



CAT-II

ISO 18436 Category II

Intermediate Vibration Analyst Training & Certification

Public Courses and Online Training

Learn vibration analysis from the world's leading provider of training & certification. At Mobius Institute, we offer the most understandable and interesting training available. Our Crystal Clear™ training methodology is unique, using hundreds of 3D animations and software simulations that make complex concepts easier to understand. We offer ISO 18436 Category I to IV training via public venue courses as well as online through the Mobius Institute website.

Mobius Institute is ISO/IEC 17024 and ISO 18436-1 accredited, meaning that you are assured that your certification meets the highest global standards, and our training teaches you everything you need to know according to the ISO 18436 standard for vibration analyst training. There is no more highly regarded training & certification available.



CAT-II Course Overview



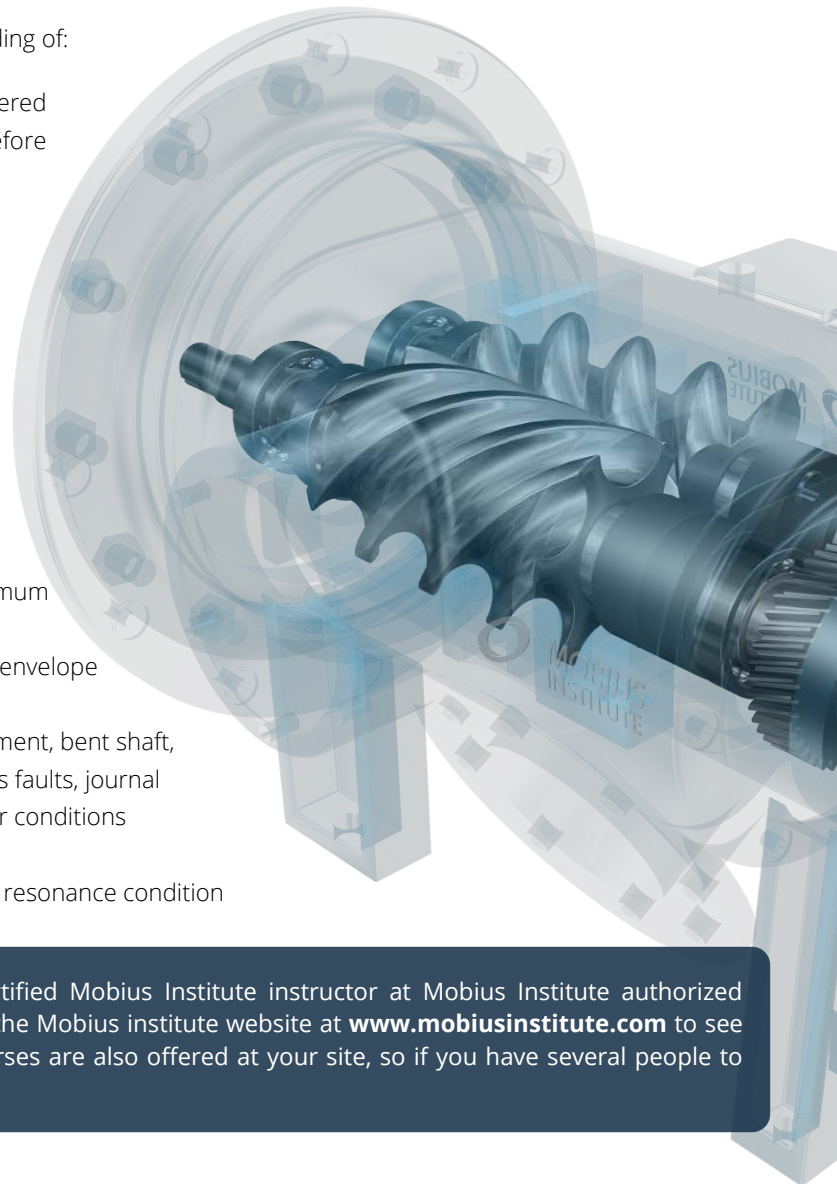
The Category-II course spans four days with an additional half day for review and the exam. It is intended for people who have mastered the basics but who need to be able to take good data (and decide how the data collector should be set up), analyze a range of fault conditions, and understand balancing and alignment.

We teach you to test machines correctly, how to diagnose faults accurately, perform additional diagnostic tests for verification, how to set vibration alarm limits, and how to correct certain types of faults. You will learn what your analyzer settings mean so that you can take the best measurements. And you will learn why the vibration signatures change the way they do and how to use time waveform analysis and phase analysis to verify the fault condition.

Mobius makes learning about vibration analysis unique. We use 3D animations, Flash simulations, and numerous software simulators that completely demystify vibration analysis. While vibration training courses have traditionally been very theoretical, difficult to understand, (and boring), you will be captivated by the Mobius training methods, and you will enjoy our practical approach. You will take away skills that you can immediately apply to your job, and you will truly understand what you are doing.

You will come away from the course with a solid understanding of:

- How a well-designed program and a reliability centered maintenance approach improve the OEE and therefore the bottom line
- The condition monitoring technologies: acoustic emission, infrared analysis (thermography), oil analysis, wear particle analysis, & motor testing via supplementary training
- How machines work; via supplementary self-study using the "Equipment Knowledge" section
- How to select the correct measurement location and axis, and collect good, repeatable measurements
- What the Fmax, resolution, averaging and other analyzer settings mean, and how to select the optimum settings for a wide variety of machine types
- How to analyze vibration spectra, time waveforms, envelope (demodulation), and phase measurements
- How to diagnose: unbalance, eccentricity, misalignment, bent shaft, cocked bearing, looseness, rolling element bearings faults, journal bearing faults, gearbox faults, resonance, and other conditions
- How to set alarm limits manually and with statistics
- How to balance and align a machine, and correct a resonance condition



Our public courses are conducted by an experienced, certified Mobius Institute instructor at Mobius Institute authorized training centers in 50 countries throughout the world. See the Mobius institute website at www.mobiusinstitute.com to see the courses scheduled in your area. All of our training courses are also offered at your site, so if you have several people to train, we can come to your location.

CAT-II Course **Description**

Duration: 4 days Cat II / Level II

Format: Live public course or online learning via the web

Optional: ½ day Review & certification examination, 70% passing grade

Compliance: ISO 18436 Category II – Vibration Analyst, ASNT SNT-TC-1A Recommended Practice

Public Course Pre-Study: Registered students are given access to the online version of the course via the Mobius Institute Learning Zone before the class and for six months after course completion to assist them with converting the course information into practice

Online Learning: Registered students are given access to the Mobius Institute Learning Management System for a period of 6 months to provide ample time to learn the material and prepare for the optional certification examination

Certification Prerequisite: Prior experience is not required for attending the training course, but 18 months of experience is required for certification.

Outcome: You will come away from this course with a very good understanding of vibration analysis fundamentals, and you will be competent in quality data acquisition and diagnosing common machine faults.

Category II - Candidate Profile:

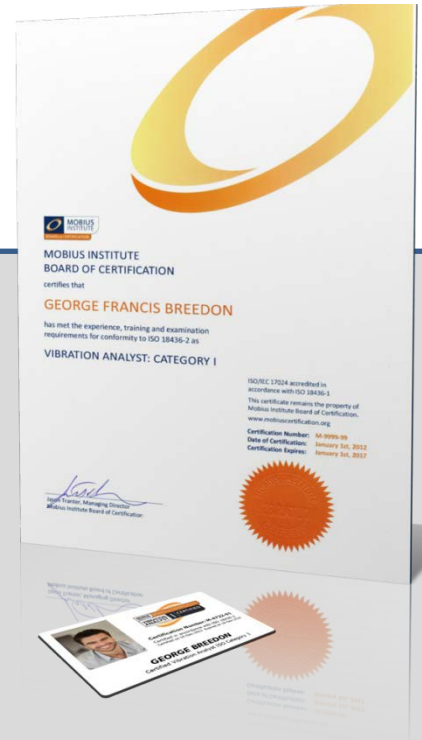
- You have a good understanding of the vibration fundamentals
- You want to be capable of confidently diagnosing a wide range of fault conditions, correcting certain conditions, and taking accurate measurements
- You look forward to the opportunity to develop your skills in the field of machine condition & vibration analysis
- You are seeking to become certified to international standards (ISO-18436) by an accredited certification body
- You want to become a key member of your condition monitoring team

Topics covered:

- Review of maintenance practices
- Review of condition monitoring technologies
- Principles of vibration; Review of basics, waveform, spectrum (FFT), phase and orbits
- Understanding signals: modulation, beating, sum/difference
- Data acquisition
- Signal processing
- Vibration spectrum analysis
- An introduction to time waveform analysis
- An introduction to orbit analysis
- Phase analysis: bubble diagrams and ODS
- Enveloping (demodulation), shock pulse, spike energy, PeakVue™
- Fault analysis
- Equipment testing and diagnostics including impact testing (bump tests) and phase analysis
- Corrective action
- Running a successful condition monitoring program
- Acceptance testing
- Review of ISO standards

The purchase of the **public course** includes six months of access to the Mobius Learning Zone (an excellent web resource, to prepare for the course, and to follow up after the course), a course manual, quick-reference guide, Mobius mouse pad with fault diagnostic reminders and pen. Examinations for certification are offered as an option at the end of the course.

The purchase of the **online learning course** includes six months access to the Mobius Learning Management System (LMS) where you are provided the complete course content, carefully explained and demonstrated on-screen. Optionally, you can order a hard copy training manual, and become certified by taking the optional certification examination through invigilation.



CAT-II Certification

All Mobius certified analysts receive personalized logos with their certification number and name for their own professional use. Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage.

For more information about Mobius Institute's accreditation, and the recognition of your certification by the ISO 18436 standard, please visit www.mobiusinstitute.com/certification.

Get started today

Go to our website to learn more about our public and online learning courses, view the public course schedule for your area. Don't hesitate to mail your questions to learn@mobiusinstitute.com or contact an authorized training center in your region.

MOBIUS INSTITUTE
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Online Learning & Classroom Course

The Intermediate Vibration Analysis course is intended for personnel who have at least twelve months vibration analysis experience and a thorough understanding of vibration theory and terminology. Eighteen months of vibration analysis experience is required for Category II or Level II certification. The course provides an in-depth study of machinery faults and their associated spectrum, time waveform and phase characteristics. A Category II analyst is expected to know how to test machines correctly, how to diagnose faults accurately, perform additional diagnostic tests for verification, how to set vibration alarm limits, and how to correct certain types of faults. You need to understand what your analyzer settings mean so that you can take the best measurements. You also need to understand why the vibration patterns change the way they do and how to use time waveform analysis and phase analysis to verify the fault condition.

Detailed topic list:

Review of maintenance practices

Review of condition monitoring technologies

Principles of vibration

- Complete review of basics
- Waveform, spectrum (FFT), phase and orbits
- Understanding signals: modulation, beating, sum/difference

Data acquisition

- Transducer types: Non-contact displacement proximity probes, velocity sensors, and accelerometers
- Transducer selection
- Transducer mounting and natural frequency
- Measurement point selection
- Following routes, and test planning
- Common measurement errors

Signal processing

- Filters: Low pass, band pass, high pass, band stop
- Sampling, aliasing, dynamic range
- Resolution, Fmax, data collection time
- Averaging: linear, overlap, peak hold, time synchronous
- Windowing and leakage

Vibration analysis

- Spectrum analysis
- Time waveform analysis (introduction)
- Orbit analysis (introduction)
- Phase analysis: bubble diagrams and ODS
- Enveloping (demodulation), shock pulse, spike energy, PeakVue

Fault analysis

- Natural frequencies and resonances
- Imbalance, eccentricity and bent shaft
- Misalignment, cocked bearing and soft foot
- Mechanical looseness
- Rolling element bearing analysis
- Analysis of induction motors
- Analysis of gears
- Analysis of belt driven machines
- Analysis of pumps, compressors and fans

Equipment testing and diagnostics

- Impact testing (bump tests)
- Phase analysis

Corrective action

- General maintenance repair activities
- Review of the balancing process
- Review of shaft alignment procedures

Running a successful condition monitoring program

- Setting baselines
- Setting alarms: band, envelope/mask, statistical
- Setting goals and expectations (avoiding common problems)
- Report generation
- Reporting success stories

Acceptance testing

Review of ISO standards