



## In House Programs

# T<sub>2</sub>G

## TECHNICAL TRAINING GROUP

## Motors - Design, Application and Analysis

This 2 Day class shows you the fundamentals of motor operation and selection as well as how to design motor circuits. Learn the basics of variable frequency drives and how to model various motor parameters for determining a motors effect on a power distribution system. Voltage flicker, harmonics and torque speed analysis will all be discussed.

Course Credit: 2 Days - 1.6 CEUs or 16 PDHs



### Course Agenda

#### DAY ONE

##### TYPES OF MOTORS

Induction, Synchronous, Salient Pole, Wound Rotor

##### MOTOR FUNDAMENTALS

Motor Characteristics, Synchronous and Asynchronous Speed, Slip, Horsepower Ratings, NEMA Design, Motor Efficiency, Voltage Ratings

##### NEC® REQUIREMENTS

NEC® Article 430 Requirements, Nameplate Information, Short Circuit Protection, Overload Selection, Conductor Selection, Service Factor, Sizing Circuits for Multiple Motors

##### DUTY CYCLES

Duty Cycle Ratings, Sizing Motors for Varying Duty Cycle

##### MOTOR STARTING

Starter Sizes, Reduced Voltage Starting, Motor Starting Time Current Curves, Torque Speed Acceleration Curves

##### MOTORS AND POWER FACTOR

Reactive Power Requirements, Sizing Power Factor Correction Capacitors for Motor Circuits

##### VARIABLE FREQUENCY DRIVES

Torque Requirements, Load Characteristics, Vector Drives, V/F Control, PWM Drives, Sizing Requirements, Other Technical Considerations

#### DAY TWO

##### POWER SYSTEM ANALYSIS OF MOTORS

Thevenin Equivalent Circuits, RLC Circuits, Series and Parallel Circuits, Wye Delta Conversions

##### SOURCE MODELING AND STRENGTH

Effect of Source Strength on Motor Starting and Operation, Per Phase Analysis, Short Circuit Considerations, Motor Contribution

##### PER UNIT MODELING OF MOTORS

Base Quantities, Per Unit Examples, Per Unit Worksheets, Developing Impedance Diagrams for Problem Solving, Induction Machine Modeling

##### MOTOR MODELING

Motor Starting and Voltage Drop, Voltage Flicker, Flicker Curve Interpretation, Impact of Source on Voltage Flicker

##### HARMONIC CONSIDERATIONS

Drives and Non Linear Loads, Constant Current Source Model, Harmonic Simulations, Capacitors and Resonance, Total Harmonic Distortion Calculations, IEEE 519 Limits, Point of Common Coupling, Relationship of Load vs. Source Strength in Determining Limits

Copyright © 2006 - Technical Training Group

For more information contact:  
T<sub>2</sub>G Technical Training Group® at 800-874-8883.

See sample videos of Jim's teaching style at:  
[www.brainfiller.com](http://www.brainfiller.com)