

Experimental Modal Analysis Seminar with Dr. Pete Avitabile

Professor Emeritus at University of Massachusetts, Lowell
May 6-8, 2025 | Montréal, QC (Canada)



Modal analysis is an essential technology behind solving noise and vibration problems. This seminar focuses on the measurements needed to make a successful test as well as the reduction of that data to obtain the dynamic characteristics of a structure or system – that is the frequency, damping and mode shapes. Lectures will be augmented with participant collection of their own data sets (working in teams of 2 or 3) with separate test setups for the seminar. Discussion on some of the common pitfalls and misconceptions are presented in this seminar. Measurements with MIMO shakers will be demonstrated; participant data will be performed using impact testing strategies. Dr. Pete Avitabile, Professor Emeritus at the University of Massachusetts Lowell, will lead the seminar discussions.

May 6, 2025 - morning session (starts 9:00 am)

- Overview of Experimental Modal Analysis
- A simple non-mathematical approach
- Impact basics – hammers, tips, force, accelerometers
- Shaker basics – shaker, amplifier, force, impedance
- Brief modal theory overview

(lunch break)

May 6, 2025 - afternoon session

- Perform LIVE modal test – introduce Crystal DAQ
- Make impact measurement modal test
- Use shaker for MIMO modal test
- Group measurements – familiarity with DAQ and measurement issues (hammer/tips; force/exponential windows; FRF/coherence; double impacts)

May 7, 2025 - morning session (starts 9:00 am)

- Modal theory – more comprehensive theory
- Digital signal processing – digitization, quantization, aliasing, leakage, windows
- FRF measurement definition – Linear/Power Spectra, Frequency Response Function, Coherence, Noise

(lunch break)

May 7, 2025 - afternoon session

- Excitation techniques
- Impact excitation considerations
- Shaker excitation considerations including MIMO
- Group measurements – continue assorted impact measurement situations – get ready for modal test

May 8, 2025 - morning session (starts 9:00 am)

- Mode indicator functions
- Modal parameter estimation concepts
- Model validation
- Group measurements – multiple reference impact test; prepare geometry; collect data

(lunch break)

May 8, 2025 - afternoon session

- Group – complete entire modal test; perform second test with different references if time permits
- Questions to ponder
- Q&A

Location: Courtyard Montréal
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