GLOBAL INITIATIVE FOR ACADEMIC NETWORKS

Ministry of Human Resource Development
Government of India

सत्यमेव जयते

# GLOBAL INITIATIVE FOR ACADEMIC NETWORKS

National Coordinating Institute
**INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR**

www.gian.iitkgp.ac.in

# FLUID DRIVE AND ALTERNATIVE DRIVES, AND CONTROL IN AEROSPACE ACTUATION SYSTEMS

## Overview

The aerospace industry is taking up the challenge to make aircraft greener, cheaper and safer throughout their entire life. One direction of action consists in developing innovative secondary power systems, in particular for actuation. Jets, propellers, rotor-wings and even space launchers need large mechanical power for flight control (primary, secondary), thrust control (thrust reverse, thrust vector control), landing gears (extension, braking, steering) and utility systems. Actuation systems in aerospace vehicles have rapidly evolved through incremental and disruptive step changes. Fly-by-wire is now well established for fixed-wings jets, and is spreading to helicopters and propellers. Power-by-wire has just been introduced but is mainly used as backup, waiting for sufficient maturity to be used in the front line for safety critical applications. The proposed lecture series intends to give the audience the opportunity to get a global view of this evolution and trends. It is structured to address power and signal architectures as well as virtual prototyping with a multi-level view (system, equipment and component). A good portion of the first two modules are on general oil hydraulics which would be useful to the beginner as well as practicing engineers/technicians in Industries/ research organizations. The lectures are illustrated by numerous examples.

Course participants will learn these topics mainly through lectures. However, case studies and assignments will also be shared to stimulate research motivation of participants.

## Modules

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| **Module 1 : Actuators and Drives for Aerospace Application** | **:** | **Dec 05 – Dec 06, 2016** |
| **Module 2 : Hydraulically Powered Actuators** | **:** | **Dec 07 – Dec 08, 2016** |
| **Module 3 : More Electrical Actuators : Signaling (fly-by-wire)** | **:** | **Dec 09 – Dec 10, 2016** |
| **Module 4 : More Electrical Actuators :Powering (power-by-wire)** | **:** | **Dec 12 – Dec 13, 2016** |

**Number of participants for the course will be limited to Fifty.**

## Who Should Attend

- You are an engineer or a research scientist interested in design and development, application/maintenance engineering of hydraulic, mechanical and newer actuation/ drive systems for aerospace and general industrial applications.
- You are a student or faculty from an academic institution interested in Fluid Drive and control in general as well as specifically in hydraulic, mechanical and newer actuation/drive systems for aerospace applications.

## Fees

The participation fees for taking the course is as follows:

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| **Participants from abroad** | **:** | **$ 550** |
| **Industry/ Research Organizations** | | |
| **All modules** | **:** | **₹ 30000** |
| **Any two modules** | **:** | **₹ 20000** |
| **Academic Institutions** | | |
| **Teachers** | **:** | **₹ 10000** |
| **Bonafide students** | **:** | **₹ 1000 (to be refunded after completion of course)** |

The above fees include all instructional materials, 24 hr free internet facility (participants are requested to bring their own laptops). The participants will be provided with accommodation and food on payment basis.

## The Faculty

**Prof. Jean-Charles Mare** is presently Professor in Dpt. Mecanique, INSA, Toulouse, France. He started his career in his Alma mater since 1982, immediately after graduation in Mechanical Engineering. His research and teaching interests are modeling and simulation of Fluid and Mechanical Drive systems. Collaborator and adviser to several industries and organizations (including Aerospace) in his own country and abroad, he has completed several design and development projects.

Recipient of several teaching and research awards, he has been guiding several doctoral students and 18 have been completed. He has over 100 publications, communications and research reports, and has delivered many invited talks. He has also authored 3 book chapters.

**Dr. Amitava Dasgupta** received his B.Tech. (Hons) in Mechanical Engineering and Ph. D. in Fluid Power from IIT Kharagpur and started his career in 1964 as a Design Engineer in SAIL. He had subsequently set up his own Technical Consultancy in 1993 and expanded his services to include Indian Tractor Industries, CSIR Labs, DRDO and the IIT's. He successfully designed the Test Hall Equipment in National Wind Tunnel Facility (NWTF) at IIT Kanpur, as well as the Test Facility for Aircraft Valves in Aerosystems Lab, CSIR-CMERI, Durgapur. As a product designer, he introduced a series of high-performance mechanical Hitch Valves for the Indian tractors. He also conducts studies needed for the development of Aero-valves for National Aerospace Lab CSIR-NAL, along with CSIR-CMERI.

**Prof. Manas Kumar Laha,** is Associate Professor in the Department of Aerospace Engineering, Indian Institute of Technology, Kharagpur (IIT Kgp), His teaching and research interests revolve around aerodynamics, CFD and flight mechanics. He has collaborated with the defense industries for the development of indigenous aircraft and has been associated with the Training programmes for aeronautical industries. He has also co-authored a book on computational fluid dynamics.

**Prof. Rathindranath Maiti** is at present Professor in Mechanical Engineering Department, IIT, Kharagpur. His teaching and research interests are Fluid and Mechanical Drives, Gear Engineering and Machine Design. He has worked in Hindustan Aeronautics Ltd. and Macneil and Magor Ltd. in India and Eaton Hydraulics in Japan for about ten years together. Recipient of DAAD and INSA Fellowships he has worked in Fluid power Institute- TU-Dresden, Germany; Cardiff University, UK and Krakow University of Technology, Poland. Publications over 40 in peer reviewed international journals and conferences; and few patents are in his credit.

## Course Co-ordinator


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## Registration Process

Registration for GIAN courses is not automatic because of the constraints on maximum number of participants allowed to register for a course. In order to register for one or multiple non-overlapping courses, you have to apply online using the following steps:

1. **Create login and password at www.cep.iitkgp.ac.in/gian**
2. **Login and complete the registration form.**
3. **Select courses**
4. **Confirm your application and payment information.**
5. **Pay ₹ 500 (non-refundable) through online payment gateway.**

The course coordinators of the selected courses will go through your application and confirm your selection as a participant one month before the starting date of the courses. Once you are selected you will be informed and requested to pay the full fees through online payment gateway service.

**htt://www.cep.iitkgp.ac.in/gian**