



Updated July 23, 2004

Modal Analysis

Prerequisites:	Two years or more training in mechanical technology or mechanical engineering at an accredited college, university or technical school is strongly recommended. Candidates should be able to understand basic differential equations and the frequency response function, and be familiar with the operation of personal computers.
Course Length:	32 Hours
Certification Exam:	25 questions plus a practical portion. Exam is closed book. A sheet of applicable equations is provided.
Maximum # Students:	10
Recommended Text:	Ewins, DJ, “<i>Modal Testing – Theory, Practice, and Application</i>”, 2nd Edition, Research Studies Press, Baldock, Hertfordshire, England, 2000.

Course Objectives

Students who successfully complete this course will be able to:

- Understand the theoretical basis for Modal Analysis
- Choose the appropriate excitation and response measurement techniques for the application in question
- Calculate the linear spectra and transfer functions using Matlab software
- Understand the fundamentals of Modal Parameter Extraction. This will include checks of the FRF data for validity, application of Mode Indicator Functions, as well as SDOF and MDOF curve fitting methods.
- Apply Modal Analysis to practical real-world problems.



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Syllabus and Seminar Schedule

Day One

8:00AM – 9:50AM	Modal Testing Overview and Applications
<i>9:50AM – 10:10AM</i>	<i>Break</i>
10:10AM – 12:00PM	Theoretical Basis <i>SDOF Theory, Undamped MDOF systems, MDOF with viscous damping</i>
<i>12:00PM – 1:00PM</i>	<i>Lunch</i>
1:00PM – 2:50PM	Theoretical Basis <i>Modal Analysis of Rotating Systems, Characteristics and Presentation of MDOF data</i>
<i>2:50PM – 3:10PM</i>	<i>Break</i>
3:10PM – 5:00PM	Practice Problems and Exercises

Day Two

8:00AM – 9:50AM	Response Function Measurement Techniques <i>Structure preparation and excitation, Digital Signal Processing, Multi-point excitation methods</i>
<i>9:50AM – 10:10AM</i>	<i>Break</i>
10:10AM – 12:00PM	Practice Problems and Exercises
<i>12:00PM – 1:00PM</i>	<i>Lunch</i>
1:00PM – 2:50PM	Modal Parameter Extraction <i>Preliminary Checks and SDOF methods</i>
<i>2:50PM – 3:10PM</i>	<i>Break</i>
3:10PM – 5:00PM	Practice Problems and Exercises



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Day Three

8:00AM – 9:50AM	Modal Parameter Extraction <i>MDOF Methods</i>
<i>9:50AM – 10:10AM</i>	<i>Break</i>
10:10AM – 12:00PM	Practice Problems and Exercises
<i>12:00PM – 1:00PM</i>	<i>Lunch</i>
1:00PM – 2:50PM	Using ME Scope for Modal Analysis
<i>2:50PM – 3:10PM</i>	<i>Break</i>
3:10PM – 5:00PM	Using ME Scope for Modal Analysis

Day Four

8:00AM – 9:50AM	Practice Problems and Exercises
<i>9:50AM – 10:10AM</i>	<i>Break</i>
10:10AM – 12:00PM	Review
<i>12:00PM – 1:00PM</i>	<i>Lunch</i>
1:00PM – 3:50PM	Certification Examination