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**KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)**

**(**Deemed to be University)

**DEPARTMENT OF MATHEMATICS**

**SCHOOL OF APPLIED SCIENCES**

SPRING SEMESTER 2023-24

**Date wise Lesson Plan**

**Section - CSSE**

**Date: 08/01/2023**

1. **Course Code: MA2011**
2. **Course title: PROBABILITY AND STATISTICS**
3. **L-T-P Structure: 2-1-0**
4. **Course Coordinator: Dr. Prasanta Kumar Das**
5. **Course faculty: Dr. Prasanta Kumar Das**

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| **Sections of the Units** | **Unit Name** | **Lect.**  **No.** | **Date** | **Learning Topics to be covered** | **Article No./ Text Book** |
|  |  |  |  | **Unit - I**  **(Overview and Descriptive Statistics; Probability; Discrete random variables and Probability Distributions)** |  |
| 1 | **Overview and Descriptive Statistics; Probability** |  |  | Population, sample and processes, Pictorial and tabular methods in Descriptive statistics | **1.1,1.2 (T1)** |
|  |  | Sample spaces, Events | **2.1, 2.2 (T1).3** |
|  |  | Axioms, interpretations and properties of probability | **2.4, 2.5 (T1)** |
|  |  | Conditional Probability, Independent events | **2.4, 2.5 (T1)** |
|  |  | Tutorial (Problem Solving) |  |
| 2 | **Discrete random variables and Probability Distributions** |  |  | Random variables, Probability distribution of discrete random variable | **3.1, 3.2 (T1)** |
|  |  | Probability distribution of discrete random variable | **3.2 (T1)** |
|  |  | Tutorial (Problem Solving) |  |
|  |  | Expected values | **3.3 (T1)** |
|  |  | Binomial Probability distribution | **3.4 (T1)** |
|  |  | Hypergeometric distribution | **3.5 (T1)** |
|  |  | Negative binomial Probability distribution | **3.5 (T1)** |
|  |  | Poisson Probability distribution | **3.6 (T1)** |
|  |  | Tutorial (Problem solving) |  |
|  |  | **Quiz Test-1** |  |
|  |  | **Assignment – 1** |  |
|  |  |  |  | **Unit - II**  **(Continuous random variables and Probability distributions; Joint random variables and random samples; Point estimation )** |  |
| 3 | **Continuous random variables and Probability distributions** |  |  | Probability Density Functions, Cumulative Distribution Functions | **4.1(T1), 4.2(T1)** |
|  |  | Expected Values | **4.2(T1)** |
|  |  | The Normal Distribution | **4.3(T1)** |
|  |  | Tutorial (Problem solving) | **(T1)** |
|  |  | The Exponential Distribution | **4.4(T1)** |
|  |  | Gamma Functions and Other continuous functions | **4.4,4.5**  **(T1)** |
|  |  | Moment Generating Function | **(T2)** |
|  |  | Tutorial(Problem Solving) | **(T1 and T2)** |
| 4 | **Joint random variables and random samples** |  |  | Jointly Distributed Random Variable | **5.1(T1)** |
|  |  | Expected values | **5.2(T1)** |
|  |  | Covariance and Co-relation coefficients | **5.2(T1)** |
|  |  | Tutorial (Problem solving) | **(T1)** |
|  |  | **Assignment – 2** |  |
| 5 | **Point estimation** |  |  | Statistics and their distributions, The distribution of the sample mean | **5.3, 5.4(T1)** |
|  |  | Tutorial (Problem Solving) | **(T1)** |
|  |  | **Quiz Test-2** |  |
|  |  | Some general concepts of point estimation, Method of point estimation | **25.2 (T2)** |
|  |  | Estimating the parameters of the distributions | **25.2 (T2)** |
|  |  | Tutorial (Problem solving) | **(T1 and T2)** |
|  |  |  |  | **Unit - III**  **(Statistical intervals based on a single sample; Tests of hypothesis based on a single sample; Inference based on two samples )** |  |
| 6 | **Confidence interval, Testing of hypothesis and Statistical Inference** |  |  | Basic concepts on confidence interval, Large sample confidence intervals for population mean and proportions. | **25.3 (T2)** |
|  |  | Intervals based on normal population distribution. | **25.3 (T2)** |
|  |  | Confidence interval for the variance of a normal population | **25.3 (T2)** |
|  |  | Confidence interval for the standard deviation of a normal population | **25.3 (T2)** |
|  |  | Tutorial (Problem solving) | **(T2)** |
|  |  | Hypotheses and test procedures | **25.4 (T2)** |
|  |  | Tests about a population mean with known variance | **25.4 (T2)** |
|  |  | Tests about a population mean with unknown variance | **25.4 (T2)** |
|  |  | Tests about a population variance | **25.4 (T2)** |
|  |  | Test concerning a population proportion | **25.4 (T2)** |
|  |  | Tutorial (Problem solving) | **(T2)** |
|  |  | **Assignment – 3** |  |
|  |  | z-Tests and confidence intervals for a difference between two population means: known variance | **9.1(T1)** |
|  |  | The two sample t-test and confidence interval | **25.4 (T2)** |
|  |  | Inferences concerning a difference between population proportions | **25.4 (T2)** |
|  |  | Inferences concerning two population variances | **25.4(T2)** |
|  |  | Tutorial (Problem solving) |  |

**Text books**

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| **T1.** | Probability and Statistics for Engineers and Sciences by J. L. Devore, CENGAGE Learning, 8th Edn |
| **T2.** | Advanced Engineering Mathematics by Erwin Kreyszig, Wiley, INC, 10th Edition |

**Reference Books:**

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| **R1.** | Introduction to Probability and Statistics by William Mendenhall, Robert J, Beaver and Barbara M. Beaver, CENGAGE Learning |
| **R2.** | Fundamentals of Probability and Statistics for Engineers, T. T. Moong, John Wiley and Sons, USA |
| **R3.** | Probability and Statistics in Engineering by W.W. Hines, D.C. Montgomery, D.M. Goldsman, C.M. Borror |
| **R4.** | Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross |
| **R5.** | Introduction to Probability and Statistics by J.S. Milton & J.C. Arnold |
| **R6.** | Introduction to Probability Theory and Statistical Inference by H.J. Larson |
| **R7.** | Probability and Statistics for Engineers and Scientists by R.E. Walpole, R.H. Myers, S.L. Myers, Keying Ye |
| **R8.** | An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md. E. Saleh Modern Mathematical Statistics by E.J. Dudewicz & S.N. Mishra |
| **R9.** | Introduction to the Theory of Statistics by A.M. Mood, F.A. Graybill and D.C. Boes |

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