Course Specifications

General Information

Course name	Probability
Course number	MATH3316
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Understanding the axiomatic approach to probability, counting and combinatorial methods

2 - Knowledge of the concepts of random variables and their properties, including marginal and conditional distributions expectation, conditional expectation, moments, generating functions, and distributions of functions of one or more random variables

3 - Recognizing of the properties of important probability distributions

4 - Ability to explain and prove results in probability

5 - Using the probability and its techniques in many applications specially in statistics

Intended Learning Outcomes

Knowledge and Understanding	* Knowledge of probability laws and its implementation
	* Understanding various concepts of expectations and finding the moments of random variables
	* Introducing some examples of probabilistic models in discete and continuous distributuions
	* Ability of finding the probability distribution of a function of random variables using different techniques
	* Knowledge of various methods of counting
Intellectual Skills	* Connecting the basic concepts of probability distribution and their findings with the corresponding model in the real data
	* Functioning the skills of probability laws on statistical applications
	* Choosing the suitable probability distribution for finding the required probabilities
	* Using the different combinatorial methods to find the probability of the events
	* Transform the data from abstract sample space to real random variable
	* Finding the moments and generating function for any random variable
Professional Skills	* Differentiating between the probabilistic distributions
	* Employing recent communication and information technologies tools effectively in probabilites
General Skill	* Structive thinking in doing exercises
	* Leading team work effectively for solving problems

Course Contents

1 - Combinatorial methods
2 - Probability laws
3 - Random variables
4 - Mathematical expectation
5 - Probability distributions and densites
6 - Function of random variables

Teaching and Learning Methods

1 - Lectures using whiteboard or occasionally using data show
2 - Problem discussion sessions with students
3 - Presentation by student teams of some independent work relevant to the course
4 - Independent search of students about certain results or applications

Students Assessment

Assessment Method	TIME	MARKS
Midterm	Mid term	30%
Quiz	Third quarter of the term	10%
Homework	Last two weeks	10%
Final	End of the term	50%

Books and References

Essential books	Mathematical Statistics and Applications, John Freund
Recommended books	Probability and Statistics for Engineers and Scientists

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Combinatorial Metods	1 week	knowledge of various methods of counting	Using the different cominatorial methods to find the probability of the events		
Probability laws	2 weeks	knowledge of probability laws and its implementation	Functioning the skills of probability laws on statistical applications	Employing recent communication and information technologies tools effectively in probabilites	Structive thinking in doing exercises
Random variables	2 weeks	Some examples of probabilistic models in discete and continuous distributuions	Transform the data from abstract sample space to real random variables		
Mathematical expectation	2 weeks	Understanding various concepts of expectations and finding the moments of random variables	Finding the moments and generating function for any random variable		
Probability distributions and densites	3 weeks	Some examples of probabilistic models in discete and continuous distributuions	Connecting the basic concepts of probability distribution and their findings with the corresponding model in the real data Choosing the suitable probability distribution for finding probability	Differentiating between the probabilistic distributions	
Function of random variables	2 weeks	Ability of finding the probability distribution of a function of random variables using different techniques			