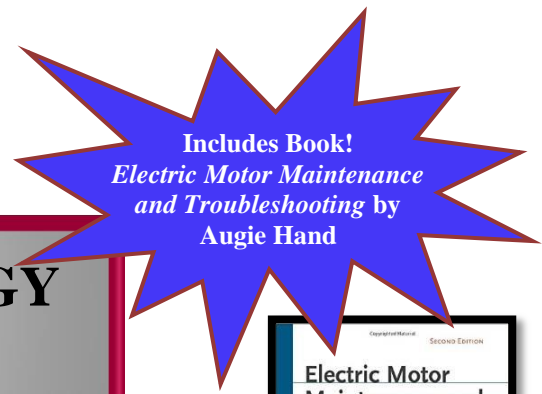
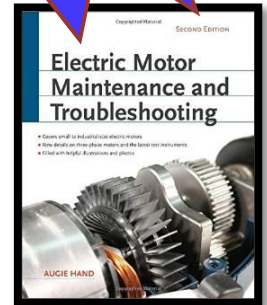




**ADVANCED MOTORTECH LLC**  
 4951 71ST AVENUE NORTH  
 PINELLAS PARK, FL 33781-4428 USA



**Includes Book!**  
*Electric Motor Maintenance  
 and Troubleshooting* by  
 Augie Hand



# ELECTRIC MOTOR TECHNOLOGY FOR NON-ENGINEERS

**October 4<sup>th</sup>, 5<sup>th</sup>, & 6<sup>th</sup> - Join Us in St. Louis, Missouri  
 At the Marriott St. Louis Airport!**

**Learn practical understanding & essential concepts of electrical motor technology from the experts. The only course of this kind available anywhere!**

- ◆ Types of Motors & The Differences
- ◆ Key Electric Motor Terminology, Nameplate Data
- ◆ Operating Principles, Functions of the Parts
- ◆ Customer View of Application & Selection Choices
- ◆ Energy Efficiency & Motor Economics
- ◆ Key Issues of Manufacturing, Installing, & Operating



### **Objectives and Benefits:**

This course provides a foundation of technical and practical principles used for electric motor design, construction and operation. The focus is on topics important to sales, customer service, and business coordination of those involved with electric motors. The intended audience is non-engineers, or engineers not familiar with electric motors, who work daily with providing or using electric motors.

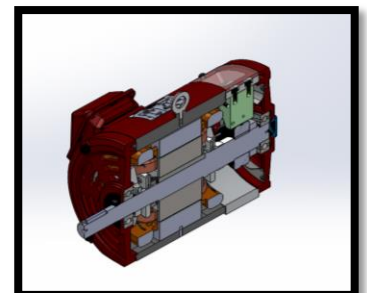
The purpose of this one-of-a-kind course is to present a solid understanding of the characteristics of electric motors to support activities important to sales persons, customer service staff, OEM manufacturers, purchasers, and users of electric motors.

Your expert instructor will help you understand the technology of electric motors and then delve into the 'why' and 'what it means' of the many principles, design details, materials used, and end-user issues. Instruction assumes no prior formal technical education.

A real-world, common sense attitude is used to help demonstrate how key choices in terms of performance, quality and value affect the motor delivered to the customer. Primary focus will be on fractional and integral horsepower NEMA-frame induction machines, including both random-wound and form-wound configurations. Other motor types will be discussed to illustrate their unique features and benefits. Most of the material is on topics and issues common to all motors, as well as most generators.

### **Those who will benefit:**

- ◆ Sales, Marketing & Customer Service Personnel at All Levels
- ◆ Suppliers to Electric Motor Businesses
- ◆ Facility Engineers, Users, & Purchasers of Electric Motors
- ◆ Application Engineers for Motor Manufacturers, OEMs & Distributors
- ◆ Electrical Contractors & Field Service Technicians
- ◆ Engineers New to Electric Motors



## **\*Course Schedule\***

### **Day 1: Tuesday, October 4<sup>th</sup>**

**7:30-8:00 Registration**

**8:15 Session Begins**

#### **1. Fundamentals of Electric Motors**

- Volts, Amps, Electromagnets
- Principle of Energy Conversion
- Meaning of Key Terminology
- Types of Motors, How They Differ
- Importance of NEMA MG1

#### **2. Understanding Electric Power**

- AC versus DC
- Single Phase versus Three Phases
- Why so Many Voltages?
- Wye versus Delta
- Series versus Parallel Circuits

#### **3. Documentation & Info Delivered with Motors**

- Nameplates & Connection Diagrams
- Box Labels: What They Care About
- Installation & Operating Manuals
- Safety Issues
- Terminals Marking

#### **4. Construction & Operation**

- Proper & Jargon Terminology
- Functions of the Electrical Parts
- Functions of the Mechanical Parts
- Energy & Losses
- Thermal Design Issues
- How Motor Performance Data is Used

#### **5. Motor Component Details – What is Important & Why**

- Laminations
- Windings & Insulations
- Rotors & Armatures
- Housing & Enclosure
- Bearings & Shaft, Other

**16:45 Session Ends**

### **Day 2: Wednesday, October 5<sup>th</sup>**

**8:15 Session Begins**

#### **6. How a Motor is Manufactured**

- Punching & Stacking Laminations
- Winding Coils & Getting into the Slots
- Making the Shaft & Rotor
- Rotor Sub-Assembly
- Stator Sub-Assembly
- Assemble Complete Motor
- Testing & Finish

#### **7. Motor Selection from the Customer Viewpoint**

- What is the Application?
- Motor Specifications
- What are the Choices? Why?
- What the Customer 'Sees' Before Purchase
- What the Customer 'Sees' After Delivery

#### **8. Energy Efficient Motors**

- Motor Economics 101
- The Repair or Replace Decision
- What is Different?
- Standards for Motor Efficiency
- Evolution of Energy Efficient Motors
- New Legislation: It's the Law!
- On Testing for Motor Efficiency

#### **9. Installation & Startup**

- Important Mounting Features
- Alignment Issues
- Electrical Connections
- Shaft Attachments
- Check-Out, Running Tests

#### **10. Adjustable Speed Drives**

- Reasons to Use ASD's
- Basic Principles
- Effects on the Motor
- How ASD's are Selected
- Problems That Can Occur

**16:45 Session Ends**

### **Day 3: Thursday, October 6<sup>th</sup>**

**8:15 Session Begins**

#### **11. Common Failure Causes**

- Bearings & Shaft
- Cooling System, Leads, Coils
- Environment, Contamination & Physical Damage
- Vibration, Balance, Mounting
- Installation Errors

#### **12. Motors with Special Features**

- Vertical Pumps
- Explosion Proof Rating
- Starting Options
- Submersible Motors
- Gearmotors
- Hoist Motors

#### **13. Small Motor Overview –**

##### **Principles, Functions, Parts**

- Single Phase Induction Motors
- Multispeed Fan Motors
- Shaded Pole Motors
- Power Tool & Appliance Motors
- Servomotors

#### **14. Large Motor Overview**

- Above NEMA Frame Sizes
- Higher Voltages Than 480 VAC
- Fabricated Frame Design Issues
- Weather Proof Enclosures
- Cooling Systems, Top Hat

#### **15. New Technologies & New Trends in Manufacturing**

- Copper Rotor Cage
- Fractional Slot Winding
- Permanent Magnet Motors
- High Speed, Axial Flux, Transverse Flux
- Motor Management Systems

**15:00 Closing & Adjourn**

***We will keep you nourished!***

*Daily schedule includes:*

*Mid-morning break (10:00)*

*Lunch (12:00-13:15)*

*Afternoon break (15:30)*

**Onsite training is now available!**

**Send inquiries to**

**[sales@advancedmotortech.com](mailto:sales@advancedmotortech.com)**

*\*Course content is subject to change. All issued material may not be covered contingent on time used for Q&A*

### **Instructor:**



**Dr. Keith W. Klontz** is President & CEO of Advanced MotorTech LLC, an engineering services company with emphasis on electric machine design. He holds BS & MS degrees in Electrical Engineering from the University of Illinois, Champaign-Urbana, and a Ph.D. in Electrical Engineering from the University of Wisconsin-Madison. Dr. Klontz is a world-recognized expert in electric machine design and has over 40 years hands-on experience with electric machine applications and design engineering. He has been involved in the research, development, testing, repair, and training of high performance machines from 10 Watts to 50 MW. Recent work includes design of permanent magnet alternators, IPM traction motors, brushless d.c. motors, brush d.c. motors, high efficiency induction motors, and very high power density machine.

**Tuition Fees Include:**

- Extensive Training Manual (Full Color )
- Hard Cover Book “Electric Motor Maintenance and Troubleshooting” by Augie Hand
- Mid-Morning and Afternoon Break w/Refreshments and Lunch Each Day
- Signed Certificate of Course Completion

**Accommodations:**

A block of rooms has been reserved at the beautiful **Marriott St. Louis Airport**.  
 Reservations should be made **before September 20<sup>th</sup>**.  
[Book your discounted room rate in this reservation link!](#)



**Enrollment:**

- Yes! Please enroll me in **Course No. EMTNE-1016**  
**Electric Machine Technology For Non-Engineers – October 4-6, 2016**  
**Fee: \$1725.00 (USD only)**

**Payment:** (Deadline: \*must be received before start of course)

- MasterCard       VISA       Amex
- Cardholder Name \_\_\_\_\_
- Card No. \_\_\_\_\_
- Exp \_\_\_/\_\_\_/\_\_\_      Billing Zip \_\_\_\_\_ Security Code: \_\_\_\_\_

Check enclosed (payable to Advanced MotorTech, LLC)

Bill my company       Purchase Order

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (      ) \_\_\_\_\_ Email \_\_\_\_\_

**How did you hear about us?**

- Email/Constant Contact       Electrical Apparatus Magazine Ad
- Social Media (Circle All That Apply: Facebook/Twitter/LinkedIn)
- Other (Please Specify) \_\_\_\_\_

\* Cancellations received 14-30 days before the course are subject to a 15% late cancellation fee. Cancellations made 7-13 days before the course starts are subject to a 50% cancellation fee. Cancellations made less than 7 days of the course beginning are subject to the full fee.

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