Semester	**FOUR**
Paper Number	**HSTGE4042T & HSTGE4042P**
Paper Title	**Sampling Distributions and Statistical Inference**
No. of Credits	**6**
Theory/Composite	**Composite**
No. of periods assigned	Th: 4 Pr: 2
Module	single
Course description/objective	*At the end of the course a student should* o Have a clear idea of sampling distribution of a statistic and statistical inference. o Be able to distinguish among the different categories of statistical inference. o Have knowledge of some basic estimators and statistical tests. o Be able to appreciate the need for ANOVA and its basic underlying idea.
Syllabus	**UNIT 1:** Population and Sample, Random Sample, Parameter & Statistic, Sampling Fluctuation & Sampling Distribution, Standard Error. Sampling Distributions arising out of Normal Population – $\chi 2$, t, F (definition & statement of important properties). Joint Distribution of sample mean & sample variance in case of normal population (statement only). [12L] **UNIT 2:** ***Point Estimation:*** Estimator, Bias & Mean Square Error. Unbiasedness & Minimum Variance. Consistency- Sufficient conditions (statement only). Methods of Estimation – Method of Moments & Method of Maximum Likelihood. [16L] **UNIT 3:** ***Testing of Hypotheses:*** Null & Alternative Hypotheses. Simple & Composite Hypotheses. Test Statistic & Critical Region. Type I & Type II errors. Level of significance. Power & Size. Tests for mean & variance of a normal population. Tests for difference of means & ratio of variances of two independent normal populations. Anova for one way and two way classified data with fixed effects model. [18L] **UNIT 4:** ***Interval Estimation:*** Confidence Interval & Confidence Coefficient. Confidence Interval for mean & variance of a normal population and difference of means & ratio of variances of two independent normal populations. [6L]
List of Practical	1. Problems on Estimation. 2. Confidence interval for the parameters of a normal

<table>
<tr><td></td><td colspan="2">distribution (one sample and two sample problems).
3. Tests of hypotheses for the parameters of a normal distribution (one sample and two sample problems).
4. Analysis of Variance of a one way classified data.
5. Analysis of Variance of a two way classified data.</td></tr>
<tr><td>Reading/ Reference list</td><td colspan="2">1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I, & II, 8th Edn. The World Press, Kolkata.
2. Goon, A.M. Gupta, M.K. and Dasgupta, B. (2003): An outline of Statistical Theory, Vol. 1, 4th Edn.World Press, Kolkata.
3. Rohatgi V.K. and Saleh, A. K. Md , E. (2009): An Introduction to Probability and Statistics, 2nd edition (Reprint), John Wiley and Sons.</td></tr>
<tr><td>Evaluation</td><td>Theory
CIA: 10
End-Sem: 50
Total: 60</td><td>Practical
CIA: 10
End Sem: 30
Total: 40</td></tr>
<tr><td rowspan="2">Paper Structure for End Sem Theory</td><td>Short questions (5 marks each)</td><td>Long questions (15 marks each)</td></tr>
<tr><td>4 out of 6</td><td>2 out of 3</td></tr>
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