Autodesk® Algor® Simulation – Course Agenda

- Introduction
    - Course Overview
    - Overview of Services and Support
        - System Requirements
        - Installing and Running Algor
        - Algor User's Guide
        - My Account Area
        - Tutorials
        - Webcasts
        - Web Courses
        - Updates
        - How to Receive Technical Support
    - Background of FEA
        - What is Finite Element Analysis?
        - Basic FEA Concepts
        - How Does FEMPRO Work?
        - The General Flow of an Analysis in FEMPRO
    - Stress and Strain Review
        - Equations Used in the Solution
        - Limits of Static Stress with Linear Material Models
        - Mechanical Event Simulation (MES) Overcomes Limitations
        - Hand-Calculated Example
    - Heat Transfer Review
        - Equations Used in the Solution
    - Linear Dynamics Review
- Example Using FEMPRO (Linear Static Stress Analysis)
- Working with CAD Solid Models and Static Stress
    - Archiving a Model
    - Types of Brick Elements
    - Generating Meshes for CAD Models
    - Tips for Modeling with CAD Solid Model Software for FEA
    - Loading Options
        - Load Cases
    - Constraint Options
        - Modeling Symmetry and Antisymmetry
    - Design Scenarios
    - FEA Object Groups
    - Local Coordinate Systems

- o Defining Materials and Using the Material Library Manager
  - ▪ Adding Material Libraries and Material Properties
- o Examples of Loads and Constraints
  - ▪ When to Use Displacement Boundary Elements
  - ▪ Using Local Coordinate Systems
  - ▪ Using Surface Variable Loads
- o Individual Exercise: Full to Quarter-Symmetry Model Comparison
- Results Evaluation and Presentation
  - o Background on How Results are Calculated
  - o How to Evaluate Results
    - ▪ Displacement Results
    - ▪ Stress Results
    - ▪ Reaction Force Results
    - ▪ Inquiring on the Results at a Node
    - ▪ Graphing the Results
  - o Presentation Options
    - ▪ Contour Plots
    - ▪ Image File Creation
    - ▪ Animating FEA Results
    - ▪ Using the Configure Report Utility
  - o Individual Exercise: Evaluation of Results and Generation of a Report
- Midplane Meshing and Plate Elements
  - o Meshing Options
  - o Element Options
    - ▪ Plate Theory and Assumptions
  - o Loading Options
    - ▪ Example of Defining the Element Normal Point
  - o Result Options
  - o Individual Exercise: Midplane Meshing and Plate Element Orientation
- Meshing
  - o Refinement Options
    - ▪ Automatic Refinement Points
    - ▪ Global Refinement Options
  - o Creating Joints
  - o Creating Bolts
  - o Mesh Convergence Testing
    - ▪ Performing a Mesh Study
  - o Individual Exercise
- Introduction to Contact
  - o Uses for Contact

- o Contact Options
    - Setting up Contact Pairs
    - Types of Contact
    - Friction
    - Surface Contact Direction
  - o Contact Examples: How to Model Shrink Fits
  - o Result Options
  - o Individual Exercise: Linear Contact
- Introduction to Linear Dynamics
  - o Modal Analysis
  - o Lumped Masses
  - o Load Stiffening
  - o Group Example: Natural Frequency (Modal) Analysis
  - o Critical Buckling Analysis
  - o Result Options
  - o Other Linear Dynamics Analyses (Self-Study)
  - o Individual Exercise: Modal and Critical Buckling Analysis
- Steady-State Heat Transfer
  - o Group Example
  - o Meshing Options
    - Thermal Contact
  - o Element Options
    - Rod Elements
    - 2-D Elements
    - Plate Elements
    - Brick and Tetrahedral Elements
  - o Loading Options
    - Body-to-Body Radiation
    - Controlling Nonlinear Iterations
  - o Result Options
  - o Individual Exercise
- Transient Heat Transfer
  - o When to Use Transient Heat Transfer
  - o Element Options
  - o Loading Options
    - Load Curves
    - Controlling Nodal and Surface Applied Temperatures
  - o Result Options
  - o Individual Exercise
- Thermal Stress

- - Performing a Thermal Stress Analysis
  - Individual Exercise
- Self Study: Linear Dynamics Supplement
  - Overview and Example of a Response Spectrum Analysis
  - Self-Study Exercise: Response Spectrum Analysis
  - Overview and Example of Random Vibration Analysis
  - Self-Study Exercise: Random Vibration Analysis
  - Frequency Response
  - Self-Study Exercise: Frequency Response
  - Transient Stress (Modal Superposition) Analysis
  - Transient Stress (Direct Integration)
  - Self-Study Exercise: Transient Stress (Direct Integration)
- Appendices
  - Finite Element Method Using Hand Calculations
  - Analysis Types in FEMPRO
  - Linear Loads and Constraints
  - Material Model Options

Page 4 of 4