B.Sc.(H)Statistics Semester-VIII

Category I

DISCIPLINE SPECIFIC CORE COURSE - 20: BAYESIAN INFERENCE

CREDIT DISTRIBUTION, ELIGIBILITY, AND PRE-REQUISITES OF THE COURSE

Course title and code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lectures	Tutorial	Practical		
Bayesian Inference	**4**	**3**	**0**	**1**	Class XII pass with Mathematics	Knowledge of Probability Distribution and Statistical Inference

Learning Objectives:
The learning objectives of this course is

- To introduce students to the Bayesian approach to statistics.
- To make students understand the basic difference between the commonly-taught Frequentist approach and the Bayesian Paradigm.
- To demonstrate the benefits of using a Bayesian approach and obtaining results that are more interpretable.

Learning Outcomes:
After completion of this course, students should have developed a clear understanding of:

- Bayes theorem for random variables
- Prior and posterior distributions
- Conjugate prior
- Non-informative priors
- Bayesian point estimation
- Bayesian Credible intervals
- Bayes factor

SYLLABUS OFDSC-20
Theory

UNIT I **(5 Hours)**

Bayes Theorem for Random Variables
Concept of inverse probability; Bayes theorem for random variables; Concept of likelihood function, prior distribution and posterior distribution.

SUGGESTED READINGS:

- Box, G.E.P. and Tiao, G.C. (2011). Bayesian Inference in Statistical Analysis, John Wiley & Sons (reprint).
- Lee, P. M. (2012). Bayesian Statistics: An Introduction 4th edition, Wiley.
- O'Hagan, A. and Forster, J. (2010). Kendall's Advanced theory of Statistics, Volume 2B, Bayesian Inference, published by Wiley.
- Robert, C.P. (2007). The Bayesian Choice: A Decision Theoretic Foundations to Computational Implementation, Second Edition, Springer-Verlag, New York (reprint).

Note: Examination scheme and mode shall be as prescribed by the Examination Branch University of Delhi, from time to time.

Discipline Specific Elective for B.Sc.(H) Statistics Semester-VIII

DISCIPLINE SPECIFIC ELECTIVE COURSE – 6 A: NON PARAMETRIC TESTING

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITESOFTHE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Nonparametric Testing	4	3	0	1	Class XII pass with Mathematics	Knowledge of Hypothesis testing

Learning Objectives

The learning objectives include:

- Usefulness of Nonparametric distribution free tests their strength and weaknesses
- Quantile and Empirical distributions and their utility
- Test for randomness, location and scales under nonparametric setup
- Test association of bivariate samples

Learning Outcomes

After completing this course, students should be able to:

- Make distinction between Parametric and Nonparametric test and measurement scales.
- Appreciatetheroleofquantileandempiricaldistributionfunctionandassociated tests.
- Identify suitable nonparametric test for both location and scale and able to apply one/two tests including Kolmogorov- Smirnov one sample and two sample tests, sign test, Wilcoxon signed rank test, run test. Median test, Kruskal-Wallis one-way analysis of variance by ranks, Friedman two-way analysis of variance by ranks.
- Test association of bivariate samples using Kendall tau and Spearman's rank correlation.