T-104
2022

Course Specification
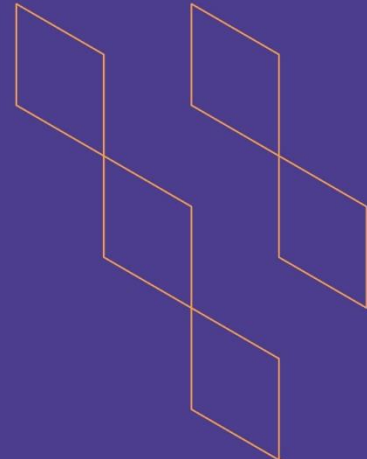
Course Title: **Probability**
Course Code: CS10403
Program: **Computer Science**
Department: **Computer Science**
College: **Computer Science and Information Technology**
Institution: **Albaha University**
Version: **: T104 – V1**
Last Revision Date: 7/4/2023

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department ☒	Track☐	Others☐
b.	Required ☒	Elective☐			

3. Level/year at which this course is offered: 4ᵗʰ / 2ⁿᵈ

4. Course general Description

This course applies Introduction to Mathematical Statistics The course covers some topics such as basic concepts of the Probabilities theory. Fundamental probabilities Concepts, conditional probability, independent events and disjoints events, probability distributions by using random variable, probability density function and mathematical expectation, Some Discrete Probability Distributionsو Some Continuous Probability Distributions and Functions of Random Variables

5. Pre-requirements for this course (if any): Statistic (CS10301)

6. Co- requirements for this course (if any): none

7. Course Main Objective(s)

This course is aimed at applied the mathematical foundations to explain the statistical and probability concepts.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	33	100%
2.	E-learning		
3.	Hybrid - Traditional classroom - E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	33
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	-

5.	Others (specify)	-
	Total	**33**

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	Define the Discrete Probability Distributions Classical definitions of probability, fundamental probability concepts, distribution theory random variables and moments.	K1	- Lectures. - PowerPoint presentation. - Debate and discussion. - Cooperative Learning. - Working in small groups. - Individual and group research.	- Quiz1 and Quiz 2. - Assignments. - Midterm exam. - Final exam
1.2	Explain the difference between the Discrete Probability Distributions & Continuous Probability Distributions.	K2	- Lectures. - PowerPoint presentation. - Debate and discussion. - Cooperative Learning. - Working in small groups. - Individual and group research	- Quiz1 and Quiz 2. - Assignments. - Midterm exam. - Final exam
1.3	How to use the theorems to find statistical measures (expected value, variance, moment generating function, correlation and covariance) mathematically.	K3	- Lectures. - PowerPoint presentation. - Debate and discussion. - Cooperative Learning. - Working in small groups. - Individual and group research	- Quiz1 and Quiz 2. - Assignments. - Midterm exam. - Final exam
2.0	**Skills**			
2.1	Apply mathematical rules to find expected values,	S3	- Lectures. - PowerPoint presentation.	- Quiz1 and Quiz 2. - Assignments. - Midterm exam.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	variances, moments generating functions of the random variable.		- Debate and discussion. - Cooperative Learning. - Working in small groups. - Individual and group research	- Final exam
2.2	Evaluate mean vector, covariance matrix, correlation of the random variables.	S1	- Lectures. - PowerPoint presentation. - Debate and discussion. - Cooperative Learning. - Working in small groups. - Individual and group research	- Quiz1 and Quiz 2. - Assignments. - Midterm exam. - Final exam
2.3	Find the relationship between PDF and CDF theoretically. the distributions of random variables	S2	- Lectures. - PowerPoint presentation. - Debate and discussion. - Cooperative Learning. - Working in small groups. - Individual and group research	- Quiz1 and Quiz 2. - Assignments. - Midterm exam. - Final exam
3.0	Values, autonomy, and responsibility			
3.1	Take responsibility for own learning and professional development.	V2	- Teamwork. - Students' presentation. - Reporting. - Scientific media. - Cooperative and individual assignments. - Cooperative learning	- Evaluation of individual and group works. - Observation card.
3.2	Work effectively in groups and exercise leadership when appropriate.	V2	- Working in small groups.	- Evaluation of group works.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			- Group research.	
3.3	Present information clearly in both written and oral form.	V3	- Teamwork. - Small groups and the distribution of roles. - PowerPoint presentation. - Writing reports.	- Oral discussion - Report evaluation
3.4	Communicates effectively in oral and written form in educational situations related to the subjects of the course.	V4	- Small groups and the distribution of roles. - PowerPoint presentation. - Writing reports.	- Oral discussion - Report evaluation

C. Course Content

No	List of Topics	Contact Hours
1.	**Probability theory:** - Random event, Algebraic operations and programs with events. - Classical definition of probability. - Fundamental probability concepts. - Probability of the unification of random events. - Probability of the opposite event. - Full probability formula. - Conditional probability. - Total Probability Theory. - Bayes Theorem	6
2.	**Random variable:** - Concept of a Random Variable - Discrete Probability Distributions - Continuous Probability Distributions - Joint Probability Distributions.	6
3	**Mathematical Expectation:** - Mean of a Random Variables - Variance and Covariance of Random Variables. - Means and Variances of Linear Combinations of Random Variables	6

	- Chebyshev's Theorem.	
4	**Some Discrete Probability Distributions:** - Binomial and Multinomial Distributions - Hypergeometric Distribution - Negative Binomial and Geometric Distributions - Poisson Distribution and the Poisson Process	6
5	**Some Continuous Probability Distributions:** - Continuous Uniform Distribution - Normal Distribution - Applications of the Normal Distribution	6
6	**Functions of Random Variables:** - Introduction - Transformations of Variables - Moments and Moment-Generating Functions	3
	Total	33

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz 1	4	10%
2.	Midterm Written Theoretical Exam	8	20%
3.	Quiz2	10	10%
4.	Assignments, Activities and Attendance	During Semester	10%
5.	Final Practical Exam	-	-
6.	Lab Reports	-	-
7.	Final Written Theoretical Exam	11	50%

*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	• Ronald E. Walpole and Raymond H. Myers (2007) Probability & Statistics for Engineers & Scientists 9th edition
Supportive References	• Rice, J. A. (2006). Mathematical statistics and data analysis. Cengage Learning.
Electronic Materials	- http://www.maths.adelaide.edu.au/patty.solomon/MSIII2012/MSIII.pdf - https://s3.amazonaws.com/arena-attachments/532676/c7837c7162f52f9f42c2f3c5cab303e1.pdf - http://fstroj.uniza.sk/kam/orsansky/pdf/eng/basicsofstatisticalmethods.pdf

Other Learning Materials	- none

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	− Classrooms equipped with smart board and display screen for (40) students
Technology equipment (projector, smart board, software)	− Provision of computers for students training to be used in research on scientific topics that serve the course.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	--	--
Effectiveness of students assessment	--	--
Quality of learning resources	• Students and Program Leaders.	• Direct
The extent to which CLOs have been achieved	• The teacher	• Using an excel program that measure CLO's.
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	1- 2-
REFERENCE NO.	
DATE	