

INNOVATIVE FOOD PACKAGING TECHNIQUES AND BIOPOLYMERS

1	Course Title:	INNOVATIVE FOOD PACKAGING TECHNIQUES AND BIOPOLYMERS	
2	Course Code:	GMB6044	
3	Type of Course:	Optional	
4	Level of Course:	Third Cycle	
5	Year of Study:	2	
6	Semester:	4	
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:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. PERİHAN YOLCI ÖMEROĞLU	
15	Course Lecturers:	Prof.Dr. Ömer Utku ÇOPUR	
16	Contact information of the Course Coordinator:	Uludağ Üniversitesi Ziraat Fakültesi Gıda Mühendisliği Bölümü 16059 Görükle/Bursa Tel: 0224 2941501 Fax: 0224 2941402 e-posta: pyomeroglu@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	The aim of this course is to develop students' ability to evaluate developments in packaging technology, natural, microbial and synthetic biopolymers used in food packaging, and their application potential in industry. In addition, students will have information about national and international legislation on packaging and migration analysis.	
19	Contribution of the Course to Professional Development:	Students taking this course learn alternative innovative packaging technologies that can be used in the food industry.	
20	Learning Outcomes:		
		1	Can give examples and explain new techniques in packaging technologies.
		2	Can compare innovative packaging techniques (active, smart, etc.) and choose the appropriate one for food.
		3	Will have information about natural and synthetic biopolymers used in food packaging.
		4	will be able to decide on the selection of the appropriate biopolymer material that can be used in foods
		5	Will have information about hydrogels and food packaging applications.
		6	Interpret national and international legislation on food packaging and have information about migration analysis
		7	
		8	
		9	
		10	
21	Course Content:		

	Course Content:				
Week	Theoretical		Practice		
1	Mass transfer principles / Solvent selection, solubility and mass transfer, phase balance-phase diagrams				
2	Barrier, optical, mechanical, thermal and chemical properties of thermoplastic polymers, innovative multilayer structures				
3	Packaging in modified and controlled atmosphere; Active packaging technology: ethylene, oxygen and carbon dioxide scavenger packaging				
4	Smart packaging applications-Barcodes, Indicators, RFID tags, Biosensors				
5	Edible films and coatings				
6	Nanofillers used in food packaging				
7	Surface modification in polymers				
8	Biopolymers and biodegradability				
9	Microbial biopolymers (Polyhydroxyalkanoates, exopolysaccharides)				
Activites			Number	Duration (hour)	Total Work Load (hour)
11	Theoretical				
	Hydrogels		14	3.00	42.00
	Optimization techniques 2 (Surface				
	Practicals/Labs		0	0.00	0.00
12	Self study and preperation (etc)		0	0.00	0.00
	Homeworks		14	5.00	70.00
	Project presentations		1	35.00	35.00
	Field Studies		0	0.00	0.00
22	Midterm exams		0	0.00	0.00
	Textbooks, References and/or Other		R. Ahvenainen, 2003. Novel Food Packaging Techniques,		
	Others		0	0.00	0.00
	Final Exams		1	30.00	30.00
Total Work Load					177.00
Total work load/ 30 hr					5.90
ECTS Credit of the Course					6.00
			2010. Functional Biopolymers, Springer International Publishing, Netherlands. Piergiovanni, L., Limbo, S. 2016. Food Packaging Materials. Springer International Publishing, Switzerland		
23	Assesment				
TERM LEARNING ACTIVITIES		NUMBE R	WEIGHT		
Midterm Exam		0	0.00		
Quiz		0	0.00		
Home work-project		1	40.00		
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	Homework and final exam are done within the scope of this course.
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	3	3	2	3	3	2	3	3	0	0	0	0	0	0
ÖK2	5	5	2	3	3	3	2	2	0	0	0	0	0	0	0	0
ÖK3	5	5	3	5	2	3	3	2	3	3	0	0	0	0	0	0
ÖK4	4	4	2	5	2	5	3	3	5	3	0	0	0	0	0	0
ÖK5	4	4	2	5	2	5	3	3	5	3	0	0	0	0	0	0
ÖK6	4	4	2	5	2	5	3	3	5	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							