UAV DESIGN - PART II

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IIT Kanpur

PRE-REQUISITES : Introduction to Aerodynamics/Flight Mechanics and Design of fixed wing Unmanned Aerial Vehicles

INTENDED AUDIENCE   : Undergraduate and postgraduate students

INDUSTRIES APPLICABLE TO : DRDO, HAL, Boeing, Airbus, Bell, McDonnell Douglas, UAV Factory**,** Lockheed Martin

COURSE OUTLINE :

This course introduces the designing and sizing process (Simulation/Experimental) for fixed ? wing UAV technology, integrated with its performance and stability analysis (Static & Dynamic) and prototype testing

ABOUT INSTRUCTOR :

Prof. Subrahmanyam Saderla obtained his B.Tech (Aeronautical Engineering) from JNTU, Hyderabad in 2008, M.Tech and Ph.D (Aerospace Engineering) from IIT Kanpur during 2010 and 2015 respectively. Later he joined as a postdoctoral fellow in the department of aerospace and software engineering at Gyeongsang National University (GNU), South Korea. At present he is working as an assistant professor in the department of aerospace engineering at Indian Institute of Technology Kanpur. His current area of interest lies in real time system identification of unmanned aerial vehicles. His research interests also include design, flight tests and parameter estimation, high angle of attack aerodynamic modelling and dynamic wind tunnel testing as well as experimental flight dynamics, chaotic modelling using Artificial Neural Networks.

COURSE PLAN :

Week 1**:** Review of the concepts covered in first part of the course.

Week 2**:** Understanding the static stability of various UAVs. Significance of location of Neutral point and Centre of gravity for a stable flight

Week 3**:** Approach for wing design and airfoil selection with examples

Week 4**:** Tail sizing, control surface sizing and significance of tail volume ratio with examples

Week 5**:** Developing subroutine for design process

Week 6**:** Design example for conventional takeoff fixed wing UAV for various mission requirements

Week 7**:** Design example for hand launch fixed wing UAV for various mission requirement

Week 8**:** Design example for VTOL fixed wing UAV for various mission requirement