

BIOSENSORS

1	Course Title:	BIOSENSORS
2	Course Code:	EEM5707
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:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Doç. Dr. Mustafa DEMİRTAŞ
15	Course Lecturers:	
16	Contact information of the Course Coordinator:	mustafademirtas@uludag.edu.tr
17	Website:	
18	Objective of the Course:	The aim of this course is to introduce and examine biosensors used in modern medical electronics. Within the scope of the course, firstly enzyme, antibody and nucleic acid based biosensors will be discussed and the potentiometric, amperometric and optometric principles of these biosensors will be discussed. Finally, an evaluation will be made on the future and potential of biosensor technologies.
19	Contribution of the Course to Professional Development:	This lecture enhances their ability to work across disciplines such as biotechnology, chemistry, and physics while allowing them to learn about innovative technologies used in areas like healthcare, environmental monitoring, and food safety. Additionally, as the design of biosensors involves integrating hardware and software components, engineers strengthen their practical design and problem-solving skills. This enables them to develop engineering solutions for medical devices and health monitoring systems in the healthcare sector, while also improving their capacity to create new products.
20	Learning Outcomes:	
	1	Understanding the basic principles of biosensors: Understanding the working principles of enzyme, antibody, and nucleic acid-based biosensors.
	2	Recognizing the types of biosensors: Distinguishing different types such as potentiometric, amperometric and optometric biosensors.
	3	Exploring the application areas of biosensors: Understanding how biosensors are used in modern medicine and examining sample applications.
	4	Evaluating the future of biosensor technologies: Predicting the development potential and future usage areas of biosensor technology.
	5	Understanding the advantages and limitations of biosensors: Evaluating the benefits and challenges faced by this technology.

		6	Developing the ability to analyze scientific and technical literature: Developing the ability to obtain and interpret information by reading research articles on the subject.		
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21	Course Content:				
	Course Content:				
Week	Theoretical		Practice		
1	Basic Principles of Biosensors				
2	Electrical Measurements in Biosensors				
3	Surface Functionalization Methods of Biosensors				
4	Surface Functionalization Methods of Biosensors				
5	Electronic Interface Circuits in Biosensors				
6	Electronic Interface Circuits in Biosensors				
7	Nanotechnology in Biosensors				
8	Nanoscale Sensors				
9	Biomedical Applications of Biosensors				
10	Biomedical Applications of Biosensors				
Activities			Number	Duration (hour)	Total Work Load (hour)
13	Theory of Biosensors		14	3.00	42.00
Practicals/Labs			0	0.00	0.00
Self study and preparation			14	5.00	70.00
22	Textbooks, References and/or Other		E. G. Banica, Chemical Sensors and Biosensors:		
Homeworks			0	0.00	0.00
Projects			0	0.00	0.00
Field Studies			0	0.00	0.00
Midterm exams			1	28.00	28.00
Others			0	0.00	0.00
Final Exams			1	40.00	40.00
TERM LEARNING ACTIVITIES		NUMBER	WEIGHT		
Total Work Load					180.00
Midterm Exam		1	40.00		6.00
Total Work load/ 30 hr					
ECTS Credit of the Course					6.00
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 priciples of Bursa uludag University Associate and Postgraduate 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	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	0	0	0	0	0	0	0	0	0	0	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			