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

**Department of Mathematics**

**( MA ) Probability Theory and Statistical Inference**

T.Y. B.Tech. Semester V

Teaching Scheme Examination Scheme

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

 Internal Test 2: 20 marks

 End Sem. Exam: 60 marks

**Objectives:** Statistics plays a very important role in Engineering, be it quality control or predictions for future. This course will give a flavor of important usage of statistical techniques in application after the techniques are studied in details.

**Unit I :** Review of basic probability theory along with examples, conditional probability and Bayes’ Rule, concept of independent events. **[6 Hrs]**

**Unit II :** Random Variables, Standard discrete and continuous distributions like Binomial,Poisson, Hypergeometric, Negative Binomial, Geometric, Normal, Exponential, Central Limit Theorem and its significance, sampling distributions of means, S2,t, and F.

 **[14 Hrs]**

**Unit III :** One - and Two - Sample estimation problems : Introduction, statistical inference, classical methods of estimation, single sample : estimating the mean and variance, two samples: estimating the difference between two means and ratio of two variances. **[8 Hrs]**

**Unit IV :** One - and Two – Sample tests of hypotheses: Introduction, testing a statistical hypothesis, tests on single sample and two samples concerning means, proportions and variances, goodness of fit test, One way analysis of variance for completely randomized design. **[12 Hrs]**

**Text Book** :

* Ronald E, Walpole, Sharon L. Myers, Keying Ye, Probability and Statistics for Engineers and Scientists (8th Edition), Pearson Prentice Hall, 2007

**Reference Books** **:**

* Douglas C. Montgomery, Design and Analysis of Experiments (7th Edition), Wiley Student Edition, 2009.
* S. P. Gupta, Statistical Methods, S. Chand & Sons, 37th revised edition, 2008
* William W. Hines, Douglas C. Montgomery, David M. Goldsman, Probability and Statistics for Engineering, (4th Edition), Willey Student edition, 2006.

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**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.)

Note:

 All the Course outcomes 1 to 3 will be judged by 75% of the questions and outcomes 4 and 5

 will be judged by 25 % of questions.