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## Notice for the PhD Viva Voce Examination

Mr Meby Joseph Manoj, Registration Number: 2270160, PhD Scholar at the Department of Statistics and Data Science, School of Sciences, CHRIST (Deemed to be University) will defend his PhD thesis at the public viva-voce examination on Tuesday, 19 May 2026 at 02.00 pm in Room No. 628, 6th Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

<b>Title of the Thesis</b>	:	<b>Design and Analysis of Skip Lot Sampling Plans with Multi-Reference Plans</b>
<b>Discipline</b>	:	<b>Statistics</b>
<b>External Examiner - I</b>	:	<b>Dr E V Gijo</b> Professor SQC and OR Unit Indian Statistical Institute, Bangalore Centre Gnana Bharathi, Bengaluru - 560059 Karnataka
<b>External Examiner - II</b>	:	<b>Dr Athar Ali Khan</b> Professor Department of Statistics and Operations Research Aligarh Muslim University Aligarh - 202001 Uttar Pradesh
<b>Supervisor</b>	:	<b>Dr Azarudheen S</b> Assistant Professor Department of Statistics and Data Science School of Sciences CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

**Registrar (Academics)**

**Place:** Bengaluru  
**Date:** 13 May 2026

## ABSTRACT

Statistical quality control emerged when statistical techniques were applied for quality inspection processes, aiming to improve the quality standards in productions. Initially adopted in military segment for the production and inspection of equipment, statistical quality control gained wide recognition across industries during the Industrial Revolution. Acceptance sampling plans and control charts contributed to the extensive validation of statistical quality control over the industrial world. The control charts are employed to oversee the production procedure and to identify the causes of variations. Acceptance sampling plans facilitate the decisions whether to approve or discard the assembled products using sampling inspection. Among the acceptance sampling plans, the skip-lot sampling plans by attribute are widely applied when the production process is in a steady state and the quality of the products is uniform. The skip-lot inspection operates in two phases: normal inspection and skipping inspection. The lots submitted for the inspection during these phases are evaluated using basic sampling plans which are used as the reference plans. The adoption of skip-lot sampling plans helps to avoid redundant inspection once the product displays stable high quality. However, the use of skip-lot sampling plans with the same sampling plan as reference plan for all phases results in the plan being ineffective in exercising the required decision flexibility and the plan may be designed to provide specific protection to either the producer or consumer. In this study, the skip-lot sampling plans are implemented with a multi-reference concept, where multiple sampling plans are used as reference plans in different phases of the inspection. This doctoral thesis focuses on the implementation of the single sampling plan and double sampling plan as the reference plans of normal and skipping inspections and entitled as Multi-reference Skip-lot Sampling Plans. The risks faced by producer and consumers are mitigated when the skip-lot sampling plans are implemented with multiple reference plans. The performance measures of the plans are formulated and compared with existing skip-lot sampling plans using graphical and tabulated methods. The comparative analysis demonstrates that the proposed multi-reference skip-lot sampling plans achieve a balance between the interest of producer and consumer simultaneously, where the existing plans fail to deliver. The optimized designing of the multi-reference skip-lot sampling plans using the unity value approach is also studied and the unity value tables for the plans are also created. The proposed methodology adopts the optimized characteristics of existing plans that use the same reference plans across different phases of inspection. Furthermore, the proposed plans offer economic advantages over the existing plans.

**Keywords:** *acceptance sampling plan, skip-lot sampling plans, operating characteristics function, average sample number, producer's risk, consumer's risk*

### Publications:

1. **Manoj, M. J., & Azarudheen, S. (2025).** Multi Reference Skip-Lot Sampling Plan. *Reliability: Theory & Applications*, 20(2 (84)), 447-455. (SJR: 0.232)
2. **Manoj, M. J., & Azarudheen, S. (2025).** Multireference Skip-lot Sampling of Type 3 (MR-SkSP-3). *Reliability: Theory & Applications*, 20(3 (86)), 473-484. (SJR: 0.232)