International School of Medicine / Medicine (English)

2023 - 2024 Academic Year

INTRODUCTION to BIOSTATISTICS

Syllabus

Course Description					
Name	**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
INTRODUCTION to BIOSTATISTICS	ISM2015434	Yearly	16+4	0	2

Prerequisites Courses	
Recommended Elective Courses	
Language of Instruction	English
Course Level	First Cycle (Bachelor's Degree)
Course Type	Committee Course
Course Coordinator	Prof.Dr. Mehmet KOÇAK
Name of Lecturer(s)	Prof.Dr. Mehmet KOÇAK
Assistant(s)	
Aim	This course begins by an introduction of main statistical concepts, types of measurements used in statistical analysis, and sampling strategies and types of research designs, followed by examples of statistical graphics. Descriptive statistics will be defined and examples will be discussed as the first step of data analysis. Following a brief introduction to the concept of probability, we will discuss some of the probability distributions that are most commonly used in statistical analysis, testing and modelling, which includes Bernoulli, Binomial, Negative Binomial, Hypergeometric, Gaussian (Normal), Student-t, Chi-Square, and F distributions. Moving from descriptive statistics to inferential statistics through the concept of sampling distributions and central limit theorem, the concept of confidence intervals and hypothesis testing will be introduced and hands-on practice will be gained through examples.
Course Content	This course contains; Basic Definitions, Descriptive Statistics, and Statistical Graphics,Introduction to Probability and Bayes Rule,Common Random Variables,Central Limit Theorem and Sampling Distribution,Concept of Confidence Interval,Descriptive Statistics Computation Lab,Confidence Interval Computation Lab.

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
At the end of this lecture, we expect that students acquire the meaning of basic terms in biostatistics, recognize basic statistics, and develop an understanding of the utility of statistical graphics.	16, 6, 9	A
At the end of this lecture, we expect that students distinguish different sampling methods, their advantages and disadvantages in different circumstances, develop understanding for various types of biases in research.	10, 14, 16, 19, 20, 9	A
At the end of this lecture, we expect that students develop an understanding of the theoretical and practical meaning of probability and recognize and appreciate probability laws.	12, 16, 9	A
At the end of this lecture, we expect that students recognize different random variables, build familiarity with their probabilistic characteristics.	16, 6, 9	A
At the end of this lecture, we expect that students develop a recognition of the importance and utility of the Central Limit Theorem and understand the mechanisms behind the probability distributions of sample statistics such as sample mean, sample proportion, and sample standard deviation.	16, 9	A
At the end of this lecture, we expect that students recognize the importance of the transition from descriptive statistics to inferential statistics and develop an understanding on how to measure the confidence we gain on population parameters through their predictors such as sample mean, sample proportion, and their two-population versions.	10, 13, 16, 19, 6, 9	A

Teaching Methods	10: Discussion Method, 12: Problem Solving Method, 13: Case Study Method, 14: Self Study Method, 16: Question - Answer Technique, 19: Brainstorming Technique, 20: Reverse Brainstorming Technique, 6: Experiential Learning, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Basic Definitions, Descriptive Statistics, and Statistical Graphics	Not needed
2	Introduction to Probability and Bayes Rule	Not needed
3	Common Random Variables	Introduction to Probability
4	Central Limit Theorem and Sampling Distribution	Normal Distribution
5	Concept of Confidence Interval	Central Limit Theorem and Sampling Distribution
6	Descriptive Statistics Computation Lab	
7	Confidence Interval Computation Lab	

Evaluation Methods	**Weight(%)**
Midterm Exam	40
General Exam	60

Resources

1. Jay Kerns: Introduction to Probability and Statistics Using R, 1st Edition, G. Jay Kerns, ISBN: 978-0557249794
2. Rosner B. Fundamentals of biostatistics. Cengage learning; 8th Edition, ISBN: 978-1305268920Course notes, presentations