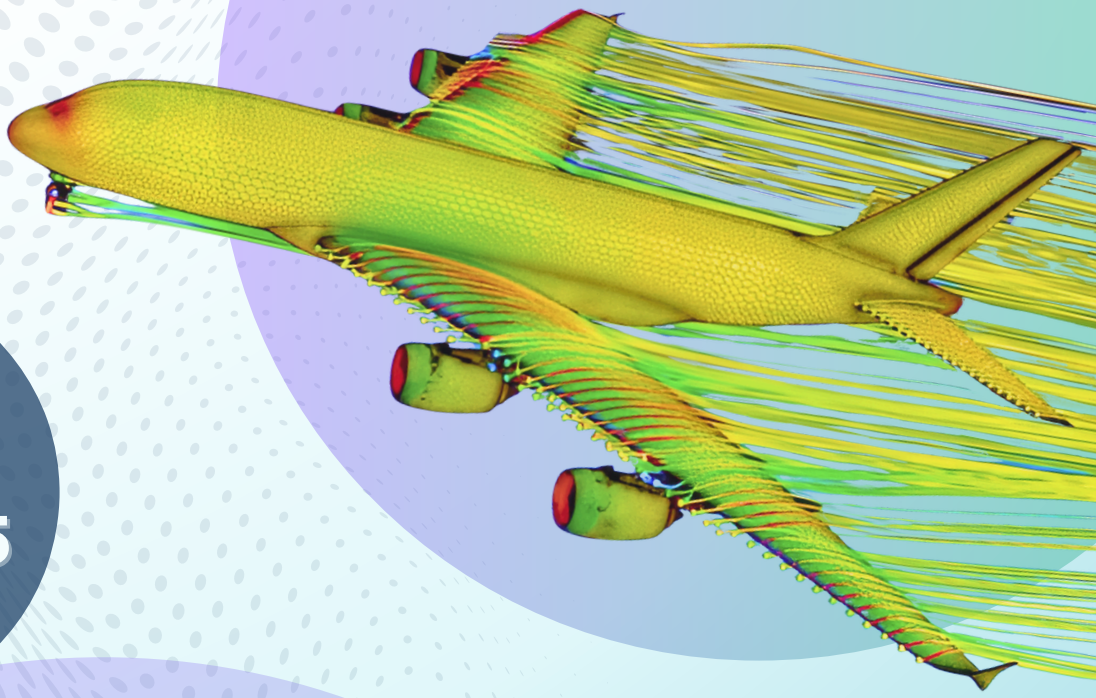
RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Workshop / Short-Term Training Programme on

COMPUTATIONAL AERODYNAMICS



18 - 22 AUGUST 2025

Jointly Organized by

Department of Aerospace and Automotive Engineering
M. S. Ramaiah University of Applied Sciences, Bengaluru

&

Department of Aerospace Engineering
Indian Institute of Science, Bengaluru.

Scan to Register
https://forms.gle/kKz32jBUgkhrhqEn8

Computational Aerodynamics plays a pivotal role in the analysis and design of aerospace vehicles by providing powerful tools to simulate and understand fluid flow behavior around complex geometries. With increasing reliance on numerical methods for aerodynamic evaluation, it has become essential for researchers, engineers, and students to develop a strong foundation in computational techniques, as well as to keep pace with advancements in simulation technologies and methodologies.

This Workshop / Short-Term Training Program is designed to provide a comprehensive overview of the theoretical foundations, numerical methods, and practical implementation aspects of Computational Aerodynamics. It will cover a range of topics including potential flow theory, thin airfoil theory and lifting line theory, compressible aerodynamics; grid generation, discretization techniques, turbulence modeling, and aerodynamic optimization. There will be also emphasis on practical aerodynamic applications. The program will be delivered by experienced faculty members from IISc, MSRUAS, and S & I Engineering, combining lectures with hands-on sessions using computational tools.

The workshop is open to faculty members, research scholars, postgraduate students, senior undergraduate students, and engineers from R&D establishments and industry. It aims to create a platform for academic and professional interaction, enhance technical skills, and encourage collaborative learning in Computational Aerodynamics.

Major Objectives

- To provide participants with a strong conceptual and computational understanding of fluid flow modeling and simulation techniques relevant to aerodynamics.
- To facilitate academic and professional interaction through expert lectures, case studies and hands-on experience in Computational Aerodynamics.

Registration Fee: Faculty Members / Industry Participants : Rs. 5,000/-
(Excluding 18% GST) Students : Rs. 2,000/-
Number of participants will be limited to 60.

SCHEDULE

DAY 01
18 AUGUST2025

Registration
09:00 AM - 09:30 AM

Inauguration
09:30 AM - 10:00 AM

Aerodynamics 01
10:00 AM - 11:00 AM
Potential Flows
Prof. O. N. Ramesh

Aerodynamics 02
11:30 AM – 01:00 PM
Compressible Fluid Flows
Prof. O. N. Ramesh

CFD 01
02:30 PM – 03:30 PM
Governing Equations & Classification of Equations
Prof. N. Balakrishnan

CFD 02
04:00 PM – 05:30 PM
Discretization, Consistency, Accuracy & Stability. Implicit Methods
Prof. N. Balakrishnan

DAY 02
19 AUGUST 2025

CFD 03
09:30 AM - 11:00 AM
Finite-Volume Methods. Methods for Euler & Navier-Stokes Equations
Prof. *N. Balakrishnan*

CFD 04
11:30 AM – 01:00 PM
Turbulence Models
Prof. A. T. Sriram

Aerodynamics 03
02:30 PM – 03:30 PM
Thin Airfoil Theory. Camber & Thickness Effects. High-Lift Sections. Boundary Layer & Reynolds Number Effects
Prof. O. N. Ramesh

Aerodynamics 04
04:00 PM – 05:30 PM
Supercritical & Supersonic Sections. Shock-Boundary Layer Interaction. Compressibility Effects
Prof. O. N. Ramesh

DAY 03
20 AUGUST 2025

Aerodynamics 05
09:30 AM - 11:00 AM
Induced Drag. 3D Effects/Area Rule. Sweep Effects
Prof. O. N. Ramesh

Aerodynamics 06
11:30 AM – 01:00 PM
Delta Wings
Prof. O. N. Ramesh

CFD Case Studies
02:30 PM – 03:30 PM
Practical Applications
Dr. *Nikhil Shende & Team*

Hands-on:
Mesh Generation 1
04:00 PM – 05: 30 PM
Dr. Nikhil Shende & Team

DAY 04
21 AUGUST 2025

Aerodynamics 07
09:30 AM - 11:00 AM
Panel Methods. Discrete Vortex Method. Lifting Line Theory
Prof. N. Balakrishnan

Aerodynamics 08
11:30 AM – 01:00 PM
Vortex Lattice Method
Prof. N. Balakrishnan

Hands-on:
Low Fidelity Codes
02:30 PM – 03:30 PM
Prof. N. Balakrishnan & Prof. A. T. Sriram

Hands-on:
Mesh Generation 2
04:00 PM – 05: 30 PM
Dr. Nikhil Shende & Team

DAY 05
22 AUGUST 2025

Aerodynamic Optimization 01
09:30 AM - 11:00 AM
Prof. M. Sivapragasam

Aerodynamic Optimization 02
11:30 AM – 01:00 PM
Prof. M. Sivapragasam

Hands-on:
CFD Tools
02:30 PM – 05:00 PM
Dr. Nikhil Shende & Team

Valediction
05:00 PM - 05:30 PM

Coordinators:

Prof. A. T. Sriram, *MSRUAS* atsriram.aae.et@msruas.ac.in
Prof. M. Sivapragasam, *MSRUAS* sivapragasam.aae.et@msruas.ac.in
Prof. N. Balakrishnan, *IISc* nbalak@iisc.ac.in

Ramaiah Technology Campus, M. S. Ramaiah University of Applied Sciences, Peenya Industrial Area, Peenya 4th Phase, Bengaluru - 560058