

Lesson Plan – October 10th – 31st

Group: 12th

Subject: Mathematics

Topics: Introduction to Three-Dimensional Geometry (Chapter 33),
Vectors (Chapter 34)

Date: October 10th - 31st 2020

Instructional Objectives:

- Extend the idea of coordinates of a point in 2-D space (x,y) to 3-D space (x, y, z)
- Find the distance between the given two points in 3-D space
- Find the point in 3-D space that divides a given line in a specific ratio (externally or internally)
- Understand the difference between a scalar and vector quantity and represent a vector quantity using appropriate symbols
- Define and identify different types of vectors
- Find the sum (resultant), difference and product (scalar, scalar triple and vector product) of two vectors
- Determine collinearity and coplanarity of given vectors
- Resolve a vector into its three components in 3-D space
- Extend the section formula to vectors in 3-D space
- Understand and calculate the direction cosines and direction ratios of a vector

Teaching Process:

Background Context:

Two-dimensional coordinate system, with different equation representations for straight lines has been covered last year. Similarly, the student has been introduced to the idea of vectors and vector arithmetic, both in Mathematics (10th IGCSE) and in Physics (11th NIOS).

Teaching:

With the mixed-mode learning of offline work and online classes, the student will be assigned work to read up and solve, before coming to class. Challenging problems and specific doubts will be cleared during the online classes.

Zoom will be used for online classes. The Zoom whiteboard application will be used to solve problems and clear doubts in class. This application allows all participants to annotate and

hence allows collaborative on-screen working. For more detailed working out, information will be typed out in MS Word or Powerpoint and shared with the student during online class, or via email.

Resources required:

Textbooks:

- The NIOS Mathematics Textbook 2 for Senior Secondary classes will be used as the main textbook
- ISC Mathematics Book II, for Class XII (O.P. Malhotra et. al.) will be used as an additional reference by the teacher for problems
- The Pure Mathematics 2&3 Cambridge Textbook has a good introduction to scalar product of Vectors
- The Further Mathematics Cambridge Textbook has a good introduction to vector product of Vectors

Online Resources:

- Essence of Linear Algebra by 3Blue1Brown (applications of Matrices in Vector transformation) provides a good visualisation of Vector operations and an idea of their application

Evaluation tools:

Understanding of the topic will be evaluated through classroom interactions, homework corrections and a written test at the end of the topic

Modifications: Special Needs

Not required for the student this year

Suggestions:

None

Self-Reflection:

To be filled post-lesson for the teacher's reference.