COMPETENCY BASED LEARNING DESIGN/COMPETENCY BASED POST-TEACHING REFLECTION

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

Course: STAT-H-MC4-6-Th

Title: Design of Experiments & Sample Survey

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: Analysis of Variance (Factors, types and effects; fixed, random and mixed effects models; one-way and two-way classification with equal observations – fixed effects models)	Knowledge: Understand ANOVA concepts, models and assumptions. Skill: Construct and analyze one-way and two-way ANOVA tables. Value/Attitude: Develop analytical and logical thinking in data analysis.	Assignment, Practical problem solving	Lecture method with derivations and examples; chalk & board; problem-solving sessions. Evaluation through class tests and numerical assignments.	10	

Unit II: Principles of Experimental Design (Treatments, experimental units & blocks, experimental error, Fisher's basic principles)	Knowledge: Learn fundamental concepts and principles of DOE. Skill: Identify design components in practical situations. Value/Attitude: Appreciation of scientific and systematic experimentation.	Assignment, Practical problem solving	Interactive lecture with real-life examples; board illustrations. Evaluation via assignments and oral questioning.	2	
Unit III: Basic Experimental Designs (CRD, RBD, LSD – layout, model, analysis; missing plot techniques; uniformity trials and comparison of designs)	Knowledge: Understand structure and assumptions of basic designs. Skill: Apply ANOVA to CRD, RBD and LSD including missing plots. Value/Attitude: Problem-solving and comparative reasoning.	Assignment, Practical problem solving	Lecture with numerical illustrations; comparison tables; problem-solving sessions. Evaluation through tests and tutorials.	10	
Unit IV: Introduction to Sample Survey & Simple Random Sampling (Population & sample, census vs sampling, sampling	Knowledge: Understand sampling theory fundamentals. Skill: Select samples and compute estimates.	Assignment, Practical problem solving	Lecture with examples; random number tables; problem-solving. Evaluation through tests and assignments.	15	

& non-sampling errors; types of sampling; SRSWR & SRSWOR; estimates and standard errors)	Value/Attitude: Awareness of survey reliability and accuracy.				
Unit V: Stratified Random Sampling (Technique; estimates of population mean and total; variances; proportional and optimum allocation; comparison with SRS)	Knowledge: Understand stratification and allocation methods. Skill: Compute estimates and variances; compare efficiencies. Value/Attitude: Analytical comparison and decision-making.	Assignment, Practical problem solving	Lecture with numerical illustrations; comparative discussion. Evaluation through assignments.	4	
Unit VI: Two-Stage & Non-Probability Sampling (Two-stage sampling with equal size primary units; unbiased estimation of mean and total; snowball and purposive sampling)	Knowledge: Learn multi-stage and non-probability sampling concepts. Skill: Apply unbiased estimation procedures. Value/Attitude: Awareness of real-life survey practices.	Assignment, Practical problem solving	Lecture with real-life survey examples; discussion-based teaching. Evaluation through unit test.	4	