AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title		Marker Teqnique and Application in Plant Breeding					
Course Code		ZBY512		Couse Level	Second Cycle (Master's Degree)		
ECTS Credit	8	Workload	206 *(Hours)*	Theory	2	Practice	2	Laboratory	0
Objectives of the Course		Combining the topics of "Plant Breeding" and "Molecular Marker" to give students a vision					
Course Content		The definition of molecular markers, techniques used in marker application, PCR-based marker techniques, genetic mapping, marker -based selection					
Work Placement		N/A					
Planned Learning Activities and Teaching Methods			Explanation (Presentation), Experiment, Discussion, Project Based Study, Individual Study				
Name of Lecturer(s)		Prof. Ahmet OKUMUŞ					

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading

1	Plant Molecular Breeding (Editor: H. John Newbury)(2003)
2	Genome Mapping and Molecular Breeding in Plants(Fruits and Nuts) (Editor:Chittaranjan Kole)(2007)
3	Genome Mapping and Molecular Breeding in Plants(Vegetables) (Editor:Chittaranjan Kole)(2007)

Week	Weekly Detailed Course Contents	
1	Theoretical	Plant Breeding: Definition, Breeding methods, agricultural importance and Objectives
	Practice	Laboratory introduction
2	Theoretical	Molecular Markers: Definition, Types, importance of molecular markers in breeding activities
	Practice	Laboratory safety
3	Theoretical	Use of Molecular Markers in Plant Breeding: Identification of genetic resources, conservation and phylogenetic analysis
	Practice	DNA isolation methods
4	Theoretical	Techniques used in the Marker Practice Approaches: nucleic acid isolation, Polymerase Chain Reaction
	Practice	RNA isolation methods
5	Theoretical	The technical approach used in Marker Application: PAGE, capillary electrophoresis, sequence analysis
	Practice	Gel preparation
6	Theoretical	AFLP (Amplified Fragment Length Polymorphism) principles and methods of application
	Practice	Introduction of markers used in molecular breeding
7	Theoretical	SSR (Simple Sequence Repeats, microsatellites) principles and methods of application
	Practice	PCR product preparation
8	Practice	NA, Marker etc. adjustment of concentrations
	Intermediate Exam	Midterm exam
9	Theoretical	SSR detection methods
	Practice	Gel imaging systems
10	Theoretical	SNP (Single Nucleotide Polymorphism in) the principles and methods of application
	Practice	Application of AFLP technique
11	Theoretical	SNP detection methods
	Practice	Implementation of ISSR technique
12	Theoretical	Genetic mapping
	Practice	Sequencing techniques
13	Theoretical	Marker-based selection (Marker Assisted Selection MAS)
	Practice	Gel reading and scoring

14	Theoretical	Mapping based cloning (Map-Based Cloning)
	Practice	Interpretation of gel results
15	Theoretical	The future of molecular breeding
	Practice	Interpretation of gel results
16	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	7	2	126
Lecture - Practice	14	3	2	70
Midterm Examination	1	4	1	5
Final Examination	1	4	1	5
			Total Workload (Hours)	206
			[Total Workload (Hours) / 25*] = **ECTS**	8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Students learn molecular techniques are used in plant breeding
2	Students learn PCR-based molecular techniques
3	Students learn the marker -based selection methods
4	Have knowledge about shortening process in plant breeding by using marker techniques
5	Prepare project on molecular marker techniques used in plant breeding

Programme Outcomes *(Agricultural Biotechnology Master)*

1	Students learn various techniques and evaluates resources about agricultural biotechnology
2	Make the necessary projects in agricultural biotechnology and to conduct a study of the basic level independently
3	Students learns how to conduct a scientific research and prepares themself for the scientists in the direction of their ideals.
4	Students may reveal new ideas in social and scientific issues and can benefit from the ideas and produce something new winning independent and teamwork skills.
5	Students can use its products for the benefit of humanity, they can produce technology and collaborate with industry

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	5	5	5	4	5
P2	5	5	5	4	5
P3	4	4	4	3	4
P4	4	4	4	3	5
P5	3	3	3	5	5