اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Actuarial Probability
Course Code:	STAT 216
Program:	Bachelor
Department:	Department of Statistics and Operations Research
College:	Science
Institution:	King Saud University

VISION 2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

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Table of Contents

A. Course Identification

1. Credit hours: **4=3+2+0**	

2. Course type

a.	University ☐	College ☐	Department **x**		Others ☐	
b.		Required **x**		Elective ☐		

3. Level/year at which this course is offered: **3**

4. Pre-requisites for this course (if any)**: STAT 100 +MATH 111+MATH 206**

5. Co-requisites for this course (if any)**: NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	75	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	45
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	75

B. Course Objectives and Learning Outcomes

1. Course Description

List of Topics:

- Set functions including set notation and basic elements of probability
- Mutually exclusive events
- Addition and multiplication rules
- Independence of events
- Combinatorial probability
- Conditional probability
- Bayes Theorem / Law of total probability
- Random variables and distributions
- Mode, median, percentiles, and moments
- Variance and measures of dispersion (including coefficient of variation)
- Moment generating functions
- Transformations
- Joint probability functions and joint probability density functions
- Joint cumulative distribution functions
- Conditional and marginal probability distributions
- Moments for joint, conditional, and marginal probability distributions
- Joint moment generating functions
- Variance and measures of dispersion for conditional and marginal probability distributions
- Covariance and correlation coefficients
- Transformations and order statistics
- Probabilities and moments for linear combinations of independent random variables
- Central Limit Theorem

2. Course Main Objective

To introduce theoretical bases in the field of Actuarial Probability.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	To be able to identify and explain, probability space Handle sequences of r.v.'s and their limits.	**K1**
1.2	To be able to handle different types of r.v.'s, to compute mathematical expectations and distributions.	**K2**
1.3	To be able to handle sequences of r.v. and their limits and calculus of distributions.	**K3**
2	**Skills :**	
2.1	How to solve the questions	**S1**
2.2	How to calculate a risk through probabilities	**S2**
2.3	How to forecast	**S3**
3	**Values:**	
3.1	Study, learn and work independently.	**C1**
3.2	Work effectively in teams.	**C2**
3.3	Meet deadlines and manage time properly.	**C3**

C. Course Content

No	List of Topics	Contact Hours
1	• Set functions including set notation and basic elements of probability • Mutually exclusive events	3

	• Addition and multiplication rules • Independence of events	
2	• Combinatorial probability • Conditional probability • Bayes Theorem / Law of total probability	6
3	• Random variables and distributions • Mode, median, percentiles, and moments • Variance and measures of dispersion (including coefficient of variation) • Moment generating functions • Transformations	9
4	• Joint probability functions and joint probability density functions • Joint cumulative distribution functions • Conditional and marginal probability distributions • Moments for joint, conditional, and marginal probability distributions • Joint moment generating functions	9
4	• Variance and measures of dispersion for conditional and marginal probability distributions • Covariance and correlation coefficients • Transformations and order statistics • Probabilities and moments for linear combinations of independent random variables	9
6	• Central Limit Theorem	6
Total		

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	Knowledge of the probability spaces and events	Development of the theory along with examples	Homework assignments. Two mid-term tests, and one final examination.
1.2	How to count the cardinal of finite samples spaces - Baye's formula	Development of the theory along with examples	Homework assignments. Two mid-term tests, and one final examination
1.3	Knowledge of random variables - Distributions and transformations	Development of the theory along with examples	Homework assignments. Two mid-term tests, and one final examination
1.4	Knowledge of joint distributions and marginal calculs	Development of the theory along with examples	Homework assignments. Two mid-term tests, and one final examination
1.5	Central limit theorem and - normal approximation	Development of the theory along with examples	Homework assignments. Two mid-term tests, and one final examination
2	**Skills :**		
2.1	Students are encouraged to do questions by themselves without depending on teaching assistant in the lab.	Examples, and Solved Problems.	Two mid-term tests, and one final examination.
3	**Values:**		
3.1	Working homework jointly and individually	Students are encouraged to discuss their ideas and raise questions	Students are encouraged to participate in the class, to be on time in the class and not to miss a lecture.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First mid-term test	6/7	30%
2	Second mid-term test	11/12	30%
3	Final exam	After 15	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 :
5 Office Hours

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	List Required Textbooks Probability and Statistical Inference, 9th edition,. ISBN 978-0-321-92327-1, by Robert V. Hogg, Elliot A. Tanis, and Dale L. Zimmerman, published by Pearson Education , 2015
Essential References Materials	
Electronic Materials	https://www.soa.org/Education/Exam-Req/Syllabus-Study-Materials/edu-exam-p-online-sample.aspx
Other Learning Materials	Many books are available in free pdf forms

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Available
Technology Resources (AV, data show, Smart Board, software, etc.)	Available
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Big traditional blackboard in order to clearly explain mathematics

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Faculty	Direct
Extent of achievement of course learning outcomes	Students	Direct
Quality of learning resources	Department's Council	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	