

# BIOMEDICAL SIGNAL PROCESSING

1	Course Title:	BIOMEDICAL SIGNAL PROCESSING	
2	Course Code:	EEM4429	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	7	
7	ECTS Credits Allocated:	4.00	
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:	Doç. Dr. ERSEN YILMAZ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	Doç.Dr. ERSEN YILMAZ	
17	Website:		
18	Objective of the Course:	Purpose of this course is to inform the students about biological signal actuation, characteristics and processing methods.	
19	Contribution of the Course to Professional Development:	To be able to follow innovations and apply them in the field by using the competence of collecting information, researching and analyzing them.	
20	Learning Outcomes:		
		1	To gain sufficient knowledge on Biomedical to be able to identify, model, formulate and solve complex biomedical signal processing problems.;
		2	To gain the ability to design partly or fully a complex biomedical signal processing systems meeting specific requirements under realistic constraints and conditions and to be able apply modern design methods in this context.;
		3	To be able to design and conduct complex experiments and to collect, analyze and interpret data for Biomedical signal processing.;
		4	To Gain the ability to apply teorical and practical knowledge for analysis and modelling methods of the Biomedical signal processing problems.;
		5	To be able to use information technologies in an efficient way to develop, select, and use modern techniques and tools necessary for the Biomedical signal processing.;
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21	Course Content:		
		Course Content:	

Week	Theoretical	Practice		
1	Action potentials,electrical activities and evoked potentials of biological systems.			
2	Biomedical signals: EOG, ERG, EMG, PCG, BPS, MEG, MCG.			
3	EEG, EKG signals, frequency, frequency-time properties.			
4	Active denoising, Adaptive filters, Wiener filters.			
5	Stochastic signal modelling, AR, ARMA models for EEG signals.			
6	Infarction diagnoisis from ECG with wavelet and frequency analysis.			
7	Epilepsy diagnoisis from ECG with wavelet and frequency analysis.			
8	Midterm Exam and Course Review			
9	Statistical and linear discrimination functions in classification of biomedical signals.			
10	Stochastic, chaotic and deterministic signals,chaotic properties of the biomedical signals.			
11	Foundations of chaos in cardiovascular activity, chaotic structure of ECG signals.			
12	Phase spatial for biomedical signals, Lyapunov exponentials and computational methods			
Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical biomedical signals.		14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study Materials		14	2.00	28.00
Homeworks		0	0.00	0.00
Projects		0	0.00	0.00
Field Studies		0	0.00	0.00
Midterm exams		1	1.00	1.00
Others		0	0.00	0.00
Final Exams		1	32.00	32.00
Total Work Load				138.00
TERM LEARNING ACTIVITIES		NUMBER	WEIGHT	
Total work load/ 30 hr				4.00
ECTS Credit of the Course				4.00
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 priciples of Bursa Uludag University 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	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	5	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			