

<b>Department</b>	Department of Sciences & Humanities	<b>Dept. Code</b>	SH
<b>Course Title</b>	Probability & Statistics (CS)	<b>Course Code</b>	MT2005
<b>Pre-requisite(s)</b>	-	<b>Credit Hrs.</b>	3
<b>Moderator</b>	Ms Sarah Ahmad		
<b>Course Instructors (FALL 2023)</b>	Ms Sarah Ahmad, Ms Huma Akbar, Ms Kanwal Saleem		
<b>Note:</b>	It is a tentative schedule of course. It may vary (if required).		

<b>Course Objective</b>	To understand the basic concepts and tools of statistics & probability and to apply them for the analysis of problems in computer sciences.
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No.	Assigned Program Learning Outcome (PLO)	Level	Tool
01			

*I = Introduction, R = Reinforcement, E = Evaluation.*

*A = Assignment, Q = Quiz, M = Midterm, F = Final,*

No.	Course Learning Outcome (CLO) Statements	Tools
01	<ul style="list-style-type: none"> <li>Compute and Interpret the various measures of location and measures of variation and construct a suitable graph for the given real life situation.</li> </ul>	A,Q1,M1,F
02	<ul style="list-style-type: none"> <li>Use of basic counting principles and laws of probability to analyze a probabilistic experiment.</li> </ul>	A,Q2,M1,F
03	<ul style="list-style-type: none"> <li>Identify and analyze the types of random variables and its probability distributions.</li> </ul>	A,Q2,M2,F
04	<ul style="list-style-type: none"> <li>Determine the type of discrete distribution and evaluate its probability distribution</li> </ul>	A,Q2,M2,F
05	<ul style="list-style-type: none"> <li>Determine the type of continuous distribution and evaluate its probability distribution</li> </ul>	A,Q2,M2,F
06	<ul style="list-style-type: none"> <li>Apply classical hypothesis testing/confidence intervals for single population and to compare two populations and draw inferences.</li> </ul>	A,Q3,M2,F
07	<ul style="list-style-type: none"> <li>Testing equality of means by using F-test in One-way Analysis of Variance (ANOVA)</li> </ul>	A,Q3,F
08	<ul style="list-style-type: none"> <li>Methodologies of regression analysis for future predictions. Able to check the goodness of fit and strength of the relationship between two variables.</li> </ul>	A,Q3,F

<b>Text Book(s)</b>	<b>Title</b>	Probability and Statistics for Engineers and Scientists 9th ed.
	<b>Author</b>	R. E. Walpole, R. H. Myers, S.L. Myers and Keying Ye
	<b>Publisher</b>	Prentice Hall, 2011
<b>Ref. Book(s)</b>	<b>Title</b>	Probability and Statistics for Engineering and the Sciences
	<b>Author</b>	Jay Devore
<b>Ref. Book(s)</b>	<b>Title</b>	Statistics for Business and Economics. 2003 (11 <sup>th</sup> Ed)
	<b>Author</b>	David R. Anderson, Dennis J. Sweeney, Thomas A. Williams.

Week	Course Contents	Chapter	CLO
01	Basic Introduction, Types of variables, Data types, Group vs Ungroup data, Measurement Scales, sample, population, dataset	1	1
02	For Ungroup data: Mean, Median, Mode, Trimmed mean, Quartile, Percentile, Variance, Standard Deviation, Coefficient of variation, IQ range, Five point summary, Box-plot	1	1
03	For Group data: Construction of dist, Freq, P.F, R.F, C.F, Mean, Variance. Graphical representation of data: (Dot Plot, Bar chart, Histogram, Pie-chart)	1	1
04	Introduction to probability, set theory, Tree diagram, Counting techniques (cross tab and joint prob table)	2	2
05	Probability of an event, addition law, Conditional Probability	2	2
06	Independence, Multiplicative rules, Bayes rule	2	2
	<b>MID-TERM-I</b>		
07	Concept of random variable, Discrete Probability Distributions and Cumulative Distribution Function (CDF), Mathematical Expectation and Variance	3,4	3,4
08	Continuous Probability Distribution and Cumulative Distribution Function (CDF) , Mathematical Expectation and Variance	3,4	5
09	Joint Probability Distribution for discrete, Marginal distribution of discrete, Statistical Independence.	3	4
10	Binomial, Hyper geometric and Poisson Distribution	5	4
11	Normal distribution, Area under the normal curve, Application of Normal distribution and Standard Normal Distribution	6	5
	<b>MID-TERM-II</b>		
12	Concept of estimation, Point estimation, interval estimation, confidence interval for mean, Introduction to Hypothesis testing: z-test and t test for single mean.	9,10	6
13	Introduction to Regression, SLR vs MLR concept, SLR application, correlation and coefficient of determination	11,12	8
14	Applications of SLR	11	8
15	Revision of concepts and problem discussion	9-12	6,8
	<b>FINAL EXAM</b>		

**Evaluation Procedure & Marks Distribution:**

Assessment Tools	Total No.	Weightage
Quizzes	3 (At least)	12%
Assignments/Tests/ Class Participation etc.	3 (At least)	08%
Mid Term Exam	2 (I+II)	30% (15% each)
Final Exam	1	50%