Course Specification

(Bachelor)

Course Title:	Probability Theory
Course Code:	STAT1252
Program	Bachelor of Science in Statistics
Department:	Statistics
College:	Faculty of Science
Institution:	University of Tabuk
Version:	1
Last Revision Date:	31 October 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3 hours)					
2. Course type					
A.	☐ University	☒ College	☐ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (……./…..)					
4. Course general Description:					
The course covers the basic principles of the probability theory and its applications. Topics include the axioms of probability, conditional probability and independence of events; discrete and continuous random variables; joint, marginal, and conditional densities, moment generating function and some discrete, continuous distributions.					
5. Pre-requirements for this course (if any)**:**					
STAT1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The course aims to teach students the meaning of random variables, distributions and applications of random variables in the real-life problem, and the relationship between bivariate random variables and the study of function of random variables.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
3	Hybrid ● Traditional classroom ● E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		45

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 importance of the random variable and its applications in statistics.	K1	*Lectures *Self-Learning * Free discussion	*Quizzes *First Midterm Exam *Second Midterm Exam *Final exam
1.2	Recognize the fundamentals of probability theory	K2		
2.0	**Skills**			
2.1	Calculate the moment generating functions, the Expectation and variance of the random variables	S1	*Lectures *Discussion *Solve problems. *Group work	*Assignments *Quizzes *First Midterm Exam *Second Midterm Exam *Final exam
2.2	Apply the different Probability distributions such as Geometric, poison, uniform and exponential distributions.	S3		
2.3	Formulate the joint (discrete–continuous) probability problems as well as marginal probability distribution problems.	S5		

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	**Values, autonomy, and responsibility**			
3.1	Collaborate responsibly to manage assignments and activities in a timely manner individually or in groups	V2	*Cooperative *learning and *teamwork *Discussion *Self-Learning	*Assignments *Oral presentation

C. Course Content

No	List of Topics	Contact Hours
1	**Revision of basics of Probability**: Definition, Axioms, Multiplicative rule, Additional rule, Conditional probability, bays theorem and find probability using combinations.	3
2	**Discrete Random variables**: definition, discrete probability distribution, Expectation (mean and variance),	3
3	**Discrete Random variables** Poisson distribution**, Geometric distribution**	3
4	**Continuous Random variables**: definition, probability density function, Expectation (mean and variance),	3
5	**Continuous Random variables:** Uniform distribution, exponential distribution	3
6	**Moments and moments generating function**: Moments about the origin, moments about the mean, moments generating function,	3
7	**Moments and moments generating function**: moments generating function for Poisson and exponential distribution.	3
8	**Joint discrete probability distributions**: Joint probability mass function, Marginal Probability Distribution Function, Conditional Distribution,	3
9	**Joint discrete probability distributions** , Statistical Independence, Mathematical Expectation	3
10	**Joint discrete probability distributions** Covariance of random variables, Correlation Coefficient	3

11	**Joint continuous probability distributions** Joint probability mass function, Marginal Probability distribution Function, Conditional Distribution.	3
12	**Joint continuous probability distributions** , Statistical Independence, Mathematical Expectation,	3
13	**Joint continuous probability distributions** Covariance of random variables, Correlation Coefficient**.**	3
14	Variance of linear combination.	3
15	Chebyshev's inequality, Central limit theorem	3
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Oral presentation	During trimester	5%
2.	Assignments (2)	4th,8th week	5%
3.	Quizzes (2)	5th, 10th week	10%
4.	First Midterm Exam	6th week	20%
5.	Second Midterm Exam	11th week	20%
6.	Final Exam	At the end of semester	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	Wackerly, D. D. (2008). Mathematical statistics with applications, 7th Edition, Brooks/Cole. Ross S.. A first course in probability, 10th ed., Prentice Hall, 2019.
Supportive References	Allan G. Bluman. Elementary Statistics, Step by Step Approach, 10th edition, McGraw-Hill, 2017. David M. Levine & David F. Stephan. Even you can learn Statistics and
Electronic Materials	http://serc.carleton.edu/introgeo/teachingwdata/Stats.html
Other Learning Materials	Other learning material such as computer-based programs/CD, professional standards or regulations and software. - SPSS, Minitab, R and Excel

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms Laboratories
Technology equipment (projector, smart board, software)	Projector
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Faculty and Peer Reviewer	Indirect
Effectiveness of Students assessment	Students, Faculty and Peer Reviewer	Direct and Indirect
Quality of learning resources	Students, Faculty, Peer Reviewer and Program Leaders.	Indirect
The extent to which CLOs have been achieved	Students, Faculty and Program Leaders.	Direct and Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**DEPARTMENT COUNCIL**
REFERENCE NO.	**18**
DATE	**1444/11/11**

COUNCIL /COMMITTEE	**FACULTY COUNCIL**
REFERENCE NO.	**30**
DATE	**04/12/1444**