Course Specification

(Bachelor)

Course Title:	**Probability and Statistics**
Course Code:	**STS 211**
Program:	**Applied Statistics & Data Management**
Department:	**Mathematics**
College:	**College of Science**
Institution:	**Majmaah University, Saudi Arabia**
Version:	
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (2+2) 3

2. Course type

A.	☐University	☐College	☒Department	☐Track	Others
B.	☒Required			☐Elective	

3. Level/year at which this course is offered: (4)

4. Course general Description:

This course covers the fundamental concepts in probabilities. So, the topics that will be covered are:
- Random variables and their probability distributions: 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 and generating functions.
– Joint, marginal and conditional probability distributions: Covariance, Correlation and Moments- Conditional expectation
-- Conditional distribution function - Conditional expectation - Moment generating function
-- Some consequent results of independence on Joint probability functions – Covariance – Correlation.

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

STS 133 Introduction to Probability

6. Co-requisites for this course (if any):

N/A

7. Course Main Objective(s):

- Determine 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 joint, marginal, and conditional probability distributions
- Use Statistical analysis software SPSS in, analysis and representation of data

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	25	55.56%
2	E-learning	20	44.44%
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		
5	Blended		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	25
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	20
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	Having the knowledge of the conditional probability and independence.	K3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam E-exam Oral Exam
1.2	Knowledge of discrete and continuous random variable.	K3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam E-exam Oral Exam
1.3	Knowledge of moment generating function.	K3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam E-exam Oral Exam
1.4	Use Statistical analysis software SPSS in the analysis and representation of data	K3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam E-exam Oral Exam
...				
2.0	**Skills**			
2.1	The students will be able to determine probabilities from probability mass functions and the reverse.	S3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam
2.2	Understanding the assumption for each of the discrete probability	S3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	distributions presented.			
2.3	The students will explain and interpret a general knowledge of the main technical tools of elementary probability theory.	S3	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam
3.0	**Values, autonomy, and responsibility**			
3.1	Standardizing normal random variables.	V2	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam
3.2	Selecting an appropriate discrete probability distribution to calculate probabilities in specific applications	V2	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam
3.3	Approximating probabilities for some Binomial and Poisson distributions	V2	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam
3.4	Use SPSS and MINITAB program to statistically analyze of data and explain the results in statistical analysis.	V2	Lectures Presentations Media Lectures Tutorials	Homework Quiz Mid Exam Final Exam

C. Course Content

No	List of Topics	Contact Hours
1.	Probability :Probability Axioms ،Conditional Probability and Bayes Theorem ،Independence of Events	8
2.	Random Variables and Their Probability Distributions :The definition of Discrete ،continuous random variable Distribution ،Probability density (mass) Functions-Expectation and variance	8

3.	Moments and Generating Functions :Moments of a Distribution Function ،Generating Functions	8
4.	Some discrete probability Distribution- Binomial Distribution- Poisson Distribution - geometric distribution.	8
5.	Some continuous probability distributions (Normal distribution - exponential distribution - T distribution -distribution of chi square)	8
6.	Some Statistical Packages as SPSS and MINITAB for data analysis and interpret the outputs	5
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid exam - 1	6 th	15
2.	Mid exam - 2	12 th	15
3.	Homework	Through of semester	10
4.	Quiz	Through of semester	10
5.	E.exam	14th	10
6.	Final exam	End of semester	40
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*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	An introduction to probability and statistics, VIJAY K. ROHATGI A. K. Md. EHSANES SALEH, Wiley, Third Edition
Supportive References	1) Probability & statistics for engineers & scientists, Ronald E. Walpole and L. M.Keying Ye., Prentice Hall, (9th edition), 2011 ISBN 978-0-321-62911-1 2) Applied Statistics and Probability for Engineer, Douglas C. Montgomery and George C Runger , John Wiley & Sons Canada, 4th Edition, 2017 Introductory Statistics, Wonnacott, T. H., and Wonnacott, R., John Wiley & Sons Canada, 1969
Electronic Materials	http://www.sciencedirect.com/ https://www.khanacademy.org/math/statistics https://www.khanacademy.org/math/statistics-probability/probability-libraryprobability/probability-library

Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students. Computer Lab of Mathematics Department
Technology equipment (projector, smart board, software)	Mathematical software packages like MINITAB and SPSS ، Python
Other equipment (depending on the nature of the specialty)	https://www.edx.org/learn/probability

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Effectiveness of Students assessment	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)
The extent to which CLOs have been achieved		
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	