



Course Specifications

Course Title:	Statistics and Probability 2
Course Code:	SAT 202
Program:	B. Sc in Mathematics
Department:	Mathematics Department
College:	College of Science
Institution:	College of Science

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A. Course Identification

1. Credit hours: 4(3+1)
2. Course type a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" 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: Third Level/Second year
4. Pre-requisites for this course (if any): SAT 101+MTH 203
5. Co-requisites for this course (if any): N/A

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	75 %
2	Blended	0	0 %
3	E-learning	0	0 %
4	Distance learning	0	0 %
5	Other	15	15 %

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (specify)	15
	Total	60

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course covers the fundamental concepts in probabilities. So the topics to will be covered are:</p> <ul style="list-style-type: none"> - The definition of discrete and continuous random variable: Probability mass function - Probability density functions- - mathematical expectation, variance and standard deviation. - Some discrete probability distribution (Poisson Distribution - geometric distribution) - Some continuous probability distributions (normal distribution- exponential distribution - T distribution- distribution chi square) - Moment generating functions and applications. -Joint, marginal and conditional probability distributions.
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2. Course Main Objective

This course aims to study the basic concepts in probability such as:

- Defining statistics, population and sample
- Determine probabilities from probability mass functions and the reverse
- Understanding the assumptions for each of the discrete probability distributions presented.
- Select an appropriate discrete probability distribution to calculate probabilities in specific applications.
- Approximating probabilities for some binomial and Poisson distributions.
- The study of the joint, marginal and conditional probability distributions.
- Use Statistical analysis software SPSS in, analysis and representation of data
- Use MINITAB program to statistically analyze of data and explain the results in statistical analysis

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Recognize conditional probability, independence and random variable.	K3
1.2	Includes calculating the probability of events related to a random experiment, random variables and their numerical characteristics and get to know some of the probability distributions and their generating function.	K3
1.3	Recognize some special distributions and apply their specific formulas.	K3
1...		
2	Skills :	
2.1	The students will be able to analyze the general knowledge of probability.	S3
2.2	The students will explain and interpret a general knowledge of probability such as random variable, joint, marginal and conditional probability distributions.	S3
2.3	The students will be able to apply several techniques of counting and calculus (series, integrals...) to calculate probabilities, mean, variance...	S3
2...		
3	Values:	
3.1	The students should be able to develop problem solving skills that require basic probabilistic modelling, including the use of discrete and continuous distributions and the use of random variables.	C2
3.2	Calculating of probability of some famous probability distributions.	C2
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Some Fundamental concepts in Statistics and probabilities. The definition of Discrete, continuous random variable Distribution, Probability density (mass) Functions - mathematical expectation	15
2	Some discrete probability Distribution -Binomial Distribution - Poisson Distribution - geometric distribution.	10
3	Some continuous probability distributions (normal distribution- exponential distribution - T distribution- distribution of chi square)	10
4	Moment generating functions and applications	10
5	Joint PDF, joint PMF, and joint CDF for three or more random variables.	10
6	Some Statistical Packages as SPSS and Minitab for data analysis and interpret the outputs.	5
Total		60

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	Having the knowledge of the conditional probability and independence.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	<ul style="list-style-type: none"> Homework Quiz Exam Final Exam E-exam Oral Exam
1.2	Knowledge of discrete and continuous random variable.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	
1.3	Knowledge of moment generating function.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	
1.4	Use Statistical analysis software SPSS in the analysis and representation of data	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	
2.0	Skills		
2.1	The students will be able to determine probabilities from probability mass functions and the reverse.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	<ul style="list-style-type: none"> Homework Quiz Midterms Final Exam
2.2	Understanding the assumption for each of the discrete probability distributions presented.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	
2.3	The students will explain and interpret a general knowledge of the main technical tools of elementary probability theory.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	<ul style="list-style-type: none"> Homework Quiz Exam Final Exam
3.0	Values		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Standardizing normal random variables.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	<ul style="list-style-type: none"> Homework Quiz Exam Final Exam
3.2	Selecting an appropriate discrete probability distribution to calculate probabilities in specific applications	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	
3.3	Approximating probabilities for some Binomial and Poisson distributions	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	
3.4	Use MINITAB program to statistically analyze of data and explain the results in statistical analysis.	<ul style="list-style-type: none"> Lectures/Presentations Media Lectures Tutorials 	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	7th week	20 %
2	Midterm 2	11th week	20 %
3	Homework	Through of semester	5 %
4	Quizzes	Through of semester	5 %
5	Electronic Test	13th week	5 %
6	Presentation	Through of semester	5%
7	Final exam	End of semester	40 %

*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 :

Department of mathematics has “**Student Academic Advisory Committee**”. This committee is responsible for students counseling and advising works in synchronization and collaboration with the Deanship of Admissions and Registration and Student Affairs. Department of mathematics Alzulfi has a continuous and standardized procedure that be associated with the student's progress until completion of degree and includes psychological, social and behavioral guidance. This advisory committee also maintain the student's files. The students with GPA below than 50 % in Mid 1 and Mid 2 are stayed under serious observation and continuous consultations with respective course instructor about their performing. The course teacher will commit to a minimum scheduled time for student consultation equivalent to **2 HOURS PER WEEK**

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> Probability & statistics for engineers & scientists (9th edition), Ronald E. Walpole and L. M. Keying Ye., Prentice Hall. 2011 ISBN 978-0-321-62911-1 Applied Statistics and Probability for Engineer , 4th Edition, Douglas C. Montgomery and George C Runger, John Wiley & Sons Canada 2007 ISBN 9780470729441
Essential References Materials	<ul style="list-style-type: none"> Applied Statistics and Probability for Engineers. D.C. Montgomery & G. C. Runger. John Wiley & Sons. 2003. Introductory Statistics. Wonnacott, T. H., and Wonnacott, R. J. John Wiley & Sons. 1969
Electronic Materials	http://www.sciencedirect.com/ https://www.khanacademy.org/math/statistics-probability/probability-library
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- Classroom with capacity of 30-students. - Computer Lab of Mathematics Department
Technology Resources (AV, data show, Smart Board, software, etc.)	Mathematical software packages like MATHEMATICA
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	https://www.edx.org/learn/probability

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)

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	Mathematics Department
Reference No.	27
Date	8/8/1442 H -21/3/2021 G

Head of Department

Dr. Muqrin Almuqrin


