WHO CAN PARTICIPATE ?

If you are a undergraduate/postgraduate student or researcher or faculty or scientist from technical and academic institutions or from industry interested in learning or do research in solving multidisciplinary problems related to modern Physical problems.

REGISTRATION PROCESS:

Stage-1: Web Portal Registration

Visit http://www.gian.iitkgp.ac.in/GREGN/index and create login User ID and Password. Fill up the registration form and do web registration by paying Rs. 500/- online through Net Banking/Debit/Credit card. This provides the user with life time registration to enroll in any number of GIAN courses offered. (If you have already registered in GiAN portal you can skip this step.)

Stage-2: Course Registration:

Login to the GiAN portal with the user ID and Password already created in Step 1. Click on Course Registration option at the top of Registration form. Select the course titled **"Nonlinear Dynamics of Classical Magnetic Systems"** from the list and click on Save option. **Confirm your registration by clicking on Confirm Course.**

REGISTRATION FEE:

Faculty	Rs. 4,000/-
Participants from Industry / Research Organizations	Rs. 8,000/-
Students & Research Scholars • Without award of Grade • With award of Grade	 Rs. 2,000/- Rs. 2,500/-
Students from abroad Other Participants from abroad	$ 100 $ 200

The above fee includes all instructional materials, computer use for tutorials and assignments, free internet facility, with mid-sessions tea & snacks. Participants will be provided boarding and lodging on additional payment. Travelling allowance will not be provided.

SELECTION AND MODE OF PAYMENT:

Candidates registering early will be given preference in short listing process.

Selected candidates will be intimated through E-Mail. They have to remit the necessary course fee to the Bank as per the details given below.

Outstation participants requiring boarding and lodging facilities have to pay appropriate fee in addition to the course fee.

Account Name	PRINCIPAL UCE OU COORDINATOR GIAN
Account No	37072716197
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Prof. P. Laxminarayana, Dean,
Faculty of Engineering, OU

INSTITUTE COORDINATORS for GIAN :

Prof. V. V. Basava Rao, Dept. of Technology, UCT, OU
Dr. D. Rama Krishna, Dept. of ECE, UCE, OU

For **any queries**, please contact the Course Coordinators:

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Government of India
Ministry Of Human Resource Development

UNIVERSIDAD DE TA APACÁ
ARICA - CHILE

GiAN Course on
Nonlinear Dynamics of Classical Magnetic Systems

10th November – 9th December, 2017

International Faculty

Professor David Laroze
Institute for Advanced Studies
University of Tarapacá, Chile

Coordinators

Dr. Y. Rameshwar
Dr. P. Ramesh Babu

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Department of Mathematics
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University College of Engineering
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ABOUT GIAN

MHRD, Govt. of India has launched an innovative program titled "Global Initiative of Academic Networks (GIAN)" in Higher Education, in order to garner the best international expertise into our system. As a part of this, internationally renowned Academicians and Scientists are invited to augment the country's academic resources, accelerate the pace of quality reforms and elevate India's scientific and technological capacity to global excellence.

OVERVIEW OF THE COURSE

The balance between injection and dissipation of a physical quantity leads a system to behave in a complicated manner, producing a rich variety of spatiotemporal structures. Commonly, systems far from equilibrium are described by nonlinear differential equations (NDEs) or coupled maps. In general, it is not possible to obtain analytic solutions for these NDEs. Nevertheless, in the last decades an extensive variety of general techniques have been developed to obtain approximate solutions close to the onset of the instabilities. In a determinist system, different type of states can be found varying the parameters and the initial conditions. By changing one parameter in the system, it can pass from one state to another. For instance, in an extended system a homogeneous state can become a pattern. This type of bifurcation is called spatial instability. The pattern can be regular or chaotic. The latter term means that pattern's behavior in a long time window is a periodic and sensible to the initial conditions. One type of physical systems that presents a variety of complex phenomena is the magnetic systems, especially when a parametric driven forcing is acting over the system.

The course pretends to cover problems concerning systems far from equilibrium where there is a competition between injection and dissipation of energy. The prototype models will be based on contemporary magnetic systems at nanometer scales. Theoretical and numerical approaches will be treated. These problems are interesting from both physical and mathematical point of view. The first goal of the course is to motivate students to solve complex problems.

The course will focus on different aspect of parametric instabilities in magnetic systems, at zero-, one- and wo-spatial dimensions. The second goal is to show the intrinsic correspondence between the physics and mathematics of the magnetic systems. The derivation of the spatiotemporal evolution equations will be performed and some features of them will be analyzed. The final goal is to show how several branches of mathematics are indispensable to characterize the dynamical behavior of such systems. In particular, different methods based on bifurcation analysis, perturbation methods, and the normal form theory will be introduced. In addition, numerical simulations techniques will be examined. In particular, the Lyapunov exponents method will be shown.

The course will benefit to the students of graduate and post graduate levels, and academicians of mathematics, physics and engineers to acquire a new experience to apply mathematical methods in modern physical problems.

COURSE CONTENTS

Foundations of magnetism, Magnetization dynamics , Non-autonomous dynamics , Simulations

Conservative systems, 1D, 2D systems out of equilibrium, Spintronics

FACULTY: PROF. DAVID LAROZE

Dr. David Laroze is the Professor at the Institute for Advanced Studies at the University of Tarapacá, Chile. He is the Director of the Mathematical Modeling Laboratory at the University of Tarapacá. Previously, he was a Research Associate at the Physics and Astronomy School at the University of Glasgow, United Kingdom; a Postdoctoral Researcher at the Max Planck Institute for Polymer Research, Germany; Postdoctoral Researcher at the University of Chile, Chile and Assistant Professor at the Pontifical Catholic University of Valparaiso, Chile. His research interest includes nonlinear phenomena, pattern formation, hydrodynamic instabilities,thermal convection, magnetism, chaos theory, numerical method, cardiac dynamics, radiation problems and thermal and electronic transport in quantum systems.

ABOUT OSMANIA UNIVERSITY AND HYDERABAD

Osmania University, established in 1918, is the seventh oldest in India, the third oldest in south India and the first to be established in the erstwhile princely state of Hyderabad. As the University approaches 100th anniversary it has evolved from a path breaking institution into an institution of high repute with global presence. Throughout its existence of over eight decades, it has shown remarkable progress and sustained an integrated development of all faculties.

The University College of Engineering (UCE) has the distinction of being the oldest and the biggest among the Engineering Colleges of the State of Telangana. Established in the year 1929, eleven years after the formation of Osmania University, it was the 6th Engineering College to be established in the whole of British India. The Golden Jubilee of the College was celebrated in 1979, the Diamond Jubilee in 1989 and the Platinum Jubilee in 2004.

Hyderabad is the capital of southern India's Telangana state and a major center for the technology industry. Its historic sites include Golconda Fort, a former diamond-trading center that was once the Qutb Shahi dynastic capital. The Charminar, a 16th-century mosque whose 4 arches support towering minarets, is an old city landmark near the long-standing Laad Bazaar.

ABOUT MATHEMATICS AND MECHANICAL ENIGEERING DEPARTMENTS

The Department of Mathematics has been integral part of the University College of Engineering since its inception in the year 1929. The Department offers Mathematics to the students of all branches of engineering at under graduate and post graduate levels to provide sufficient background for better understanding of engineering.

Mechanical Engineering Department was established in the year 1939 at University College of Engineering. To meet the required academic standards, quality instruction to students is imparted by the motivated and qualified faculty members providing good academic insights. The Department receives research and modernization grants from UGC, MHRD, AICTE and TEQIP.