



Course Specification

— (Bachelor)

Course Title: **Biostatistics**

Course Code : **123 MAT-2**

Program: **Health track**

Department: **Preparatory Year**

College: **Science and Arts**

Institution: **Najran University**

Version: **1**

Last Revision Date: **4/1/2024**

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A. General information about the course:

1. Course Identification

1. Credit hours: (2)

2. Course type

A. ☐ University ☐ College ☐ Department ☒ Track ☐ Others
B. ☐ Required ☐ Elective

3. Level/year at which this course is offered: (Level 5 / third year)

4. Course general Description:

This course is designed with basic principle of statistics and Emphasis on application in of Biological problems. Biostatistics provides the basic framework for thinking about data in a rigorous fashion. This course acquaints the students with the basic concepts of descriptive statistics i.e. data summarization and presentation, central tendency and dispersion and linear correlation and regression model. The students are trained to draw statistical inference by two main methods these are: estimation and hypothesis testing. Z, T, and Chi-square are discussed with relevant biological examples.

5. Pre-requirements for this course (if any):

Non

6. Co-requisites for this course (if any):

Non

7. Course Main Objective(s):

By the end of this course, the student will be able to:

- Organize, summarize, and present data.
- Describe the relation between two variables.
- Work with sample data to make inferences about a population.
- Apply basic statistical concepts commonly used in biological Sciences.
- Use basic analytical techniques to generate results.
- Interpret results of commonly used statistical analyses in written summaries.
- Demonstrate statistical reasoning skills correctly and contextually.
- To learn how to appropriately apply statistical procedures in the biological environment.
- Understand basic statistical concepts for central tendency, dispersion and linear correlation.

2. Teaching mode (mark all that apply)





No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify biostatistics and type of a variable and the difference between nominal, ordinal, discrete, continuous, ungrouped and grouped	It depends on the program	<ul style="list-style-type: none"> Lectures. Home work. Statistical exercises. 	<ul style="list-style-type: none"> First Midterm exam. Second Midterm Exam Final Exam
1.2	Understand the basic concepts of Descriptive statistics and Some biological indices.	It depends on the program	<ul style="list-style-type: none"> Lectures. Home work. Statistical exercises Using the library. 	<ul style="list-style-type: none"> First Midterm exam. Second Midterm Exam Final Exam



Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.3	Be aware by the measures of central tendency and dispersion.	it depends on the program	<ul style="list-style-type: none"> • Lectures. • Home work. • Statistical exercises • Using the library. 	<ul style="list-style-type: none"> • First Midterm exam. • Second Midterm Exam • Final Exam
2.0	Skills			
2.1	Investigate biological and scientific problems using statistical techniques.	It depends on the programs	<ul style="list-style-type: none"> • lectures. • Scientific discussions. • Brain storming. • Discussion. • Problem solving Open discussion 	<ul style="list-style-type: none"> • First Midterm exam. • Second Midterm Exam • Final Exam
2.2	Investigate biological and scientific problems using statistical techniques.	It depends on the program	<ul style="list-style-type: none"> • lectures. • Scientific discussions. • Brain storming. • Discussion. • Problem solving Open discussion 	<ul style="list-style-type: none"> • performance and reports • discussion. • Report assignments
2.3	Competently practices analytical and critical thinking skills in studying and assessing biological problems and reading the results of examinations that is related to biological sciences.	It depends on the program	<ul style="list-style-type: none"> • lectures. • Scientific discussions. • Brain storming. • Discussion. • Problem solving Open discussion 	<ul style="list-style-type: none"> • performance and reports • discussion. • Report assignments
2.4	Predicts an appropriate diagnosis for the most common biological problems through analysis of data and the results .	It depends on the program	<ul style="list-style-type: none"> • lectures. • Scientific discussions. • Brain storming. • Discussion. • Problem solving Open discussion 	<ul style="list-style-type: none"> • performance and reports • discussion . • Report assignments
3.0	Values, autonomy, and responsibility			
3.1	Communicates effectively with other and expresses his ideas clearly and objectively.	It depends on the program	<ul style="list-style-type: none"> • Homework (preparing a report on some topics related to 	<ul style="list-style-type: none"> • Evaluation of presentations.

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
			the course depending on web sites). • Seminars presentation.	• Evaluation of reports.
3.2	Play a major role in joint work planning and evaluation.	It depends on the program	• Teamwork	• Evaluation of presentations. • Evaluation of reports.

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction: Introduction to Biostatistics (Importance and targets).	1
2.	Descriptive Statistics : Statistical and biostatistics Concepts Type of Data and Information Type of variable, difference between nominal and ordinal, difference between discrete and continuous	1
3.	Data Presentation: The frequency distribution tables, Relative, cumulative and percentage frequency for ungrouped data tables. Relative, cumulative and percentage frequency for grouped data tables	2
4.	Data Presentation: Graphical presentation, charting ungrouped data by pie, simple clustered, stacked bar, step charts, time series charts. Charting grouped data histogram, curve and ogive	2
5.	Measures of central tendency: Mod, median, mean	2
6.	Measures of dispersion: rang, variance, standard deviation, coefficient of variation.	2
7.	Linear relationship between two variables (rxy): Simple Correlation: Person's correlation coefficient of linear correlation, Coefficient of contingency and Type of correlation coefficient	4
8.	Simple Linear Regression: Model Equation Regression Using it in Diagnostics	2
9.	Test hypothesis: Null and alternative hypothesis, Significance level and P value. Testing the Population Mean When the Population Standard Deviation Is Known	4
10.	Parametric tests: T test: T-test for single sample, two independent samples and t test for paired samples.	4
	Non-parametric tests: Chi Square test.	2
11.	Inference a Population Mean When the Standard Deviation Is Unknown (T and Z test).	2

12.	Inference about the Difference between Two Means: Independent Samples Inference about the Difference between Two Means: Matched Pairs Experiment Chi square test.	2
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Midterm Exam	6 th week	15%
2.	Quizzes/ assignments/ Discussion/Homework	continuous	10 %
3.	Second Midterm Exam	10 th week	15 %
7.	Final Theoretical Exam	16,17 th weeks	60%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> W.W. Daniel and C.L. Cross (2019). Biostatistics: A foundation for analysis in the health sciences, 10th edition, Wiley. Banerjee, A. (2016). Essentials of Biostatistics, Medical Journal of Dr. D.Y. Patil University. 9. 10.4103/0975-2870.194237. Daniel, Wayne and Cross. C. L. (2013). Biostatistics: A foundation for analysis in the health sciences, student solutions manual. 10th edition, John Wiley, Canada. 2- David Bowers. 2008. Medical Statistics from Scratch An Introduction for Health Professionals, JohnWiley and Sons, England. Kanishka Bhattacharya. (2004). Introduction to Statistics for Medical Students, University of Oxford. Chap T. LE. (2003). Introductory Biostatistics. John Wiley & Sons Publication.
Supportive References	<ul style="list-style-type: none"> Principles of plant physiology and its application Introduction to physiology (E. Mac Donald & Evans)
Electronic Materials	<ul style="list-style-type: none"> http://www.mikemiddleton.com/ http://jmasi.com/ehsa/index.htm Blackboard website; Website of Saudi digital Library
Other Learning Materials	<ul style="list-style-type: none"> Class room is already provided with data show. The area of class room is suitable concerning the number of enrolled students and air conditioned.

2. Required Facilities and equipment

Items	Resources
facilities	<ul style="list-style-type: none"> Lecture room (8 x 15m) equipped with about 20 student seats.





Items	Resources
(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	
Technology equipment (projector, smart board, software)	• White Board, computer, Data Show, Overhead projector and laptop.
Other equipment (depending on the nature of the specialty)	• Library, and Seminar Room and Wi-Fi internet connections

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, program leaders, peer reviewers	Course evaluation questionnaires - Opinion polls via the university website - Opinion poll to evaluate learning outcomes (live)- Analysis the grades of students.
Effectiveness of Students assessment	Students, program leaders, peer reviewers	Course evaluation questionnaires - Opinion polls via the university website - Opinion poll to evaluate learning outcomes (live) - Open discussion in the class room at the end of the lectures.
Quality of learning resources	Students, program leaders, peer reviewers	Course evaluation questionnaires - Opinion polls via the university website - Opinion poll to evaluate learning outcomes (live)
The extent to which CLOs have been achieved	Students, program leaders, peer reviewers	
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PROGRAM COUNCIL
REFERENCE NO.	14450625-0540-00008
DATE	08/01/2024

