INTRODUCTION TO EXPERIMENTS IN FLIGHT

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PRE-REQUISITES : Aircraft Performance, Aircraft Stability and Control.

INTENDED AUDIENCE : PHD, M.Tech & B.Tech

INDUSTRIES APPLICABLE TO : NAL Bangalore, ARDE Pune, ADE Bangalore, ADA Bangalore

COURSE OUTLINE :

This course is designed to conduct experiments in airplane to determine different parameters. This course will also help in creating a background to design an experiment to determine a specific parameter.

ABOUT INSTRUCTOR :

Prof. A.K. Ghosh is a faculty of Aerospace Engg. Department of IIT Kanpur. He is also the in-charge of the flight laboratory and unmanned aerial vehicle of IIT Kanpur. His research areas include system identification through flight tests using conventional and neural network based methods, design of aircrafts and airborne projectiles, supercavitation, unmanned aerial systems. Before joining IIT Kanpur, he worked as a scientist with Defense Research Development Organization (DRDO). He has published many peer reviewed journal papers and conference papers, guided 13 doctoral students, and 38 masters students. He is also a mentor of multiple aerospace start-up companies, and also been associated with major industry contributions of high speed low drag aircraft bomb, Pinaka Mk-I, 105mm sabot round for tracked vehicles, etc.

COURSE PLAN :

Week 1**:** Planning of Experiment
   Weighment and Calculation of CG (Theory)
   Cruise Experiment (Theory)
   Weighment Experiment and cockpit panel description
   Drag Polar Experiment
   CG and Climb Experiment

Week 2**:** Calibration of Control Surface
   Calibration of Control Surfaces (Experiment)
   Introduction to Flight Data Recorder
   Sensors- Part I
   Sensors - Part II
   Data Acquisition using MEMS devices

Week 3**:** Estimation of Stick-Fixed Neutral Point
   Stick-Free Neutral Point & Stick-Free Maneuvering Point
   Static: Lateral-Directional Stability Test
   Static: Lateral-Directional Stability Test... continued
   Steady Coordinated Turn

Week 4**:** Introduction to parameter estimation
   Parameter Estimation using Least Squares Method
   Aerodynamic Parameter Estimation using Least Squares Method
   Aerodynamic Parameter Estimation using Delta Method
   Aerodynamic Parameter Estimation using Delta Method Contd..