COURSE CONTENT

PROBABILITY AND STATISTICS							
IV Semester: CIVIL							
Course Code	**Category**	**Hours/ Week**			**Credits**	**Maximum Marks**	
2530006	**Basic Science**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	0	0	3	40	60	100
Contact Classes: 48	**Tutorial Classes:Nil**	**Practical Classes:Nil**				**Total Classes:48**		
Prerequisites: Mathematics courses of first year of study.							

Course Overview:

This Course deals with basic probability theory & statistical techniques. Each method will be explained in theoretical with real life examples. Problem solving techniques will be taught with respect to the theory. Interpretation for these problems will be highlighted. More number of Exercise problems will be given for enhancing their problem-solving skills. The students will improve their ability to think critically, to analyse a real problem and solve it using a wide array of mathematical tools.

Course Objectives:

1. The Concept of Random variables.
2. Expectation and correlation.
3. Probability distributions of single random variables.
4. The sampling theory and the concept of Estimation.
5. Testing of hypothesis and making statistical inferences.

Course Outcomes: After Completion of the Course, Students should be able to

1. Formulate and solve real world problems involving Random variables.
2. Identify probability distributions to various case studies.
3. Apply the concept of testing a hypothesis to case studies.
4. Explain the concept of hypothesis testing and the procedure for performing large sample tests for proportions and means.
5. Illustrate the numerical models in real world problems.

UNIT-I: Random Variables and Probability Distributions

Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions - Mean of a random variable - Variance of a random variable.

Discrete Probability distributions: Binomial and Poisson distributions

UNIT-II: Continuous Distributions and Sampling

Uniform distribution - Normal distribution - Area under the Normal Curve - Applications of the Normal Distribution- Normal Approximation to the Binomial distributions.

Fundamental Sampling Distributions: Random Sampling - Some important Statistics - Sampling Distributions - Sampling Distribution of Means - Central Limit Theorem.

UNIT-III: Estimation

Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Estimating a Proportion for single sample, Difference between Two Means, difference between two proportions for two Samples.

UNIT-IV: Test of Hypothesis (Large and Small Samples)

Statistical Hypothesis, General Concepts, Testing a Statistical Hypothesis, Test of a single mean, difference of means, single proportion and difference of proportion for large samples, F- distribution.

UNIT - V: Applied Statistics

Curve fitting by the method of least squares, fitting of straight lines, second degree parabolas and more general curves, Correlation and regression, Rank correlation.

TEXTBOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists,9thEd. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

REFERENCEBOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and Statistics for Engineers and scientists, academic press.

ELECTRONIC RESOURCES:

1. **https://www.youtube.com/watch?v=j9WZyLZCBzs**
2. **https://www.youtube.com/watch?v=UnzbuqgU2LE**
3. **https://www.youtube.com/watch?v=gI5y3RZe9fk**
4. **https://www.youtube.com/watch?v=l87zHfGW3Z4**
5. **https://www.youtube.com/watch?v=kjfIPyrdzuE**
6. **https://www.youtube.com/watch?v=IkbkEtOOC1Y**

MATERIALS ONLINE:

1. Coursetemplate
2. Tutorialquestionbank
3. Definitionsandterminology
4. Assignments
5. Modelquestionpaper–I
6. Modelquestionpaper–II
7. Lecturenotes
8. E-LearningReadinessVideos(ELRV)