LIGHTER THAN AIR SYSTEMS

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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) that were delivered by the instructor at IIT Bombay in Autumn Semester of 2015. There will be a monthly interaction video session with students, in which their doubts will be cleared. The students can also approach the instructor via e-mail, or on phone at some pre-specified time window.

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. Prof. Pant is an alumnus of College of Aeronautics, Cranfield University, UK, where he earned his Ph.D. under Commonwealth Scholarship Scheme, IIT Madras, where he did his Masters in Aeronautical Engineering, and PEC Chandigarh where he underwent his undergraduate studies in Aeronautical Engineering. He has also worked for five years in Hindustan Aeronautics Limited in the Design & Engineering Department at Kanpur (3.5 years) and Nasik (1.5 years) Divisions. He has published and presented ~ 220 scientific papers, of which ~ 170 are in international journals and conferences. He has also visited several top ranking institutes and universities all over the world. Prof. Pant was a Visiting Professor at School of Mechanical & Aerospace Engineering at Nanyang Technological University, Singapore in 2015-16, visiting faculty at Department of Aerospace & Ocean Engineering at Virginia Polytechnic Institute and State University in 2010-11, and a visiting researcher at Instituto Tecnolgico de Aeronutica, Brazil in 2012, Texas A&M University in 2011, Cambridge University in 2008, and Imperial College London in 2006. In November 2012, he was appointed as a Special Visiting Researcher under the Science Without Borders program of the Brazilian Government for three years

COURSE PLAN :
Week 1**:** Background and Introduction to LTA systems
Week 2**:** Historical Perspectives of LTA Systems
Week 3**:** Airships developed at IITB
Week 4**:** Static Lift Concepts
Week 5**:** Static Lift Estimation
Week 6**:** Variation of Net Static Lift
Week 7**:** Pressure Height Calculations
Week 8**:** Envelope Materials and Ground Handling of LTA Systems
Week 9**:** Airship Design Methodology
Week 10**:** Airship Propulsion Systems and Case studies in Airship Operation
Week 11**:** Aerostat Design Methodology
Week 12**:** High Altitude Airships and Hybrid LTA systems