

SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore-35**



DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

23ADT202 – FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS

II YEAR IV SEM

UNIT III – Effect of Sample size

Engaging Hook

- **Title:** How Big is Your Sample?

- **Content:**

- Present a curious question: "Can a small sample truly represent the population?"
- Brief industry example: "Consider a company trying to gauge customer satisfaction with just 10 responses."

Empathize

- **Title:** Connecting to Real-World Experiences

- **Content:**

- Discuss cases where businesses rely on survey data (e.g., product testing, market research).
- Ask students about their experiences with small vs. large samples in projects or studies.

Define the Problem

- **Title:** The Core Problem

- **Content:**

- Define the concept of sample size: "The number of observations or replicates in a statistical sample."
- Highlight the uncertainty in data: "How does sample size impact the reliability of results?"

Ideate

- **Title:** Exploring Potential Solutions

- **Content:**

- Discuss how sample size influences statistical power, confidence intervals, and generalizability.
- Introduce concepts like the law of large numbers and its implications on data accuracy.

Prototype

- **Title:** Understanding the Effects of Sample Size

- **Content:**

- Visual diagram comparing small vs. large samples:
 - Show visual representation of confidence intervals narrowing with larger sample sizes.
- Example: "How does increasing the sample size impact the margin of error?"

Implementation

•**Title:** Applying Sample Size Considerations

•**Content:**

- Explain methods to determine optimal sample size:
 - Power analysis to calculate required sample size.
 - Provide examples from industry applications.

Test / Reflect

•**Title:** Evaluating Performance

•**Content:**

- Discuss limitations of small sample sizes: increased variability, risk of bias, and inaccurate conclusions.
- Reflect on trade-offs between cost, time, and the quality of the insights gained.

Real-World Application

- **Title:** Industry Scenario

- **Content:**

- Case Study: A pharmaceutical company testing a new drug with different sample sizes.
- Discuss how sample size affected the drug's approval process based on trial results.

Summary & Reflection

- **Title:** Linking Back to the Core Problem

- **Content:**

- Recap: A larger sample size leads to more reliable and valid data analysis.
- Emphasize that understanding sample size is critical for informed decision-making as future engineers.
- Close with a reminder of its relevance in practical scenarios, like surveys and experiments.