Semester Project Proposal



Proposed to

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Optimization of PCB Manufacturing Processes Using Statistical Quality Control (SQC)

**Introduction**

Manufacturing industries aim to achieve high efficiency, reduce production costs, and maintain top-tier product quality. Statistical Quality control (SQC) is a collection of methods that leverages statistical techniques to monitor, analyse, and improve production processes. This project focuses on utilizing SQC to optimize the performance of a hypothetical manufacturing process, such as a Printed Circuit Board (PCB) assembly line, by identifying inefficiencies and minimizing defects.

Mention inner working

**Problem Statement**

Frequent variations in cycle times and defects in manufacturing processes result in increased production costs and inconsistent product quality. Traditional approaches lack the necessary real-time analysis to address these inefficiencies.

There is a need to implement a structured statistical approach to identify and mitigate these problems.

**Required Skill Set**

To successfully execute the project, the following skills and tools are essential:

* Proficiency in work and method study.
* Strong understanding of ergonomics and its impact on efficiency.
* Ability to develop process, material, and information flow charts/diagrams.
* Knowledge of lean methodologies, like six sigma, kaizen.

Relevant courses:

Statistical quality control, operations research, manufacturing processes, work study.

**Methodology**

Process selection

Choose a manufacturing process for analysis, such as a PCB assembly line.

Data collection

Collect cycle time, defect rate, and workstation-specific performance data.

Analysis using SQC techniques

Develop control charts to monitor process stability.

Propose solutions

Use findings to standardize cycle times, reduce variations, and minimize defects.

Validation and assessment

Validate the proposed improvements by analysing the updated process metrics.

**Expected Outcomes**

* Process optimization: improved efficiency through reduced cycle time variations.
* Quality enhancement: lower defect rates and more consistent product quality.
* Organizational benefits: reduced costs and increased productivity for manufacturing systems.
* Student learning: practical application of statistical techniques to solve real-world industrial problem.

Increase introduction, references minimum 5 references. Read article, read 10 minimum, 20 lines introduction.