Autodesk® Algor® Simulation MES – Course Agenda

- Introduction
  - Overview of Services and Support
    - Installing and Running Algor
    - Algor User's Guide
    - My Account Area
    - Tutorials
    - Webcasts
    - Web Courses
    - Updates
    - How to Receive Technical Support
  - Background of MES
  - Stress and Strain Review
    - Contrasting Event Simulation with Classical Methods
    - Numerical Example
    - Force Estimation Methods
  - Solution Steps in MES
- Example Using MES
- Setting up the Event and Prescribing Motion
  - Dynamic Analysis Techniques
    - Determining Time Stepping
  - Setting up a Model for a Nonlinear Natural Frequency (Modal) Analysis
  - Modeling Options
  - Element Options
  - MES Loading Options
    - Prescribed Translations and Rotations
  - Setting up Time-Dependent Loads
    - Multiplier Table Editor
  - Event Setup
    - Load Curves Tab
  - Result Options
    - Load Cases
    - Graphing Results
  - Example of Prescribing Motion
- Individual Exercise: Prescribing Motion
- Introduction to Contact and Impact
  - Uses for Contact and Impact
  - Surface-to-Surface Contact Options

        - Parameters section:
        - Modeling Friction section:
        - Contact Side of Shell Elements section:
        - Beam/Truss Element Point Contact section:
        - Tied Contact Options section:
        - Slide / No Bounce Contact Options section:
        - Advanced options
    - Impact Plane Options
    - Acceleration
    - Result Options
    - Example of Contact
    - Example of Impact Planes
- Individual Exercise: Contact and Impact
- Overview of Material Models
    - Material Model Options
        - Elastic Material Models
        - Hyperelastic Material Models
        - Foam Material Models
        - Viscoelastic Material Models
        - Plastic Material Models
        - Electrical Material Models
        - Advanced Options
    - Results Options
    - Example using von Mises Material Models
- Individual Exercise: Plastic Deformation
- Chapter 5: Geometric Nonlinearities
    - Buckling Analyses
    - Restarting Existing Analyses
    - Example of MES Restart
- Individual Exercise: Buckling
- Multiphysics and Results-Based Loading
    - Results Based Loading
        - Magnetic Force Example
    - Thermal Stress Analyses
- Individual Exercise: Thermal Stress Analysis
- Planar Elements
    - Element Options
        - Shell Elements
        - Membrane Elements
    - Loading Options

        - Surface Loads
        - Shell Element Example
- Individual Exercise: Membrane Elements
- Self Study
    - Other Element Types
    - Line Elements
    - 2-D Elements
    - When to Use Different Element Types
- Self-Study Exercise: Mechanism Analysis
    - 2-D Elements
    - 2-D Element Options
        - Plane Stress
        - Plane Strain
        - Axisymmetric
    - 2-D Loading Options
        - 2-D Hydrodynamic Element Example
        - Snap-Through Analysis Example
- Self-Study Exercise: Hyperelastic Material
    - Line Elements
    - Line Element Options
        - Truss Elements
        - Beam Elements
        - General Contact Elements
        - Pipe Elements
        - Slider Elements
        - Actuator Elements
        - Spring Elements
        - Pulley Elements
    - Line Element Loading Options
        - Initial Axial Forces and Strains
        - Beam Preloads
        - Internal Pressure
    - Line Element Result Options
        - Truss Element Example
- Self-Study Exercise: Beam Model
    - Comparing Analysis Options
    - MES/NLM versus MES/LM
        - When are Nonlinear Material Models Important
        - Typical Examples of Nonlinear Analysis
    - Implicit Time Integration Schemes

        - Wilson – Theta Time Integration Scheme
        - Newmark Time Integration Scheme
        - MES Time Integration Scheme
    - Iterative Methods
        - Full Newton-Raphson Method
        - Convergence Criteria
        - Modified Newton-Raphson Method
        - Combined Full and Modified Newton-Raphson Method
    - Convergence Controls
        - Nonlinear Static versus Dynamic Analyses
- Self-Study Exercise: Cable Model

