INTRODUCTORY MATHEMATICAL METHODS FOR BIOLOGISTS

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TYPE OF COURSE : Rerun | Core | UG/PG
COURSE DURATION : 8 weeks (21 Feb' 22 - 15 Apr' 22)
EXAM DATE : 24 Apr 2022

PRE-REQUISITES : Core

INTENDED AUDIENCE : Students, PhD scholars, teachers, industry

COURSE OUTLINE :
It is an introductory mathematics course for biology students with the aim of training them to do quantitative analysis of biological systems. Students will be trained on how to use the language of mathematics to describe biological processes, how to write down simple mathematical equations for various phenomena occurring in biology.

ABOUT INSTRUCTOR :
Prof.Ranjith Padinhateeri completed his MSc and PhD in Physics from IIT Madras. During PhD he studied statistical mechanics of DNA. After PhD he did post-doctoral research in University of Illinois Chicago, USA, Northwestern University. Evanston, USA, and Institute Curie, Paris, France. He does his research in the broad area of biological physics. Prof.Ranjith Padinhateeri does theoretical studies to understand various biological phenomena using a variety of tools from physics, including equilibrium and non-equilibrium statistical mechanics, polymer physics, and soft-matter theory. He tackled research problems using a combination of computational and analytical methods. His Specific areas of interest include Nucleosome dynamics, Chromatin assembly, DNA mechanics and self-assembly of proteins

COURSE PLAN :

 Week 1**:** Introduction, Graphs and Functions

 Week 2**:** Functions and its Derivatives, Computing Derivatives of Curves

 Week 3**:** Plotting Curves , Numerical Calculation of Derivatives, Partial Derivatives

 Week 4**:** Integration and their Graphical Understanding

 Week 5**:** Vectors : Position and Movement in 2D, Cell Symmetry : Use of Polar Coordinates

 Week 6**:** Gradient, Forces and Flows , Understanding Diffusion

 Week 7**:** Introduction to Fourier series , Fourier Transform and Statistics

 Week 8 **:** Basics of bio-statistics