



# Computer Oriented Statistical Techniques (COST)

---

BscIT Sem IV



# Who will teach ?



Ms. Maitreyi Joglekar

M.Tech- Electronics and Telecommunication

Experience - 5 years

Area of Expertise –Signals and systems,  
Embedded systems



Ms. Geeta Sahu

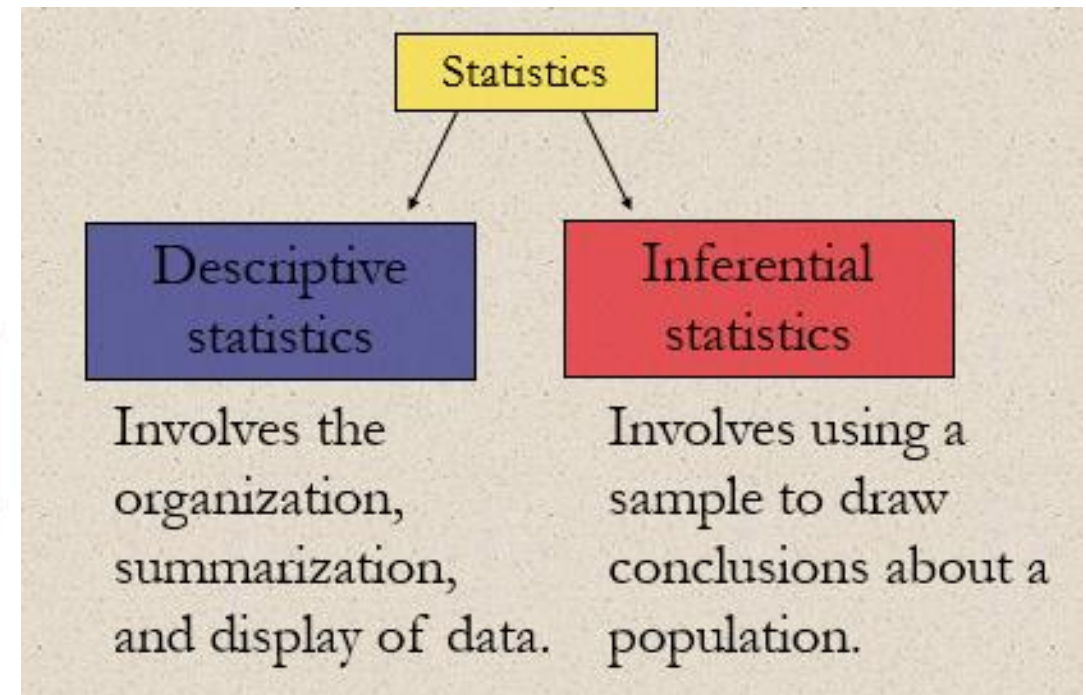
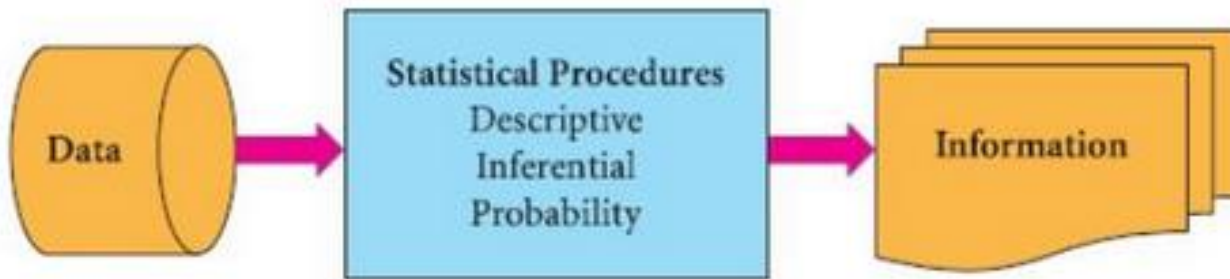
M.C.A, UGC NET Qualified- Computer Science

Experience - 11 years

Area of Expertise -Mathematics, Networking

# What is statistics

- The science of collecting, organizing, analysing and interpreting data in order to make decisions.
- Statistics is used to describe the data set and to draw conclusion about the population from the data set.





# STATISTICS

1

2

3

4

## REAL TIME APPLICATIONS



Research and Analysis



Estimation and Prediction  
Quality Testing

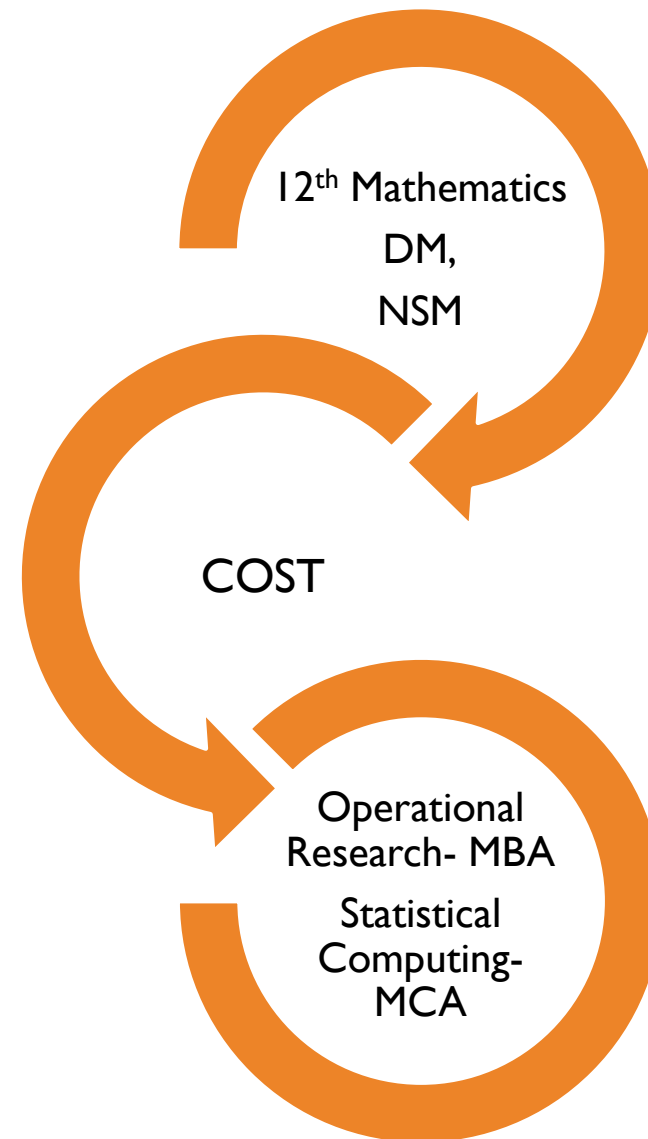


Stock Exchange



Weather Forecasting

## PREREQUISITE AND LINKAGE



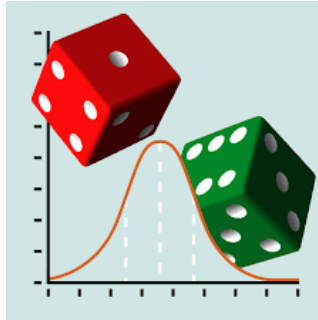
# Measures of Central Tendency

Mean, Median, Mode,  
Std Deviation



## Probability Theory

Probability and  
sampling theory



## Estimation and Decision Theory

Estimation of  
parameters, error  
probability, statistical  
hypothesis, statistical  
tests



## Small Sampling Theory

Chi square distribution  
and chi square test.



## Correlation Theory

Curve fitting,  
regression and  
correlation theory



C  
O  
S  
T

# Syllabus

# CONTENT-PRACTICAL (R PROGRAMMING)

- Basic commands of R, arrays, list, frames.
- Operations of Matrices
- Mean, Median, Mode, Quartiles, Range using R
- Importing data from Excel
- Draw Skewness
- Hypothetical Testing, Chi-square test
- Binomial & Normal Distribution
- Linear Regression







## REFERENCE BOOKS

- **Statistics**  
by Murray R, Larry Stephens
- **A Practical Approach using R**  
by Patil, Dand and Bhavsar

# EXAMINATION

| Exam      | Weightage |
|-----------|-----------|
| Theory    | 75        |
| Internal  | 25        |
| Practical | 50        |



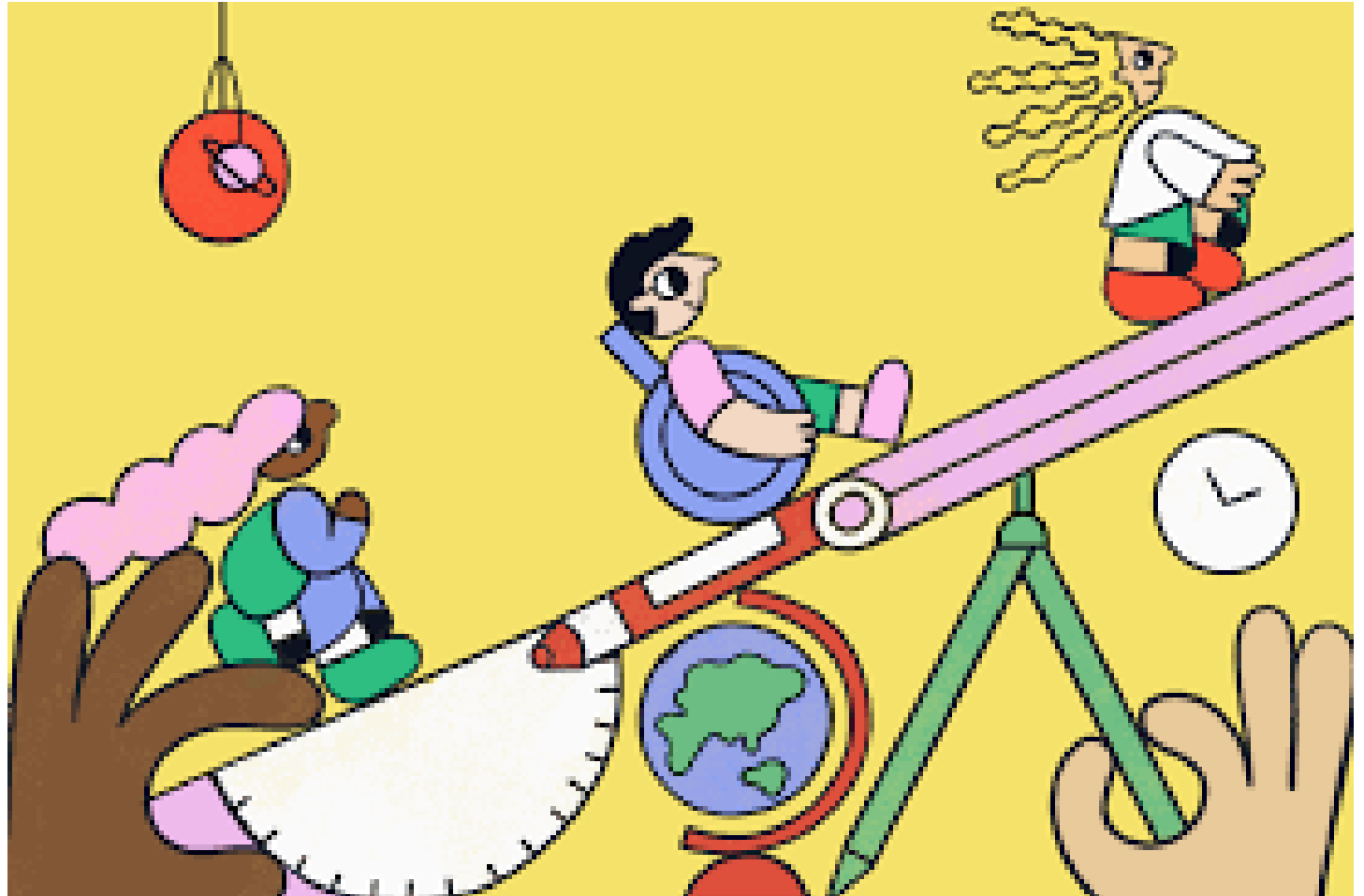


## INTERNAL ASSESSMENT

| Exam Type       | Details   | Marks | Scale to  |
|-----------------|---|-------|-----------|
| Internal Marks  | IA 1 (Descriptive)                                      | 20    | 7.5       |
|                 | IA 2 (MCQ + Viva)                                       | 20    | 7.5       |
|                 | Attendance/Active participation/Activities(Unit wise 5) | 10    | 10        |
|                 | Total   |       | <b>25</b> |
|                 |   |       |           |
| Practical Marks | Practical Lab Work-I to 10 Submission                   | 100   | 20        |
|                 | Practical Assessment I                                  | 10    | 10        |
|                 | Final Practical Exam (Mini-Project presentation + Viva) | 20    | 20        |
|                 | Total   |       | <b>50</b> |

# Unit 1

Measures of Central Tendency  
and Dispersion



# Measures of Central Tendency

- Central tendency- a single value that describes the characteristic of the entire data.

## 1. Mean

- i. Arithmetic Mean
- ii. Harmonic Mean
- iii. Geometric Mean

## 2. Median

## 3. Mode

# Arithmetic Mean (AM)

**Arithmetic mean-** *Average of the set of the data.*

A.M. of  $N$  observations  $X_1, X_2, \dots, X_n$  is denoted by  $\bar{X}$  and defined as-

$$\begin{aligned}\bar{X} &= \frac{\sum x}{N} \\ &= \frac{X_1 + X_2 + X_3 + \dots + X_n}{N}\end{aligned}$$

# Median

- **Median-** *Middle value of the data arranged in order of magnitude.*

Median for raw data-

Suppose there are N observations.

- If N is odd,

$$\text{Median} = \left( \frac{N+1}{2} \right)^{th} \text{ number}$$

- If N is even,

$$\text{Median} = \text{average} \left( \left( \frac{N}{2} \right)^{th} \text{ and } \left( \frac{N}{2} + 1 \right)^{th} \right) \text{ observation.}$$

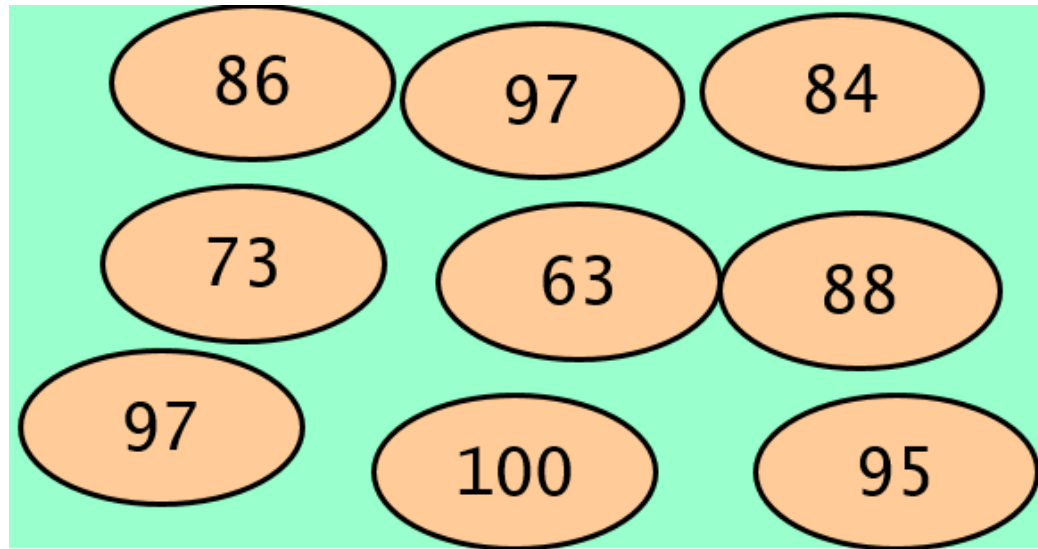
# Mode

- **Mode-** *The value in the set of data that occurs most frequently.*
- The set of data can have-
  - One mode
  - More than one mode
  - No mode

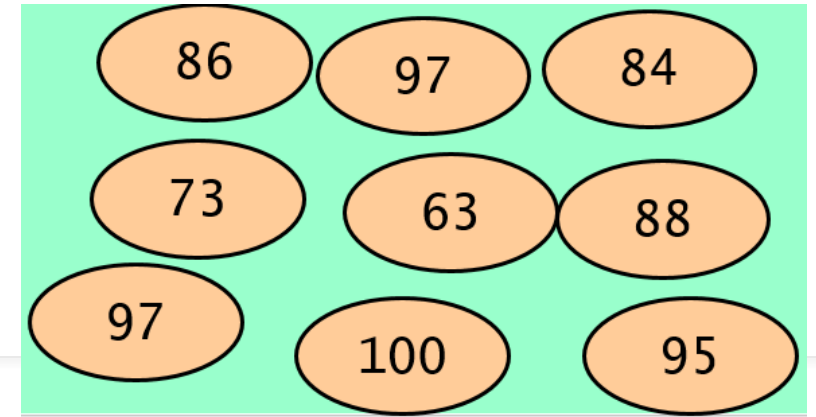


# Example

- These are the marks obtained by the class out of hundred. Find Mean, median and mode for the given data set.



# Solution



## 1. Mean- Average

$$\text{Mean} = \frac{86 + 97 + 84 + 73 + 63 + 88 + 97 + 100 + 95}{9}$$

## 2. Median- Middle value

Arrange data in increasing order


|    |    |    |    |    |    |    |    |     |
|----|----|----|----|----|----|----|----|-----|
| 63 | 73 | 84 | 86 | 88 | 95 | 97 | 97 | 100 |
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   |


$$\text{Median} = 88$$


## 3. Mode- value that occurs more frequently

$$\text{Mode} = 97$$

# Find the....

 **Mean** 11

 **Median** 10

 **Mode** 10, 13

9, 10, 10, 13, 13

# Find the....

11



Mean

10



Median

8, 10, 12



Mode

8, 8, 9, 10, 10, 12, 12, 13, 17

# Find the....

56



Mean

57



Median

No Mode



Mode

13, 82, 79, 54, 60, 48