**NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES LAHORE**

**MT206 Probability and Statistics (CS) Credit Hrs**: 4

**Course Moderator:** Ms. Hira Iqbal

**Course Instructors:** Mr. Aizaz Ahmed Khan, Dr. Riaz, Ms. Syeda Farva Asim, Ms. Seyab Yasin, Dr. Rehan Ahmad Khan, Ms. Hira Iqbal

**Objectives**: 1. To explain the basic concepts of the theory of probability.

2. To enable the students to understand statistical data and analyze it.

3. To make the students understand the interplay between theory of probability and the tests of hypotheses.

**Text Book**: Probability and Statistics for Engineers and Scientists by Walpole, Myers, Myers, Ye

**Weekly Course Outline**

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| **Week** | **Contents** |
| 1 | Introduction to the subject, concept of population and sample, statistical inference and the role of probability, sampling procedures, data collection |
| 2 | Measures of location and dispersion, graphical presentation of data. |
| 3 | Sample space, events, probability of an event, additive rules of probability, Conditional probability, multiplicative rules, Bayes’ rule. |
| 4 | Continuation of probability exercises, random variable, discrete probability distributions, continuous probability distributions. |
| 5 | Joint probability distributions, mean and variance of random variables, covariance, variance of linear combinations, Chebyshev’s theorem. |
| 6 | **M I D T E R M 1** |
| 7 | Uniform, binomial and multinomial distribution, hypergeometric, negative binomial and geometric distributions. |
| 8 | Poisson distribution, continuous uniform distribution, concept of normal distribution, standard normal distribution |
| 9 | Probabilities under normal curve and applications of normal distribution, normal approximation to binomial distribution. Exponential distribution |
| 10 | Sampling distribution of mean, central limit theorem. Sampling distribution of the difference between two averages. Sampling distribution of variance. |
| 11 | T and F distributions. Concept of estimation, unbiased estimation, interval estimation, confidence interval for mean and proportion. |
| 12 | **M I D T E R M 2** |
| 13 | Confidence Interval for the difference of two means and the difference of two proportions. Introduction to hypotheses testing. |
| 14 | Testing of hypotheses. Test statistics, two types of error in testing hypotheses, the use of p-value, Testing the mean and proportion in single samples, testing the difference of means. . |
| 15 | Testing the difference of proportions. test of goodness of fit, test of independence. test of homogeneity, test for several proportions. |
| 16 | Simple linear regression, method of least squares. Finding regression coefficients and testing their significance, coefficient of determination , prediction |

\*Outline is tentative, it may change

**Evaluation Procedure**: Quizzes 12 %, Assignments 05 %, Mid-term Test(s) 30%, C.P 3%, Final 50 %