



# Course Specification

## (Bachelor)

**Course Title:** Biostatistics

**Course Code:** APEP1604

**Program:** Diploma - Technology of Environmental Protection

**Department:** Biology Department

**College:** Faculty of Science

**Institution:** Umm Al-Qura University

**Version:** 2

**Last Revision Date:** 12 / 2024

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## A. General information about the course:

### 1. Course Identification

1. Credit hours: (3 Credits )

#### 2. Course type

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

3. Level/year at which this course is offered: (1<sup>st</sup> Year /3<sup>rd</sup> Level)

#### 4. Course General Description:

Introduction to methods and concepts of statistical analysis and sampling, with special attention to those occurring in biological sciences. Topics include Frequency Distributions, Graphs, Descriptive statistics and Inferential Statistics. The class is applied using examples from real life and through statistical software.

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

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

#### 7. Course Main Objective(s):

The purpose of the course is to teach fundamental concepts and techniques of descriptive and inferential statistics with applications in biology. Basic statistics, including, descriptive statistics, inference for parametric and non-parametric methods are presented. The analytic methods and applications will be linked to topics including real life problems, and program evaluation.

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>Traditional classroom</li> <li>E-learning</li> </ul>		
4	Distance learning		





### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	80%
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	10%
5.	Others (specify)	10%
Total		

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	To understand the basics terms of biostatistics, types of variables numerical or categorical , and different sampling types.	K1, K2	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
1.2	To understand the concepts of descriptive statistic, tables graphs and measures, and how they are used in statistical analysis.	K1, K2	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
1.3	To understand methods of statistical inference including parametric and non-parametric methods .	K1, K2	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
1.4	To understand the difference between descriptive and inferential statistics and when do we use them in real life.	K1, K2	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
2.0	Skills			





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.1	Choose an appropriate graphical or tabular display for a given data set and question	S1, S2, S3	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
2.2	Determine which basic statistical method(s) is/are most appropriate to analyze the data at hand	S2	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
2.3	Analyze data using fundamental statistical methods	S2, S3	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
3.0	<b>Values, autonomy, and responsibility</b>			
3.1	Work collaboratively and constructively in teams with responsibility	V1, V2	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
3.2	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	V3	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities

### C. Course Content

No	List of Topics	Contact Hours
1.	Introduction: Introduction to Biostatistics (Importance and targets).	3
2.	Descriptive Statistics Data as a simple/grouped frequency tables. Data presentation (frequency distribution) and box-plot.	6





3.	- Data Presentation Different types bars and histograms. Data presentation by pie and graphs.	3
4.	- Measures of central tendency Mean, medium and mode.	3
<b>Descriptive Statistics</b>		
5.	- Measures of central tendency - Measures of dispersion - Measures of position	3
6.	- Midterm examination	3
<b>Introduction to Statistical Inference</b>		
7.	- Concept of hypothesis testing - Parametric tests Non-parametric tests	3
8.	<b>Measures of dispersion.</b> Range, variance, standard deviation and mean deviation	6
9.	T test: T-test for single sample, two independent samples and t- test for paired samples.	3
10.	Quartile Measures	3
11.	- Normal Distribution - Applications in Science	3
12.	Standard Normal Distribution Z-Scores	3
13.	Chi Square (X <sup>2</sup> )Test Correlation Coefficient (r)	3
<b>Total</b>		

#### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz 1 (Theory)	3	10%
2.	Midterm examination (Theory)	6	30%
4.	Group project	9-10	10%
6.	Final examination (Theory)	16	50%
	TOTAL	100%	



\*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	1- Daniel, W. W., & Cross, C. L. (2018). Biostatistics: a foundation for analysis in the health sciences. Wiley. 2- Bluman, A. G. (2017). Elementary statistics: A step by step approach. New York;: McGraw-Hill Higher Education.
Supportive References	- Griffith, A. (2007). SPSS for Dummies. John Wiley & Sons. - Evans, M. (2009). Minitab manual
Electronic Materials	
Other Learning Materials	- Handouts and Lecture notes - Microsoft office package

### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- Lecture room - Data show.
<b>Technology equipment</b> (projector, smart board, software)	- Computers or internet connection. - Active Board.
<b>Other equipment</b> (depending on the nature of the specialty)	

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	- Faculty	Indirect
Effectiveness of Students assessment	- Program leader, - curriculum - committee; - external - reviewers	Direct
Quality of learning resources		
The extent to which CLOs have been achieved	- Peer Reviewer	Direct
Other		

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.) **Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) **Assessment Methods** (Direct, Indirect)

## G. Specification Approval

COUNCIL /COMMITTEE	Umm al-Qura University Council
REFERENCE NO.	851141114462/190635
DATE	22-11-1446

