

# PRINCIPLES OF PLANT BIOTECHNOLOGY

1	Course Title:	PRINCIPLES OF PLANT BIOTECHNOLOGY	
2	Course Code:	BIGB6001	
3	Type of Course:	Compulsory	
4	Level of Course:	Third Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. NAZAN DAĞÜSTÜ	
15	Course Lecturers:	Prof. Dr. Meryem İpek Prof. Dr. Aydın Türkeç	
16	Contact information of the Course Coordinator:	ndagustu@uludag.edu.tr, 224 2941518, U.U. Field Crops Department, Faculty of Agriculture 16059 Görükle Campus Bursa	
17	Website:		
18	Objective of the Course:	The objectives of courses are; to follow the new technologies and applications on agricultural biotechnology, get enough information on biotechnology, get experience on applications of agricultural biotechnology.	
19	Contribution of the Course to Professional Development:	To develop doctoral students' horizons on genetically modified organisms and agricultural biotechnology	
20	Learning Outcomes:		
		1	Learns the Uses of Biotechnology in Agriculture and the Possible Disadvantages of Biotechnology Applications
		2	Learns the relationship between somaclonal variation and disease resistance breeding
		3	Gains knowledge of the use of new technologies to obtain disease-free plants.
		4	Knows the possibilities of developing transgenic plants resistant to herbicides
		5	Have information about the advantages and disadvantages of transgenic products developed resistant to insects.
		6	Have knowledge about protoplast fusion and usage areas of protoplast fusion
		7	Gain knowledge about secondary metabolites and their economic importance and their use in plant breeding
		8	Knows the uses of haploid plant production and breeding
		9	Have knowledge about the basic techniques used in recombinant DNA technology
		10	Knows gene transfer methods
21	Course Content:		
		<b>Course Content:</b>	
Week	Theoretical	Practice	

1	Introduction to Biotechnology, What is Biotechnology and Agricultural Biotechnology? What is biotechnology divided into? What are the biotechnological methods applied in plants? Biotechnology Uses in Agriculture and Possible Disadvantages of Biotechnology Applications 2ND LESSON Description and brief explanation of tissue culture methods applied to plants I 3RD LESSON Genetic manipulation techniques			
2	What is a somaclonal variation? Origin, what are the causes of somaclonal variation? Determination of somaclonal variation, exploiting somaclonal variation, advantages and disadvantages of somaclonal variation Breeding resistance to diseases with somaclonal variation			
3	Introduction to Disease Free Plant production Obtaining of disease-free plants with meristem culture Obtaining transgenic plants resistant to viruses			
4	Development of herbicide-resistant transgenic plants Transgenic crops resistant to herbicides Advantages and disadvantages of transgenic products developed based on herbicides			
5	Development of insect resistant transgenic			
Activites		Number	Duration (hour)	Total Work Load (hour)
6	Theoretical Introduction of plant cell and protoplast	14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study Advantages and disadvantages of protoplast culture and preperation		6	6.00	36.00
Homeworks		10	10.00	100.00
Projects protoplast fusion Protection and importance of germoplasm in		0	0.00	0.00
Field Studies		0	0.00	0.00
Midterm exams Tissue culture techniques in germplasm preservation		0	0.00	0.00
Others		0	0.00	0.00
Final Exam significance Tissue culture technique of secondary		1	1.00	1.00
Total Work Load				179.00
Total work load/ 30 hr				5.97
ECTS Credit of the Course				6.00
	Haploid stimulation from male gametes Haploid stimulation from the female gamete			
10	Basic techniques used in recombinant DNA technology			
11	Gene transfer methods			
12	Molecular Identifiers			
13	Genetically modified organisms (GMO) and GMO analysis methods			
14	New plant breeding methods and Biosafety			

22	Textbooks, References and/or Other Materials:	<p>1. Cell culture and somatic cell genetics of plants. Volume 1. Laboratory procedures and their applications, Eds. Vasil, I.K. 1984. Academic Press, Orlando, pp. 1-825.</p> <p>2. Handbook of Plant Cell Culture, Volume 1. Techniques for Propagation and Breeding, 1983. Eds. D.E. Evans, W.R. Sharp, P.V. Ammirato, Y. Yamada. Macmillan Publishing Co. New York, pp. 1-970.</p> <p>3. Bitki Biyoteknolojisi I Doku Kültürü ve Uygulamaları, 2001. M. Babaoğlu, E. Gürel, S. Özcan. S. Ü. Vakfı Yayınları, Konya. pp. 1-456.</p> <p>4. Experiments in Plant Tissue Culture, 1982. J.H. Dodds and L.W. Roberts, Cambridge University Press, UK.</p> <p>5. Cell Culture and Somatic Cell Genetics of Plants, Volume 1 Laboratory Procedures and Their Applications, 1984. Ed. I.K. Vasil. Academic Press, Inc. New York, pp. 1-825.</p> <p>6. Plant Cell Culture A Practical Approach, 1985. Ed. R.A. Dixon, IRL Press Limited, England, pp. 1-236.</p> <p>7. Plant Cell and Tissue Culture A laboratory Manual, 1982 . Eds. J. Reinert, M.M. Yeoman, Springer-Verlag, pp. 1-83</p> <p>8. Huangfu, C., X. Song, S. Qiang. ISSR variation within and among wild Brassica juncea populations: implication for herbicide resistance evolution. Genet Resour Crop Evol, 2009; 56:913-924.</p> <p>9. Quist, D. and I.H. Chapela. Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico. Nature, 2001; 414:541-543.</p> <p>10. Anonim. FAOSTAT. <a href="http://www.faostat.fao.org">http://www.faostat.fao.org</a> Erişim Tarihi: 23.02.2010</p> <p>11. Anonim. USDA Foreign Agricultural Service. <a href="http://www.fas.usda.gov/">http://www.fas.usda.gov/</a> E.T.: 23.02.2010</p> <p>12. Quaim, M., C.E. Pray, D. Zilberman. Economic and social considerations in the adoption of Bt crops. In. Romeis, J., A.M. Shelton, G.G. Kennedy (Eds). Integration of Insect-Resistant Genetically Modified Crops with IPM Systems. Springer, Berlin, Germany. 2008; p.329-356.</p> <p>13. Bett, K.S. Mounting evidence of genetic pollution from GE crops growing evidence of widespread GDO. 1999. <a href="http://www.purefood.org/ge/gepollution.cfm">http://www.purefood.org/ge/gepollution.cfm</a> E.T.: 24.02.2010</p> <p>14. E. OLHAN, 2010. Modern biyoteknolojinin tarımda kullanımının politik ve ekonomik yönden değerlendirilmesi. Farklı Boyutlarıyla Genetiği Değiştirilmiş Organizmalar, 9-14.</p> <p>15. Ellstrand N. 2003. Current knowledge of gene flow in plants: implications for transgene flow. The Royal Society, Philosophical Transactions, 1163-1170.</p>
----	---	---

23	Assesment	
TERM LEARNING ACTIVITIES	NUMBE R	WEIGHT
Midterm Exam	0	0.00
Quiz	0	0.00
Home work-project	0	0.00

Final Exam	1	100.00
Total	1	100.00
Contribution of Term (Year) Learning Activities to Success Grade	0.00	
Contribution of Final Exam to Success Grade	100.00	
Total	100.00	
Measurement and Evaluation Techniques Used in the Course	Bursa Uludağ University is evaluated according to the principles of the Associate and Undergraduate Education Regulation	

## 24 ECTS / WORK LOAD TABLE

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	3	3	4	4	3	4	4	4	3	4	0	0	0	0	0	0
ÖK2	3	4	3	4	4	2	4	3	4	3	0	0	0	0	0	0
ÖK3	3	4	3	3	3	4	3	4	3	3	0	0	0	0	0	0
ÖK4	3	3	3	4	3	3	3	3	3	3	0	0	0	0	0	0
ÖK5	3	3	4	4	4	4	4	3	3	3	0	0	0	0	0	0
ÖK6	3	3	3	3	3	4	2	4	3	3	0	0	0	0	0	0
ÖK7	3	2	3	4	4	4	3	4	3	3	0	0	0	0	0	0
ÖK8	3	3	4	4	4	3	4	4	4	4	0	0	0	0	0	0
ÖK9	4	3	4	3	3	4	3	2	2	2	0	0	0	0	0	0
ÖK10	2	3	5	4	2	3	3	4	3	3	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low		2 low		3 Medium		4 High		5 Very High							