

Short term course on Nonlinear Dynamical Systems

About the Course

The techniques of nonlinear dynamical systems provide important tools to model and study many complex phenomena in almost every disciplines of science and engineering. In last four decades there has been tremendous growth of interest in the study of nonlinear dynamical systems. This field has now emerged as one of the major interdisciplinary subject. The main objective of this course is to lay the theoretical foundation of the basics of continuous dynamical systems and bifurcation theory. The course provides adequate background in linear algebra prior to introducing the continuous dynamical systems. The lectures are supplemented with a number of problem solving sessions and take-home assignments to enable enhanced learning. Moreover, there will be laboratory sessions for bifurcation analysis of continuous dynamical systems using MATCONT and XPPAUT.

Who Can Apply

Research scholars, PG Students and young researchers.

Number Of Seats

Total number of seats is limited to about **15** due to significant component of laboratory and tutorial sessions in the course.

Registration Fees

Faculty: Rs. 5000/- (with accommodation)

Rs. 3000/- (without accommodation)

Research Scholar: Rs. 3000/- (with accommodation)

Rs. 2000/- (without accommodation)

Registration fee include breakfast and lunch.

Venue

Department of Mathematics,
National Institute of Technology,
Durgapur-713209,
India

Important Dates

Course Dates: 14 -18 December, 2015

Registration Deadline: 30 November, 2015.

Course Coverage

Fundamentals of Linear Algebra: Elementary matrix theory, Matrix diagonalization and Jordan normal forms.

Basics of continuous dynamical systems: One dimensional dynamical systems, two dimensional linear and nonlinear dynamical systems, Poincare-Bendixson theorem and Linear stability of limit cycle,.

Elementary Bifurcation theory: Local bifurcations: saddle-node, transcritical, pitchfork and Hopf. Global bifurcations: Homoclinic and heteroclinic.

Introduction to Chaos: Lorenz model, strange and chaotic attractors.

Introduction to MATCONT and XPPAUT: Elementary bifurcation analysis, construction of bifurcation diagram using MATCONT and XPPAUT softwares.

Resource Persons

Dr. Pinaki Pal

Assistant Professor

Department of Mathematics

National Institute of Technology

Durgapur – 713209, West Bengal, India

Dr. Supriyo Paul

Assistant Professor

Department of Physics

A. C. College,

Jalpaiguri -735102, West Bengal, India

Convener

Dr. Pinaki Pal

Department of Mathematics

NIT Durgapur

e-mail: pinaki.math@gmail.com

Mobile: 9434788193