National University of Computer & Emerging Sciences
MT-2005 Probability and Statistics
Spring 2025

Course Content for Final Exam

Theory Contents/Topics	Question/ Examples	Marks Distribution in finals
Descriptive statistics: Basic definition, Types of variables, Mean, Median, Mode, Variance, Standard Deviation, Quartiles, Deciles, Percentiles, IQRange **Graphical representation of data:** histograms, box plot, **Axioms of Probability:** Conditional Probability, Independence and Multiplicative rules.Bayes' Rules **Continuous Probability Distributions** PDF and CDF Joint Probability Distribution, marginal distribution Mean & Variance of a Continuous Random Variable, Covarriance, and Correlation Uniform, Normal and standard normal distributions and their applications	**NW** Exercise # 2.3 Questions 2.52-2.71 Exercise # 2.2 Questions 2.18-2.29 Exercise # 3.3 Questions 3.113-3.135 Questions 3.62-3.78 **WP** Questions 2.49-2.65 Questions 2.73-2.89 Questions 2.95-2.100 **MB** Questions 4.1-4.5,4.16-4.26 **WP** Examples 6.1-6.8 Questions 6.3-6.9	**20%**

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Estimation Introduction, confidence interval estimation using z & t distributions for single mean and difference between two means **Hypothesis Testing:** Testing of hypothesis for single mean and difference between two means using z-test and t-test Z(CLO-3), p-value method (CLO-3)	WP Questions 9.1-9.5, 9.9- 9.18 and all solved examples related to the topic WP Questions 10.19-10.46	**80%**
Regression & Correlation: Scatter diagram . Introduction to linear regression. The simple linear regression model , Method of least square and **Gradient Descent method** w.r.t regression Simple Correlation , Testing of Hypothesis for correlation coefficient , coefficient of determination **Inferencing of simple linear regression coefficients**	WP Questions 11.1-11.9, 11.11-11.14 WP Examples 11.2-11.5 Questions 11.17-11.22	
Analysis of variance: ANOVA	NW Questions 16.42-16.47	