



Guru Kashi University

(Established by Punjab Govt. Act No. 37 of 2011)

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Note: The question paper will be of 100 marks. Examiner will set eight questions and Candidates will be required to attempt any five questions. Time allowed for examination will be 3 hours, evaluation & grading will be as per Ph.D regulations.

Syllabus for Research Methodology - Ph.D. Course Work

- 1) **Research:**
Research and its types, Research process and steps in it. Essential constituents of Literature Review.
- 2) **Design of Experiments:**
Objectives & strategies of research, completely randomized, Randomized block, Latin Square, Factorial experimental design, response surfaces.
- 3) **Methods of Data Collection:**
Types of data collection and classification, designing questionnaires and schedules.
- 4) **Sampling Methods:**
Probability sampling, random sampling, systematic sampling, stratified sampling, cluster sampling and multistage sampling. Non-probability sampling: convenience sampling, judgement sampling, quota sampling.
- 5) **Analysis of Data:**
Statistical measures and their significance: Central tendencies, variation, skewness, Kurtosis, time series analysis, correlation and regression, Testing of Hypotheses: Parametric (t, z and F) Chi Square, ANOVA.
- 6) **Multivariate Analysis:**
Multiple Regression, Factor Analysis, Discriminant Analysis, Cluster Analysis, multidimensional scaling.
- 7) **Design of Simulation Experiments:**
Simulation Modelling, Verification and validation of model, Length of simulation run, Replication and batches, Elimination of Initial bias, Validation of input / output data, Variance reduction techniques.
- 8) **Report writing:**
Pre writing considerations, Thesis writing, Format of report writing, Format of publications in research journals.

Note: Application and use of various software for case studies should be essential.

References:

1. Montgomery, Douglas C. (2007), 5/e, Design and Analysis of Experiments, (Wiley India)
2. Montgomery, Douglas C. & Runger, George C. (2007), 3/e, Applied Statistics & Probability for Engineers (Wiley India)
3. Kothari C.K. (2004), 2/e, Research Methodology- Methods and Techniques (New Age International, New Delhi)
4. Krishnaswamy, K.N., Sivakumar, Appa Iyer and Mathiranjana M. (2006), Management Research Methodology; Integration of Principles, Methods and Techniques (Pearson Education, New Delhi)
5. Hira, D.S. System Simulation, S. Chand of Co., New Dehli