

ALL-TEST Pro, LLC

**Training and Technical Department**



**Course Catalog**

**2012**

**Continuing Education and Training in the Field of Motor Diagnostics and Predictive Maintenance**



**ALL-TEST Pro, LLC**  
**Training and Technical Department**  
**121 Spencer Plain Road**  
**Old Saybrook, CT 06475**  
**United States of America**  
**Tel (860) 399.4222**  
**Fax (860) 399.3180**  
**Email [CE@alltestpro.com](mailto:CE@alltestpro.com)**  
**[www.alltestpro.com](http://www.alltestpro.com)**

*The contents of this catalog were as accurate as possible at the time of printing. This catalog is for informational purposes only and does not constitute a contract. ALL-TEST Pro, LLC reserves the right to change, at any time, without notice course offerings, fees and other charges, curriculum, course structure and content, and other such matters as may be within its control, notwithstanding any information set forth in this Catalog. Students should consult ALL-TEST Pro, LLC to confirm all information prior to registration.*

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## **Mission Statement: Training and Technical Department**

It is the mission of the ALL-TEST Pro, LLC, Training and Technical Department to design and deliver a comprehensive learning experience that incorporates theory, new technology and practical field applications to educate attendees in the scope of Motor Diagnostics and Testing as it relates to Predictive Maintenance

## **Diversity Statement**

ALL-TEST Pro, LLC (the Company) recognizes its talented and diverse workforce as a key competitive advantage. Our business success is a reflection of the quality and skill of our people. The Company is committed to seeking out and retaining the finest human talent to ensure top business growth and performance.

Diversity management benefits individuals, teams, our company as a whole, and our customers. We recognize that each employee brings their own unique capabilities, experiences and characteristics to their work. We value such diversity at all levels of the company in all that we do.

The Company believes in treating all people (employees, vendors and customers) with respect and dignity. We strive to create and foster a supportive and understanding environment in which all individuals realize their maximum potential within the company, regardless of their differences. We are committed to employing the best people to do the best job possible. We recognize the importance of reflecting the diversity of our customers and markets in our workforce. The diverse capabilities that reside within our talented workforce, positions the Company to anticipate and fulfill the needs of our diverse customers, both domestically and internationally, providing high quality products, services and training.

ALL-TEST PRO, LLC accepts diversity. Diversity includes differences in ethnicity, gender, language, age, sexual orientation, religion, socio-economic status, physical and mental ability, thinking styles, experience, and education. We believe that the wide array of perspectives that results from such diversity promotes innovation and business success. Managing diversity makes us more creative, flexible, productive and competitive. We work to create working and learning environment in which everyone is respected, welcomed and appreciated.

### **Career development and promotion**

ALL-TEST PRO, LLC rewards excellence and all employees are promoted on the basis of their performance. We have clear reporting procedures for any type of discrimination or harassment combined with follow-up procedures to prevent future incidents.

### **Diversity practices**

All employees of the Company undergo diversity training. Diversity training encompasses raising awareness about issues surrounding diversity and developing diversity management skills. The Company encourages the staff to commit to continued growth in understanding of diversity issues and strive to integrate awareness into all aspects of their position. We encourage professional and self development.

## Personnel

Vice President and Acting Director of Training and Technical Department	Jorgen Bjorkman
Training Technical Manager	William Kruger
Office Manager	Barbara St. Germain
Training Coordinator	Crystal Taylor-Torneo
Inside Sales	Simon Young

All inquiries regarding Continuing Education and Training Events including registration, payment, logistics and other administrative inquiries should be directed to our Corporate Office (860)399.4222 or [CE@alltestpro.com](mailto:CE@alltestpro.com). Our office is available 8:15am – 5:00pm EST Monday – Friday, with the exception of holiday closings and weather emergencies.

Inquiries regarding Technical Support including assistance with post course exercises, software or hardware questions, and application questions should be directed to [support@alltestpro.com](mailto:support@alltestpro.com). A member of our Technical Support Team will respond to your request within 24 hours.

## Continuing Education Units (CEU)

A Continuing Education Unit (CEU) is defined as 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. This includes classroom, self-paced instruction, pre/post assignments, and/or homework in support of a learning outcome.

## Authority

The ALL-TEST Pro, LLC Training and Technical Department, located at 121 Spencer Plain Road Old Saybrook CT 06475, is the authority responsible for the design and delivery of all Continuing Education and Training Events hosted and certified by ALL-TEST Pro, LLC.

## Accreditation

ALL-TEST Pro, LLC has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102; (703) 506-3275. In obtaining this approval, ALL-TEST Pro, LLC has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider accreditation status, ALL-TEST Pro, LLC is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard

## How CEU's are Calculated and Awarded

Continuing Education Units (CEU's) will be awarded on the basis of 1 CEU for each 10 hours of qualified instruction. CEU's will be awarded in increments of 0.10 CEU. The CEU award for each event is predetermined and will be announced prior to the start of each event and detailed on all event

advertisements. You will also find all CEU award calculations listed in the Course Offerings section of this Course Catalog.

Sessions greater than 30 minutes but less than 60 minutes will be calculated as 1 contact hour or 0.1 CEU. Sessions lasting less than 30 minutes will not be awarded any qualified contact hours or CEU.

All students/attendees who successfully fulfill the requirements of a CEU qualified event will be notified in writing via email or standard mail, depending on preference, within 30 days of their completion. This notification will include a Certificate along with transcript record detailing the number of CEU's earned/awarded.

***IF COURSEWORK IS MODIFIED OR SHORTENED DUE TO EXTRAORDINARY CIRCUMSTANCES\* BY ALL-TEST Pro, LLC, COMPANY SHALL HAVE THE RIGHT TO MODIFY THE COURSE AND CEU CREDITS WILL BE AWARDED BASED ON COMPLETED WORK.. SHORTENED COURSE EVENTS WILL BE FINANCIALLY CREDITED ACCORDING TO COST OF COURSE EVENT AS COMPARED TO TIME SHORTENED.***

**\*Example: Natural disaster, instructor illness or accident, etc.**

## Privacy Policy

### Privacy Policy For Customer Personally Identifiable Information

**The following policy will be provide to all customers in regards to completion of Website "Contact Us" forms, and/or registrations for Training seminars, webinars, product information and product services.**

Your privacy is important to us. This privacy policy ("Privacy Policy") covers privacy practices with respect to "Personally Identifiable Information" that is transmitted electronically to or collected by via the web, telephone, mail and other sources:

- How we collect and use your information
- With whom we may share your information.
- Choices available to you regarding collection, use and sharing of Personally Identifiable Information

In giving us your Personally Identifiable Information when registering our website, and/or other services, you agree to terms of this Privacy Policy as they may be amended from time to time. As we update and expand our services, this Privacy Policy may change so you may want to check with us from time to time. You may opt out of our sharing of your Personally Identifiable Information with third parties for marketing purposes, by following the directions in "Sharing Personally Identifiable Information".

#### **Collection and Use:**

We do not collect any Personally Identifiable Information from you except when you expressly volunteer the information. This includes when you:

- Register for a seminar, become a customer by purchasing or downloading service or information from our website.
- Request information (electronically) about products, services, or enter a promotional contest.
- Use or participate in various services or features made available on the web.
- Request contact with a sales representative or support team member.
- Provide comments, questions or feedback about products and services.

“Personally Identifiable Information” includes, for example, your name, home or business address, email address, telephone, wireless and/or fax number; any other device address, credit card and other payment information, employment information and work experience, demographic information and /or other information that may identify you as an individual or allow online/offline contact with you as an individual. Additional information that is protected under this privacy policy and will only be shared directly to you includes:

- Courses you have attended
- Dates and durations
- CEUs awarded to you

We will not sell, rent or share Personally Identifiable Information other than as disclosed below in the “Sharing” section of this Privacy Policy. We do not sell, rent to or share with others email addresses solely for the purpose of third party marketing, other than as disclosed below in the “Sharing” section, which may include third party advertisements within emails that we may send to you.

Personally Identifiable Information may be utilized to respond to your requests and inquiries and to provide you with the services and products offered on or through our website. We may also use your Personally Identifiable Information to communicate timely information and special offers (for example, in form of emails, mailings and the like) about products, services, companies and events, sponsored by us and others, that we think might interest you.

If you register for a seminar or pay for products and services using a credit card, Personally Identifiable Information (such as your name and shipping address) and financial information (credit card number, expiration date and CVV) may be required. This information may be used for billing purposes and to fill orders. If we have trouble processing an order, this contact information may be used to get in touch with you. Personally Identifiable Information also may be collected when you apply for a position with us or a program sponsored by us. In these cases, Personally Identifiable Information is used only for the purpose of processing and evaluating the application.

The Personally Identifiable Information you give us via the secured faxed and information order may be combined with other Personally Identifiable Information (such as demographic information and past purchase history) available from our records. This information may be used to make our future marketing efforts more efficient and will help us to improve the operations and maintenance of our website and business.

#### **Sharing Personally Identifiable Information**

We may share Personally Identifiable Information collected in the following ways:

- With our Qualified Distributors

#### **Notification of Changes**

If we decide to change our Privacy Policy, we will post those changes in the Privacy Policy section accessible from the home page of our website so that you are always aware of what information we collect, how we use it, and under what circumstances, if any, we disclose it. Any changes or updates will

be effective when posted. Under certain circumstances, we may also elect to notify you of changes or updates to our Privacy Policy by additional means, such as posting a notice on the front page of our website or sending you an email.

### **Problems or Complaints**

If you believe that there has been a violation of this Privacy Policy, please contact us at [info@alltestpro.com](mailto:info@alltestpro.com). We will investigate and take appropriate action and report back to you within a reasonable period of time.

### **Requesting Copies of Records**

Any student requesting past records must complete a Release of Records Form in accordance with the Company's Privacy Policy (no record or information will be released to other parties, other than the student). ALL records will be mailed via First Class mail using US Postal Services to the address provided on completed forms.

### **Notification of Technology Requirements**

Students/Attendees will be notified of all Technology Requirements for a Continuing Education and Training Event prior to or during the registration process. For more information about the requirements of specific learning events please refer to the Course Offerings section of this book.

### **Proprietary Interest Policy**

Any proprietary interests of providers will be disclosed during contractual arrangements and/or agreements between Provider, developer and/or instructor and Training Department. Provider must list all interests prior to contract execution.

ALL-TEST Pro, LLC, maintains a policy on intellectual property rights for all event materials.

### **Intellectual Property Policy**

Unless otherwise agreed to in writing by ALL-TEST PRO, any work produced, including but not limited to event materials, inventions, methods, art, or literature, by a ALL-TEST Pro employee as a part of doing the job for which they are employed and paid by ALL-TEST Pro, shall be the sole property of ALL-TEST Pro and any and all financial proceeds including royalties from such work shall inure to ALL-TEST Pro.

## **Types of Continuing Education and Training Events Offered**

### **Public Classroom**

A public classroom is defined as any CE/T Event that is open for registration by the general public. These types of courses are held on a periodic basis within the United States and as requested internationally. Please see our Event Schedule on our website [www.alltestpro.com](http://www.alltestpro.com) for the latest public classroom schedule. Domestic dates and locations are available in the Course Offerings section of this catalog.

## On-Site Classroom

An On-Site Classroom is defined as a CE/T Event that is held on the customer's premises and is not available for public registration. Schedules for On-Site Classrooms are not published to the public. Interested companies should contact our Training Coordinator for availability.

## Consulting

Consulting is defined as any type of CE/T Event that is developed based on specific customer criteria as a one-time event or series of events that will not be offered or available to other customers or the general public. Interested companies should contact our Training Coordinator for availability.

## Registration

### How to Register

Students/Attendees will be required to submit their registration form to our office register for all public classrooms. Registration forms are available on our website [www.alltestpro.com](http://www.alltestpro.com) or by contacting our office at (860)399.4222.

Registration forms can be submitted directly to our office by emailing [CE@alltestpro.com](mailto:CE@alltestpro.com) or faxing (860)399-3180. Registration information will not be taken over the phone.

For all On-Site Classrooms, a company purchase order is required to hold and book training dates. Registration will be available to all Students/Attendees prior to the start of class on the first day of the CE/T Event.

### Payment

Payment in full is required for all Public Classrooms prior to the start of the CE/T Event. A 50% deposit is required to hold dates for all On-Site Classrooms or Consulting. The remaining balance is due and payable within the terms listed on the customer's invoice.

Acceptable forms of payment include MasterCard, Visa, Discover, American Express, Check or Money Order. Checks and Money Orders should be made payable to ALL-TEST Pro, LLC. Cash payments will not be accepted.

## Refunds/Cancellations

Public course events:

- Refunds will not be issue.
- Open credit for unattended or uncompleted (specific requirements must be met to qualify) public course event is valid for one year from the course event.

On-Site customer scheduled coursework events:

- Customers who need to cancel the scheduled date course dates must contact our office (30) thirty days prior to the start of the course event to reschedule with no penalty.
- Cancellations of a scheduled course event less than (30) thirty days of the event will result in a loss of the 50% deposit.
- For rescheduling a course event that has been postponed less than (30) days prior to the event will result in a \$2500.00 USD reschedule fee.

## Travel Policy

### Domestic Travel

Instructor Travel Expenses for all CE/T Events located within the United States and Canada are included in the cost of the event. Learners must supply their own transportation to and from the site location.

### International Travel

Instructor travel expenses for all CE/T Events located outside of the United States and Canada are not included in the cost of the event, with the exception of International Public Classrooms. Please contact your sales agent for details. Please contact our Inside Sales Dept for more information regarding international travel expenses. Learners must supply their own transportation to and from the site location.

## Public Course Offerings

### AT10201 3 Day Motor Circuit Analysis Seminar

**Course Type:** Public Classroom

Three days of MCA (Off-line) training prepares you to troubleshoot all types of electric motors, coils, and windings, and improve the reliability and uptime of your plant. This public course is appropriate for both supervisors and technicians. Course materials include Workbook and Motor Circuit Analysis Manual. Continental breakfast and Lunch are provided each day.

Upon successful completion of this course students should be able to:

- Identify the components in the winding system; factors that determine Resistance(R), Inductance(L), Capacitance(C), and Impedance(I/F)
- Describe how changes in R, L, Z, and I/F affect the winding system
- Explain the Lenz Law, Ohms Law, and Faraday's Law
- Use the basic MCA instruments to manually measure R, L, Z, Fi and I/F
- List the different types of AC Motors, identify their components and describe the purpose of each component

- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- List the main types of failures associated with AC Motors
- Describe the various techniques available to identify electrical failures in winding systems
- Explain the various measurements used in MCA
- Evaluate a motor's winding condition based on MCA measurements
- Explain the process for correcting MCA readings caused by "Rotor Position"
- Explain the purpose of the ALL-TEST PRO 31 (AT31) and ALL-TEST IV PRO (ATIV); and describe their features
- Obtain data from a 3 phase AC motor using the AT31 and the ATIV (on the AUTO and manual modes)
- Evaluate the condition of an AC Motor based on the measurements taken with the AT31 and ATIV
- Demonstrate the ability to enter data and evaluate the condition of an AC Motor using the Condition Calculator Software
- Demonstrate the ability to upload data stored in the ATIV onto the EMCAT software and generate a machinery report
- Explain the 4 Primary Maintenance Philosophies
- Describe the 3 phases of Predictive Maintenance
- List the 6 most common off-line motor diagnostic techniques and the 5 most common on-line diagnostic techniques. Describe the motor fault that each of the techniques identifies.

**Technology or Other Requirements:** No Requirements

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** \$1695.00 USD, Prices may vary for events held outside the United States and Canada

**Duration:** 3 Days/24 Instructor Lead Hours, 5 Self Paced Hours

**CEU Award:** ALL-TEST Pro, LLC is authorized by IACET to offer 2.5 CEUs for this program

**Instructor:** William Kruger

**Dates and Locations:**

**2012**

March 5-7, 2012  
Baton Rouge, LA USA

October 1-3, 2012  
Houston, TX USA

June 4-6, 2012  
Chicago, IL USA

December 10-12, 2012  
Las Vegas, NV USA

August 13-15, 2012  
Orlando, FL USA

## **AT10202 2.5 Day Electrical Signature Analysis Seminar**

**Course Type:** Public Classroom

Two and a half days of ESA (On-line) training prepares you to evaluate many types of electric motor systems to improve the reliability and uptime of your plant. This course is appropriate for both supervisors and technicians. Course materials include Workbook, Motor Circuit Analysis Manual and Pattern Recognition Manual. Breakfast and Lunch are provided each day.

Upon successful completion of this course students should be able to:

- List the 6 most common off-line motor diagnostic techniques and the 5 most common on-line diagnostic techniques. Describe the motor fault that each of the techniques identifies.
- Explain the 4 Primary Maintenance Philosophies
- Describe the 3 phases of Predictive Maintenance
- List the different types of AC Motors, identify their components and describe the purpose of each component
- Describe the 4 stages of rolling element bearing failure and explain how to determine which stage a defective bearing is in
- Explain the operation of the different types of AC Electric Motors
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- Describe how electrical signature analysis (ESA) collects its signal
- Demonstrate how to change the resolution of the high frequency and the low frequency spectrum
- Explain the importance of sidebands in the FFT and discuss their meaning
- Demonstrate how to enter machine information in the ESA Software
- Demonstrate how to verify running speed is correct
- Perform an automatic analysis
- List what mechanical faults can be automatically analyzed with ESA
- Discuss the relationship of Dynamic Load to bearing life
- Discuss the effects of Resonance in a mechanical system and what it will do to the electrical spectrum
- Explain how to determine which gear is at fault when gear problems are diagnosed in the electrical spectrum

- List the motor electrical faults that can be automatically analyzed with ESA
- Define what is meant by pole pass frequency (PPF)
- Evaluate the condition of a squirrel cage rotor using the ESA spectrum and rotor severity
- Explain the difference between Static and Dynamic Eccentricity
- Define what is meant by Stator Electric Faults
- Explain the main purpose of the ALL-TEST PRO On-Line II (ATPOL II) and briefly describe it's features
- Use the ATPOL II to obtain data from a 3 phase AC Motor in the Remotely, Locally and Manual Modes
- Demonstrate the ability to upload data stored in the ATPOL II into the ESA software and generate a machinery report

**Technology or Other Requirements:** Students attending this course must bring their own laptop. Laptop must have administrative rights to install software. Minimum operating system and software to be installed on the laptop should be Windows XP, with Microsoft Word and Excel 2003. **NOTE: WE ARE NOT APPLE compatible, nor LINUX operating systems.**

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** \$1695.00 USD, Prices may vary for events held outside the United States and Canada

**Duration:** 2.5 Days/20 Instructor Lead Hours, 5 Self Paced Hours

**CEU Award:** ALL-TEST Pro, LLC is authorized by IACET to offer 2.5 CEUs for this program

**Instructor:** William Kruger

**Dates and Locations:**

**2012**

March 7-9, 2012  
Baton Rouge, LA USA

October 3-5, 2012  
Houston, TX USA

June 6-8, 2012  
Chicago, IL USA

December 12-14, 2012  
Las Vegas, NV USA

August 15-17, 2012  
Orlando, FL USA

## AT10203 5 Day Motor Circuit Analysis and Electrical Signature Analysis Seminar

**Course Type:** Public Classroom

Three days of MCA (Off-line) training prepares you to troubleshoot all types of electric motors, coils, and windings. Two and a half days of ESA (On-line) training prepares you to evaluate many types of electric motor systems to improve the reliability and uptime of your plant. This public course is appropriate for both supervisors and technicians. Course materials include Workbook, Motor Circuit Analysis Manual and Pattern Recognition. Breakfast and Lunch are provided each day.

Upon successful completion of this course students should be able to:

- Identify the components in the winding system; factors that determine Resistance(R), Inductance(L), Capacitance(C), and Impedance(I/F)
- Describe how changes in R, L, Z, and I/F affect the winding system
- Explain the Lenz Law, Ohms Law, and Faraday's Law
- Use the basic MCA instruments to manually measure R, L, Z, Fi and I/F
- List the different types of AC Motors, identify their components and describe the purpose of each component
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- List the main types of failures associated with AC Motors
- Describe the various techniques available to identify electrical failures in winding systems
- Explain the various measurements used in MCA
- Evaluate a motor's winding condition based on MCA measurements
- Explain the process for correcting MCA readings caused by "Rotor Position"
- Explain the purpose of the ALL-TEST PRO 31 (AT31) and ALL-TEST IV PRO (ATIV); and describe their features
- Obtain data from a 3 phase AC motor using the AT31 and the ATIV (on the AUTO and manual modes)
- Evaluate the condition of an AC Motor based on the measurements taken with the AT31 and ATIV
- Demonstrate the ability to enter data and evaluate the condition of an AC Motor using the Condition Calculator Software
- Demonstrate the ability to upload data stored in the ATIV onto the EMCAT software and generate a machinery report
- Explain the 4 Primary Maintenance Philosophies
- Describe the 3 phases of Predictive Maintenance

- List the 6 most common off-line motor diagnostic techniques and the 5 most common on-line diagnostic techniques. Describe the motor fault that each of the techniques identifies.
- Describe the 4 stages of rolling element bearing failure and explain how to determine which stage a defective bearing is in
- Explain the operation of the different types of AC Electric Motors
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- Describe how electrical signature analysis (ESA) collects its signal
- Demonstrate how to change the resolution of the high frequency and the low frequency spectrum
- Explain the importance of sidebands in the FFT and discuss their meaning
- Demonstrate how to enter machine information in the ESA Software
- Demonstrate how to verify running speed is correct
- Perform an automatic analysis
- List what mechanical faults can be automatically analyzed with ESA
- Discuss the relationship of Dynamic Load to bearing life
- Discuss the affects of Resonance in a mechanical system and what it will do to the electrical spectrum
- Explain how to determine which gear is at fault when gear problems are diagnosed in the electrical spectrum
- List the motor electrical faults that can be automatically analyzed with ESA
- Define what is meant by pole pass frequency (PPF)
- Evaluate the condition of a squirrel cage rotor using the ESA spectrum and rotor severity
- Explain the difference between Static and Dynamic Eccentricity
- Define what is meant by Stator Electric Faults
- Explain the main purpose of the ALL-TEST PRO On-Line II (ATPOL II) and briefly describe it's features
- Use the ATPOL II to obtain data from a 3 phase AC Motor in the Remotely, Locally and Manual Modes
- Demonstrate the ability to upload data stored in the ATPOL II into the ESA software and generate a machinery report

**Technology or Other Requirements:** Students attending this course must bring their own laptop. Laptop must have administrative rights to install software. Minimum operating system and software to be installed on the laptop should be Windows XP, with Microsoft Word and Excel 2003. **NOTE: WE ARE NOT APPLE compatible, nor LINUX operating systems.**

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** \$2295.00 USD, Prices may vary for events held outside the United States and Canada

**Duration:** 5 Days/40 Instructor Lead Hours, 7 Self Paced Hours

**CEU Award:** ALL-TEST Pro, LLC is authorized by IACET to offer 3.8 CEUs for this program

**Instructor:** William Kruger

**Dates and Locations:**

**2012**

March 5-9, 2012  
Baton Rouge, LA USA

October 1-5, 2012  
Houston, TX USA

June 4-8, 2012  
Chicago, IL USA

December 10-14, 2012  
Las Vegas, NV USA

August 13-17, 2012  
Orlando, FL USA

## On-Site Course Offerings

### AT10205 3 Day Motor Circuit Analysis Seminar

**Course Type:** On-Site Classroom

Three days of training at the customers site covering Off-Line testing. Price includes course material for up to 10 attendees, instructors travel & expenses in the USA & Canada. Develop your MCA skills, learn to easily trouble shoot and carry out predictive maintenance analysis.

Upon successful completion of this course students should be able to:

- Identify the components in the winding system; factors that determine Resistance(R), Inductance(L), Capacitance(C), and Impedance(I/F)
- Describe how changes in R, L, Z, and I/F affect the winding system
- Explain the Lenz Law, Ohms Law, and Faraday's Law
- Use the basic MCA instruments to manually measure R, L, Z, Fi and I/F
- List the different types of AC Motors, identify their components and describe the purpose of each component
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- List the main types of failures associated with AC Motors
- Describe the various techniques available to identify electrical failures in winding systems
- Explain the various measurements used in MCA

- Evaluate a motor's winding condition based on MCA measurements
- Explain the process for correcting MCA readings caused by "Rotor Position"
- Explain the purpose of the ALL-TEST PRO 31 ALL-TEST IV PRO and describe their features
- Obtain data from a 3 phase AC motor using the ALL-TEST PRO 31 and the ALL-TEST IV PRO (on the AUTO and manual modes)
- Evaluate the condition of an AC Motor based on the measurements taken with the ALL-TEST PRO 31 and ALL-TEST IV PRO
- Demonstrate the ability to enter data and evaluate the condition of an AC Motor using the Condition Calculator Software
- Demonstrate the ability to upload data stored in the ALL-TEST IV PRO onto the EMCAT software and generate a machinery report
- Explain the 4 Primary Maintenance Philosophies
- Describe the 3 phases of Predictive Maintenance

**Technology or Other Requirements:** Students/Attendees must have access to PC for software , demonstration and exercises. If the customer has already purchased the EMCAT software it must be installed by the IT Dept prior to the start of the course.

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** Prices vary depending on the required location of the course. Please contact ALL-TEST Pro, LLC for a detailed quotation.

**Duration:** 3 Days/24 Instructor Lead Hours, 5 Self Paced Hours

**CEU Award:** TBD

**Instructor:** William Kruger

**Dates and Locations:** Please contact ALL-TEST Pro, LLC for available dates.

## **AT10206 3 Day Electrical Signature Analysis Seminar**

**Course Type:** On-Site Classroom

Three days of training at the customers site covering On-Line testing. Price includes course material for up to 10 attendees, instructors travel & expenses in the USA & Canada. Develop your ESA skills; learn to examine the entire AC induction motor system.

Upon successful completion of this course students should be able to:

- List the 6 most common off-line motor diagnostic techniques and the 5 most common on-line diagnostic techniques. Describe the motor fault that each of the techniques identifies.
- Explain the 4 Primary Maintenance Philosophies
- Describe the 3 phases of Predictive Maintenance
- List the different types of AC Motors, identify their components and describe the purpose of each component
- Describe the 4 stages of rolling element bearing failure and explain how to determine which stage a defective bearing is in
- Explain the operation of the different types of AC Electric Motors
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- Describe how electrical signature analysis (ESA) collects its signal
- Demonstrate how to change the resolution of the high frequency and the low frequency spectrum
- Explain the importance of sidebands in the FFT and discuss their meaning
- Demonstrate how to enter machine information in the ESA Software
- Demonstrate how to verify running speed is correct
- Perform an automatic analysis
- List what mechanical faults can be automatically analyzed with ESA
- Discuss the relationship of Dynamic Load to bearing life
- Discuss the effects of Resonance in a mechanical system and what it will do to the electrical spectrum
- Explain how to determine which gear is at fault when gear problems are diagnosed in the electrical spectrum
- List the motor electrical faults that can be automatically analyzed with ESA
- Define what is meant by pole pass frequency (PPF)
- Evaluate the condition of a squirrel cage rotor using the ESA spectrum and rotor severity
- Explain the difference between Static and Dynamic Eccentricity
- Define what is meant by Stator Electric Faults
- Explain the main purpose of the ALL-TEST PRO On-Line II (ATPOL II) and briefly describe its features
- Use the ATPOL II to obtain data from a 3 phase AC Motor in the Remotely, Locally and Manual Modes
- Demonstrate the ability to upload data stored in the ATPOL II into the ESA software and generate a machinery report

**Technology or Other Requirements:** Students/Attendees must have access to PC for software demonstration and exercises. If the customer has already purchased the ESA software it must be installed by the IT Dept prior to the start of the course.

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** Prices vary depending on the required location of the course. Please contact ALL-TEST Pro, LLC for a detailed quotation.

**Duration:** 3 Days/24 Instructor Lead Hours, 5 Self Paced Hours

**CEU Award:** TBD

**Instructor:** William Kruger

**Dates and Locations:** Please contact ALL-TEST Pro, LLC for available dates.

## **AT10207 4 Day Motor Circuit Analysis Seminar**

**Course Type:** On-Site Classroom

Combine both technologies into Four days of training at the customer's site covering Off & On-Line testing. Price includes course material for up to 10 attendees, instructors travel & expenses in the USA & Canada. Learn how to implement on & off line technologies to gain the maximum benefit of these exciting technologies in analysis of the entire AC induction motor system.

Upon successful completion of this course students should be able to:

- Identify the components in the winding system; factors that determine Resistance(R), Inductance(L), Capacitance(C), and Impedance(I/F)
- Describe how changes in R, L, Z, and I/F affect the winding system
- Explain the Lenz Law, Ohms Law, and Faraday's Law
- Use the basic MCA instruments to manually measure R, L, Z, Fi and I/F
- List the different types of AC Motors, identify their components and describe the purpose of each component
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- List the main types of failures associated with AC Motors
- Describe the various techniques available to identify electrical failures in winding systems
- Explain the various measurements used in MCA
- Evaluate a motor's winding condition based on MCA measurements
- Explain the process for correcting MCA readings caused by "Rotor Position"
- Explain the purpose of the ALL-TEST PRO 31 (AT31) and ALL-TEST IV PRO (ATIV); and describe their features

- Obtain data from a 3 phase AC motor using the AT31 and the ATIV (on the AUTO and manual modes)
- Evaluate the condition of an AC Motor based on the measurements taken with the AT31 and ATIV
- Demonstrate the ability to enter data and evaluate the condition of an AC Motor using the Condition Calculator Software
- Demonstrate the ability to upload data stored in the ATIV onto the EMCAT software and generate a machinery report
- Explain the 4 Primary Maintenance Philosophies
- Describe the 3 phases of Predictive Maintenance
- List the 6 most common off-line motor diagnostic techniques and the 5 most common on-line diagnostic techniques. Describe the motor fault that each of the techniques identifies.
- Describe the 4 stages of rolling element bearing failure and explain how to determine which stage a defective bearing is in
- Explain the operation of the different types of AC Electric Motors
- Determine Motor Shaft Speed based on Measured Values of Voltage, Current, Nameplate Speed and Rated Power
- Describe how electrical signature analysis (ESA) collects its signal
- Demonstrate how to change the resolution of the high frequency and the low frequency spectrum
- Explain the importance of sidebands in the FFT and discuss their meaning
- Demonstrate how to enter machine information in the ESA Software
- Demonstrate how to verify running speed is correct
- Perform an automatic analysis
- List what mechanical faults can be automatically analyzed with ESA
- Discuss the relationship of Dynamic Load to bearing life
- Discuss the affects of Resonance in a mechanical system and what it will do to the electrical spectrum
- Explain how to determine which gear is at fault when gear problems are diagnosed in the electrical spectrum
- List the motor electrical faults that can be automatically analyzed with ESA
- Define what is meant by pole pass frequency (PPF)
- Evaluate the condition of a squirrel cage rotor using the ESA spectrum and rotor severity
- Explain the difference between Static and Dynamic Eccentricity
- Define what is meant by Stator Electric Faults
- Explain the main purpose of the ALL-TEST PRO On-Line II (ATPOL II) and briefly describe it's features
- Use the ATPOL II to obtain data from a 3 phase AC Motor in the Remotely, Locally and Manual Modes

- Demonstrate the ability to upload data stored in the ATPOL II into the ESA software and generate a machinery report

**Technology or Other Requirements:** Students/Attendees must have access to PC for software demonstration and exercises. If the customer has already purchased the EMCAT or ESA software it must be installed by the IT Dept prior to the start of the course.

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** Prices vary depending on the required location of the course. Please contact ALL-TEST Pro, LLC for a detailed quotation.

**Duration:** 4 Days/32 Instructor Lead Hours, 5 Self Paced Hours

**CEU Award:** TBD

**Instructor:** William Kruger

**Dates and Locations:** Please contact ALL-TEST Pro, LLC for available dates.

## **AT10208 1 Day Additional Training to cover DC Motors, Transformers and Synchronous Motors Only**

**Course Type:** On-Site Classroom

AT10208 1-Day Additional Training to cover DC motors, Transformers and synchronous motors only in conjunction with the AT10207 4-Day course.

Upon successful completion of this course students should be able to:

- List the different types of DC Motors, identify their components and describe the purpose of each component
- List the main types of failures associated with DC Motors
- Briefly describe how to perform MCA on DC Motors
- List the different types of Transformers, and list their main purposes
- List the 4 ways to connect 3 phase transformers, describe which applications each different arrangement is used
- List the main types of failures associated with transformers
- Briefly describe how to perform MCA on 3 phase transformers

**Technology or Other Requirements:** Students/Attendees must have access to PC for software demonstration and exercises. If the customer has already purchased the EMCAT software it must be installed by the IT Dept prior to the start of the course.

**Format:** Blended, Self-Paced and Instructor Lead Classroom

**Assessment Style:** Graded Test, Pass/Fail

**Cost:** Prices vary depending on the required location of the course. Please contact ALL-TEST Pro, LLC for a detailed quotation.

**Duration:** 1 Day/8 Instructor Lead Hours, .5 Self Paced Hours

**CEU Award:** TBD

**Instructor:** William Kruger

## Consulting

### **AT10212 On-Site Customer Consulting/Hands-on Training**

Consulting is offered to all customers who have purchased ALL-TEST PRO Equipment and wish to gain hand-on experience with the equipment and training tailored to their application needs. Course content is developed specifically for the client. Please contact our office for more information or to speak directly with a course developer.