**College of Engineering, Pune-5.**

**Department of Mathematics**

**( MA15007 ) Statistical and Quantitative Methods in Planning II**

F.Y. B. Tech. Planning

Teaching Scheme Examination Scheme

Lectures: 3 hrs / week Internal Test 1: 20 marks

 Internal Test 2: 20 marks

 End Sem. Exam: 60 marks

**Objectives:** The basic necessity for the foundation of B. Tech. Planning, being mathematics and statistics, the main aim is, to teach statistical methodologies & models, develop mathematical skills & enhance thinking power of students.

**Unit I** : **Probability**

Sample Space, Events, Probability of an event, Additive Rules, Conditional Probability, independent events, Bayes’ Rule. **[06 Hrs]**

**Unit II :** **Random Variables , Probability Distributions and Mathematical Expectation**

Random Variable, Discrete probability distributions, Continuous probability distributions, Mean of a random variable, variance and covariance of random variables, Means and Variances of linear combinations of random variables, independent random variables, Chebyshev’s theorem. **[10 Hrs]**

**Unit III : Discrete and Continuous Probability Distributions**

Introduction, discrete uniform distribution, binomial and poisson distribution, continuous uniform distribution, normal distribution, applications of normal distribution, normal approximation to the binomial. **[08 Hrs]**

**Unit IV : Sampling Distributions**

Random sampling, sampling distributions, sampling distributions of mean, sampling distributions of variance, Chi- squared, t and F distribution. **[04 Hrs]**

**Unit V :** **Testing of Hypothesis**

Statistical hypothesis, testing a hypothesis, one and two tailed tests, tests concerning means, proportion, variance, choice of sample size, two sample tests of means, proportions, variances, goodness of Fit test, one way analysis of variance (ANOVA) for completely randomized designs. **[12 Hrs]**

**Text Book :**

* Probability and Statistics for Engineers and Scientists(8th Edition) by Ronald E. Walpole, Sharon L. Myers, Keying Ye, Pearson Education.

**Reference Books** **:**

* Introduction to Probability and Statistics for Engineers and Scientists(4th Edition) by Sheldon M. Ross, Academic Press, imprint of Elsevier.
* Design and Analysis of Experiments (7th Edition) by Douglas C. Montgomery, Wiley Student Edition, 2009.
* Statistical Methods by S. P. Gupta, S. Chand & Sons, 2008
* Probability and Statistics for Engineering, (4th Edition) by William W.

 Hines, Douglas C. Montgomery, David M. Goldsman , Willey Student

 edition, 2006.

* Probability and Statistics for Engineers by Jay L. Devore, Cengage Learning.

--------------------------------------------------------------------------------------------

**Outcomes :** Students will be able to

1. know and recall the core knowledge of the syllabus. ( To measure this outcome, questions may be of the type- define, identify, state, match, list, name etc.)
2. understand the concept. ( To measure this outcome, questions may be of the type- explain, describe, illustrate, evaluate, give examples, compute etc.)
3. analyze the problem and apply the appropriate concept. ( To measure this outcome, questions will be based on applications of core concepts)
4. give reasoning. ( To measure this outcome, questions may be of the type- true/false with justification, theoretical fill in the blanks, theoretical problems, prove implications or corollaries of theorems, etc.)
5. apply core concepts to new situations. ( To measure this outcome, some questions will be based on self-study topics and also comprehension of unseen passages.)