

Advanced Femap Modeling

A two day class for existing users of Femap who want to advance their modeling skills to the next level. The class explores the more sophisticated uses of Femap for creating surface and solid models. An overview of Femap's Application Programming Interface (API) is given with several hands on examples.



Course Outline:

I. Introduction to Finite Element Analysis

- a.) The concept of finite element analysis - nodes, DOF, elements
- b.) Basic element types - a quick overview

II. Introduction to Plate Modeling

- a.) Importing Geometry
- b.) Creating Sheet Solids from Body Solids
- c.) Stitching Surfaces into Single Solid
- d.) Meshing Surfaces
- e.) Creating Mass and Rigid Elements
- f.) Applying Loads and Constraints to Mesh

III . Advanced Plate Meshing Techniques

- a.) Geometry Cleanup (Remove Hole, Trim w/ Curve, Solid Cleanup)
- b.) Non-Manifold Adding Multiple Solids into Single Solid
- c.) Curves on Surfaces (Curve Surface Slice, Curve Pad, Curve Washer)
- d.) Mapping Mesh (Four and Three Corner Surfaces)
- e.) Meshing Toolbox (Sizing Mesh w/ Auto Remesh, Combined Composite Curves, Combined Boundary Surfaces)
- f.) Applying Loads and Constraints to Geometry

IV. Introduction to Solid Modeling

- a.) Panes, Toolbars and Saving Layout
- b.) Building Custom Toolbars
- c.) Solid Geometry Manipulation (Slice, Intersect)
- d.) Mesh Size on Solids, Slaved Surfaces
- e.) View Options and Saving Views

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Course Outline (continued):

V. Glued Connections

- a.) Hex Meshing Solids
- b.) Automatic Glued Connections
- c.) Using the Selector

VI. Applying Loads from Excel Using the Femap API

- a.) Macro Enabled Excel Files
- b.) Connecting to Femap
- c.) Node Object
- d.) Set Object
- e.) Entity Selection Dialogue Box
- f.) Exporting Data to Excel
- g.) Load Set Object
- h.) Load Mesh object
- i.) Linking to Data in Excel

VII. Event Callback and Modifying the Model with the API

- a.) Connecting to Femap
- b.) Property Object
- c.) Set Object
- d.) Variable Object
- e.) Entity SelectID Dialogue Box
- f.) User Dialogue Box
- g.) feAppEventCallback
- h.) Analysis Object
- i.) Material Object

Course Outline (continued):

VIII. Linear Surface to Surface Contact

- a.) Connection/Linear Contact Entities (Properties, Regions and Connections)
- b.) Element Normals
- c.) Highlighter Tool

IX. Grouping Techniques and the Data Table

- a.) Group Operations
- b.) Data Table
- c.) Exporting Data to Excel