STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2024

Department : Mathematics
Name/s of the Faculty : Dr. A. S. Shanthi
Course Title : MATHEMATICAL STATISTICS
Course Code : 23MT/PC/MS34
Shift : I

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	recognize common probability distributions, characteristic functions, moments and estimators for discrete and continuous random variables	K1
CO2	understand the statistical concepts of inequalities, limits theorems, sample moments and estimators	K2
CO3	derive the characteristic function and moments for a range of probability distributions, calculate probabilities for sampling distributions related to the normal distribution and construct suitable estimators	K3
CO4	analyses the concept of convergence, use mathematical tools, including calculus and linear algebra, to study probability and mathematical statistics including properties of desirable estimators	K4
CO5	evaluate probabilities relevant to various distributions and use the laws to interpret real time problems	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	1.1 Properties of Characteristic Functions 1.2 The Characteristic Function and Moments	K1-K5	5	CO1-CO5	Lecture & Problem Solving	Questioning
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	1.3 The Characteristic Function of the Sum of Independent Random Variables	K1-K5	5	CO1-CO5	Presentation	Quiz
July 5 – 12, 2024 (Day Order 1 - 6)	1 & 2	1.4 Determination of the Distribution Function by the Characteristic Function 2.1 One Point and Two Point Distribution	K1-K5	5	CO1-CO5	Project assignment	Questioning
July 15 – 23, 2024 (Day Order 1 - 6)	2	2.2 The Gamma Distribution 2.3 The Beta Distribution	K1-K5	5	CO1-CO5	Lecture & Problem Solving	**III Component 1 – Seminar (15 marks) Portion: Selected portions from Unit 2-5**
July 24 – 31, 2024 (Day Order 1 - 6)	2	2.4 The Cauchy and Laplace Distribution	K1-K5	5	CO1-CO5	Presentation	Questioning
Aug 1 – 5, 2024 (Day Order 1 - 3)	3	3.1 Stochastic Convergence 3.2 Bernoulli's Law of Large Numbers	K1-K5	3	CO1-CO5	Lecture & Problem Solving	Slip test
Aug 6 – 10, 2024	**C.A. Test – I (Unit 1 & 2.1-2.3)**						

Aug 12 – 14, 2024 (Day Order 4-6)	3	3.3 The Convergence of Sequence of Distribution Function	K1-K5	2	CO1-CO5	Presentation	Questioning
Aug 16 – 23, 2024 (Day Order 1-6)	3	3.4 The Levy – Cramer Theorem 3.5 The de-Moivre's – Laplace Theorem	K1-K5	5	CO1-CO5	Project assignment	Quiz
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	3.6 The Lindberg – Levy Theorem 3.7 Poisson's, Chebyshev's and Khintchin's Law of Large Numbers	K1-K5	5	CO1-CO5	Project assignment	Assignment
Sep 4 – 11, 2024 (Day Order 1-6)	4	4.1 The Notions of Sample and Statistic 4.2 The Distribution of Arithmetic Mean of Independent Normally Distributed Random Variables	K1-K5	5	CO1-CO5	Lecture & Problem Solving	**III Component – II (slip test – 20 marks)** **Portion: 2.4, 3.1, 3.2**
Sep 12 - 20, 2024 (Day Order 1-6)	4	4.3 The Chi-Square Distribution 4.4 The Distribution of the Statistic ($\overline{X}$, S)	K1-K5	5	CO1-CO5	Presentation	Questioning
Sep 23 - 26, 2024 (Day Order 1-4)	4	4.5 Student's – t Distribution 4.6 Fisher's Z – Distribution	K1-K5	3	CO1-CO5	Project assignment	Slip test
Sep 27 – Oct 3, 2024	**C.A. Test – II (Unit 3.3 – 3.7 & 4)**						

Oct 4 – 5, 2024 (Day 5 & 6)	5	5.1 Characteristics of Estimators 5.2 Unbiasedness 5.3 Consistency	K1-K5	2	CO1-CO5	Lecture & Problem Solving	Questioning
Oct 7 - 15, 2024 (Day Order 1 to 6)	5	5.4 Efficient Estimators 5.5 Sufficiency of an Estimate 5.6 Cramer Rao Inequality	K1-K5	5	CO1-CO5	Presentation	**III Component – III – Quiz – 15 marks Portion: 5.1-5.3**
Oct 16 - 22, 2024 (Day Order 1 to 6)	5	5.7 Methods of Estimation 5.8 Method of Maximum Likelihood Estimation	K1-K5	5	CO1-CO5	Project assignment	Slip test
Oct 23 - 24, 2024 (Day Order 1 to 2)	**REVISION**						