Marwadi University
Faculty of Diploma Studies
Information and Communication Technology

Diploma Year – III (Semester V)

Subject Name: Probability and Statistics

Subject Code - 09CT0501

Objective:
This subject provides foundation knowledge of probability theory and statistical methods which can be used to solve applied problems. It will be also helpful for the learners to explore in-depth learning of future subjects related to data analytics.

Credits Earned: 03 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Understand types, application, techniques for statistical analysis
2. Understand fundamental concepts of random variable and theorems of probability and distribution
3. Apply various methods to identify statistical values and plot statistical data
4. Apply probability distributions, correlation analysis and hypothesis testing
5. Analyse various data set for concluding remarks

Pre-requisite of course: Knowledge of engineering mathematics and programming language

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
2	2	0	3	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Statistics** Types of statistics, Application of statistical analysis, Population, Sample, Statistical inference	2
2	**Graphical and Tabular Descriptive Techniques** Data, Frequency distribution, Data representation techniques like pie and bar charts, histograms, line charts, scatter plot etc.	4
3	**Numerical Descriptive Techniques** Measures of central location mean, median, mode and averages, Measures of variability dispersion, variance and standard deviation, Measures of relative standing and Measures of box plots and linear relationship	4
4	**Data Collection, sampling, and sampling distribution** Various methods of collecting data, sampling, sampling plan, sampling, and non-sampling errors, sampling distribution of the mean	3
5	**Probability** Assigning probability to events, joint, marginal, and conditional probability, probability rules and trees, Theorems for probability, Identification of right method for various cases	3
6	**Random Variables and Probability Distributions** Random Variables and continuous and discreet probability Distributions, binomial distribution, poisson distribution, probability density functions, normal distribution	5
7	**Hypothesis Testing** Testing of Hypothesis, Type I and Type II Errors, Two Tailed and One Tailed Test of Hypothesis, Test of Significance of Difference between Two Means, Test of Significance for Proportions	5
8	**Correlation Analysis** Types of Correlation, Methods of Studying Correlation, Scatter Diagram	2
	Total Hours	28

Suggested Text books / Reference books:

1. BSTAT A south-Asian Perspective with CourseMate, Gerald Keller and Hitesh Arora, Cengage Learning, 2012.
2. Introduction to Quantitative Methods, ICFAI University
3. Introduction to Probability and Statistics for Engineers and Scientists, S. M. Ross, Academic Press, 2009

4. Introduction to Probability and Statistics, J.S. Milton & J. C. Arnold, Cengage Learning, 2008
5. A First Course in Probability, S.M. Ross, Prentice Hall, 2001.
6. Introduction to Probability Theory and Statistical Inference, H.J. Larson, Wiley, 1982.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	20%	30%	15%	10%	5%

Suggested list of tutorials with simulation:

1. Generate histogram, line chart, pie chart, bar chart and scatter plots for data.
2. Measure mean, mode, median and averages for data.
3. Measure variance, standard deviation, and various direct statistics of data.
4. Measure co-variance and coefficient of correlation of data.
5. Find the probability for given outcome.
6. Calculate different types of distributions for given set of condition.
7. Generate distinct probability density functions with simulation or coding.
8. Apply normal distribution on data.
9. Apply hypothesis for given set of data with conditions.
10. Apply various correlation techniques on data with suitable analysis techniques.

Supplementary Resources

1. https://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistics-spring-2014/index.htm
2. http://www.maths.uq.edu.au/probweb/teaching.html
3. https://oli.cmu.edu/jcourse/lms/students/syllabus.do?section=729ec6a50a0001dc1fc85045eaf859e5
4. https://nptel.ac.in/courses/111/105/111105041/
5. https://nptel.ac.in/courses/111/106/111106112/
6. https://swayam.gov.in/nd1_noc20_ma22/preview