



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name: Biostatistics

0341737

Course Syllabus

1	Course title	Biostatistics	
2	Course number	0341737	
3	Credit hours	3	
	Contact hours (theory, practical)	3	
4	Prerequisites/corequisites		
5	Program title	M.Sc in Medicine, Dentistry, Pharmacy, Public Health, Biology, Ecology	
6	Program code		
7	Awarding institution	The University of Jordan	
8	School	School of Science	
9	Department	Department of Mathematics	
10	Course level	Compulsory requirement for graduate program	
11	Year of study and semester (s)	First or second year of graduate program	
12	Other department (s) involved in teaching the course	None	
13	Main teaching language	English	
14	Delivery method	<input type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	November 2 nd , 2022	

17 Course Coordinator:

Name: Hisham Hilow	Contact hours: one hour before class time
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18 Other instructors:

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Name: Professor Amal Helu

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19 Course Description:

As stated in the approved study plan.

Organizing and summarizing sample data (qualitative / quantitative), Probability Theory and Probability Laws for computing events probabilities, Conditional and Unconditional probabilities, statistical distributions of random variables (Binomial, Poisson and Normal), Central Limit Theorem and the Sampling distributions (χ^2 , t and F), estimation (point / interval) and hypotheses tests about population means, proportions and variances on single large and small samples, Statistical errors and the p -value, analysis of variance, regression analysis and Correlations, Chi-square tests, Nonparametric methods.

20 Course aims and outcomes:

A. Aims: This course is designed for beginning graduate students in fields such as: medicine, pharmacy, nursing, applied sciences and public health whose seek a strong foundation in statistical quantitative methods for data analysis to solve problems arising in these fields.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to

1. understand the basic concepts and terminology of Biostatistics including the various kinds of variables and also the various measurement scales .

2. understand the steps of the scientific method for solving problems including the design of the experiments (or surveys) to properly collect and analyze data from real-life problems.

3. know how raw sampled data can be organized and displayed in frequency tables and numerically summarized using statistical summary measures of location, dispersion, skewness and kurtosis.

4. utilize probability theory to describe the likelihood of events from random phenomena employing counting rules and probability laws.

5. apply Bayes Rule when calculating screening test results including: test's error probabilities of false positive and false negative and also test's predictive value positive and negative.

6. understand random variables (discrete or continuous) and their probability distributions for describing randomness of quantitative random phenomena in the field of Biostatistics.

7. understand discrete/continuous probability distributions (Binomial and Normal) for describing and modeling random phenomena then calculating various event probabilities from these distributions.

8. understand sampling distributions for the sample statistics (mean, proportion, standard deviation) and the sampling distributions for the difference between two sample means/proportions and two variances.

9. make good use of the sampling distributions of (Z , Student t , Chi-square and F) for statistical inference using (1) interval estimation of population unknown parameters or using (2) hypothesis testing about population parameters.

10. differentiate between statistical inferences based on paired comparisons and those based on unpaired comparisons.

11. understand how to correctly state null and alternative hypotheses , how to carry out hypothesis tests and how to compute their observed level of significance (i.e. p-value) then how to make statistical comparisons.

12. use Chi-Square distribution for goodness-of-fit tests and for independence and homogeneity tests

13. understand rank transformation and how non-parametric procedures can be used for statistical analysis of data coming from weak measurement scales or levels.

21 . Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face)	Platform	Synchronous/ Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Definition of Statistics and its subdivision The Biostatistics	B1, B2		MS	NA	Exams	Textbook and related websites
	1.2	Describing sample data(qualitative/quantitative)	B3					
	1.3	Data summarization by frequency tables and plots						
2	2.1	Data summarization by numerical computations of location measures						
	2.2	Data summarization by measures of dispersion						
	2.3	Data percentiles and data skewness and kurtosis						
3	3.1	Introduction to Probability Theory	B4, B5					
	3.2	Probability laws						
	3.3	Conditional probability and						

		Bayes Rule						
4	4.1	Screening tests and their classification errors	B6, B7, B8				Exams	
	4.2	Random variables(discrete/continuous)						
	4.3	Mean and Variance of Random variables						
5	5.1	Binomial random variable						
	5.2	Normal Random variables and their distributions						
	5.3	Applications of the Normal Distribution						
6	6.1	The central Limit Theorem	B9, B10, B11					
	6.2	Applications of the Central Limit theorem						
	6.3	Confidence intervals for population means						
7	7.1	Hypothesis testing concepts						
	7.2	Use of Hypothesis testing for statistical inference						
	7.3	Errors of Hypothesis testing and their computations						
8	8.1	The sampling distribution of the						

		sample proportion						
	8.2	Confidence intervals and hypothesis testing for population proportions						
	8.3	The sampling distribution of the sample standard deviation	B9, B10, B11					
9	9.1	Confidence intervals and tests of hypothesis for population variance						
	9.2	Student t-distribution for the mean of small samples						
	9.3	Use of Student t distribution for confidence interval and tests about the population mean						
10	10.1	The sampling distribution of the difference between two sample means (large samples)						
	10.2	Comparisons of two population means by confidence interval and by tests of hypothesis						
	10.3	The sampling distribution of the difference between tow sample proportions	B9, B01, B11					

11	11.1	The sampling distribution of the difference between two sample means (small samples)						
	11.2	Small samples Comparisons of two population means by confidence interval and by tests of hypothesis						
	11.3	The sampling distribution of the ratio of two sample variances						
12	12.1	Use of the F Distribution in comparing two population means (estimation and testing)						
	12.2	Bivariate data and the correlation coefficient						
	12.3	Paired and unpaired comparisons						
13	13.1	Simple linear regression						
	13.2	Statistical inference from simple linear regression						
	13.3	One –way Analysis of variance						
14	14.1	Multiple comparison in one way ANOVA						
	14.2	Analysis of frequency count						

		data						
	14.3	Test of Goodness of fit						
15	15.1	Tests of homogeneity and independence in two-way count data						
	15.2	Nonparametric techniques for paired comparisons	B12, B13					
	15.3	Nonparametric techniques for unpaired comparisons						

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
First Exam	30%	Descriptive statistics and probability Theory	1-6	During the 6 th week	In class
Second Exam	30%	Discrete and continuous random variables and Sampling Distribution	7-10	During the 11 th week	In Class
Final Exam	40%	The entire course content	1-13	After the 15 th week and during University final exam	In Class

23 Course Requirements

Students should have a computer, internet connection, webcam, account on a specific software/platform:

24 Course Policies:

A- Attendance policies:

B- Absences from exams and submitting assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

F- Available university services that support achievement in the course:

1. students are not allowed to take the course and its pre-requisite at the same time.
 2. Attendance is absolutely essential to succeed in this course. So, each student is expected to attend every class; Notify your instructor in case you are going to be absent. All exams must be taken at their scheduled times, where exceptions will be made only in extreme circumstances but by prior arrangement with the instructor.
 3. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from sitting in for the final examination. Also he/she will get a failing grade in this course.
 4. Authorized medical certificates should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
 5. Test papers shall be returned to students after they are graded by the instructor. Instructor's marks are considered final after a lapse of one week following their return to the students.
 6. Solutions for the exams questions and student exams and homework marks will be announced.
- Cheating is prohibited. The University of Jordan regulations on cheating will be strictly and firmly applied to any student who cheats in exams or on homework



25 References:

A- Required book(s), assigned reading and audio-visuals:

A-Requiredbook(s)

- (i) Biostatistics, 11th edition
By Wayne W. Daniel and Chad L. Cross John
Wiley and Sons 2014

B-Recommended books, materials, and media:

- (i) Fundamentals of Biostatistics, 7th edition
By Bernard Rosner
Duxbury Press 2010
- (ii) Biostatistics, 2nd edition
By Gerald van Belle and others Wiley
Interscience 2004
- (iii) Introductory Biostatistics for the Health Sciences
By Michael R. Chernick and Robert H. Friis Wiley Interscience

26 Additional information:

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Name of Course Coordinator: Prof. Hisham Hilow-----Signature: -----
Date: Nov 2 nd , 2022-----
Head of Curriculum Committee/Department: Prof. Ahmad Al Zghoul-- Signature: -----
Head of Department: -Prof. Manal Ghanem - Signature: -M. Ghanem
Head of Curriculum Committee/Faculty: ----- Signature: ----
Dean: Mahmoud Jaghoub Signature: -----