1. Introduction
   * NDT Introduction
   * Facility Tour & Method Demonstrations

2. Introduction to Magnetic Particle
   How Magnetic Particle Works
   * Basic Principles Of MT
   * Magnetic Particle History
     o Source Of Magnetism
     o Ferromagnetic Materials
     o Diamagnetic Materials
     o Paramagnetic Materials

3. Magnetic Domains
   Magnetic Field Characteristics
   * Magnetic Fields Of Force
   * Magnet Properties
     o Other Sources Of Magnetic Fields
     o Magnetic Fields Produced By Coils
     o Quantifying Magnetic Properties

4. Hysteresis Loop Magnetic Properties
   Hysteresis Loop Magnetic Properties
   * Retentivity
   * Residual Magnetism/ Residual/Flux
   * Coercive Force
   * Permeability
   * Reluctance
   Magnetic Field Orientation
   * Circular
   * Longitudinal
   ◆ Review Of Training Center Magnetic Particle Systems

5. Magnetizing Methods
   Direct Induction
   * Head Shots
   * Prods, Clamps Etc.
   Indirect Induction
   * Yoke
   * Central Bar Conductor (CBC)
   * Coil / Solenoids
6. Magnetizing Currents

Magnetizing Currents
  * Alternating Current
    o Rectified Alternating Current
    o Half Wave (HWAC)
    o Full Wave Single Phase (FWAC)
    o Three Phase Full Wave (FWAC)
  * Direct Current

7. Magnetizing Fields

Longitudinal Magnetic Fields
  * Coil Shot
  * Amperage Calculations

Circular Magnetic Fields
  * Coil Shot
  * Solid Central Conductor
  * Hollow Central Conductor

Skin Effect (AC)

8. Demagnetization

Measuring Field Strength
  * Field Strength Indicators (FSI)
  * Hall Effect Meter (Gauss/Tesla)
  * Pie Gage
  * QQI's

9. Magnetic Particle Equipment

Portable Magnetization Equipment
  * Permanent Magnets
  * Electro Magnetic Yokes (AC/DC)
  * Prods
  * Portable Coils
  * Portable Power Supply

Stationary Magnetization Equipment
  * Wet Horizontal

Characteristics of Wet Horizontal Equipment
  * Head Shot System
  * Coil Shot System
  * Central Bar Conductors
  * Multi Directional

Lighting
  * Ultra Violet Lights (Black Lights)
  * White Lights
9. Magnetic Particle Equipment

Magnetic Field Indicators
* Gauss Meters (Hall Effect Meters)
* QQI’s - Quantitative Quality Indicators (Advantages & Disadvantages)
* Pie Gages (Advantages & Disadvantages)

Magnetic Particle Materials
* Dry Magnetic Particles
* Wet Magnetic Particles
* Fluorescent Magnetic Particles

Suspension Liquids
* Petroleum Based
* Water Based

10. Magnetic Particle Inspection

Dry Particle Inspection
* Process Steps

Wet Particle Inspection
* Process Steps
* Continuous Technique
* Residual Technique

Field Direction & Intensity
* Determining Field Direction with QQI, Gauss Gage, Pie Gage

Field Direction & Intensity
* Hall Effect Gage
* Transverse Probes
* Axial Probes

11. Magnetic Particle Equipment Quality Checks

* Particle Concentration & Condition
* Water Break Test
* Internal Short Test
* Ammeter Check
* Quick Break Test
* Ketos Ring
* Lighting Black & White Lights

12. The Human Eye

Eye Adaptation
How The Eye Works
Photo Receptors (Rods & Cones)
Contrast Sensitivity

13. Test Sample Indications

Sample Test Pieces With Indications
14. Inspection Procedures & Standards
   * Understanding And Interpreting Specifications, Standards
   * Following Written Procedures
   * General Documentation Procedures and Record Keeping

15. Material Processes
   * Inherent Discontinuities
   * Processing Discontinuities
     o Primary
     o Secondary
   * In Service Discontinuities

16. Laboratory Exercises
   * System Maintenance and Operational Checks
   * Technique Development and Applications
   * Parts Processing
   * Interpretation and Evaluation