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

Course Specification

(Bachelor)

Course Title:	**Probability & Statistics (1)**
Course Code:	**STA 1104**
Program:	**Bachelor of Science in Actuarial and Financial Mathematics**
Department:	**Mathematics and Statistics**
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	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 1 / Year 1)					
4. Course general Description:					
This course describes the most important ideas, theoretical results, and examples of descriptive statistics, counting, random variables probability distributions. The course includes the essential fundamentals of these topics. The emphasis is on calculations, and some applications are mentioned. The use of statistical packages is essential during this course.					
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 and dispersion.** • **Compute probabilities by modeling sample spaces and applying rules of permutations and combinations, additive and multiplicative laws and conditional probability.** • **Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance.** • **Compute probabilities based on practical situations using the discrete and continuous distributions.**					

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	**Describe the various measures of central tendency and dispersion.**	**K1**	**Use of statistical software, Lecturing, Interactive learning.**	**Direct: Lab Exam, Assignments, Practical exam**
1.2	**Outline basic probability concepts and techniques of counting for the calculation of probabilities.**	**K3**	**Lecturing, Interactive learning.**	**Direct: Assignments, Practical exam**
1.3	**Define and reproduce some special probability distributions.**	**K1**	**Lecturing, Interactive learning.**	**Direct: Assignments, Practical exam**
2.0	**Skills**			
2.1	**Analyze data using tables and charts.**	**S1, S2**	**Use of statistical software, Lecturing, Interactive learning.**	**Direct: Lab Exam, Assignments, Practical exam**
2.2	**Produce descriptive summary measures for a population and the coefficient of correlation.**	**S2, S3**	**Use of statistical software, Lecturing, Interactive learning.**	**Direct: Lab Exam, Assignments, Practical exam**
2.3	**Compute probabilities from the binomial,**	**S3**	**Lecturing, Interactive learning.**	**Direct: Assignments, Practical exam**

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	geometric, Poisson, and hypergeometric distributions.			
2.4	**Deduce probability mass functions, the expected value and variance for discrete random variables.**	**S1, S2**	**Lecturing, Interactive learning.**	**Direct: Assignments, Practical exam**
3.0	**Values, autonomy, and responsibility**			
3.1	**Argue the formulated conclusions.**	**V2**	**Personal questions**	**Direct: Participation**
3.2	**Debate meaningfully and productively with others.**	**V2**	**Teamwork and class discussions.**	**Direct: Homework and Mini projects**

C. Course Content

No	List of Topics	Contact Hours
1	**The Nature of Probability and Statistics:** Descriptive and inferential Statistics; Variables and Type of Data; Data Collection and Sampling Techniques; Observations and Experimental Studies.	**4**
2	**Frequency Distributions and Graphs:** Organizing Data; Histograms, Frequency Polygons, and Ogives; Other Types of Graphs.	**12**
3	**Data Description:** Measures of Central tendency; Measure of Variation; Measure of Positions; Exploratory Data Analysis.	**12**
4	**Counting Rules and Probability:** Counting Rules; Sample Space and Probability; The Additional Rules for Probability; The Multiplication Rules and Conditional Probability. Probability and Counting Rules.	**10**
5	**Discrete Probability Distributions:** A Discrete Random Variable; Probability distribution; Mean, Variance, Standard Deviation and Expectation; The Binomial Distribution; The Poisson Distribution; The Hyper-Geometric Distribution, The Geometric Distribution; The Negative Binomial Distribution.	**10**
6	**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; Uniform Distribution; The Normal Distribution.	**12**
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 semester	10%
2.	First Midterm	Week 5-6	25%
3.	Second Midterm	Week 10-11	25%
4.	Final Exam	Week 16	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	1. ***Elementary Statistics***, 14th edition; Mario F. Triola, Pearson, 2021. 2. ***Introduction to Probability and Statistics;*** 14th Edition, W. Mendenhall, R. J. Beaver, Barbara M. Beaver, Duxbury Press, 2013. 3. ***Applied Probability and Statistics in Engineering***, 4th Edition, William W. Hines, Douglas C. Montgomery, David M. Goldsman, Connie M. Borror, John Wiley & Sons Inc, 2003. 4. ***Probability and Statistics for Engineering and the Sciences,*** 9th Edition, Jay L. Devore, Brooks/Cole, Cengage Learning, 2016. 5. ***Data Analysis with Microsoft Excel,*** 3rd Edition, Kenneth N. Berk, Patrick Carey, Duxbury Press, 2010.
Supportive References	***Elementary Statistics: A Step By Step Approach,*** 10th Edition, Allan Bluman, Mc Graw Hill, 2018. ISBN13: 9781259755330 **(Main Reference).**
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	▪ Each classroom 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

Items	Resources
	• IBM SPSS • R-Project • MATLAB
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.	8/1446
DATE	05/04/1446 (08/10/2024)