INSTITUTE OF AERONAUTICAL ENGINEERING

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Dundigal, Hyderabad -500 043

COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

Course Name	**PROBABILITY AND STATISTICS**
Course Code	AHS010
Programme	B.Tech
Semester	II
Course Coordinator	Mr. J Suresh Goud
Course Faculty	Ms. P Srilatha
Lecture Number	41
Topics Covered	Introduction of large sample tests
Course Learning Outcome's	Understand the foundation for hypothesis testing.

Population:

The collection of objects is known as population.

Population size:

The number of observations in the population is defined as population size.
It is denoted by N.

Sample:

The subset of the population is called sample.

Sample size:

The number of observations in the sample is defined as sample size.
It is denoted by n.

Large Sample:

If the sample size $n \geq 30$ then it is called as large sample.

Level of significance:

The null hypothesis is rejected if the p-value is less than a predetermined level, α. α is called the significance level, and is the probability of rejecting the null hypothesis given that it is true (a type I error). It is usually set at or below 5%.

Testing of hypothesis:

Hypothesis test as the formal procedures that statisticians use to test whether a hypothesis can be accepted or not.

There are two types of testing of hypothesis.

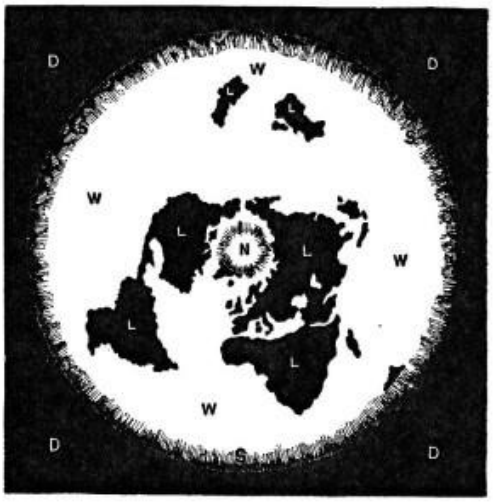
1. Null Hypothesis (H_0)
2. Alternative Hypothesis (H_1)

1. Null Hypothesis: There is no relationship between two quantities.

Example:
A ten percent increase in price will not adversely affect the sale of this product.

2. Alternative Hypothesis: It is the hypothesis differs from the given null hypothesis.

Example:
Not so long ago, people believed that the world was flat.



Null hypothesis: The world is flat.

Alternate hypothesis: The world is round.

Several scientists, including Copernicus, set out to disprove the null hypothesis. This eventually led to the rejection of the null and the acceptance of the alternate. Most people accepted it. The ones that didn't created the Flat Earth Society. What would have happened if Copernicus had not disproved the it and merely proved the alternate? No one would have listened to him. In order to change people's thinking, he first had to prove that their thinking was wrong.

Note: $H_0: \mu = 20$

$H_1: \mu \neq 20$ Two tailed test

$H_1: \mu > 20$ Right tailed test

$H_1: \mu < 20$ Left tailed test

Procedure of Test of Hypothesis:

Step 1: Null Hypothesis (H_0): Setup Null Hypothesis

Step 2: Alternative Hypothesis (H_1): Setup Alternative Hypothesis

Step3: Level of Significance(α): Choose Z_α value from the table

Step 4: Test Statistic(Z): $Z = \dfrac{t - E(t)}{S.E(t)}$

Step 5: Conclusion:

If $|Z| < Z_\alpha$ then We accept null hypothesis

If $|Z| > Z_\alpha$ then We reject null hypothesis

Test of Hypothesis for Large Samples:

There are 4 tests for large samples

1. Test of Hypothesis for single mean
2. Test of Hypothesis for difference of means
3. Test of Hypothesis for single proportion
4. Test of Hypothesis for difference of proportions