RELIABILITY TOOLS AND INTEGRATION FOR THE DESIGN PHASE

OBJECTIVES

This course will look at reliability tools that are used in the design phase of a project after the reliability has been defined. Predictions, FMECAS, derating, and other forms of reliability analysis are performed here. These tools will only have an impact on the design if they are done very early in the design process.

WHO SHOULD ATTEND

This course is intended for hardware, software, and reliability engineers involved in the design of a product.

OUTLINE

- **Elements of a Reliability Program**
  - Basic Definitions
  - Reliability vs. Cost
  - Product Life Cycle Matrix
  - Integration Phases
    - Integration in the Concept Phase
    - Integration in the Design Phase
    - Integration in the Prototype Phase
    - Integration in the Manufacturing Phase
- **Integration in the Design Phase**
  - Reliability Modeling and Predictions
    - Objectives of a Reliability Prediction
    - Standards Available
    - General Assumptions
    - Inputs Required
    - Available Methods

- Multiplier Factors
- Examples
- How to use Modeling and Predictions in preparation for HALT and HASS

- Failure Modes, Effects, and Criticality Analysis (FMECA)
  - Objectives of a FMECA
  - Standards Available
  - Design FMECA
  - User FMECA
  - Software FMECA
  - Process FMECA
  - Top-down Approach
  - Bottom-up Approach
  - Examples
  - How to use a FMECA in preparation for a HALT
- Derating Analysis
  - What is derating
  - How to apply principles
  - How to use derating analysis in preparation for a HALT
- Design of Experiments
  - Advantages over conventional experiments
  - How to perform
  - When to use Design of Experiments in Conjunction with HALT and HASS
- Fault Tree Analysis (FTA)
  - When to use
  - How to perform
  - When to Use FTA in Conjunction with HALT and HASS
- Stress-Strength Analysis
  - Definition
  - How to perform
  - How to use in conjunction with HALT and HASS
- Tolerance and Worst Case Analysis
  - Definition
  - Types of Tolerance Analyses
  - When to use and when not to use
  - How to perform

- How to use in conjunction with HALT
- Human Factors Analysis
  - How to perform
  - Considerations for Safety, Maintainability, and Preventive Maintenance
  - How to use Human Factors Analysis in Planning for HALT and HASS
- Maintainability and Preventive Maintenance (PM)
  - Definitions
  - How to perform a Maintainability Prediction
  - How to decide on a PM schedule
  - How to Use Maintainability and PM in Conjunction with HALT and HASS

- **Summary**
  - Reliability vs. Cost
  - Summary of Phases
  - Summary Tools within this Phase
  - Benefits of Integration
  - Next Steps
    - Implementation
    - Further Education in Integration
    - Related courses by Ops A La Carte
  - Contact Information