



A 10-Day Gian Course on Hydrodynamic Stability and Dynamo Theory

9-20, December 2016

at

Department of Mathematics,
National Institute of Technology Warangal, Warangal



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

In line with Gian initiative, it is proposed to conduct a course, related to recent astrophysical and geophysical problems, which is very attractive to applied mathematicians. Sophisticated mathematical approaches applying wide spectra of numerical as well as analytic and asymptotic methods are necessary for successful and effective solutions of those physical problems. The first goal of the course is to motivate mathematicians to solve complex physical problems. Therefore, the course indicates an attractiveness and practical usefulness of topics related to the magnetic fields generation of cosmic bodies, in particular of the Earth and Sun. Understanding and the ability to predict the time behaviour of the last two fields has also enormous practical significance, and it is not yet solved. The second goal is to show how various branches of mathematics are indispensable in solving the problems of Convection and Dynamo Theory in astrophysics and geophysics. The third goal is to introduce the basic physical background for the topics with emphasis on mathematical expression of this physics, i.e. to underline the correspondence between the physics and mathematics of the topics.

The course will benefit the students of undergraduate and postgraduate levels, and academicians with background of mathematics and physics to acquire a new experience to apply mathematical methods in attractive physical problems. At the end of the course the participant can able to work on the open research problems related to the course.

About International Faculty: Prof. Brestenský Jozef

Prof. J. Brestenský is from Faculty of Maths, Physics and Informatics (FMPI) in Comenius University (CU), Bratislava, Slovakia. He contributed his research knowledge in different departments of CU such as Astronomy, Physics of the Earth and Meteorology, General Physics, Geomagnetism and Magneto-hydrodynamics, and Natural Sciences. His research interests include Geophysics, Geophysical Fluid Dynamics, Planetary Magnetic Fields, Rotating Magnetoconvection, Cosmic Magneto-hydrodynamics, Solar Physics, physics of everyday life and applied mathematics. He contributed his vast knowledge in the prestigious scientific committees in different positions. He has been invited by the different prestigious universities, to name a few, Cambridge University, University of Hyderabad and NIT- Warangal.

Modules

- Foundations of Magneto-hydrodynamics (MHD).
- Dynamics of Rotating Fluids:
- Rotating Magnetoconvection (RMC), Linear and Nonlinear Models of RMC, Waves in rotating MHD Systems, Numerical modeling in RMC
- Dynamo Theory: Numerical Simulations of Dynamos, Natural Dynamos.

Course Coordinator: Dr. H.P. Rani

Dr. HP Rani, Assistant Professor of Mathematics from NIT-Warangal obtained her doctorate degree from Anna University, Chennai and has vast experience as an academician and researcher by working in prestigious National Taiwan University, Taiwan and Kyung Hee University, South Korea. She has introduced a new concept of boundary layer flow visualisation through heatlines and masslines. Her work in flow assisted corrosion problems has gained currency in the nuclear industry. The detailed analysis of microcirculatory blood flow in hepatic lobule has got much appreciation from the medical community. Her area of interest includes Computational Fluid Dynamics, Heat and Mass Transfer, Biomechanics, MHD, Geodynamo and Corrosion problems.

You should attend if:

- you are a mathematician / physicist / geophysicist / astrophysicist / engineer / research scientist.
- you are a undergraduate / postgraduate student / researcher / scientist from technical and academic institutions / from industry interested in learning to do research on MHD, RMC and dynamo theory.
- you keen to learn how to apply mathematical methods in astro- and geophysical models.

How to register?

Stage - 1: Web (Portal) Registration: Visit Gian Website <http://www.gian.iitkgp.ac.in/GREGN/index> and create your login User ID and Password. Fill up the blank registration form and do web registration by paying Rs.500/- online through Net Banking/Debit/Credit card. This provides him/her with life time registration to enroll in any number of the Gian courses offered.

Stage - 2: Course Registration (Through GIAN Portal): Log in to the

Gian portal with the user ID and Password created in stage 1. Click on "Course Registration" option given at the top of the registration form. Select the Course titled "Hydrodynamic Stability and Dynamo Theory" from the list and click on "Save" option. Confirm your registration by clicking on "Confirm Course". After receiving the course participation mail from the coordinator pay the registration fee as mentioned below:

Registration Fee (Excluding Lodging & Boarding)

* Total number of seats is limited to 50 only and will be filled on first come first serve basis.

Students and Research Scholars	Rs. 2,000/-
Faculty & Scientists	Rs. 4,000/-
Participants from Industry/Training Organizations/Consultancy Firms	Rs. 8,000/-
Student Participants from Abroad	USD 100
Other Participants from Abroad	USD 200

The registration fee includes instructional materials, tutorials and computer use, free internet facility, working lunch, mid-sessions tea & snacks. Outstation participants requiring boarding and lodging have to pay extra in addition to the registration fee.

About National Institute of Technology, Warangal

National Institute of Technology (formerly Regional Engineering College), Warangal (NITW) was established in the year 1959. There are 14 academic Departments offering 8 undergraduate and 29 post-graduate programs besides doctoral programs. About 5,000 students across the country and 500 international students pursue their education in the campus. It is a fully residential campus sprawling over 250 acres with excellent infrastructure in the form of state of art library, seminar halls, guest houses and laboratories.

About the Department of Mathematics

The Department of Mathematics was established in 1959 and has always shared the vision of the institute in striving for excellence in teaching and research activities and it is recognized as the only QIP centre for PhD programmes among all NITs. The department runs two M.Sc programs, one is a convectional M.Sc program and the other one is specializing in Mathematics with Scientific Computing keeping in tone with the software industry. Recently the department has signed a MoU with Indian Institute of Geomagnetism for scientific and academic cooperation.

Contact Details:

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