

College of Engineering Pune
(An Autonomous Institute of Government of Maharashtra, Pune-411005)
Department of Mathematics
(EE-17002) Probability Theory and Statistical Inference
T.Y. B. Tech. Semester V (All Branches)

Teaching Scheme
Lectures : 3 hrs / week

Examination Scheme
Internal Test 1: 20 marks
Internal Test 2: 20 marks
End Sem. Exam: 60 marks

Unit I : Review of basic probability theory along with examples, conditional probability and Bayes' Rule, concept of independent events. **[06 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, S^2 , 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. **[08 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.
 - The practice of Business Statistics by Manish Sharma and Amit Gupta, Khanna Publishing Company Private Limited, New Delhi.
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Outcomes : Students will be able to

1. **find** probability and conditional probability of simple events, **define** random variables.
2. **understand** standard discrete and continuous distributions, statistical inference, types of estimation and hypothesis.
3. **calculate** probabilities, **apply** tests of hypothesis for various population parameters.
4. **apply** chi-square test for different problems, **perform** analysis of variance.
5. **apply** probability theory and statistical inference to problems in Engineering and real life situations.

Note 1 :

- To measure CO1, questions may be of the type- define, identify, state, match, list, name etc.
- To measure CO2, questions may be of the type- explain, describe, illustrate, evaluate, give examples, compute etc.
- To measure CO3, questions will be based on applications of core concepts.
- To measure CO4, questions may be of the type- true/false with justification, theoretical fill in the blanks, theoretical problems, prove implications or corollaries of theorems, etc.
- To measure CO5, some questions may be based on self-study topics and also comprehension of unseen passages.

Note 2 :

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.