



Institute of Biomedical Engineering

SYLLABUS

Mathematics for Biomedical Engineering Course

Fall Semester

Course Code	Course Name	Course Type	Weekly Hours			Credits	ECTS	Campus / Weekly Time & Classroom Schedule
			T	A	L			
BM 571	Biomedical Signal Processing	Elective	3	0	0	3	7	To be arranged
Prerequisite		Prerequisite to						
Course Lecturers	Ahmet Ademoğlu					Office Hours Schedule	Monday 14:00 - 16:00	
E-mail	ademoglu@boun.edu.tr					Office / Room No	A1-05	
Phone	0216 516 3447					Phone		
Teaching Assistant	Hüden Neşe					Office / Room No		
E-mail	hudennese@gmail.com							
Course Objectives	Overview of probability, statistics and random processes. Signal Modeling: AR, ARMA, Prony Methods. Fourier based power spectrum estimation. Parametric power spectrum estimation based on AR and ARMA modeling. Eigenanalysis based power spectrum estimation. Optimal filtering; Wiener and Kalman Approach. Adaptive transversal filters.							
Textbooks/ References	1	<i>Text : Statistical Digital Signal Processing and Modeling, Monson Hayes, Wiley.</i>						
	2	<i>Reference : Adaptive Filter Theory, Simon Haykin Prentice Hall.</i>						
	3	<i>Reference : Random Signals, S. Shanmugam & A. Breipohl, Wiley.</i>						
Learning Outcomes	1	Stochastic signals						
	2	Parametric signal modeling						
	3	Parametric, nonparametric and eigenbased spectrum estimation						
	4	Optimal filtering						
	5	Adaptive filtering						
Teaching Methods	Lecturing, assignments and tutorials.							
WEEK	Work required for that week							Reading Assignment
Week 1	Basic Overview							Chapter 1
Week 2	Basic Overview							Chapter 2
Week 3	Random Processes							Chapter 3
Week 4	Random Processes							Chapter 3
Week 5	Signal Modeling							Chapter 4
Week 6	Signal Modeling							Chapter 4
Week 7	Midterm I							
Week 8	Spectrum Estimation							Chapter 8
Week 9	Spectrum Estimation							Chapter 8
Week 10	Optimal Filtering							Chapter 7
Week 11	Optimal Filtering							Chapter 7
Week 12	Adaptive Filtering							Chapter 9
Week 13	Midterm II							
Week 14	Adaptive Filtering							Chapter 9
Week 15	Final Exam							
Assessment Methods and Criteria	Evaluation Tool		Quantity	Date			Weight in %	
	Final Exam		1				30	
	Semester Evaluation						70	
	Attendance, active tutorials		1				10	
	In-term exams		2				40	
Homework Assignments		6				20		
*** ECTS Credit Calculation ***						Language of Instruction:	English	
Evaluation Tool	Hour	Quantity	Student Workload Hours	Evaluation Tool	Hour	Quantity	Student Workload Hours	
Theoretical hours	3	14,0	42	In Term Exam	10	2	20,0	
Pre-class self study	4	14,0	56	Final Exam	20	1	20,0	
Post-class self study	4	14,0	56	Assignments	5	6	30,0	
GENERAL TOTAL HOURS:							224,0	
Recommended ECTS Credit (Total Hours / 25) :							7	