

## Day 1

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### Reliability Prediction

- Reliability Prediction Overview
  - What is it?
    - What is reliability?
    - What is reliability prediction analysis?
    - History of Reliability Prediction Analysis
    - Parts Count & Parts Stress Methods
  - Why is it done?
  - What are the available handbooks?
    - What are they?
    - What model Exist?
    - How do I chose ?
    - Commonly Used Handbooks?
  - What are the outputs?
    - Failure Rate ?
    - MTBF ?
    - MTTR ?
    - Reliability ?
    - Availability ?
- Steps for Performing Reliability Prediction Analysis
  - Select the prediction handbook
  - Define the system
  - Define the components
  - Calculate
  - Generate output(s)
  - Review/analyze
- Reliability Prediction Analysis FAQs
  - No component model exists for my component?
  - I have mechanical components?
  - I want to adjust the predicted failure rates for the specific application?
  - I want to include printed circuit boards and/or connections?
- Other Considerations for Reliability Prediction Analysis
  - Derating
  - Burn-in

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## Day 2

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### Reliability Prediction & Weibull Analysis (cont.)

- Introduction to Windchill Quality Solutions
  - Important Terminology
  - Opening PTC Windchill Quality Solutions 10.2
  - The Start Page
  - Auto-Hide Windows
  - Project Navigator
  - Module Selections Toolbar
  - PTC Windchill Quality Solutions 10.2 Help & References
- Data Entry
  - Creating the System
  - Inserting assemblies
  - Assigning assembly properties
  - Inserting parts
  - Assigning part properties
  - Importing parts
- Data Analysis
  - How to calculate
  - Where to review calculated results
- Data Output
  - Graphing reliability prediction data
  - Reporting reliability prediction data
  - Exporting reliability prediction data
- Practical Exercises
- Miscellaneous Advanced Topics
  - Incorporating Test or Field Data
  - Modeling User-Defined Parts
  - Modeling Hybrids
  - Modeling Boards and Connections
  - Using the Common Library Project
- Introduction to Weibull Analysis

## Day 3

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### Failure Modes, Effects & Criticality Analysis (FMECAs)

- Introduction
- FMEA Overview
  - What is FMEA/FMECA?
  - Why is FMEA done?
  - What is the output of FMEA?
  - How is FMEA done?
  - What are the limitations?
  - Where can I learn more?
- Data Entry
  - Creating the System
  - Creating the FMEA
  - Creating the tree structure, if applicable
  - Inserting items, modes, causes, effects, and actions
  - Entering FMEA data
- Data Analysis
  - How to calculate
  - Where to review calculated results
- Data Output
  - Graphing FMEA data
  - Reporting FMEA data
  - Exporting FMEA data
- Practical Exercise – Digital Recorder
- Additional Features
  - Options
  - Project Properties
  - File Properties
  - FMEA Templates
  - FMEA Modes Library

## Day 4

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### Reliability Block Diagrams (RBDs)

- Block Diagram Analysis Overview
  - What is block diagram analysis?
  - Why block diagram analysis done?
  - What is the output of block diagram analysis?
  - How is block diagram analysis done?
  - What are the limitations?
  - Where can I learn more?
- Data Entry
  - Inserting a new black block diagram
  - Inserting blocks
    - Manually
    - From RBD Block Library
  - Connecting blocks
  - Assigning block properties
  - Assigning Redundancy
  - Expanding block diagrams
- Data Analysis
  - How to calculate
  - Where to review calculated results
- Data Output
  - Graphing RBD data
  - Reporting RBD data
  - Exporting RBD data
- “What if” Analysis with RBD
- Redundancy calculations with RBD
  - Parallel systems
  - Load Sharing Systems
  - Series Systems
  - Stand-by Systems
- Monte Carlo Simulation with RBDs

## Day 5

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### Fault Tree Analysis (FTAs)

- Introduction
- FTA Basics
  - What is Fault Tree Analysis?
  - Use of Fault Tree Analysis (FTA)
  - Qualitative vs. Quantitative FTA
  - Elements of Fault Tree
    - Top Event
    - Intermediate Event(s)
    - Terminal Event(s)
    - Event Symbols
    - Logic Symbols (Gates)
  - Types of Fault Trees
    - Static Coherent
    - Static Non-Coherent
    - Dynamic
  - Fault Tree Construction
  - Probability Theory/Boolean Algebra
- Qualitative Analysis
  - Cut Sets
  - Cut Set Generation Methods
  - Success Trees
  - Path Sets
- Quantitative Analysis
  - Quantitative Analysis Type
    - Time Dependent FTA
    - Lambda Tao FTA
    - SAE ARP4754A and ARP4761 FTA
  - Methods for Calculation
    - Cut Set Summation
    - Cross Product
    - Esary Proschan
    - Boolean Logic for Static Gate Analysis
    - Markov Analysis for Dynamic Gate Analysis
- References

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