Overview of the Course: The topics of the course, related to recent astrophysical and geophysical problems, are also very attractive to applied. Nowadays planetary hydrodynamics are subjected in the wide range of scientific and technology applications where the greatest achievements in analytic, asymptotic and numeric approaches are reached recently. Those impressive approaches will be presented in the proposed course in the way that they could be effectively used in many other scientific and industrial applications. The proposed course is devoted to the hydrodynamics and critical convection of a rotating spherical layer, which models the liquid core of the Earth and similar areas in the interior of planets and as well fast rotating stars. Emphasis is placed on the mass/momentum/critical transfer for fast and slightly differential rotation in the liquid core of a terrestrial planet including correspondent moons and exoplanets. The course will cover various analytic, asymptotic and numeric solutions explaining in detail about their methodology and practical usefulness for participants in the computational sciences, basic sciences, Civil engineering, Chemical engineering, Physics, Applied Mathematics, Climate, Marine, Ship crafting, Air crafting, programming and many others. Course participants will learn these topics through lectures and hands-on numerical experiments. Also, case studies and assignments will be shared to stimulate research motivation of participants.

The primary objectives of the course are as follows: This course provides training in the application of the modern and classical planetary hydrodynamics'-based mathematics to a wide range of problems in various science and technology. Emphasis will be placed on the formulation of problems, on the analytical, asymptotical and numerical techniques for a solution, the computation and presentation of results. The primary objectives of the course are as follows:

i) Elucidate the fundamentals of the planetary hydrodynamics' analytic, asymptotic and numeric applications.
ii) Introduce the computational methods necessary for the numeric modeling.
iii) Derive and provide interpretations for the basic hydrodynamics' equations.
iv) Generalize hydrodynamics' analytic, asymptotic and numeric approaches for using in the other scientific and industrial applications.
v) Application of methods mentioned above in modeling of the deep interiors of the Earth, exoplanets, solar system planets and moons.

About Resource Person:

Prof. STARCHENKO Sergey Vladimirovich, Chief Scientist in IZMIRAN, Moscow RUSSIA and Consulting Professor in Novosibirsk State University, Department of Physics, Lavrentyev Institute of Hydrodynamics, Chair of Continuous Media, since 1985, is working on magnetism and hydrodynamics in the Earth, planets, stars, galaxies and other objects. His main specialization is analytic and asymptotic modeling of convection and magnetism in fast rotating shells. Recently he started to work also on data temporal and spectra analyses. In 2017, for first time, he proposed new similarity criteria to access real planetary parameters in rapidly rotating plane layer. He found general asymptotic and analytical solutions for critical mean-field dynamos, planetary-type MHD flows in strong potential fields and power based MHD dynamo scaling laws.
ResearchGate:
https://www.researchgate.net/profile/Sergey-Starchenko

Participation Registration Link:
https://forms.gle/WuLMrYywMF1HbNGG6

Last Date of Registration: 31 Jan. 2025

A 10-*Days GiAN Course*
on

Hydrodynamics and Critical Convection in Liquid Cores of Terrestrial Planets

(*Course ID*: 2412149)

February 19-28, 2025

Call for Registration & Participation

Resource Person
Prof. Sergey V. Starchenko
Chief Scientist & Head of "Main magnetic field of the Earth" lab, Russian Academy of Sciences (IZMIRAN), Russia

Course Coordinator
Prof. H.P. Rani
Department of Mathematics, NITW

Organized by
Department of Mathematics,
National Institute of Technology Warangal (NITW),
Telangana - 506 004. India

Who can participate?

- Faculty member/ research scientist/ industry professionals.
- UG/PG student or research scholars.

Registration Link:

https://forms.gle/WuLMrYywMF1HbNGG6

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

Registration Fee:

Students & Research Scholars Without award of Grade With award of Grade	**Rs. 1,500/-** **Rs. 2,000/-**
Faculty	**Rs. 2,500/-**
Industry/ Research Organizations	**Rs. 3,000/-**
Students from abroad	**US $100**
Faculty/Scientists/Industry Participants from abroad	**US $200**

The above fee includes all instructional materials, tutorials, free internet facility, working lunch, tea and snacks. The course fee is inclusive of 18% GST as per institute norm. Shared accommodation and food (breakfast and dinner) on an additional payment basis.

Details for NEFT

Account Name	Director Research Account
Account No.	62266262236
Bank	State Bank of India
Branch	NIT Branch, Warangal
Branch Code	20149
IFSC	SBIN0020149
MICR Code	506002030
SWIFT Code	SBININBBH14

About GIAN Course: The Global Initiative of Academic Networks (GIAN) is a program of the Ministry of Education, Government of India. It is designed to tap the talent pool of scientists and entrepreneurs internationally to encourage their engagement with the institutes of higher education in India so as to augment the country's existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence.

About the NIT Warangal (NITW): NITW formerly known as RECW is the first among seventeen RECs set up in 1959. Over the years, the Institute has established itself as a premier Institution in imparting technical education of a very high standard, leading to B.Tech., M.Tech., MCA and Ph.D. programs in various specializations of Science and Engineering streams. There are 14 departments offering 8 UG and 31 PG programs besides doctoral programs. It is fully residential campus sprawling over 250 acers with excellent infrastructures. NITW campus is 2 km away from Kazipet railway station and 12 km away from Warangal railway station.

About Mathematics Department, NTIW: The Department has been one of the key departments of the institute. The department has expanded steadily over the last few decades and is now recognized as one of India's leading academic and research centers. The department also provides support to R&D organizations. The faculty is actively engaged in providing solutions to industry problems as consultants. The department's academic programs are rated among the top in the country. The Department at NITW has an international reputation for excellence in teaching, research and service. With excellent dedicated faculty, the department of Mathematics offers 4-year B.Tech in Mathematics and Computing, 5-year Integrated M.Sc, 4-year B.Sc. BEd, 2-year Master degree in Applied Mathematics, Mathematics and Scientific Computing and Ph.D. programs.

About Warangal: Warangal is known for its rich historical and cultural heritage. It is situated at a distance of 140 km from the state capital Hyderabad (Nearest Airport). Warangal is well connected by rail and road. It was the seat of erstwhile 5th Kakatiya dynasty. It is a place of tourist attraction with a number of historical monuments like Thousand Pillar Temple, Warangal Fort, Bhadrakali Temple, Ramappa Temple and Laknavaram Lake.

For any queries regarding registration of the course, please contact the Course Coordinator:

Prof. H.P. Rani

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Telangana. India.

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