



# LIGHTER THAN AIR SYSTEMS

**PROF. RAJKUMAR S. PANT**

Department of Aerospace Engineering  
IITB

**TYPE OF COURSE** : New | Elective | UG/PG

**COURSE DURATION** : 12 Weeks (18 Jan' 21 - 09 Apr' 21 )

**EXAM DATE** : 24 Apr 2021

**INTENDED AUDIENCE** : Aeronautical Engineering, Aerospace Engineering, Mechanical Engineering

**INDUSTRIES APPLICABLE TO** : ISRO, NAL, ADRDE, Airbus, Boeing, Lockheed Martin

**COURSE OUTLINE :**

This course is designed to provide students an overview of Lighter-than-Air (LTA) systems, a subject of Aerospace Engineering that was once at the forefront of technological developments, but which got pushed into oblivion in late 1930s. The subject was revived in mid 1980s due to renewed interest in such systems for long endurance applications with low fuel consumption. The course will be conducted using the in-class recordings of 20 lectures of this course (by CDEEP) delivered by the instructor at IIT Bombay in Autumn Semester of 2015. Around ten additional lectures will be recorded to highlight some current and relevant topics.

**ABOUT INSTRUCTOR :**

Prof. Rajkumar S. Pant has Bachelors, Masters and Ph.D. degrees in Aerospace Engineering. His areas of specialization include Aircraft Conceptual Design, Air Transportation, and Optimization. He has been a member of faculty of Aerospace Engineering Department at the Indian Institute of Technology Bombay since December 1989. Prior to that, he worked at HAL for five years in Kanpur (1984-88) and Nasik (1988-89) divisions in the Design & Engineering Department.

**COURSE PLAN :**

**Week 1:** Background and Introduction to Lighter-than-Air systems

**Week 2:** Historical Perspectives and indigenously developed LTA Systems

**Week 3:** Static Lift Concepts & its Estimation

**Week 4:** Variation of Net Static Lift

**Week 5:** Pressure Height Calculations

**Week 6:** Envelope Materials and Structural Design

**Week 7:** Operational Issues and Ground Handling

**Week 8:** Aerodynamics and Flight Mechanics

**Week 9:** Aerostat Sizing and Conceptual Design

**Week 10:** Airship Sizing and Conceptual Design

**Week 11:** High Altitude Airships

**Week 12:** Hybrid LTA systems