



Linear Algebra & Linear Models
for Data Science
www.fractionshub.com

The WHY: Learning Objectives

- Linear Algebra and Linear Models for Datascience is a course designed for visualizing data in higher dimensions, geometrical interpretation of projections and lastly we would discuss some linear models and see them in action.
- The course helps you understand the driving screws of many in-built R/Python functions for both data visualisation and linear predictions.
- The course is tailored to suit students of diverse background. Building adequate theory, we will explore routine and tricky questions, many of which appear in Data Science interviews and Entrances.

The WHO and WHEN:

Instructors

Diganta Bhattacharya



Completed B.Stat from ISI Kolkata. Currently pursuing M.Stat at ISI Kolkata and will be joining Morgan Stanley as an

Associate next year.

Archi De



Completed B.Stat from ISI Kolkata. Currently pursuing M.Stat at ISI Kolkata and will be joining Goldman Sachs as an

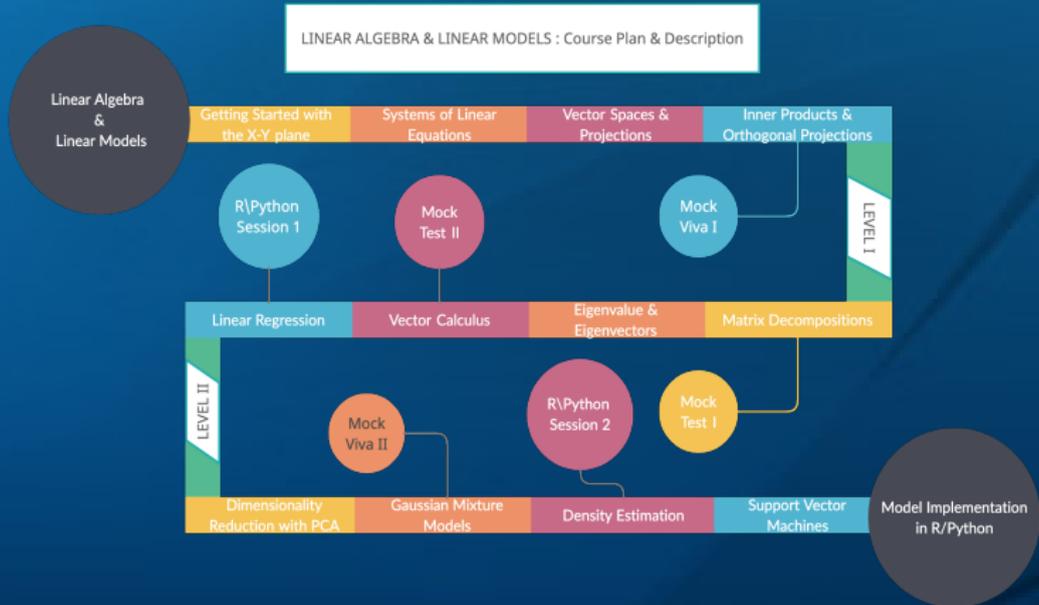
Analyst next year.

Class schedule

Friday: 9pm-11pm

Saturday: 9pm-11pm

The WHAT: Syllabus Schematics



Lecture-Wise Syllabus

Lectures (1-4)

- Getting Started With \mathbb{R}^2 .
- Systems of Linear Equations and \mathbb{R}^n .
- Vector Spaces and Beyond.
- Matrix Decomposition and Eigen-Values.

Lectures (5-8)

- Vector Calculus & Matrix Operations.
- Linear Regression and BLUE.
- Gaussian Mixture Models & Density Estimation.
- Support Vector Machines & Classification Algorithms.

Brain Teasers and FAQ's

- Can there be square matrices A, B such that $AB - BA = I_{n \times n}$.
- Suppose we pick 3 points uniformly at random from the circumference of a circle. What is the probability that this triangle is *acute*? Suppose we extend this setup to \mathbb{R}^3 .

Suppose we pick 4 points uniformly at random from the surface area of a sphere. What is the probability that this pyramid/tetrahedron is *acute* ?

[All the faces are acute angled triangles.]

Brain Teasers and FAQ's [*continued*]

- Suppose we take an equilateral triangle in \mathbb{R}^2 , say the 3 vertices are $(X_1, Y_1), (X_2, Y_2), (X_3, Y_3)$ like given in the figure. What is the regression line of Y on X ?
- What happens to the regression line when we rotate this triangle about its centroid?

