National University

Of Computer & Emerging Sciences

Karachi Campus

Course Outlines of BS (CS) Degree Program

Course Instructor	Mr. Osama Bin Ajaz / Miss Fareeha Sultan / Miss Asma Maqsood	**Semester**	Spring 2020
Batch/Section(s)	Batch 2018 / Section	**Year**	2020
Course Title	MT205-Probability and Statistics	**Credit Hours**	3
Prerequisite(s)	Calculus 1	**Course TA**	

Text Book(s)

Title of book	Probability & Statistics for Engineers & Scientists, 9th Edition
Author(s)	Walpole, Myers, Myers YE

Reference Book(s)

1-Probability And Statistics For Engineering And The Sciences, Jay L Devore 8th Edition

2-Introductory statistics , Neil A.Weiss , 9rd Edition

Course Objective:

The course is designed to:

- Develop the understanding of probability, random variables and random processes
- To be proficient at manipulating data to draw insights and probe research questions.
- Enhance the capabilities of data interpretation.
- Develop the necessary software skills like EXCELL,MINITAB, SPSS

Course Description:

Ideas and tools based on probability, statistics and data analysis are becoming increasingly important in computer science research. In areas such as artificial intelligence and theory, probabilistic methods and ideas based on randomization are central and in other areas such as networks and systems they are becoming increasingly useful. Research that involves manipulating large data sets is also becoming common, and in all areas of computer science statistical techniques are important in the design and analysis of experimental work.

This course gives an introduction to probability and data analysis from a computer science perspective, including many of the fundamental concepts and techniques that are most relevant to current research areas. The course will put an emphasis on computing. Research in CS is fast-paced, and researchers often need to be proficient at manipulating data to draw insights and probe research questions. The course will make use of three general scientific computing environments to help and develop the necessary skills: Matlab, R, and SPSS. It will include the rudiments of probability and random variables, estimation, special distributions and sampling, hypothesis testing and regression analysis.

Tentative Weekly Lectures Schedule:

Week	Theory Contents/Topics	Sections
20 – 24 January	**Descriptive Statistics:** Basic definition , Types of variables , Measurement of Scales, Mean, Median, Mode, Variance and Standard Deviation,	
27 – 21 January	Quartiles, Construction of bar chart , histograms, Stem-leaf plot,box plot, frequency curve, Skewness and Kurtosis.	
3 – 7 Feb.	**Introduction to Probability:** Probability of different events.	
10 – 14 Feb.	Additive rules, Independence and Multiplicative rules.	
17 – 21 Feb.	Conditional Probability, Bayes' Rule	
24 – 28 Feb.	**1st Mid Term Exam**	
2 – 6 March	**Random variables and its Distributions:** Discrete probability distributions, PMF, CDF, joint distribution	

9 – 13 March	Continuous distribution, PDF, CDF, joint distribution	
16 – 20 March	Mathematical Expectation	
23 – 27 March	Binomial, Poisson Distribution, Geometric distribution, Exponential distribution.	
30 March – 3 April	Uniform distribution, Normal distribution, Standard normal distribution and its applications.	
6 – 10 April	**2nd Mid Term Exam**	
	Introduction to Hypothesis testing: Test concerning Mean of a population, Test concerning difference of two population means for independent populations and dependent populations.	
	Analysis of variance: ANOVA	
	Regression & Correlation : Scattered diagram .Introduction to linear regression. The simple linear regression model and multiple regression Simple and multiple Correlation	
	Final Exam	

Grading Criteria:

Marks Distribution:

Particulars	**% Marks**
1. Assignments	10
2.Quizzes	10
3. First Mid Exam	15
5. Second Mid Exam	15
6. Lab Exam	0
7. Final Exam	50
Total:	**100**

Important Instructions to be followed for this Course

- Be in classroom on time. Any student who arrives more than 5 minutes late in the class would be marked LATE. Anybody coming to classmore than 15 minutes late will be marked ABSENT.
- All students are required to maintain 80% of attendance. In case students fail to maintain 80% of attendance, they become ineligible to take the final exam and are awarded “F” grade. **This is a ZERO tolerance policy.**
- Turn off your cell phones or any other electronic devices before entering the class.
- Maintain the decorum of the class room all the time.
- Avoid a conversation with your classmates while lecture is in progress.
- Submit your assignments on time, no assignment will be accepted after the deadline.

Instructions / Suggestions for satisfactory progress in this course:

- On average, most students find at least three hours outside of class for each class hour necessary for satisfactory learning.
- Chapters should be read and homework should be attempted before class.
- Do not get behind. You are encouraged to work with other students. Plus, I am always available during office hours to help you.
- The homework assigned is a minimum. You may always work extra hours on your own.
- Use the few minutes you usually have before the start of each class to review the prior meetings' notes and homework. This will save us valuable in-class time to work on new material.
- Develop a learning habit rather than memorizing.
- Work in groups, whenever appropriate.
- Apply the learned principles and gained knowledge.
- Be creative in thinking, but stick to the topic assigned for discussions, assignments and presentations.
- Always bring your Work Book with you in the class.

Note: Students are welcome all the time to get help from the Teacher.

Osama Bin Ajaz

Signature: Date:17-01-2019