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Guest Lecture organized by Department of Aeronautical and Aerospace Engineering

Report on Guest Lecture "Drone Pilot Training and DGCA Certification Requirements"

Date of the event	28/03/2025
Title of the Event	Guest Lecture- Fluid Structural Interaction (FSI)
Name of the Resource Speaker	Mr. Hero Hemaraj, Senior Data Hemaraj, GE Aerospace, Bangalore
No. of Participants	180
Venue	RJ Seminar Hall

The Departments of Aeronautical and Aerospace Engineering at MVJ College of Engineering organized a guest lecture on the topic "Fluid Structural Interaction" on March 28, 2025. The event was conducted in RJ Seminar Hall and commenced at 1:30 PM. The session was delivered by Mr. Hero Hemaraj, Senior Data Hemaraj, GE Aerospace, Bangalore. The lecture was attended by around 180 students and faculties from the Aerospace Engineering, Aeronautical Engineering department and related disciplines.

The event began with a welcome address by Ms Aishwarya Anand, 3rd year student from Aeronautical Engineering. The guest speaker was formally introduced, followed by a brief overview of the significance of drone technology in current and future aerospace applications.

Introduction to the Guest Speaker

About the guest

Mr. Hero Hemaraj, an accomplished Aerospace Engineer with impressive academic and professional achievements:

- M.E in Aerospace Engineering from IISc Bangalore
- Currently working at GE Aerospace

- Secured an All India Rank of 60 in the GATE exam
- Expertise in Aerodynamics and Gas Dynamics
- Apart from academics, he is also skilled in badminton

Mr. Hemaraj shared valuable insights into fundamental concepts in Aerospace Engineering, the importance of strong basics, and career opportunities through GATE and industry experience.

Fig: Prof SC Gupta welcoming our Chief Guest

Key Topics Covered in the Lecture

1. Basics of Energy Transfer

Mr. Hemaraj emphasized the three fundamental modes of energy transfer in any system:

a) Conduction – Transfer of heat through direct contact

b) Convection – Heat transfer through fluid motion

c) Radiation – Heat transfer through electromagnetic waves

He encouraged students to develop a strong understanding of these basics, as they form the foundation for advanced concepts in aerodynamics and thermodynamics.

2. Conservation Laws in Fluid Systems

The lecture covered the three primary conservation laws applicable to fluid systems:

a) Conservation of Mass (Continuity Equation) – Mass can neither be created nor destroyed.
b) Conservation of Momentum – The total momentum of a system remains constant unless acted upon by external forces.
c) Conservation of Energy – Energy can neither be created nor destroyed; it only changes from one form to another.

Mr. Hemaraj demonstrated how these laws apply in aerospace engineering, particularly in fluid dynamics and propulsion systems.

Importance of Basics in Learning

Mr. Hemaraj emphasized that mastering fundamental concepts is crucial for a successful career in aerospace engineering. He shared his personal experience at IISc Bangalore and GE Aerospace, highlighting how strong basics helped him:

- Solve complex real-world problems efficiently.
- Crack the GATE exam with an excellent rank.
- Adapt quickly in industry roles where fundamentals are applied practically.

He advised students to prioritize understanding core principles rather than just memorizing formulas.

Fig: A lecture delivered on Fluid Structure Interaction by Mr. Hero Hemaraj

Significance of the GATE Exam

One of the most crucial topics discussed was the importance of the GATE (Graduate Aptitude Test in Engineering) exam for students aspiring to build a career in aerospace or any engineering field. He outlined:

- Opportunities after GATE:
- Higher education in IISc, IITs, and NITs.
- Direct job opportunities in PSUs like ISRO, DRDO, HAL, BHEL, and NTPC.
- Competitive edge in private sector companies like GE Aerospace and Rolls-Royce.

Why students should prepare for GATE:

a) The syllabus covers essential engineering concepts that are valuable in research and industry.
b) A good rank opens doors to high-paying, reputed jobs.
c) GATE score is valid for three years, allowing flexibility in career choices.

He encouraged students to start early, focus on basics, and practice consistently for the GATE exam.

Student Takeaways and Learnings

From this lecture, students gained several key insights:

✓ The fundamentals of energy transfer, conservation laws, and fluid dynamics play a critical role in aerospace engineering.

✓ Strong basics are necessary for excelling in academics, research, and industry applications.

✓ The GATE exam is a powerful career accelerator and should be taken seriously.

✓ Practical knowledge and understanding theoretical concepts deeply is essential for problem-solving in engineering fields.

Conclusion

The guest lecture by Mr. Hemaraj was highly informative and inspiring. His experiences and knowledge in academia, industry, and competitive exams provided students with a clear roadmap

for success in aerospace engineering. The lecture reinforced the importance of building a strong foundation, continuous learning, and career-oriented preparation.

His words encouraged students to focus on fundamentals, pursue excellence, and leverage opportunities like GATE to achieve their goals in the aerospace field.

Outcome of the event:

- **Enhanced Understanding of FSI Principles**: Gain insights into the fundamental concepts and equations governing the interaction between fluids and solid structures, including aspects of deformable solids and fluid mechanics.
- **Exposure to Real-World Applications**: Learn about practical applications of FSI in various engineering fields, such as analyzing bridge stability under wind loads, assessing aircraft wing performance, and understanding blood flow dynamics in biomedical engineering.
- **Familiarity with Analytical and Computational Methods**: Understand different methods of dynamical analysis for structures and coupled fluid-structure systems, and how to apply them effectively.

Recommendations to MVJCE

- **Fluid Structure Interaction Course by Flow ThermoLab**
  This course introduces FSI concepts, emphasizing vortex-shedding, resonance, and self-excited vibrations. It includes practical sessions using OpenFOAM and is designed for students with a background in fluid mechanics and CFD.