Kingdom of Saudi Arabia
King Saud University
Deanship of Common First Year
Department of Basic Sciences

Syllabus and Course Contents – First Semester 1447H

Course Name: Introduction to Probability and Statistics **Course Number: Stat 101**	**Credit Hours: 3 hours** **Actual Hours: 4 hours**
Head of the Department: Dr. Abdulrahman Alzahrani **E-mail: chair-math@cfy.ksu.edu.sa**	**Office: 2562** **Phone: 94070**
Course Coordinator: Dr. Mustafa Salah Shama **E-mail: stat140@cfy.ksu.edu.sa**	**Office: 2434** **Phone**: ……..

Textbook: Introduction to Probability and Statistics, Sixth Edition, 2022.

Authors: Abouammoh A., Sultan K., Kayid M. and Sharahili M.

Some References:

1-Nicholas, Jackie. Introduction to Descriptive Statistics. Mathematics Learning Centre, University of Sydney, 1990.

2-Samules, M.L., Witmer, J.A and Schaffner, A., Statistics for the Life Sciences. Fourth edition, Pearson, New York, 2012.

3-Walpole, R.E., Myers, R.H. and Myers, S.L. and Ye, K., Probability and Statistics for Engineers and Scientists, Ninth Edition, Prentice, New York, 2012.

Course Learning Outcomes:

❖ Skills Domain

By the end of this course, students will be able to:

- Explain fundamental statistical concepts and their applications in real-life contexts.
- Distinguish between quantitative and qualitative variables and data types.
- Compute measures of central tendency (mean, median, mode) and positional measures (quartiles, percentiles) and illustrate them using Box Plots.
- Calculate measures of dispersion (variance, standard deviation, range) and use comparative measures to evaluate variation across multiple datasets.
- Construct the space of elementary events of random experiments and calculate the probability of events, including conditional probabilities, using the law of total probability and Bayes' theorem.
- Describe the concepts of probability, random variables, and probability distributions (discrete and continuous).

- Compute the mean and standard deviation of discrete random variables, and apply exponential, and normal distributions in problem-solving.
- Perform point estimation and interval estimation for population parameters and conduct parametric hypothesis tests.
- Calculate Pearson's correlation coefficient and perform simple linear regression analysis using the least squares method.

❖ Values & Attitudes Domain

By the end of this course, students will be able to:

- To develop an understanding and appreciation of the role of statistics as a scientific tool for informed decision-making and scholarly research.
- Demonstrate academic honesty, accuracy, and responsibility in performing statistical analyses.
- Develop critical thinking and logical reasoning in interpreting data and statistical results.

❖ Notes:

Each week consists of **four contact hours**, divided into **two structured components**:

- **Lecture (2 hours):** The lecture introduces and explains the concepts and terminology specified in the teaching plan. Each concept is supported with an illustrative example to enhance student understanding.
- **Practical/Exercise Session (2 hours):** This session focuses on solving coordinator-assigned exercises, enabling students to apply lecture concepts, enhance problem-solving skills.

❖ Important Instructions:

1) **Student absences** are recorded from the **first day** of classes until the **last day** before final examinations
2) **Arrival** more than **five minutes** after the scheduled start of class shall be recorded as **lateness**. **Two** instances of **lateness** shall be **counted** as the equivalent of **one hour of absence**.
3) **A student** will be **denied** the **final exam** if **absences exceed 25%** of the total course contact hours.
4) The student shall be **evaluated** during the semester **according** to the following components:
   - ✓ **Homework Assignments** (**10 marks**): **Two written homework** assignments, each carrying 5 marks **(2 × 5 = 10)**.
   - ✓ **Class Participation and Activities** (**15 marks**): This includes **solving exercises** during the practical sessions (**13 marks**) and **active participation** in class discussions (**2 marks**).
   - ✓ **Midterm Examination** (**25 marks**): **One written exam** administered during the semester.
   - ✓ **Final Examination** (**50 marks**): A comprehensive exam **covering the course content**.

❖ Course Schedule and Contents:

Week	Chapter	Required
1	Chapter One: Descriptive Statistics	Orientation Week (الأسبوع التعريفي)
2		1.0- Introduction. 1.1- Basic Concepts and Definitions.
3		1.2- Organization of Data. (Except: Cumulative relative and cumulative percentages frequencies). 1.3- Graphical Representations. (Except: Two directional bar chart, Multiple bar chart, Component bar chart).
4		1.4- Measures of Central Tendency and Position (Central Tendency). (Except: The median for Frequency Table).
5		1.4- Measures of Central Tendency and Position (Position). (Except: Definition 1.4.11).
6	Chapter Two: Probability	1.5- Measures of Variability. (Except: Variance and Standard Deviation for Grouped Data and Empirical rule). 2.1- Mathematical Concepts.
7		2.2- Definitions and Concepts in Probability Calculus. (Except: Example 2.2.8).
8		2.3- Concept of Probability Function. (Except: Relative frequency of event, Remark 2.3.1, Example 2.3.7, Example 2.3.8 and Example 2.3.10). 2.4- Conditional Probability and Independence of Events. (Except: Remark 2.4.2, Example 2.4.3(2), Example 2.4.6(b) and Example 2.4.7).
9	Chapter Three: Random Variables and Probability Distribution	3.1- Concept of Random Variables and Their Distributions. (Except:Example 3.1.2).
10		3.2- Discrete Random Variables and Their Distributions. (Except: Example 3.2.3, Example 3.2.7, 3.2.10, 3.2.11 and 3.2.14).
11		3.3- Continuous Random Variables and Their Distributions. (Except: Example 3.3.2, Example 3.3.3, Example 3.3.4 and Example 3.3.5).
12	Chapter Four: Introduction to Statistical Inference	4.1-Definitions and Concepts.
13		4.2- Estimation of the Population Mean. 4.3- Estimation of The Population Proportion
14		4.4- Introduction to Hypotheses Testing. 4.5- Hypotheses Testing for the Population Mean. 4.6-Hypothesis Testing for the Population Proportion.
15	Chapter Five: Correlation and Regression	5.1- Simple Linear Correlation. 5.2- Simple Linear Regression.