INDUSTRIAL MICROBIOLOGY

1	Course Title:	INDUSTRIAL MICROBIOLOGY	
2	Course Code:	GIDS112	
3	Type of Course:	Optional	
4	Level of Course:	Short Cycle	
5	Year of Study:	1	
6	Semester:	2	
7	ECTS Credits Allocated:	3.00	
8	Theoretical (hour/week):	1.00	
9	Practice (hour/week):	2.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	-	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Dr. Ögr. Üyesi ASUMAN KARAKAŞ ŞEN	
15	Course Lecturers:	Meslek Yüksekokulları Yönetim Kurullarının görevlendirdiği öğretim elemanları	
16	Contact information of the Course Coordinator:	Dr. Öğr. Üyesi Asuman KARAKAŞ ŞEN U.Ü. Yenişehir İ.O.M.Y.O. akarakas@uludag.edu.tr 773 60 42	
17	Website:		
18	Objective of the Course:	To teach, Characteristics of Industrial Microorganisms and Recombinant Microorganisms, The Use of Microorganisms in The Production of Fermented Food and Beverages, Food Additives, Enzymes, Health-care products, Chemicals and Biofuels, The Use of Microorganisms in Waste Treatment.	
19	Contribution of the Course to Professional Development:	To have knowledge about the industrial uses of microorganisms.	
20	Learning Outcomes:		
		1	To have knowledge about the use of microorganisms in industry
		2	To be able to explain the physiology of microorganisms
		3	To give examples to industrial microorganisms
		4	To be able to define fermentation and fermentation products
		5	To be able to apply fermentors and fermentation methods
		6	To be able to produce fermented foods and beverages
		7	To be able to list the industrially important products produced by using microorganisms
		8	To explain the production of recombinant species used in industrial microbiology using genetic engineering methods
		9	To be able to see the importance of the environmental roles of microorganisms
		10	
21	Course Content:		
	Course Content:		
Week	Theoretical	Practice	

1	The History of Industrial Microbiology and Introduction	Introduction of the course
2	The Physiology of Microorganisms	The growth of bacteria at different salt concentrations
3	Industrial Microorganisms	Industrially important bacteria
4	Fermentation	Industrially important yeasts
5	Fermenters and Fermentation in large-scale	Industrial importance molds
6	Culture Media Used in Fermenters and The Methods of Fermentation.	Preparation of the medium
7	Repeating courses and midterm exam	Lecture notes
8	Fermented Food and Beverages	Yoghurt making
9	Food Additives	Kefir making
10	Microbial Enzymes	Cheese making
11	Health-care products	Gram staining of kefir and yoghurt samples and examination under a microscope
12	Vitamins, Polymers, Agricultural Products	Measuring bacterial growth
13	Industrial Chemicals and Biofuels	Comparison of the acidity of fermented products produced
14	The Enviromental Roles of Microorganisms	Testing antimicrobial agent production

22	Textbooks, References and/or Other Materials:	1- Genel Mikrobiyoloji, 4. Baskı. Prof. Dr. M. Öner. Ege Üniversitesi Basımevi, Bornova İzmir. (2001) 2- Industrial Microbiology: An Introduction. Michael J. Waites, Neil L. Morgan, John S. Rockey, Gary Higton (2001) Blackwell Science Ltd. 3- Gıda Mikrobiyolojisi 3. Baskı. Editörler Prof. Dr. Adnan Ünlütürk ve Prof. Dr. Fulya Turantaş (2003) META Yayınevi 4- Manual of Industrial Microbiology and Biotechnology. Arnold L. Demain et. al., (1999) ASM Press. 5- Biology of the Prokaryotes. J. Lengeler, G. Drews, H. Schlegel (1999) Blackwell Science. 6- Bacillus subtilis and Its Closest Relatives: from Genes to Cells Abraham L. Sonenshein, James A. Hoch, and Richard M. Losick (1999) ASM Press.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	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		Measurement and Evaluation is carried out according to the principles of Bursa Uludağ University Associate and Undergraduate Education and Training Regulation

24	**ECTS / WORK LOAD TABLE**

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	1.00	14.00
Practicals/Labs	14	2.00	28.00
Self study and preperation	7	2.00	14.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	16.00	16.00
Others	0	0.00	0.00
Final Exams	1	18.00	18.00
Total Work Load			90.00
Total work load/ 30 hr			3.00
ECTS Credit of the Course			3.00

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	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK2	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK3	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK4	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK5	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK6	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK7	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK8	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
ÖK9	4	1	4	4	4	4	5	5	4	4	4	5	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**		**3 Medium**		**4 High**			**5 Very High**						