



AIRCRAFT STRUCTURES - I

PROF. ANUP GHOSH

Department of Aerospace Engineering
IIT Kharagpur

PRE-REQUISITES : Basic Solid Mechanics

INTENDED AUDIENCE : Aerospace, Mechanical, Civil, Naval Architecture.

INDUSTRY SUPPORT : ISRO, DRDO, CYIENT, TATA Lockheed Martin Aerostructures Ltd., Mahindra Aerospace, HAL, Raj Hamsa Ultralights.

COURSE OUTLINE :

This course is an introduction for the analysis of aircraft structures. It bridges together the basic solid mechanics with applications to aerospace structures. The course starts with the introduction to the basic details of type of structures used in aircraft construction. It is followed by an introduction to the estimation of loads on wing, fuselage and landing gear. Principle of stressed skin structure and indeterminate structures are covered next. Theory of elasticity will be introduced later for analysis of problems related to aerospace structures.

ABOUT INSTRUCTOR :

Prof. Anup Ghosh, in the last few years has completed guidance of 3 Ph. D. student and 4 more students are continuing at present. In this process they have explored and studied the nonlinear behaviour of laminated composite laminates in association with the interdigitated smart composite structures. The study also includes the hygrothermal effect on the geometrically nonlinear vibration of AFC actuated composite structures. It includes the active vibration control of smart laminated composite plates. An UAV laboratory has been developed in recent years in our department. This laboratory is equipped with all possible modes of UAV fabrication facility including fibre reinforced laminated composite structures using vacuum assisted resin transfer moulding procedure. One more laboratory has been set up for complete characterization of laminated composite in the department of Chemical Engineering under the DST funding. Five major sponsored R&D projects have been completed. In a nutshell any research related to the structural analysis and experiments of aircraft related structures may be pursued. It is intended to emphasize the area related to the development of MAV and UAV in near future.

COURSE PLAN :

Week 1: Introduction To Flight Vehicle Structures

Week 2: Forces Acting On An Aircraft

Week 3: Statically Determinate and Indeterminate Structures And landing Gear

Week 4: Energy Methods Of Structural Analysis

Week 5: Introduction To Theory of Elasticity – Stress

Week 6: Introduction To Theory of Elasticity – Strain

Week 7: Stress Concentration Due To A Circular Hole

Week 8: Torsion Problem