COMPETENCY BASED LEARNING DESIGN/COMPETENCY BASED POST-TEACHING REFLECTION

YEAR - 2026 SEMESTER - V DEPARTMENT – STATISTICS (Minor)

Course: STAT-H-MC3-5-Th

Title: Statistical Inference Credits: 3 | Theory

Topic/Unit	**Competency-Based Expected Learning Outcome (Knowledge, Skill Value, Attitude)**	**Assessment**	**Brief Description of Strategies, Aids (if any), Evaluation process**	**Hours Allotted**	**Evaluated Outcome/ Post-Teaching Reflections**
Unit I: Basic Concepts of Statistical Inference (Population & sample, parameter & statistic, population and sampling distributions; point estimation, interval estimation and testing of hypothesis; χ^2, t and F distributions – derivations excluded)	**Knowledge:** Understand fundamental concepts of statistical inference and related distributions. **Skill:** Distinguish between population and sample; identify appropriate distributions. **Value/Attitude:** Develop logical and probabilistic thinking.	Assignment, Practical problem solving	Lecture method using examples; chalk & board; discussion-based teaching. Evaluation through class test and oral questioning.	5	

Unit II: Point Estimation (Concepts of estimation; properties of estimators; bias, variance, MSE; UMVUE; efficiency; methods of moments and maximum likelihood; estimators for Binomial, Poisson and Normal distributions)	**Knowledge:** Learn properties and methods of point estimation. **Skill:** Derive and compute estimators using MOM and MLE. **Value/Attitude:** Accuracy and analytical reasoning.	Assignment, Practical problem solving	Lecture with step-by-step derivations; numerical problem-solving; board work. Evaluation through assignments and tests.	15	
Unit III: Elements of Hypothesis Testing (Null and alternativ e hypotheses; type I & II errors; level of significance, power, p-value; exact tests; tests for Binomial, Poisson; Fisher's exact test; χ^2 tests; tests for Normal	**Knowledge:** Understand testing framework and decision rules. **Skill:** Perform and interpret hypothesis tests. **Value/Attitude:** Critical judgment and evidence-based reasoning.	Assignment, Practical problem solving	Lecture with numerical illustrations; problem-solving sessions; comparison of tests. Evaluation through tests and tutorials.	20	

distribution; paired t-test; combination of probabilities)					
Unit IV: Interval Estimation (Confidence interval and confidence coefficient; exact confidence intervals for mean(s) and variance(s) for one-and two-sample normal populations)	**Knowledge:** Understand interval estimation concepts. **Skill:** Construct and interpret confidence intervals. **Value/Attitude:** Precision and statistical confidence.	Assignment, Practical problem solving	Lecture with formula-based explanation; numerical examples. Evaluation through assignments and unit test.	5	