Elective: Introduction to Engineering Statistics

L	T	P	Credit
3	0	0	03

CH367 **Scheme**

1. Course Outcomes (COs):

At the end of the course the students will be able to:

CO1	Understanding of descriptive statistics by quantitative reasoning and data visualization
CO2	Knowledge of the basics of inferential statistics from sample data analysis
CO3	Understanding the consept of the probability and regression analysis
CO4	Apply statistical reasoning and procedures in the analysis of real data
CO5	Employ the concept of parametric and non-parametric test for statistical analysis
CO6	Solve statistical problem using software package

2. Syllabus:

- **INTRODUCTION** **(4 Hours)**
  Definition and scope of statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, scales of measurement nominal, ordinal, interval and ratio.

- **MEASURES OF CENTRAL TENDENCY** **(5 Hours)**
  Mean, Median, Mode. Measures of Dispersion: Range, Mean deviation, Standard deviation, Coefficient of variation.

- **DATA ANALYSIS** **(5 Hours)**
  Types of variables, data collection principles, types of studies, examining numerical data Graphical methods: histograms and other graphs, Examining categorical data, Tabular methods: contingency tables, Graphical methods: bar plots and other graphs, Frequency distributions, cumulative frequency distributions and their graphical representations. Stem and leaf displays

bayes theorem is important

- **PROBABILITY** **(6 Hours)**
  Elementary probability rules, conditional probability, normal distribution, binomial distribution, probability distribution function

- **HYPOTHESIS TESTING** **(4 Hours)**
  Null hypothesis, alternative hypothesis, p-value, Type-I and Type-II error, confidence interval, central limit theorem

- **REGRESSION** **(5 Hours)**

Lines of regression, properties of regression coefficients, Multiple and Partial correlation coefficients in three variables and their properties.

- **PARAMETRIC AND NON-PARAMETRIC TESTS (5 Hours)**
  One Sample t-test, paired t-test, ANOVA, two-way ANOVA, sign test, Wilcoxon's signed rank test.

- **APPLICATION OF STATISTICAL ANALYSIS IN ENGINEERING (8 Hours)**
  Case Studies, Elementary statistics using software package like MINITAB, Excel.

(Total Lecture Hours: 42)

---

3. Books Recommended:

1. Goon,A.M., Gupta,M.K. and Dasgupta,B. (2002): Fundamentals of Statistics, Vol. I& II, 8th Edn. The World Press, Kolkata.
2. Mood, A.M., Graybill, F.A. andBoes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn. (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
3. Bhat B.R, Srivenkataramana T and Rao Madhava K.S.(1996): Statistics: A Beginners Text, Vol. I, New Age International (P) Ltd.
4. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia
5. Tamhane, A. C. and Dunlop, D. D. (2000) Statistics and Data Analysis: From Elementary to Intermediate. Prentice Hall: Upper Saddle River, NJ.