

SNS COLLEGE OF TECHNOLOGY

Kurumbapalayam (Po), Coimbatore – 641 035

An Autonomous Institution

Accredited by NAAC – UGC with ‘A++’ Grade

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**COURSE NAME: 23ADO201- DATA SCIENCE FUNDAMENTALS
(OPEN ELECTIVE)**

III YEAR / VI SEMESTER

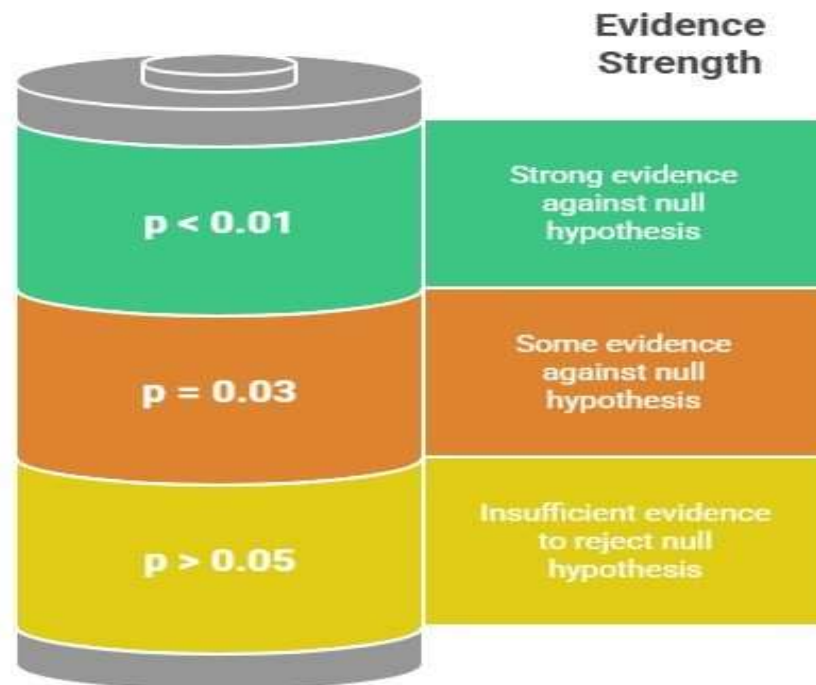
Unit 4 - ANALYSIS OF VARIANCE

Topic : Statistical Significance

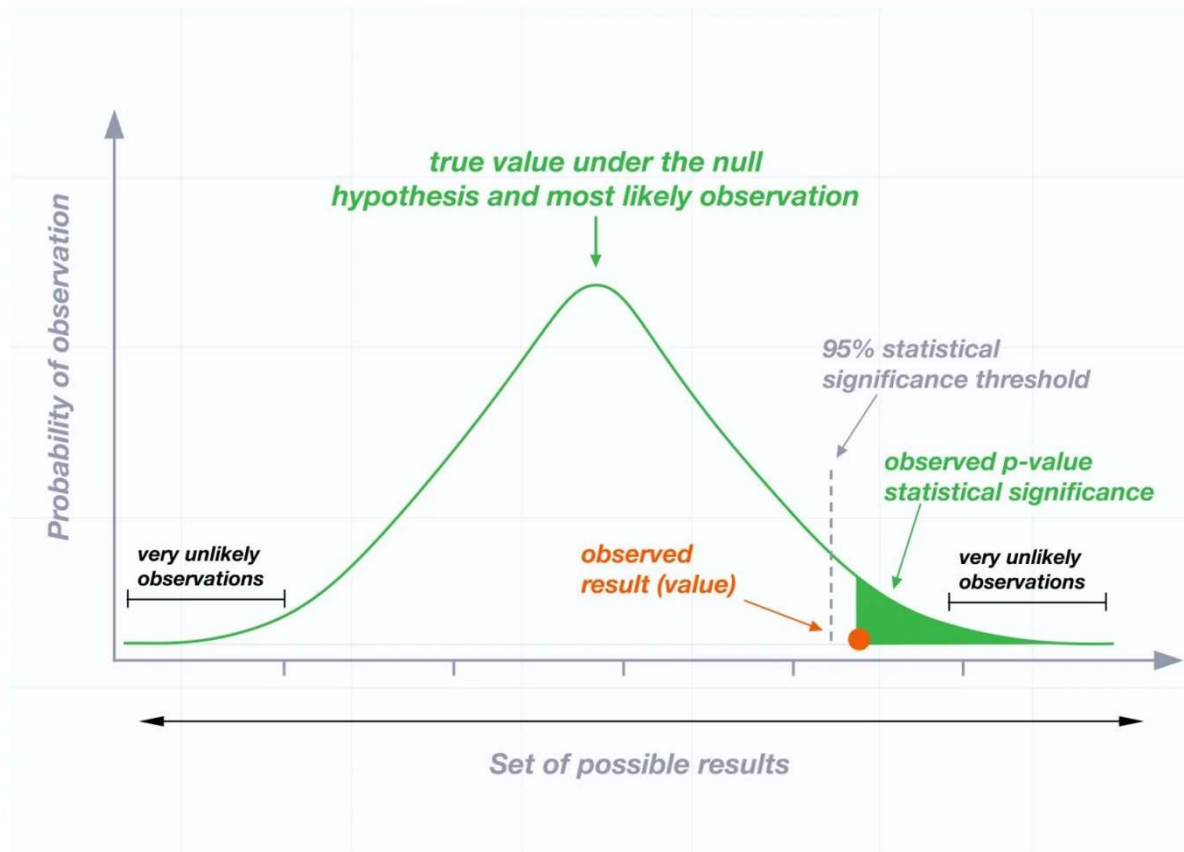
P-value Interpretation Flowchart



P-values range from weak to strong evidence against the null hypothesis.



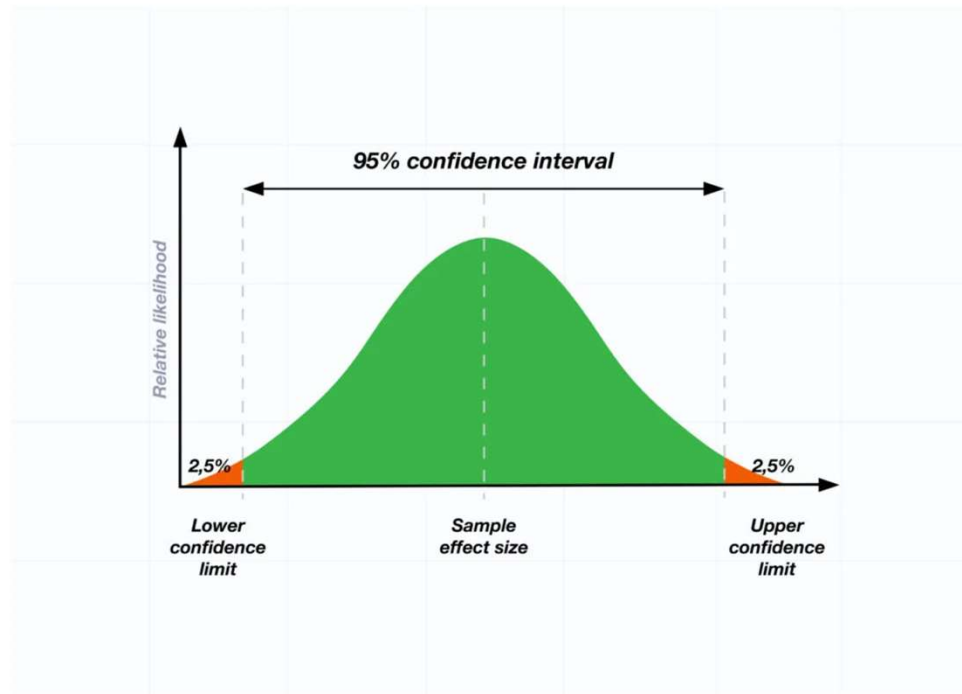
Probability & statistical significance



4/12/2026

4/12/2026

Statistical significance and confidence interval



4/12/2026

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	Statistical Significance	Practical Significance
Definition	Indicates the data provide enough evidence to reject the null hypothesis at a chosen p-value threshold.	Assesses whether the size of the effect is large enough to matter in real-world or applied contexts.
Measure	p-value (compared to α , e.g., 0.05).	Effect size (e.g., Cohen's d, correlation coefficient) and real-world impact.
Tells You	Whether the result is likely due to more than random chance.	Whether the effect is meaningful or valuable in practice.
Example	p = 0.02 suggests strong evidence against the null. <small>6</small>	A new diet might cause just half a pound of weight loss in three months — statistically significant, but too small effect to matter for most people.
Limitation	Says nothing about the magnitude or importance of the effect.	May overlook results that are statistically weak but still important in specific contexts.

4/12/2026

Activity



Activity Title: Testing Statistical Significance using Class Data

🎯 Objective

To help students understand how **statistical significance** determines whether results are meaningful or due to chance.

📁 Materials Needed

- Paper & pen
- Calculator (optional)
- Classroom students (data source)

🔗 Step-by-Step Procedure

1. Define the Problem

Ask students:

👉 “Do students in this class study more than 2 hours per day on average?”

2. State Hypotheses

- Null Hypothesis (H_0): Average study time = 2 hours
- Alternative Hypothesis (H_1): Average study time > 2 hours

3. Collect Data

- Ask 10–15 students their daily study hours
- Example data: 2, 3, 2.5, 4, 3, 2, 3.5, 4, 2.5, 3

4. Calculate Sample Mean

- Find the average study time

5. Introduce Statistical Significance

Explain:

- We test whether the difference (mean vs 2 hours) is **real or just random**

📊 Key Formula (Conceptual)

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

👉 This is used in a **t-test** to check significance.

6. Decision Rule

- Choose **significance level** ($\alpha = 0.05$)
- If **p-value < 0.05** → **Statistically significant**
- If **p-value ≥ 0.05** → **Not significant**

7. Interpretation

- If significant → Study time is truly higher
- If not → Difference may be due to chance

🏠 Student Discussion Questions

- 1.What does “statistically significant” mean?
- 2.Can a result be different but not significant?
- 3.Why do we use 0.05 as a threshold?

MCQ



MCQs on Statistical Significance

1. Statistical significance means:

- A) Result is always correct
- B) Result is unlikely due to chance
- C) Sample size is large
- D) Data is perfect

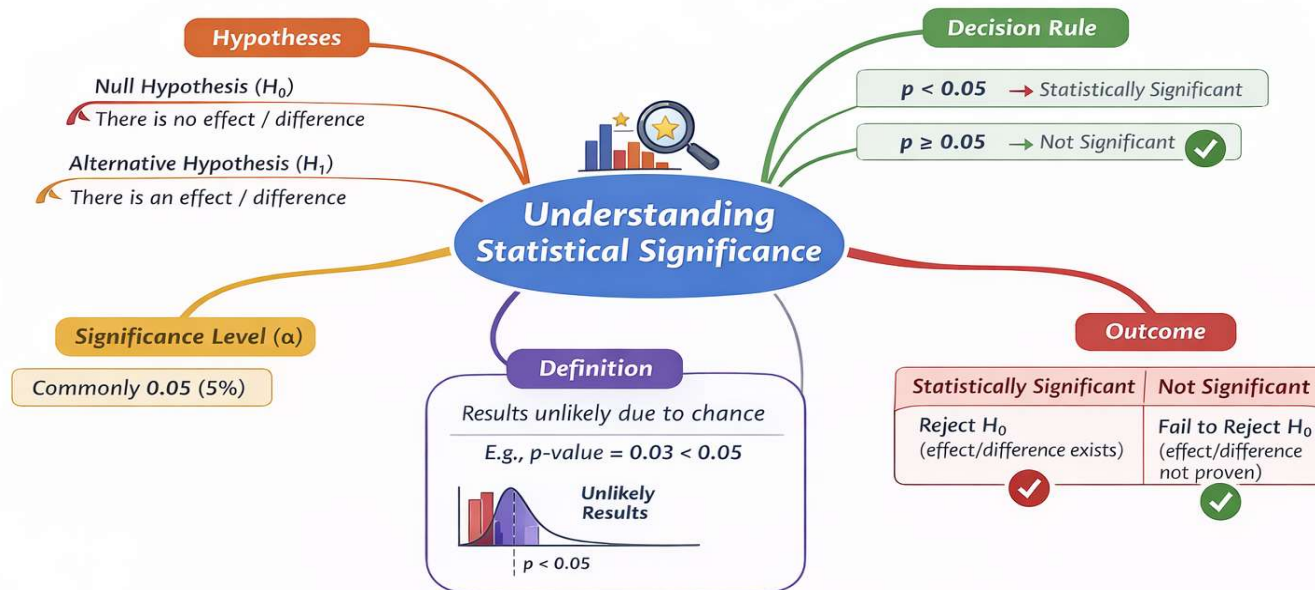
Answer: B

2. A result is statistically significant when:

- A) p-value > 0.05
- B) p-value = 1
- C) p-value $<$ significance level (α)
- D) Sample size is small

Answer: C

MINDMAP



TEXT BOOKS	
1.	Srinivasan Desikan and Gopaldaswamy Ramesh, —Software Testing – Principles and Practices, Pearson Education, 2006.
REFERENCES	
1.	Ilene Burnstein, —Practical Software Testing, Springer International Edition, 2003
2.	Edward Kit, Software Testing in the Real World – Improving the Process, Pearson Education, 1995
3.	Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4.	Aditya P. Mathur, —Foundations of Software Testing _ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

THANK YOU!

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