PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement

facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS101/II/2025

Introduction to Dynamic Models in Biology

Name of the PMRF student

Sauma Suvra Majumdar

Required background of the students taught

Understanding of basic Molecular Biology, and basics of Programming, Statistics and Mathematics.

Details of the content of the module

Intended for students in biology, this course offers an introduction to the elementary mathematical concepts essential for understanding and constructing dynamical models. The central theme of the course is ordinary differential equations (ODEs). We begin by establishing the basic mathematical framework for ODE-based models before transitioning to their direct relevance and application in experimental biology. The models explored will center on key cellular and molecular processes, including but not limited to cell signaling pathways and gene transcriptional networks. These sessions would include problem solving.
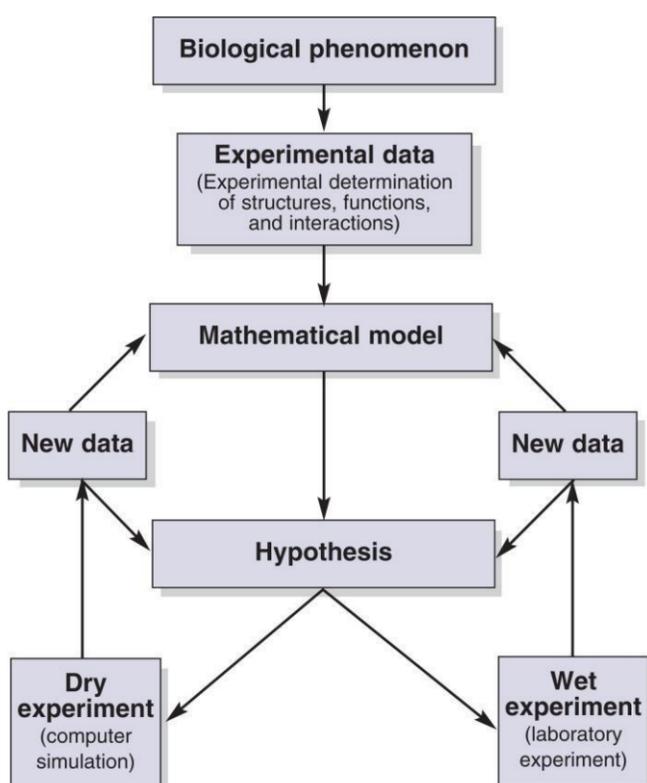
Week1: 2 hrs
        Topics: Mathematical models in Biology, Application in Ordinary Differential Equations (ODEs) in Biological Systems

Week2: 2 hrs
        Topics: Steady States, Slope and direction fields , Bifurcation in ODE

Week 3: 2 hrs
        Topics: Network Motifs, Regulatory networks, Michaelis Menten Model, Hill Function

Schedule of the module

Course starts on: 17th October, 2025

Course ends on: 31st October, 2025

Classes on : Fridays
Timings: 17:30 – 19:30 hrs

Meeting link : https://meet.google.com/cxx-qfzr-moz

Contact email ID: isss.forum@gmail.com

 Registration link:
https://forms.gle/joTWqRia78DdyeRV7