Fluid (drive) and Alternative Drives, and Control in Aerospace Actuation Systems

Course as approved under the MHRD scheme on Global Initiative on Academic Network (GIAN)

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Overview

The aerospace industry is taking up the challenge to make aircrafts greener, cheaper and safer throughout their entire life. In commercial, private and military markets, one direction of action consists in developing innovative secondary power systems, in particular for actuation. Jets, propellers, rotor-wings and even space launchers involve high consumers of mechanical power for flight control (primary, secondary), thrust control (thrust reverse, thrust vector control), landing gears (extension, braking, steering) and utility systems. In the very last years, actuation for aerospace has rapidly evolved through incremental and disruptive step changes. Fly-by-wire is nowadays well established for fixed-wings jets. It starts to propagate to helicopters and propellers. Power-by-wire has just been introduced but are mainly used as backup, waiting for sufficient maturity to be used in 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 in order to address power and signal architectures as well as virtual prototyping with a multi-level view (system, equipment and component). An ample portion of 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	**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.**
You Should Attend If…	▪ you are an engineer or a research scientist interested in design and development, application/maintenance engineering of hydraulic, mechanical and newer actuation/drivesystems for aerospace and general industrial applications. ▪ you are a student or faculty from 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: **Participants from abroad : US $550** **Industry/ Research Organizations: ` All modules INR 30000/- Any two modules INR 20000/-** **Academic Institutions: `Teachers INR 10000/- Students INR 1000/-** 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 Mareis 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 research publications, 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, who builthis academic career from bachelors to PhD, inthe Department of Aerospace Engineering, IndianIn stitute of Technology, Kharagpur (IIT Kgp), is now Associate Professor there. His teaching and research interests revolve around aerodynamics, CFD and flight mechanics. He has been collaborated with the defense industries for the development of indigenous aircraft and associated with the Training programmes for aeronautical industries. Apart from guiding PhD students and publications in peer reviewed journals, he has also co-authored a book on computational fluid dynamics.

Prof. RathindranathMaitiis 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 workedin Fluid power Institute- TU-Dresden, Germany; Cardiff University, UK and Krakow University of Technology, Poland.Publications over 40 in International conferences and journals, few patents and 8 PhD guidance are in his credit.

Course Co-ordinator

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