Single Phase Induction Motor Course Outline

I. Magnetics

A. Maxwell's Equations
B. Ampere's Law
C. Faraday's Law
D. Gauss' Law for Magnetic Fields

II. Magnetic Circuits

A. Flux
B. Magneto Motive Force (MMF)
C. Reluctance
D. Permeance
E. Permeability
F. Inductances
G. Leakage
H. Steel Selection
I. Core Loss
J. Magnetization Curves

III. Electromagnetic Forces

A. Forces on Conductors
B. Electromagnetic Torque
C. Motor Action
D. Energy Approach (courtesy of Earl Richards, Ph.D.)

IV. Mechanics of Motors

A. Ball Bearings
B. ABEC Grades
C. Sleeve Bearings
D. Shafts and Shaft materials
E. Shafts and Bearings
F. Stator Cores
G. Stack In Die Cores
H. Welded Cores
I. Bonded cores
J. Cleated Cores
K. Housings
L. Motor Assembly
M. Magnet Wire
N. Insulation
O. Stator and Coil Assemblies
P. Windings

Q. Sinusoidal Winding Distribution
R. Lap Windings and Concentric Windings
S. Rotor Assemblies
T. Thermal Protection Electrical Spacing

V. Induction Motor Theory

A. Theory of Induction
B. Single Phase Equivalent Circuit
    Revolving field Theory
    Cross field Theory
C. Slot constants
D. Reactance
E. Resistance
F. Magnetic Circuit Calculations
G. Saturation
H. Performance Calculations

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William H. Yeadon, P.E., Yeadon Energy Systems., Iron River, Mich., has over 40 years experience in the electric motor industry including work in design and development, production, quality assurance and engineering management. Prior to starting his consulting firm in 1993, he worked at A.O. Smith, Warner Electric and Barber-Colman Co., Motor Div.