



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Principles of Gene Manipulation							
Course Code		TBY429		Course Level		First Cycle (Bachelor's Degree)			
ECTS Credit	4	Workload	103 ( <i>Hours</i> )	Theory	2	Practice	0	Laboratory	2
Objectives of the Course		The aim of this course is that students learn the basic structure and functions of genes, mutations in gene structure, mutation mechanisms, modification of gene structure by wet-lab studies, transformation of a gene from an organism to another, recent methods, devices and recombinant technologies used in gene modification and cloning, etc. This course will teach these topics to student and they will have a general overview and experimental skills for application.							
Course Content		Gene structure: Operator, promoter, gene control regions, gene structural regions; Operons, Regulons, Transkriptipn, Translation, Protein Synthesis, Restriction enzyme digestion, Ligation, Screening, Vectors, Genoms, Plasmids, Transformation, Methods and devices for recombinant DNA construction, cloning strategies, utilization of bioinformatics tools in the cloning process, mutation types, mutation mechanisms, model organisms used in recombinant Technologies, relavant protein design, gen transformation in plant, technical information of laboratory for gene manipulation etc.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Problem Solving					
Name of Lecturer(s)									

### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	70

### Recommended or Required Reading

1	1- Principles of Gene Manipulation and Genomics, S. B. Primrose and R. M. Twyman, Blackwell Publishing
2	2- Moleküler Biyolojide Kullanılan Yöntemler, Nobel Tıp Kitabevi, Yazar: Prof.Dr. Güler Temizkan, Prof.Dr. Nazlı Arda, ISBN: 9789754205831
3	3- Moleküler Biyoloji, NOBEL Yayın Dağıtım, Çeviri Editörü: Prof. Dr. Muhsin KONUK, Yazarlar: P.C. Turner, A.G. McLennan, A.D. Bates and M.R.H. White

Week	Weekly Detailed Course Contents	
1	Theoretical	Fundamentals of Gene manipulation-Overview
2	Theoretical	Gene Structure-Operons-Regulons
3	Theoretical	Replication-Transcription-Translation
4	Theoretical	Cutting and Joinin DNA molecules, Screening, Vectors
5	Theoretical	Transformation
6	Theoretical	Methods and Devices used ing Recombinant DNA construction
7	Theoretical	Cloning strategies
8	Theoretical	DNA sequencing analysis and Genoms
9	Intermediate Exam	Midterm exam
10	Theoretical	Changing genes: Site-directed mutagenesis and Protein engineering
11	Theoretical	Gene transfer in Bacteria, Yeast, Plant and Animal
12	Theoretical	Utilization of Mutations in Gene manipulation
13	Theoretical	Utilization of Bioinformatic data in Gene manipulaiton
14	Theoretical	Laboratory infrastructure for Gene manipulation



15	Theoretical	General overview
16	Final Exam	Final exam

**Workload Calculation**

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	2	2	56
Seminar	5	3	2	25
Individual Work	5	2	1	15
Midterm Examination	1	2	1	3
Final Examination	1	3	1	4
Total Workload (Hours)				103
[Total Workload (Hours) / 25*] = <b>ECTS</b>				4

\*25 hour workload is accepted as 1 ECTS

**Learning Outcomes**

1	1. Structural characteristics of inheritance material and how it can be changed using these features
2	2. Gen transfer in bacteria, yeast, plants and animals
3	3. Methods, technics and devices cor changing of DNA structure
4	4. Laboratory infrastructure for DNA manipulation applications
5	To be able to integrate bioinformatics tools and databases with DNA-RNA applications

**Programme Outcomes (Agricultural Biotechnology)**

1	To be able to develop skills in identifying, modeling and solving problems in agricultural biotechnology
2	To be able to synthesize life and engineering sciences for the effective resource planning of agricultural biotechnology applications
3	To be able to interpret about living organisms structure, metabolic and physiological processes in order to propose biotechnological solutions to the agricultural problems
4	To be able to analyze genomic, metabolomic and proteomic information via bioinformatic tools.
5	To have the ability to analyze collected data and interpret the results.
6	To have the ability of individual working ability and to make independent decisions, to work in inter-disciplinary and interdisciplinary teamwork, to communicate by expressing their ideas orally and in writing, clearly and concisely
7	To have the awareness of professional liabilities and ethics
8	To be able to follow current national and international problems

**Contribution of Learning Outcomes to Programme Outcomes** 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	2	4	4	5	4
P2	2	4	3	4	5
P3	2	3	3	4	4
P4	2	5	5	3	3
P5	2	5	5	4	5
P6	2	2	2	4	4
P7	2	3	3	4	5
P8	2	4	4	5	4

