**CURRICULUM DEVELOPMENT PLAN: Dr. Savita Sharma**

**B.Sc. (H) Physics VIth Semester (Even Semester, 2024-2025)**

**Paper: Statistical Analysis in Physics;**

**Credit: 04 (Lecture-02, Practical-02)**

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| **Topics** | **Allocation of Lectures**  **(hrs)** | **Month**  **Wise schedule** | **Tutorial/assignment/**  **Presentation etc.** |
| Unit – I  Random variables, Discrete and Continuous Probability Distributions. Bivariate and multivariate random variables, Joint Distribution Functions (with examples from Binomial, Poisson and Normal). Mean, variance and moments of a random vector, covariance and correlation matrix, eigen decomposition of the covariance matrix (bivariate problem).  Cumulative Distribution Function and Quantiles. Point Estimation, Interval estimation, Central Limit Theorem (statement, consequences and limitations). | 08 | 13th January-24th February 2025 | * Syllabus Overview * Reference Books * Derivations * Problem-solving * Students’ difficulties |
| Unit – II  Bayesian Statistics: Conditional probability and Bayes Theorem, Prior and Posterior probability distributions, examples of Bayes theorem in everyday life. Bayesian parameter  estimation. Normal, Poisson and Binomial distributions, their conjugate priors and properties.  Bayes factors and model selection. | 11 | 25th February- 31st March 2025 | * Derivations * Problem-solving * Students’ difficulties * Assignments |
| Unit – III  Bayesian Regression: Introduction to Bayesian Linear Regression. Bayesian logistic regression and its applications. Bayesian parameter estimation for regression models.  Posterior distribution of model parameters and the posterior predictive distributions. | 11 | 7th to 28th April 2025 | * Derivations * Problem-solving * Students’ difficulties * Class Test   Previous year's Question Papers |