MSc. program, Biomedical Engineering Department

Course Unit Title	Advance Biostatistics
Course Unit Code	BME520
Type of Course Unit	Elective
Level of Course Unit	
National Credits	3
Number of ECTS Credits Allocated	10
Theoretical (hour/week)	4
Practice (hour/week)	-
Laboratory (hour/biweekly)	-
Year of Study	-
Semester when the course unit is delivered	-
Course Coordinator	-
Name of Lecturer (s)	Mohammed Momanzadeh
Name of Assistant (s)	
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:
Within this course, students will study multivariate techniques in health care research and apply aspects of complex research designs, including model testing, decision theory, and advanced statistical techniques.

Learning Objectives
1.Identify and test assumptions for statistical tests.
2. Select, conduct and report appropriate statistics to test hypotheses with
a) One independent variable and three or more levels (aka groups): ONE-WAY ANOVA, KRUSKAL-WALLIS ANOVA
b) One independent variable and three or more levels with confounding variable (aka covariate): ANCOVA
c) One group measured repeatedly with and without covariate: REPEATED MEASURES ANOVA & ANCOVA, FRIEDMAN ANOVA
d) Two or more independent variables with 2 or more groups with and without covariate: TWO-WAY ANOVA, TWO-WAY ANCOVA aka FACTORIAL ANOVA
e) Two or more independent variables with 1 group measured repeatedly with and without covariate: TWO-WAY REPEATED MEASURES ANOVA & ANCOVA
f) Two or more independent variables and mixed methods with and without covariate: MIXED DESIGN ANOVA
g) One or more independent variables and the prediction of one or more dependent variables: REGRESSION, MULTIPLE REGRESSION, and Logistic Regression
h) Multiple Independent and Dependent Variables: MANOVA & RM MANOVA
3. Create tables to report findings.
4. Compare the utility of multivariate statistical methods in transcultural health research. 5. Interpret reported statistical findings.

Learning Outcomes		
At the end of the course the student should be able to		Assessment
1	Learn to read, critically evaluate, and discuss biostatistical primary literature	
2	Learn about a variety of statistical techniques frequently used in biology	
3	Learn to apply the techniques to real data	
4	Learn the statistical computing SPSS.	
5	Gain an understanding of how to learn new statistical techniques	
Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab. Work		

Course's Contribution to Program		
		CL
1	Apply knowledge of mathematics, natural science with relevant to life science and multidisciplinary context of engineering science.	5
2	Analyze, design and conduct experiments, as well as to analyze and interpret data.	5
3	Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	4
4	Function on multidisciplinary teams.	5
5	Control in design work, by using simulation, modelling and tests and integration in a problem solving oriented way.	1
6	Display an understanding of professional and ethical responsibility.	3
7	Communicate effectively aware of the non-technical effects of engineering.	3
8	Search technical literature and other information sources.	1
9	Recognize of the need for, and an ability to engage in life-long learning.	2
10	Exhibit a knowledge of contemporary issues.	2
11	Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents			
Week	Chapter	Topics	Exam
1	1	Introduction to advanced statistics	
2	1,2	Review and t-tests	
3	2	ANOVA	
4	3	ANOVA	
5	5	ANOVA	
6	5	RM ANOVA	
7	6	RM ANOVA	
8			Midterm
9	7	Correlation and Simple Regression	
10	8	Multiple Regression	
11	8	Logistic Regression	
12	9	Logistic Regression	
13	9	MANOVA	

14	13	MANOVA	
15			Final

Recommended Sources

Textbook:
None; readings will be from the primary literature (journal articles and book chapters).

Assessment

Attendance	5%	
Midterm Exam	40%	Written Exam
Final Exam	55%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

1. Attendance to the course is mandatory.
2. Students may use calculators during the exam.
3. Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload (hour)
Course duration in class (including Exam weeks)	16	4	64
Labs and Tutorials	10	10	100
Assignment	4	3	12
Project/Presentation/Report	3	10	30
E-learning activities	-	-	-
Quizzes	-	-	-
Midterm Examination	1	5	5
Final Examination	1	3	3
Self Study	-	100	100
Total Workload			312
Total Workload/30(h)			10.1
ECTS Credit of the Course			10