Education & Training Evaluation Commission

Course Specification
(Bachelor)

Course Title:	Probability & Statistics 1
Course Code:	STA 1101
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

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (………)
3 (2 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 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**

No	Activity	Contact Hours
2.	**Laboratory/Studio**	**15**
3.	**Field**	**0**
4.	**Tutorial**	**15**
5.	**Others (specify)**	**0**
Total		**60**

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 state the various measures of central tendency and dispersion.**	**K2, K3**	2 lecture hours per week Classroom discussions	**Direct:** Regular Exams, Lab Assignments,
1.2	**To outline basic probability concepts and techniques of counting for the calculation of probabilities.**	**K1, K2**	1 tutorial hour per week 1 lab hour per week	**Direct:** Regular Exams, Lab Assignments,
1.3	**To define and reproduce some special probability distributions.**	**K1, K2**	Lecturing, Interactive learning.	**Direct:** Assignments, Practical exam
2.0	**Skills**			
2.1	**To summarize data using tables and charts.**	**S1, S2, S5**	**Use of statistical software, Lecturing, Interactive learning.**	**Direct:** Lab Exam, Assignments, Practical exam
2.2	**To compute descriptive summary measures for a population and the coefficient of correlation.**	**S2, S3, S5**	**Use of statistical software, Lecturing, Interactive learning.**	**Direct:** Lab Exam, Assignments, Practical exam
2.3	**To compute probabilities from the binomial, geometric, Poisson, and hypergeometric distributions.**	**S3, S4**	**Lecturing, Interactive learning.**	**Direct:** Assignments, Practical exam
2.4	**To calculate probability mass functions, the expected value and variance for discrete random variables**	**S1, S2, S3**	**Lecturing, Interactive learning.**	**Direct:** Assignments, Practical exam
3.0	**Values, autonomy, and responsibility**			
3.1	**To defend the formulated conclusions.**	**V1, V2**	**Interactive learning, Group interaction, Problem solving.**	**Direct:** Participation
3.2	**To operate meaningfully and productively with others.**	**V1, V3**	**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.	8
2.	**Frequency Distributions and Graphs:** Organizing Data; Histograms, Frequency Polygons, and Ogives; Other Types of Graphs. *Applications using statistical software.*	12
3.	**Data Description:** Measures of Central tendency; Measurse of Variation; Measure of Positions; Exploratory Data Analysis. *Applications using statistical software.*	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.	12
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. *Applications using statistical software.*	16
	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 (Lab exam)**	**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	▪ *Elementary Statistics: A Step By Step Approach,* 10th Edition, Allan Bluman, Mc Graw Hill, 2018. ISBN13: 9781259755330 **(Main Reference).** ▪ *Elementary Statistics*, 14th edition; Mario F. Triola, Pearson, 2021.
Supportive References	1. *Introduction to Probability and Statistics;* 14th Edition, W. Mendenhall, R. J. Beaver, Barbara M. Beaver, Duxbury Press, 2013. 2. *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. 3. *Probability and Statistics for Engineering and the Sciences,* 9th Edition, Jay L. Devore, Brooks/Cole, Cengage Learning, 2016.

	4. *Data Analysis with Microsoft Excel,* 3rd Edition, Kenneth N. Berk, Patrick Carey, Duxbury Press, 2010.
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.** **All computers should be equipped with the following software:** ▪ **Microsoft Excel** ▪ **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	**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	**None**	

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

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