AYDIN ADNAN MENDERES UNIVERSITY
GRADUATE SCHOOL OF HEALTH SCIENCES
BIOSTATISTICS
BIOSTATISTICS (MEDICAL)
BIOSTATISTICS (MEDICAL) MASTER
COURSE INFORMATION FORM

Course Title	Simulation Methods in Biostatistics								
Course Code	BİS537		Couse Level		Second Cycle (Master's Degree)				
ECTS Credit	6	Workload	145 *(Hours)*	Theory	3	Practice	2	Laboratory	0
Objectives of the Course	The aim of this course is to teach students the ability to model, simulate and analyse complex systems in a reasonable time.								
Course Content	Random number generation and random distributions, Monte Carlo simulations, Markov chain theory, Monte Carlo Markov chain method, bootstrap and Jackknife methods, the Gibbs and Metropolis algorithms, simulation of medical data and application.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Project Based Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading	
1	Rubinstein, R. Y., & Kroese, D. P. (2016). Simulation and the Monte Carlo method (Vol. 10). John Wiley & Sons.
2	Baudrillard, J. (1994). Simulacra and simulation. University of Michigan press.
3	Law, A. M., Kelton, W. D., & Kelton, W. D. (2000). Simulation modeling and analysis (Vol. 3). New York: McGraw-Hill.
4	Ross, S. (2015). Benzetim : Simulation. Nobel Akademik Yayıncılık

Week	Weekly Detailed Course Contents	
1	Theoretical	Generating uniform random samples
	Practice	Application with package programs
2	Theoretical	Statistical tests for randomness
	Practice	Application with package programs
3	Theoretical	Generating non-uniform random samples
	Practice	Application with package programs
4	Theoretical	Random distributions
	Practice	Application with package programs
5	Theoretical	Monte Carlo Simulations
	Practice	Application with package programs
6	Theoretical	Markov Chain Theory
	Practice	Application with package programs
7	Theoretical	Monte Carlo-Markov Chain Method-1
	Practice	Application with package programs
8	Intermediate Exam	Midterm exam
9	Theoretical	Monte Carlo-Markov Chain Method-2
	Practice	Application with package programs
10	Theoretical	Bootstrap and Jackknife Methods-1
	Practice	Application with package programs
11	Theoretical	Bootstrap and Jackknife Methods-2
	Practice	Application with package programs
12	Theoretical	Gibbs and Metropolis algorithms-1
	Practice	Application with package programs
13	Theoretical	Gibbs and Metropolis algorithms-2
	Practice	Application with package programs

14	Theoretical	Simulation of medical data
	Practice	Application with package programs
15	Theoretical	Literature review and discussion
	Practice	Literature review and discussion
16	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	3	42
Lecture - Practice	14	0	2	28
Assignment	1	10	0	10
Quiz	7	2	1	21
Midterm Examination	1	20	2	22
Final Examination	1	20	2	22
			Total Workload (Hours)	145
			[Total Workload (Hours) / 25*] = **ECTS**	6

**25 hour workload is accepted as 1 ECTS*

Learning Outcomes

1	Be able to do programming
2	Be able to numerify of biological systems
3	Learn the techniques of estimate coeeficients using optimization
4	Be able to entegrate statistics to simulation techniques
5	To be able to apply simulation techniques

Programme Outcomes *(Biostatistics (Medical) Master)*

1	To be able to understand the interdisciplinary interaction releated with biostatistics.
2	to be able to use Theoretical and practical knowledge at the level of expertise.
3	To be able to nterpret the information by integrating information from different disciplines and create new information
4	To be able to nalyze the problems encountered by using research methods
5	to be able to conduct a study as an independent specialist
6	To be able to formulate solutions for complex unpredictable problems encountered by developing new approaches and taking responsibility.
7	To be able to resolve problems in environments that require leadership.
8	To be able to evaluate and direct knowledge and skills with a critical approach at the level of expertise.
9	To be able to to give statistical advise at the begining stages of preparing health related projects
10	To be able to get the knowledge and the ability of using statistical packages

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4
P1	4	4	2	5
P2	4	4	3	5
P3	4	4	3	5
P4	3	4	3	4
P5	4	3	3	5
P6	3	3	3	4
P7	3	3	3	4
P8	4	2	3	4
P9	3	2	2	5
P10	4	3	2	5