Course Specification
(Bachelor)

Course Title:	**Biostatistics**
Course Code:	**STA 1217**
Program:	**Bachelor of Science in Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**2024 – V1**
Last Revision Date:	**None**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lectures, 0 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: Level 4 / Year 2					
4. Course general Description:					
This course describes the most important ideas, practical results, and examples of Descriptive Statistics, Probabilities and Distributions, Estimation, Hypothesis Testing, Inferences, Correlation and Regression, and Multinomial Experiments. The course includes the essential fundamentals of these topics. The emphasis is on calculations, and some applications are mentioned.					
5. Pre-requirements for this course (if any):					
None.					
6. Co-requisites for this course (if any):					
None.					
7. Course Main Objective(s):					
• Describe discrete data graphically and compute measures of centrality anddispersion. • Compute probabilities by modeling sample spaces and applying rules ofpermutations and combinations, additive and multiplicative laws andconditional probability. • Compute probabilities based on practical situations using the binomial andnormal distributions. • Teach students techniques of estimations. • Learn and use some tests of hypothesis. • Estimate and the use of the linear regression Line. • Use the ANOVA analysis.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	0	0%
3	Hybrid • Traditional classroom • E-learning	0	0%
4	Distance learning	0	0%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**30**
2.	**Laboratory/Studio**	**0**
3.	**Field**	**0**
4.	**Tutorial**	**30**
5.	**Others (specify)**	**0**
Total		**60**

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Identify several techniques of counting and calculus (series, integrals…) to calculate probabilities, mean, and variance.	K1, K3	2 lecture hours\week	Direct: Regular Exams
1.2	Describe different sampling experiments, sampling distribution, confidence interval, and hypothesis testing.	K1, K3	• 2 tutorial hours\week • Self-study	Direct: Short Quizzes
2.0	**Skills**			
2.1	Use techniques of problem solving.	S3	• Self-study • Real-life problems	Direct: • Participations • Short Quizzes
2.2	Draw graphs of data using descriptive statisitcs.	S3	Real-life problems	Direct: Short Quizzes
2.3	State, clearly and precisely, both orally and in writing, correlation and regression technique.	S3	Self-study	Direct: Participations
3.0	**Values, autonomy, and responsibility**			
3.1	Generate initiatives independently.	V1, V2	Personal questions	Direct: Participation
3.2	Develop personal values and attributes such as honesty, empathy and respect for others.	V1, V2	Teamwork and class discussions.	Direct: Homework and Mini projects

C. Course Content

No	List of Topics	Contact Hours
1.	***Descriptive Statistics:*** Types of Data, Design of Experiments, Frequency Distributions, Visualizing Data, Measures of Center, Measures of Variation, Measures of Relative Standing, Exploratory Data Analysis.	9
2.	***Probabilities and Distributions:*** Fundamentals, Addition Rule, Multiplication Rule, Condition Probability, Bayes' Theorem, Risks and Odds, Rates of Mortality, Fertility, and Morbidity. Random variables, Mean, Variance, Standard deviation, Binomial Distribution, Poisson Distribution, Standard Normal Distribution, Applications of Normal Distributions, Sampling Distributions and Estimators, The Central Limit Theorem, Normal as Approximation to Binomial, Assessing Normality.	10
3.	***Estimates and Sample Sizes with One Sample:*** Estimating a Population Proportion, Estimating a Population Mean (sigma known and unknown), Estimating a Population Variance.	9
4.	***Hypothesis Testing with One Sample:*** Basics of Hypothesis Testing, Testing Claim about Proportion, Testing Claim about Mean (Sigma Known and unknown), Testing Claim about Standard Deviation and Variance.	8
5.	***Inferences from Two Samples:*** Inferences about Two Proportions, Inferences about two Means: Independent Samples, Inferences from Matched Pairs, Odds Ratios, Comparing Variations in Two Samples.	8
6.	***Correlation and Regression:*** Correlation, Regression, Variation and Prediction Intervals, Multiple Regression.	8
7.	***Multinomial Experiments:*** Multinomial Experiments: Goodness-of-Fit, Contingency Tables: Independence and Homogeneity, One-Way ANOVA.	8
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**HomeWorks, Quizzes, Mini projects**	**During the term**	**10%**
2.	**First Midterm**	**Week 5-6**	**25%**
3.	**Second Midterm**	**Week 10-11**	**25%**
4.	**Final Exam**	**Week 15**	**40%**

*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	***Biostatistics for Biological and Health Sciences*, M.M. Triola & M.F. Triola, Pearson, 2006.** ISBN-10: 0321194365 ISBN-13: 9780321194367 **(Main Reference)**
Supportive References	• ***Biostatistical Analysis*, 5th Edition, Jerrold H. Zar, PearsonEducation. Inc., 2010.** ISBN-10: 0131008463, ISBN-13:9780131008465

	• ***The Analysis of Biological Data*, M.C. Whitlock, D.Schluter, Roberts & Company Publishers, 2015.** ISBN:9781936221486. • ***Intuitive Biostatistics*, 3rd Edition, Oxford UniversityPress, Harvey J. Motulsky, 2013.** ISBN13: 978-0199946648, ISBN10: 0199946647. • ***Basic Biostatistics: Statistics for Public Health Practice*, 2ndEdition, B. Burt Gerstman, Jones & Barlett Learning, 2015.** ISBN-13: 9781284036015.
Electronic Materials	**None**
Other Learning Materials	**None**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	▪ **Each class room should be equipped with a whiteboard and a projector.** ▪ **Laboratories should be equipped with computers and an internet connection.**
Technology equipment (projector, smart board, software)	**The rooms should be equipped with data show and Smart Board.**
Other equipment (depending on the nature of the specialty)	**None**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students**	**During the semester and at the end of the course each student will complete two evaluation forms.**
Effectiveness of Students assessment	**Instructor**	**At the end of each semester the course instructor should complete the course report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.**
Quality of learning resources	**Students**	**During the semester and at the end of the course each student will complete two evaluation forms.**
The extent to which CLOs have been achieved	**Instructor**	**At the end of each semester the course instructor should complete the course report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.**
Other	**None**	

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL
REFERENCE NO.	٤/١٤٤٦
DATE	06/03/1446 (09/09/2024)