

# **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**

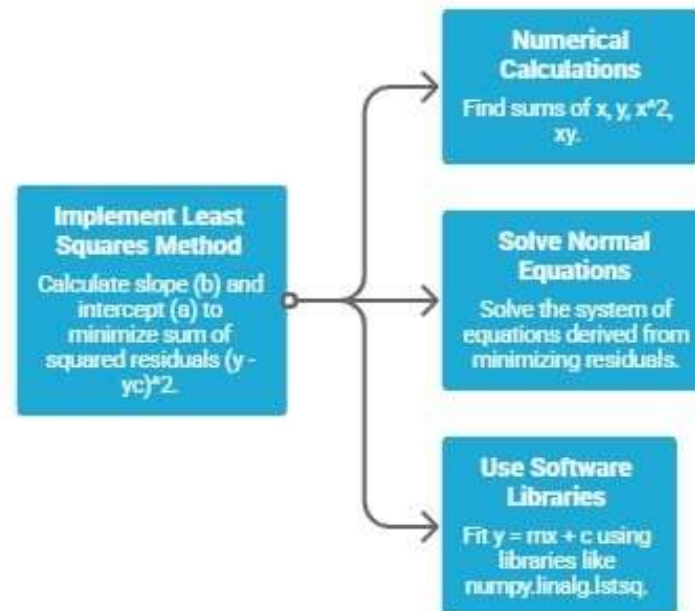
**COURSE NAME: 23ADO201- DATA SCIENCE FUNDAMENTALS  
(OPEN ELECTIVE )**

**III YEAR / VI SEMESTER**

**Unit 5 - PREDICTIVE ANALYTICS**

**Topic : IMPLEMENTATION OF LINEAR LEAST SQUARES**

## Least Squares Method Implementation



### Steps for Implementation:

1. **Define the Model:** Choose a model, typically a straight line  $y = mx + c$  or  $y = ax + b$  (where  $b$  is slope and  $a$  is intercept).
2. **Calculate Sums:** Calculate necessary sums from the data:  $\sum x$ ,  $\sum y$ ,  $\sum x^2$ ,  $\sum xy$ , and the number of data points  $N$ .
3. **Find the Slope ( $b$  or  $m$ ):** Use the formula  $b = \frac{N \sum xy - \sum x \sum y}{N \sum x^2 - (\sum x)^2}$ .
4. **Find the Intercept ( $a$  or  $c$ ):** Use the formula  $a = \frac{\sum y - b \sum x}{N}$ .
5. **Form the Equation:** Substitute  $a$  and  $b$  back into  $y = a + bx$ .

## python

```
import numpy as np
import matplotlib.pyplot as plt

# Sample Data
x = np.array([1, 2, 3, 4, 5])
y = np.array([2, 4, 5, 4, 5])

# Calculate slope (m) and intercept (c) using numpy.polyfit
m, c = np.polyfit(x, y, 1)

# Generate fitted line
y_fit = m * x + c

# Plot
plt.scatter(x, y)
plt.plot(x, y_fit, color='red')
plt.show()
```

# Activity



Activity: Implementation of Linear Least Squares (Best Fit Line)

$$y = mx + c$$

## Given Data

x	y
1	2
2	3
3	5
4	4
5	6

## Materials Required

- Graph sheet
- Pencil & ruler
- Calculator / Excel

## MCQ



### Multiple Choice Questions (MCQs) on the Implementation of Linear Least Squares:

**1. The main objective of the Linear Least Squares method is to:**

- A) Maximize the error
- B) Minimize the sum of squared errors
- C) Minimize the number of data points
- D) Maximize the slope

**Answer:** B) Minimize the sum of squared errors

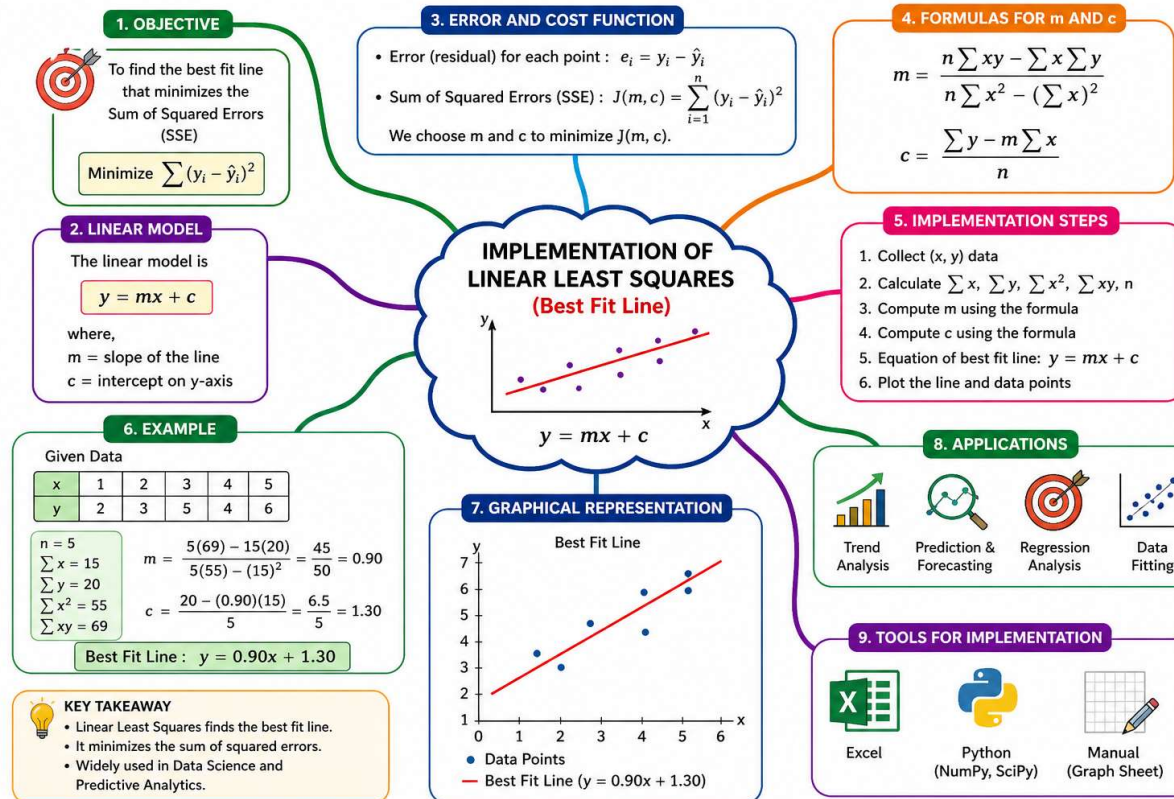
**2. The general form of a linear model used in least squares is:**

- A)  $y = ax^2 + bx + c$
- B)  $y = mx + c$
- C)  $y = \log(x)$
- D)  $y = e^x$

**Answer:** B)  $y = mx + c$

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# 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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