



# INTRODUCTORY NONLINEAR DYNAMICS

**PROF. RAMAKRISHNA RAMASWAMY**

Department of Chemistry and Biochemistry  
IIT Delhi

**TYPE OF COURSE** : New | Elective | UG

**COURSE DURATION** : 4 weeks (26 Aug'19 - 20 Sep'19)

**EXAM DATE** : 17 Nov 2019

**PRE-REQUISITES** : Basic mathematics

**COURSE OUTLINE :**

This course is designed to introduce students to the basic ideas of Dynamical systems, Stability, and chaos, largely using Iterative mappings as the model. The course will focus on qualitative ideas and will require students to explore dynamics through simulations (MATLAB will be adequate).

**ABOUT INSTRUCTOR :**

Ram Ramaswamy is currently Visiting Professor in the Department of Chemistry at IIT Delhi. He earlier taught in the School of Physical Sciences at the Jawaharlal Nehru University. His areas of research include chemical dynamics, nonlinear dynamics, and systems and computational biology.

**COURSE PLAN :**

**Week 1:** Introduction, Stability, Phase space and invariant sets.

**Week 2:** Maps and flows. Simple examples of dynamical systems

**Week 3:** The Tent map and the Logistic map. Symbolic dynamics

**Week 4:** Chaotic dynamics, Lyapunov exponents, invariant measures.