BOĞAZİÇİ UNIVERSITY

Institute of Biomedical Engineering
SYLLABUS
Medical Imaging Course
Spring Semester

Course Code	Course Name	Course Type	Weekly Hours T	A	L	Credits	ECTS	Campus / Weekly Time & Classroom Schedule
BM 536	Principles of Neuroimaging	Elective	3	0	1	3	9	
Web Page:	http://neurosignal.boun.edu.tr/courses/							Thursday 14:00-17:00
Prerequisite		**Prerequisite to**						

Course Lecturers	Ahmet Ademoğlu		**Office Hours Schedule**	Thursday 10:00-13:00
E-mail	ademoglu@boun.edu.tr			
Phone	0216 516 3447		**Office / Room No**	A1-05
Teaching Assistant	Hüden Neşe		**Phone**	0216 516 3447
E-mail	hudennese@gmail.com		**Office / Room No**	A1-05

Course Objectives	Understanding the basic statistical and image processing methods and models for the functional brain data using Statistical Parameter Mapping (SPM). Using the MATLAB based SPM platform for fMRI data processing.

Textbooks/ References	1	**Statistical Parametric Mapping :The Analysis of Functional Brain Images**, *Eds:, K.J Friston, J.T. Ashburner, S.J.Kiebel, T.E. Nichols, W.D. Penny, Academic Press, 2006.*
	2	**Pattern Recognition and Machine Learning**, C. M. Bishop, *Springer,* 2006.

Learning Outcomes	1	Preprocessing algorithms of fMRI data
	2	General linear modeling and statistical inference of fMRI data
	3	Classical and Bayesian inference of fMRI and EEG data using hierarchical modeling
	4	Expectation maximization and Restricted Maximum Likelihood Algorithms

Teaching Methods	Lecturing, assignments and tutorials.

WEEK	**Work required for that week**	**Reading Assignment**
Week 1	Introduction and Matrix Calculus	
Week 2	Matrix Calculus	
Week 3	Probability Distributions and Multivariate Analysis	
Week 4	Probability Distributions and Multivariate Analysis	
Week 5	General Linear Model	
Week 6	Contrasts and Classical Inference	
Week 7	Thresholding	
Week 8	Hierarchical Models and Random Effects	
Week 9	Restricted Maximum Likelihood Algorithm	
Week 10	Expectation Maximization Algorithm	
Week 11	Classical and Bayesian Inference	
Week 12	Preprocessing and Segmentation Algorithms	
Week 13	Bayesian Estimation of Evoked and Induced EEG Responses	
Week 14	Final Exam	

Assessment Methods and Criteria	Evaluation Tool	Quantity	Date	Weight in %	
	Final Exam	1		**30**	
	Semester Evaluation			**70**	
	Attendance, active tutorials, Quizzes	1		10	
	In-term exams	2		30	
	Homework Assignments	1		30	

*** 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	6	6	36,0
				GENERAL TOTAL HOURS:			230,0
				Recommended ECTS Credit (Total Hours / 25) :			9