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

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

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

