AI Azhar University - Gaza

## Planning and Quality Assurance Affairs

## Course Specifications

## General Information

| Course name | Probability |
| :--- | :--- |
| Course number | MATH3316 |
| Faculty |  |
| Department |  |
| Course type | 3 |
| Course level | 3 |
| Credit hours (theoretical) | 0 |
| Credit hours (practical) |  |
| 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 <br> * Understanding various concepts of expectations and finding the moments of random variables <br> * Introducing some examples of probabilistic models in discete and continuous distributuions <br> * Ability of finding the probability distribution of a function of random variables using different techniques <br> * 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 <br> * Functioning the skills of probability laws on statistical applications <br> * Choosing the suitable probability distribution for finding the required probabilities <br> * Using the different combinatorial methods to find the probability of the events <br> * Transform the data from abstract sample space to real random variable <br> * Finding the moments and generating function for any random variable |
| Professional Skills | * Differentiating between the probabilistic distributions <br> * Employing recent communication and information technologies tools effectively in probabilites |
| General Skill | * Structive thinking in doing exercises <br> * 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 <br> 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 |  |  |  |

