PROBABILITY AND STATISTICS

II Semester: CSE / IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AHS010	**Foundation**	3	1	-	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

I. COURSE OVERVIEW:

The course focuses on more advanced Engineering Mathematics topics which provide with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. The course includes probability, random variables, probability distributions, correlation, regression, sampling distribution, testing of hypothesis and analysis of variance. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

II. OBJECTIVES:

The course should enable the students to:
I. Enrich the knowledge of probability on single random variables and probability distributions.
II. Apply the concept of correlation and regression to find covariance.
III. Analyze the given data for appropriate test of hypothesis.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Explain** the parameters of random variety Probability distributions including Binomial, Poisson and Normal distribution by using their probability functions, expectation and variance.	Understand
CO 2	**Interpret** the concepts of discrete and continuous probability distribution, CLT problems, correlations and Regression Analysis for statistical forecasting.	Understand
CO 3	**Make use of** the concept of sampling distribution of statistical data by using behavior of the sample mean.	Apply
CO 4	**Apply** the concept of estimation in real-world problems of signal processing and testing of hypothesis to predict the significance difference, types of errors in the sample means.	Apply
CO 5	**Calculate** the role of statistical hypotheses, confidence intervals, the tests of hypotheses for large samples in making decisions over statistical claims in hypothesis testing	Apply
CO 6	**Identify** the tests of hypothesis for small samples and comparing three variables of ANOVA in making decisions over statistical claims in hypothesis testing	Apply

IV. SYLLABUS:

UNIT-I	**SINGLE RANDOM VARIABLES AND PROBABILITY DISTRIBUTION**	**Classes: 09**

Random variables: Basic definitions, discrete and continuous random variables; Probability distribution: Probability mass function and probability density functions; Mathematical expectation; Binomial distribution, Poisson distribution and normal distribution.

UNIT-II	**MULTIPLE RANDOM VARIABLES**	**Classes: 09**

Joint probability distributions, joint probability mass, density function, marginal probability mass, density functions; Correlation: Coefficient of correlation, the rank correlation; Regression: Regression coefficient, the lines of regression, multiple correlation and regression.

UNIT-III	SAMPLING DISTRIBUTION AND TESTING OF HYPOTHESIS	Classes: 09

Sampling: Definitions of population, sampling, statistic, parameter; Types of sampling, expected values of sample mean and variance, sampling distribution, standard error, sampling distribution of means and sampling distribution of variance.

Estimation: Point estimation, interval estimations; Testing of hypothesis: Null hypothesis, alternate hypothesis, type I and type II errors, critical region, confidence interval, level of significance. One sided test, two sided test.

UNIT-IV	LARGE SAMPLE TESTS	Classes: 09

Test of hypothesis for single mean and significance difference between two sample means, Tests of significance difference between sample proportion and population proportion and difference between two sample proportions.

UNIT-V	SMALL SAMPLE TESTS AND ANOVA	Classes: 09

Small sample tests: Student t-distribution, its properties: Test of significance difference between sample mean and population mean; difference between means of two small samples. Snedecor's F-distribution and its properties; Test of equality of two population variances Chi-square distribution and it's properties; Test of equality of two population variances Chi-square distribution, it's properties, Chi-square test of goodness of fit; ANOVA: Analysis of variance, one way classification, two way classification.

Text Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons Publishers, 9th Edition, 2014.
2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42nd Edition, 2012.

Reference Books:

1. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", S. Chand & Co., 10th Edition, 2000.
2. N. P. Bali, "Engineering Mathematics", Laxmi Publications, 9th Edition, 2016.
3. Richard Arnold Johnson, Irwin Miller and John E. Freund, "Probability and Statistics for Engineers", Prentice Hall, 8th Edition, 2013.

Web References:

1. http://www.efunda.com/math/math_home/math.cfm
2. http://www.ocw.mit.edu/resourcs/#Mathematics
3. http://www.sosmath.com
4. http://www.mathworld.wolfram.com

E-Text Books:

1. http://www.keralatechnologicaluniversity.blogspot.in/2015/06/erwin-kreyszig-advanced-engineering-mathematics-ktu-ebook-download.html
2. http://www.faadooengineers.com/threads/13449-Engineering-Maths-II-eBooks

Course Home Page: