: No activity	L01, L02, L03
6	Introduction to cloning: Cloning vectors	L01, L02, L03

	Activity: No activity	
7	Constructing gene libraries	L01, L02, L03
	Activity: No activity	
8	Hybridization and gene probes, screening gene libraries	L01, L02, L03
	Activity: No activity	
9	Applications of gene cloning: sequencing cloned DNA, in vitro mutagenesis, oligonucleotide directed mutagenesis, PCR based mutagenesis	L01, L02, L03
	Activity: No activity	
10	Expression of foreign genes: production of fusion proteins, phage display techniques, alternative display methods	L01, L02, L03
	Activity: No activity	
11	<i>In-silico</i> analysis, manipulation and annotation of DNA sequences for experimental design and efficient management of cloning experiments	L01, L02, L03
	Activity: No activity	
12	Molecular Biotechnology and applications I	L01, L02, L03
	Activity: Current scientific papers will be discussed	
13	Molecular Biotechnology and applications II	L01, L02, L03
	Activity: Current scientific papers will be discussed	
14	Student presentations	L01, L02, L03
	Activity: Current scientific papers will be discussed	

Prepared by
Date