AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	DNA and Rna Based Applications								
Course Code	TBY416		Couse Level		First Cycle (Bachelor's Degree)				
ECTS Credit	4	Workload	100 *(Hours)*	Theory	2	Practice	0	Laboratory	2
Objectives of the Course	The focus of Molecular Biology and Biotechnology is DNA and RNA molecules. The aim of this course is to teach students recombinant Technologies, methods and strategies by focusing DNA and RNA, and thanks to these information to provide perspectives and background for applying in agricultural applications.								
Course Content	DNA and RNA structure, DNA and RNA synthesis-functions and degradation, Physico-biochemical charachteristics of DNA-RNA and the opportunities provided by these charachteristics for biotechnologic applications, DNA-RNA and molecular biology, DNA-RNA and biotechnology, DNA-RNA and bioethic, PCR, RT-PCR, RT-qPCR, cloning, vectors, restriction enzymes, ligation, transformation, DNA sequence analysis, bioinformatic, electrophoresis systems, DNA-RNA isolation, DGEE, FISH, qualitative analysis, quantitative analysis.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Case Study, 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- Moleküler Biyolojide Kullanılan Yöntemler, Nobel Tıp Kitabevi, Yazar: Prof.Dr. Güler Temizkan, Prof.Dr. Nazlı Arda, ISBN: 9789754205831
2	2- PCR, BIOS Scientific Publishers, C.R. Newton and A. Graham
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	DNA structure and characteristics
2	Theoretical	RNA structure and characteristics
3	Theoretical	DNA and RNA isolation
4	Theoretical	Qualitative and Quantitative analysis methods
5	Theoretical	DNA-RNA concentration determination
6	Theoretical	Polymerase Chain Reaction (PCR)
7	Theoretical	PCR-derived methods
8	Intermediate Exam	Midterm Exam
9	Theoretical	Vectors
10	Theoretical	Restriction Enzyme Digestion and Ligation
11	Theoretical	Transformation and verification of clones
12	Theoretical	Sequence analysis and Bioinformatic
13	Theoretical	Electrophoresis technics
14	Theoretical	Denaturing Gradient Gel Electrophoresis (DGGE), Fluorescence In Situ Hybridization (FISH)
15	Theoretical	Primer and Prob Design
16	Final Exam	Final exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	2	3	70
Assignment	5	1	1	10
Individual Work	4	2	2	16

Midterm Examination	1	1	1	2
Final Examination	1	1	1	2
			Total Workload (Hours)	100
			[Total Workload (Hours) / 25*] = **ECTS**	4
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	1. DNA and RNA structurs, charachteristics and isolations.
2	2. Associating the structural features of DNA and RNA with molecular biology and biotechnologic methods
3	3. Transformation the DNA-RNA charachteristics from bioinformatic data to wet-lab processes
4	4. Development new strategies in molecular biology and biotechnology.
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	5	4
P4	2	3	4	3	5
P5	2	3	5	4	4
P6	2	2	2	4	5
P7	2	3	3	4	4
P8	2	4	4	5	5