



EXPERIMENTAL MODAL ANALYSIS: NON-CONTACT MEASUREMENT METHODS

Sponsored by Scheme for Promotion of Academic and Research
Collaboration (SPARC) Ministry of Education, Govt. of India



COURSE DESCRIPTION

This course offers an in-depth study of Experimental Modal Analysis (EMA), focusing on non-contact measurement techniques for accurate structural analysis. Participants will begin with foundational principles of modal analysis, exploring key concepts like natural frequencies, mode shapes, and damping. The curriculum progresses through advanced techniques such as Laser Doppler Vibrometry (LDV) and Digital Image Correlation (DIC), equipping students and professionals with the skills to handle real-world challenges in structural testing and analysis across aerospace, automotive, and civil engineering applications.

LEARNING OBJECTIVES

By the end of this course, students should be able to:

- Understand fundamental concepts of Experimental Modal Analysis and its significance in engineering applications.
- Learn principles of vibration testing and key components of modal testing.
- Explore non-contact measurement techniques, including LDV and high-speed cameras.
- Gain proficiency in Digital Image Correlation (DIC) for deformation and strain tracking.
- Recognize the challenges and advancements in non-contact modal testing.

ABOUT SPARC

Scheme for Promotion of Academic and Research Collaboration (SPARC) aims at improving the research ecosystem of India's Higher Educational Institutions by facilitating academic and research collaborations between Indian Institutions and the best institutions in the world from 28 selected nations to jointly solve problems of national and/or international relevance.

COURSE OUTLINE

Overall course has been divided into 5 modules. This course is designed to extend benefits to all participants without affecting their daily schedule. Therefore, Sundays within the period (**Dec 2024 to Jan 2025**) would be ideal for people from all the backgrounds. Only one time registration is required for all the modules.

1. Introduction to Experimental Modal Analysis (EMA)

Fundamental concepts: natural frequencies, mode shapes, damping. Importance of experimental validation in various engineering fields.

2. Principles of Vibration Testing

Basics of Structural Vibration: SDOF and MDOF systems. Modal Testing: structure selection, excitation, and response measurement.

2. Non-Contact Measurement Techniques

Advantages of non-contact methods. Laser Doppler Vibrometry (LDV): principles, setup, applications, pros and cons. High-Speed Cameras/Digital Image Correlation (DIC): displacement and strain measurement.

2. Digital Image Correlation (DIC) and Photogrammetry

DIC principles and applications in civil and aerospace engineering. Speckle pattern generation, image capture, and data processing.

5. Challenges and Future Trends

Addressing environmental noise and surface limitations in laser-based systems. Emerging technologies: advanced laser systems, drones for remote access, and AI for real-time analysis.

TARGET AUDIENCE

Faculty members, Research Scholars, PG and UG Students, Persons from Industries and Research Institutes.

INTERNATIONAL EXPERT



DR. HADI MADINEI
AEROSPACE ENGINEERING
SWANSEA UNIVERSITY, UK

DELIVERY METHOD: Hybrid mode

VENUE: Seminar Hall, Mechanical Engineering, National Institute of Technology Silchar, India

REGISTRATION FEE: NIL

REGISTRATION LINK:

<https://tinyurl.com/3uy55ty2>

Organized by

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COURSE COORDINATOR

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