

Lesson Plan – July

Group: 12th

Subject: Mathematics

Topics: Limits and Continuity (Chapter 25), Differentiation (Chapter 26), Differentiation of Trigonometric Functions (Chapter 27)

Date: July 1st – 31st 2020

Instructional Objectives:

- Briefly review the concepts of: (a) a limiting value of a function at a point and (b) continuity of a function
- Understand the meaning of derivative of a function $f(x)$ at a point $x = a$, both algebraically and geometrically
- Find the derivative of some simple functions from first principle/ab-initio/delta method
- Find the derivative of complex functions using the sum, difference, product, quotient and chain rules
- Understand the meaning of a second derivative and compute the second derivative of a given function
- Find the derivative of basic trigonometric and inverse trigonometric functions from first principle/ab-initio/delta method
- Find the derivative of complex trigonometric and inverse trigonometric functions using the sum, difference, product, quotient and chain rules
- Compute the second derivative of a given trigonometric/inverse trigonometric function

Teaching Process:

Background Context:

The ideas of limits and continuity have been covered in the last academic year. This will be revisited as a recap to help understand the process of differentiation.

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

Software Tools:

- Geogebra will be used to graphically show various functions (algebraic, trigonometric)

Online Resources:

- Underground Mathematics Introduction to Calculus helps convey the idea of a tangent being the limiting case of a chord:
<https://undergroundmathematics.org/introducing-calculus/zooming-in>
- Essence of Calculus youtube series by 3Blue1Brown (<https://www.youtube.com/watch?v=WUvTyaaNkzM&t=3s>) provides high quality visual aids to understand the meaning of differentiation and integration, the two tools of Calculus

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 teacher's reference.