هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

Course Title:	**Probability & Statistics (2)**
Course Code:	**STA 1102**
Program:	**Bachelor of Science in Applied Statistics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**2024 – V1**
Last Revision Date:	**2 October 2024**

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A. General information about the course:

1. Course Identification

1. Credit hours: (.....)					
4 (3 Lectures, 1 Lab, 1 Tutorial)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (.....)					
Level 2/ Year 1					
4. Course General Description:					
The Probability & Statistics (2) course is designed to provide students with a thorough understanding of continuous random variables, probability distributions, and the foundational concepts of test hypothesis for one sample and two samples. This course emphasizes the application of statistical methods in analyzing data and making informed decisions based on probability theory.					
5. Pre-requirements for this course (if any):					
STA 1101					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
▪ To provide students with a foundational understanding of continuous random variables and their properties, including the concepts of probability density functions (PDFs) and cumulative distribution functions (CDFs). ▪ To equip students with the ability to identify and analyze common continuous probability distributions. ▪ To develop students' understanding of sampling distributions and the Central Limit Theorem, emphasizing its significance in inferential statistics and the behavior of sample means. ▪ To enable students to formulate and test hypotheses for one sample and two samples using appropriate statistical methods. ▪ To provide hands-on experience with statistical software for conducting analyses related to continuous random variables and hypothesis testing, enhancing students' computational skills and practical application.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	***Traditional classroom***	75	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*	45
2.	*Laboratory/Studio*	15
3.	*Field*	0
4.	*Tutorial*	15
5.	*Others (specify)*	0
Total		75

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 define the concept of continuous random variables and their properties.	K1	Lectures, problem solving, Classroom discussions	**Direct:** Regular Exams, Assignments,
1.2	To state sampling distributions and the Central Limit Theorem.	K2, K3	Lectures, problem solving, Classroom discussions	**Direct:** Assignments, Practical exam
1.3	To outline the hypothesis theory and procedures.	K1, K2	Lectures, problem solving, Classroom discussions	**Direct:** Regular Exams, Assignments,
2.0	Skills			
2.1	To analyze continuous random variables and their distributions	S1, S2	Lecturing, Interactive learning.	**Direct:** Assignments, Practical exam
2.2	To perform hypothesis tests for one sample and two samples.	S3, S1		
2.3	To utilize statistical software for conducting analyses.	S5, S3	Lecturing, Interactive learning, Use of statistical software.	**Direct:** Exam, Assignments, Practical exam
2.4	To evaluate the appropriateness of statistical methods for different data types and scenarios.	S4, S2	Lecturing, Interactive learning.	**Direct:** Assignments, Practical exam
3.0	Values, autonomy, and responsibility			
3.1	To demonstrate ethical considerations in the analysis and reporting of statistical findings.	V1, V3	Lecturing, Interactive learning.	**Direct:** Assignments, Mini-project, Practical exam
3.2	To formulate independent hypotheses and choose appropriate statistical methods for analysis.	V2	Lecturing, Interactive learning.	**Direct:** Assignments, Mini-project, Practical exam

C. Course Content

No	List of Topics	Contact Hours
1.	**Continuous Random Variables and Probability Distributions:** Continuous Random variables. Probability Distribution and Probability Density Function. Cumulative Distribution Function. Mean and Variance of a Continuous Random Variable Moments.	**15**
2.	**Some Examples of Continuous Probability Distributions:** Uniform Distribution. The Normal Distribution and its Approximations to the Binomial and Poisson Distributions; Gamma and Exponential Distributions. Chi-Square Distribution. t-Distribution. F-distribution.	**15**
3.	**Sampling distributions and the central limit theorem: concept of** Random Sampling; Sampling distributions; Sampling Distributions of the Means and the Central Limit Theorem; Sampling Distribution of the Difference between Two Means; Sampling Distribution of variance; Sampling Distribution of two Sample Variances.	**15**
4.	**Tests of Hypothesis for one Sample:** Steps in Hypothesis Testing-Traditional Method. z-Test for the Mean; t Test for the Mean. z-Test for the Proportion. Chi-Square Test for a Variance or Standard Deviation. ***Applications using statistical software.***	**15**
5.	**Tests of Hypothesis for Two Samples:** Testing the Difference Between Two Means of Independent Samples. Testing the Difference Between Two Means of Dependent Samples. Testing the Difference Between Two Proportions. Testing the Difference Between Two Variances. ***Applications using statistical software.***	**15**
Total		**75**

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 16-17**	**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	***Probability & Statistics for Engineers & Scientists***, 9th Edition, R. Walpole, R. Myers, S. Myers, K. Ye, Pearson Education International, 2012. ISBN 9780321629111. **(Main Reference).** ***Elementary Statistics***, 14th edition; Mario F. Triola, Pearson Education, 2021.

Supportive References	1. ***Introduction to Mathematical Statistics,*** 6th Edition, Robert V. Hogg, Joseph McKean, Allen T. Craig, Prentice Hall, 2005.***Mathematical Statistics with Applications,*** 7th Edition, D. Wackerly, W. Mendenhall, R.L. Scheaffer, Brooks/Cole-Cengage Learning, 2008. ISBN-13: 9780495385080. 2. ***Elementary Statistics: A Step by Step Approach*;** Bluman, Allan. G.; McGraw Hill, 8th Edition, 2012. 3. ***Probability and Statistics in Engineering***, 4th Edition, William W. Hines, Douglas C. Montgomery, David M. Goldsman, Connie M. Borror, John Wiley & Sons Inc, 2003.
Electronic Materials	**Course Website: Learning Management Systems (Blackboard)**
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.** **All computers should be equipped with the following software:** ▪ **Microsoft Excel** ▪ **IBM SPSS** ▪ **R-Project** ▪ **ATLAB**
Other equipment (depending on the nature of the specialty)	**See the attached file**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Student and teaching staff**	**Surveys and Questionnaires**
Effectiveness of Students assessment	**Course Coordinator**	**Peer Reviews**
Quality of learning resources	**Students and teaching staff**	**Classroom Observations**
The extent to which CLOs have been achieved	**Student Representatives**	**Student Performance Evaluations (exams, projects) CLOs Excel sheet.**
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	SMATHEMATICS AND STATISTICS DEPARTMENT COUNCIL
REFERENCE NO.	8/1446
DATE	(08/10/2024) 05/04/1446