



Course Specifications

Course Title:	Probability (1)
Course Code:	2150 Stat
Program:	Bachelor of Science in Mathematics
Department:	Mathematics
College:	Faculty of science and humanity studies
Institution:	Prince Sattam Bin Abdul Aziz University, Saudi Arabia

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A. Course Identification

1. Credit hours: 4 Hours	
2. Course type	
a. University <input type="checkbox"/>	College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>
3. Level/year at which this course is offered: Elective	
4. Pre-requisites for this course (if any): Stat 2040	
5. Co-requisites for this course (if any): None	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4 hours a week	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	48
2	Laboratory/Studio	-
3	Tutorial	--
4	Others (specify)	60
	Total	108

B. Course Objectives and Learning Outcomes

1. Course Description

Continuing the STAT 2010 concepts – Definitions and properties of discrete and continuous random variables – Famous discrete and continuous probability distributions – Discrete bivariate probability distributions – Marginal and conditional probability distributions – Expectation and variation – Multinomial and GHG distributions – Independence and correlation – Likelihoods of continuous Random Sample – Functions of random variables: χ^2, t, F .

2. Course Main Objectives

- Provide the students with the principles and the basic rules of probability.
- Study the properties of discrete random variables and probability distributions.
- Know some special discrete probability distributions with its properties and applications.
- Study the properties of continuous random variables and probability distributions.
- Know some special continuous probability distributions with its properties and applications.
- Learn the joint (bivariate) probability distribution for two discrete random variables.
- Learn the joint (bivariate) probability distribution for two continuous random variables.
- Studying the properties of mathematical expectation and moment generating function.
- Understand the relation between random variables using covariance and correlation.
- Know the students to the properties and applications of functions of random variables.
- Study the point estimation of the population parameters using maximum likelihood estimator's method.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Gain knowledge and reproduce various theorems on probability	K2
1.2	Describe appropriate methods to evaluate the coefficient of correlation and other estimators	K4
2	Skills :	
2.1	Develop analytical and problem solving skills in real-life environment.	S1
2.2	Able to analyses the problems in relation to the associated statistical concepts and plan strategies for solving the same.	S2
3	Values:	
3.1	Able to appreciate the use of Probabilistic estimators	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the course	3
2	Fundamentals of probability <ul style="list-style-type: none"> • Basic Probability Concepts • Basic Probability Rules Bayes' theorem and its applications	3
3	Discrete Random Variable and Probability distributions <ul style="list-style-type: none"> • Probability mass function • Cumulative distribution function Statistical measures (mean, median, mode and variance)	3
4	Some special discrete probability distributions <ul style="list-style-type: none"> • Binomial distribution • multinomial distribution • Geometric distribution Hyper-geometric distribution	3
5	Continuous Random Variable and Probability distributions <ul style="list-style-type: none"> • Probability density function • Cumulative distribution function • Statistical measures (mean, median, mode and variance) 	3
6	Some special continuous probability distributions <ul style="list-style-type: none"> • Uniform distribution • Exponential distribution • Weibull distribution 	3
7	Joint probability distributions (Two <u>discrete</u> random variables) <ul style="list-style-type: none"> • Joint probability distribution • Marginal probability distribution • Conditional probability distribution & Independence Mean and variance of a Joint probability distribution	3

8	Joint probability distributions (Two <u>continuous</u> random variables) <ul style="list-style-type: none"> • Joint probability distribution • Marginal probability distribution • Conditional probability distribution & Independence • Mean and variance of a Joint probability distribution 	3
9	Mathematical Expectation (properties & applications)	3
10	Moment Generating functions (properties & applications)	3
11	Covariance and Correlation	3
12	Functions of random variables	3
13	Point estimation of parameters <ul style="list-style-type: none"> • Likelihood function of a sample maximum likelihood estimator 	3
14	General Review	3
Total		42

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Gain knowledge and reproduce various theorems on probability	1. Class room Lectures 2. Interactive sessions 3. Exclusive Office Hours for clearing doubts in small groups	1. Home work. 2. Assignment. 3. Quizzes.
1.2	Describe appropriate methods to evaluate the coefficient of correlation and other estimators		
2.0	Skills		
2.1	Develop analytical and problem solving skills in real-life environment.	1. Application oriented exercises during tutorial session. 2. Homework to improve the analytical skills	1. Internal exams 2. End semester exam 3. Assignments 4. Home work
2.2	Able to analyses the problems in relation to the associated statistical concepts and plan strategies for solving the same.		
3.0	Values		
3.1	Able to appreciate the use of Probabilistic estimators	1. Group discussion during lectures and interactive Session 2. Exercises during lecture and tutorials	1. Assignments 2. Home work 3. Mini Projects

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid Term Exam I	6	20%
2	Quiz	4 & 10	5%
3	Mid Term Exam II	13	20%
4	Continuous Assessment – Homework, Assignment, Attendance etc.	--	5%
5	End Semester Exam (Practical 10%, Theory 40%)	15	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

1. Exclusive Office Hours – 5 Hours per week
2. Academic Advising for Students – 1 Hour per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Applied Statistics and probability for Engineers. By: Douglas C. Montgomery, and George C. Runger, John Wiley (Third Edition)
Essential References Materials	Journals, Reports, etc
Electronic Materials	Web Sites, Social Media, Blackboard, etc.
Other Learning Materials	Computer-based programs/CD, professional standards or regulations and software, Lecture Notes Prepared by the Department of Mathematics

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms with Smart boards with suitable number of student in each room.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart board, Internet Connection for Blackboard
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students, Graduates	Course Evaluation and Program Evaluation Survey (Indirect)
Head of department reports.	Program Leaders	Peer Review (Direct)
Achievement of CLOs	Faculty and Quality Personnel	Direct (Tests and Quiz) and Review of Course Report
Quality of Learning Resources	Students	Course Evaluation (Indirect)
Annual course reports. Departmental review of course ILO"s.	Graduates	Program Evaluation(Indirect)

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Facilities	Students / Graduates	Course and Program Evaluation (Indirect)
	Faculty	Faculty Survey (Indirect), Course Reports (Direct)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	