



# 2010 Knoxville Training Center Schools

No other company in the Analysis Industry offers a staff with more analysis training experience.

Instructors: Mike Jones | Gary Jones | Warren Laible | Kent Petersen

## TRAINING SCHEDULE

Course content described on following pages

DATES	COURSE	PRICE
As required	6310-6320 PA Start-up Assistance <i>(Class is 4 days. 5 student minimum)*</i>	\$1,000.00
As required	6310-6320 MA Start-up Assistance <i>(Class is 3 days. 4 student minimum)*</i>	\$750.00
Feb. 1 - 5	FFT Vibration Analysis for Reciprocating & Rotating Machinery	\$1,000.00
Feb. 8 - 12	Basic Engine Analysis	\$1,000.00
Feb. 15 - 19	Basic Compressor Analysis	\$1,000.00
Mar. 8 - 12	Advanced Software Training (6310 PA, 6310 PA/VA, 6320 PA, 6320 PA/VA)	\$1,000.00
Mar. 29 - Apr. 2	Advanced Engine Analysis	\$1,000.00
Apr. 5 - 9	Advanced Compressor Analysis	\$1,000.00
Apr. 19 - 23	Using On-Guard™ Software for Engine & Compressor Diagnostics	\$1,000.00
May 3 - 7	FFT Vibration Analysis for Reciprocating & Rotating Machinery	\$1,000.00
Jul. 12 - 16	High Speed Engine & Compressor Package Analysis	\$1,000.00
Aug. 2 - 6	Basic Engine Analysis	\$1,000.00
Aug. 9 - 13	Basic Compressor Analysis	\$1,000.00
Sept. 13 - 17	Using On-Guard™ Software for Engine & Compressor Diagnostics	\$1,000.00
Oct. 18 - 22	FFT Vibration Analysis for Reciprocating & Rotating Machinery	\$1,000.00
Oct. 25 - 29	Advanced Engine Analysis	\$1,000.00
Nov. 1 - 5	Advanced Compressor Analysis	\$1,000.00
Dec. 6 - 10	Advanced Software Training (6310 PA, 6310 PA/VA, 6320 PA, 6320 PA/VA)	\$1,000.00

\*On-site training recommended. Please consult On-site Training Brochure for more information and pricing.  
1832 Midpark Drive, Suite 102, Knoxville, TN 37921

**TO REGISTER: PHONE 865-330-1113 • FAX 865-330-1101 • E-MAIL [ALITTLE@WINDROCK.COM](mailto:ALITTLE@WINDROCK.COM)**



Let Windrock train your Engine & Compressor Analysts

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*Come and enjoy the hospitality of Windrock, Inc. and East Tennessee!*

## 6310-6320 PA Start-up Assistance 4 Days

Analyzer Hardware Orientation  
Database Basics  
Machine Geometry Setup  
Sensor Point and Collection Point Setup  
Engine Balancer and Spark Setup  
Route Based FFT Setup  
Transferring and Maintaining Setups  
Data Collection (phased data, ignition survey, balancer operation, FFT, temperature, panel information)  
Viewing Reports and Data in the Analyzer  
Transferring Collected Data to a Personal Computer  
Viewing Reports and Data in the Win6310/6320 Software  
Using the Help System  
The instructor will assist in setting up as many units as possible.

Location: Knoxville Training Center or On-Site  
Cost: \$1,000.00 / student  
(for On-Site cost please call for quotation)

Prerequisites: PA Analyzer User  
Requirements: Laptop Computer with Windows  
Windrock Analyzer Kit

Time: 4 Days  
Dates: As required  
5 student minimum

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## 6310-6320 MA Start-up Assistance 3 Days

Analyzer Hardware Orientation  
Database Basics  
Machine Geometry Setup  
Sensor Point and Collection Point Setup  
Engine Balancer and Spark Setup  
Transferring and Maintaining Setups  
Data Collection (phased data, ignition survey, balancer operation, temperature, panel information)  
Viewing Reports and Data in the Analyzer  
Transferring Collected Data to a Personal Computer  
Viewing Reports and Data in the Win6310 Software  
Using the Help System  
The instructor will assist in setting up as many units as possible.

Location: Knoxville Training Center or On-Site  
Cost: \$750.00 / student  
(for On-Site cost please call for quotation)

Prerequisites: 6310/MA Analyzer user  
Requirements: Laptop Computer with Windows  
Windrock 6310/MA Analyzer Kit

Time: 3 Days  
Dates: As required  
4 student minimum

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## Basic Compressor Analysis 4 Days

Data Collection Review  
Analyzer Setup Review  
Compressor Construction and Theory  
Data Collection Techniques  
Measuring Performance  
Pattern and Data Analysis Procedures  
Systematic Approach to Troubleshooting  
Case Studies and Example Problems

Location: Knoxville Training Center  
Cost: \$1,000.00 / student

Prerequisites: Basic Mechanical Knowledge  
Familiar with using an Analyzer

Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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## Basic Engine Analysis 4 Days

Data Collection Review  
Analyzer Setup Review  
2-Stroke and 4-Stroke Cycle Engines  
Basic Engine Theory  
Data Collection Techniques  
Measuring Performance  
Pattern and Data Analysis Procedures  
Systematic Approach to Troubleshooting  
Case Studies and Example Problems

Location: Knoxville Training Center  
Cost: \$1,000.00 / student  
Prerequisites: Basic Mechanical Knowledge  
Familiar with using an Analyzer  
Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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## Advanced Compressor Analysis (Annual Refresher) 4 Days

Data Verification, Reduction and Manipulation  
Diagnostic and Report Software Review  
Advanced Compressor Theory  
Advanced Analysis Procedures  
Advanced Pattern Interpretation  
Student Case Studies  
Power Loss Analysis  
Rod Loads and Reversal  
Rod Runout Measurements  
Reports  
Unit Acceptance and Load Curve Verification Techniques  
Systematic Approach to Troubleshooting Review

Location: Knoxville Training Center  
Cost: \$1,000.00 / student  
Prerequisites: Basic Compressor Analysis Training  
Experienced Analyzer user  
Requirements: Computer with Collected  
Compressor Data  
Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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## Advanced Engine Analysis (Annual Refresher) 4 Days

Data Verification, Reduction and Manipulation  
Diagnostic and Report Software Review  
2-Stroke and 4-Stroke Cycle Engines  
Includes Diesel Engines  
Theory and Mechanical Geometry Review  
Advanced Level Analysis Procedures  
Advanced Pattern Interpretation Techniques  
Examination and Discussion of Student Supplied Data  
Systematic Approach to Troubleshooting Review  
Ignition Survey and Balancing Procedures

Location: Knoxville Training Center  
Cost: \$1,000.00 / student  
Prerequisites: Basic Engine Analysis Training  
Experienced Analyzer user  
Requirements: Computer with Collected  
Engine Data  
Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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### **FFT Vibration Analysis for Reciprocating & Rotating Machinery** 4 Days

Basic Understanding of Vibration  
Setup of 6310/6320 FFT Analyzer Mode  
Data Collection  
Routine Monitoring  
Troubleshooting  
Amplitude, Frequency, Direction, Phase  
Pulsation  
Identifying Excessive Vibration Levels  
Setting Band Warnings and Alarms  
The Causes of Excessive Vibration  
Route Based Collection Procedures

Location: Knoxville Training Center  
Cost: \$1,000.00 / student  
Prerequisites: Basic Compressor Analysis Training  
Experienced Analyzer user  
Requirements: Computer  
Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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### **Advanced Software Training (6310 PA, 6310 PA/VA, 6320 PA, 6320 PA/VA)** 4 Days

Advanced Setup Techniques  
Gas Composition Setup  
Load Step Setup  
Setting Analyzer Options  
Using Nozzle Traces  
FFT Route Based Setup  
Setting Up the O-scope Mode  
Balancer Setup and Balancing Routines  
Spark Survey Setup and Data Collection  
Performance Report Details  
Discussion of Latest Software Features  
Transferring Databases Between Analyzers  
Theoretical PV's and Theoretical Clearance Calculation Diagnostics  
1st and 2nd Derivatives  
Statistical Analysis  
Adjusting Toe Points and VE  
Offset Adjustment to Improve Data Accuracy  
Pressure Pattern Pulsation Filtering  
Customizing Spreadsheets for Exported Data and Advanced Reporting Procedures  
Fuel Curves, Economic Reporting and By-pass Leakage Calculations and Reporting  
Customizing Reports  
Using Theoretical Clearance Calculations as an Analytical Tool  
Using Direct Channel Read for Troubleshooting

Location: Knoxville Training Center  
Cost: \$1,000.00 / student  
Prerequisites: Experienced PA or PA/VA  
Analyzer User  
Requirements: Computer  
Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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### High Speed Engine & Compressor Package Analysis 4 Days

Data Collection Review  
Analyzer Setup Review  
4 Stroke Cycle Engines  
Engine Theory  
Compressor Construction and Theory  
Data Collection Techniques  
Pattern and Data Analysis Procedures  
Systematic Approach to Troubleshooting  
Measuring High Speed Compressor Performance  
Case Studies and Example Problems

Location: Knoxville Training Center  
Cost: \$1,000.00 / student

Prerequisites: Instructor Interview  
Requirements: Computer

Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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### Using On-Guard™ Software for Engine & Compressor Diagnostics 4 Days

Using the Help System  
Advanced Setup Techniques  
Gas Composition Setup  
Load Step Setup  
Software Configuration  
Performance Report Details  
Discussion of Latest Software Features  
Trending Features  
Theoretical PV's and Theoretical Clearance Calculation Diagnostics  
1st and 2nd Derivatives  
Statistical Analysis  
Adjusting Toe Points and VE  
Offset Adjustment to Improve Data Accuracy  
Pressure Pattern Pulsation Filtering  
Customizing Spreadsheets for Exported Data and Advanced Reporting Procedure  
Fuel Curves, Economic Reporting and By-Pass Leakage Calculations and Reporting  
Using Theoretical Clearance Calculations as an Analytical Tool

Location: Knoxville Training Center  
Cost: \$1000.00 / student  
Prerequisites: On-Guard™ Software User  
or Supervisor

Requirements: Computer

Time: 1 PM Monday - 12 Noon Friday  
3 student minimum

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**On-site Domestic and International Training Classes are also available.**  
Our website ([www.windrock.com](http://www.windrock.com)) has more information.

### 4 Ways to Register for Windrock In-House Training Classes:

**Call (865) 330-1113**

**FAX Company Purchase Order to (865) 330-1101**

**Email Anderson Little at [alittle@windrock.com](mailto:alittle@windrock.com)**

**Register On-line at [www.windrock.com](http://www.windrock.com)**

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## “What makes us different?”

Our staff of instructors (combined total of over 141 years of industry experience) are dedicated to the education of mechanics, operators, and engineers of reciprocating machinery. You will receive a level of individual instruction and attention unsurpassed in the industry. Truly, the best value for your training dollar (plus we're located in beautiful East Tennessee)!



### **Gary L. Jones, Senior Analyst / Consultant**

Gary has been involved in the Oil and Gas industry for over 44 years and has been an equipment analyst for 26 years. Gary has extensive experience analyzing engines, compressors, turbochargers, turbines, centrifugal compressors and support equipment. He participated in developing his previous company's equipment analyst qualification and training. Gary also participated in developing unit load curves, fuel air mixture and ignition timing grids. He has taught several classes on compressor operations. Gary joined Windrock in August 2006.



### **Mike Jones, Senior Analyst / Consultant**

With 39 years of engine and compressor experience including maintenance, overhaul, and diagnostics, Mike joined the Windrock Technical Services Team in 2005. He has run several different types of analyzers during his career and had input into the development of the CARMA, EnSpect, Recip-Trap™ and Windrock analyzers. His experience covers analysis services to the marine, oil, and gas industries implementing predictive maintenance programs, analyst reviews and selections, training in both electronic engine/compressor and spectrum vibration analysis. Other duties included training and generation of military “how to” manuals for electronic diesel combustion analysis while under contract with the U.S. Coast Guard.



### **Warren Laible, Technical Services Manager**

Warren has performed more than 4,000 mechanical condition, performance, vibration, and pulsation tests in his 34 years in the engine and compressor diagnostics field. Providing over 21 years of contract analysis services and training to the marine, oil, and gas industries, Warren has extensive experience in high speed design and spectral vibration troubleshooting. Warren has been providing analysis training since 1976 and is recognized as an industry leader. Involved in the development and testing of many analyzer systems, Warren has been using Windrock analyzers since 1997 and also participated in our product development before joining Windrock in 2000.



### **Kent Petersen, Product Manager – Online Systems**

Kent has worked in the instrumentation and controls industry for over 30 years. For the last 13 years, he has been involved in condition monitoring of rotating and reciprocating machinery. He was responsible for the design and development of numerous online condition monitoring systems and software packages. Kent has participated in the planning, design, installation and startup of over 100 online condition monitoring systems for industrial applications. He has developed and taught numerous training classes for online vibration monitoring systems. Kent joined the Windrock team in February 2007.

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