BIOLOGICAL NITROGEN FIXATION IN FIELD CROPS

1	Course Title:	BIOLOGICAL NITROGEN FIXATION IN FIELD CROPS
2	Course Code:	TAB5039
3	Type of Course:	Optional
4	Level of Course:	Second 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. Murat ERMAN
15	Course Lecturers:	yok
16	Contact information of the Course Coordinator:	e-mail: muraterman@uludag.edu.tr Tel: 0 224 29 41468
17	Website:	
18	Objective of the Course:	The aim of this course; To give basic information about biological nitrogen fixation in field crops.
19	Contribution of the Course to Professional Development:	Students who take the course are provided with knowledge and experience in the cultivation of field crops by symbiotic and asymbiotic bacteria to convert nitrogen into a useful form. In the preparation of field crops projects, a contribution is made to the plant growth promoting rhizobacteria.
20	Learning Outcomes:	
	1	Learns the use of elemental nitrogen in the atmosphere through microorganisms in agriculture.
	2	Learns the importance of symbiotic and asymbiotic nitrogen fixation in nitrogen cycle.
	3	Learns the methods of inoculation of bacteria to seeds and soils.
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21	Course Content:	

Course Content:

Week	Theoretical	Practice
1	The role of biological nitrogen fixation in the nitrogen cycle in nature	
2	Importance of biological nitrogen fixation for agriculture and environment	

3	Ways of gain and loss of nitrogen in the soil	
4	Conversion mechanisms of nitrogen in the soil; ammonification, nitrification and denitrification	
5	Nodule formation mechanism by Rhizobium bacteria in legume plants, structure and shapes of nodules	
6	Effect of biotic and abiotic environmental factors on nodule formation and nitrogen fixation	
7	Microorganisms involved in symbiotic and asymbiotic nitrogen fixation	
8	Mechanisms of obtaining ammonia from elemental nitrogen in symbiotic and asymbiotic nitrogen fixation	
9	Obtaining bacterial cultures to be used in inoculation; isolation, culture and identification	
10	Preparation and storage methods of bacterial stock cultures in liquid and solid media	
11	Definition, importance and conditions of bacterial inoculation	
12	Preparation of liquid and solid inoculation materials from stock cultures	
13	Methods of inoculating bacteria into seeds and soil	
14	Issues to be considered in inoculation	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	4.00	56.00
Homeworks	12	5.00	60.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	15.00	15.00
Total Work Load			173.00
Total work load/30 hr			5.77
ECTS Credit of the Course			6.00

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Midterm Exam	0	0.00
Quiz	0	0.00
Home work-project	12	40.00
Final Exam	1	60.00
Total	13	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		It is evaluated according to the principles of the Postgraduate Education Regulation of Bursa Uludağ University.

Mediterranean-type Agriculture, ICARDA, Syria, April

Vincent, J. M. (1984). Potential for enhancing biological

Beck, D. P., Materon, L. A., Afandi, F. (1993). Practical

Alexander, M. (2012). Biological Nitrogen Fixation:

National / international articles on the subject

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	5	5	5	4	4	5	5	3	5	4	0	0	0	0	0	0
ÖK2	5	5	5	4	4	4	4	4	5	4	0	0	0	0	0	0
ÖK3	5	5	5	5	4	5	5	4	5	5	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