

Level 1 On-Line – NURBS Modeling with Rhino

Course Outline

In this comprehensive 6 session class you'll learn to create and edit accurate free-form 3-D NURBS models. This fast-moving class covers most of Rhino's functionality, including the most advanced surfacing commands. (Typically classes are 4 hours long.)

Structure

In this class, you will systematically move through the user interface, command access, creation and editing curves, surfaces and solids.

Expected Outcomes

After this course the student is expected to be able to:

- Move comfortably around the Rhino modeling window.
- Identify when free form or precision modeling is required.
- Create and edit curves, surfaces, and solids.
- Use modeling aids for accuracy.
- Produce simple renderings of the Rhino models.

Target Audience

This course is for the design professional who wants to efficiently learn the concepts and features of the Rhinoceros modeling software at an accelerated pace in an instructor-lead environment.

Prerequisites

Windows skills and a desire to model are desired. Previous drafting and modeling experience helpful but not required.

Curriculum

Session 1

The Foundation

After a brief introduction, the following concepts will be covered:

- Get acquainted with the Rhino screen and menus
- Navigate around the Rhino model
- Create 2-D lines, polylines, and NURBS curves
- Modeling setup and mode functions: ortho, grip, snap, and planar
- Fast 3-D solids and surfaces
- The Rhino layering system
- Delete objects
- Discover display commands used to view different parts of the model.
- Pan, zoom and reset model views
- OpenGL shade

Session 2

Precision Modeling

Use coordinates and constraints to model easily and accurately. Move off the x-y plane and use viewports to establish the current construction plane. Draw polygons and ellipses. Draw free-form curves and compare interpolated and control points curve.

- Draw with absolute, relative rectangular, and polar coordinates
- Distance and angle constraints
- Using object snaps
- Analysis commands: length, distance, angle, radius
- Smart tracking and constraints
- Viewports, construction planes, and modeling in 3-D space
- Elevator mode
- Drawing circles, arcs, rectangles, ellipses and polygons
- Model free-form curves
- Create helix and spiral curves

Session 3

Basic Editing

Use edit commands to produce complex and detailed variations on the curves. Loft and extrude curves into surfaces and solids. Learn additional editing commands and use them to build practice models. Reinforce concepts of model setup and drawing accurate 2-D geometry to build precision 3-D shapes.

- Edit curves with fillet and chamfer
- Loft and extrude curves
- General editing: move, copy, rotate, mirror, scale
- Array polar and rectangular
- Boolean union, difference, and intersection
- Offset curves and surfaces
- Trim and split for curves and surfaces
- Extend and extend to surface
- Practice modeling and editing

Session 5

Solids and Surfacing

Learn how to model with solids and solid text. Use Booleans to shape your model. Extrude, loft, and revolve curves into surfaces. Use sweeps to create surfaces. Use advanced surfacing techniques like blend, match, and surface from network of curves.

- Model with pipe and extrude
- Modifying solids with Booleans
- Extrude and loft surfaces
- Generate curves from objects—contour, duplicate edge, project, section
- Revolve curves into surfaces
- Sweep 1 and 2 rail curves
- Surface with network of curves

Session 4

Intermediate Edit and Surfacing Commands

Learn additional editing commands and use them to build practice models. Reinforce concepts of model setup and drawing accurate 2-D geometry to build precision 3-D shapes.

- Introduction to NURBS modeling concepts and terminology
- Free-form curves
- Control point editing of curves and surfaces
- Rebuild curves and surfaces
- Use the nudge modeling aid
- Create deformable shapes
- Curve creation through projection
- Split surfaces with curves and surfaces
- Blend between two surfaces
- Create solid primitives and solid text

Session 6

Let's Model

Reinforce the commands and skills gained in the class by creating several models: the hammer and the chocolate syrup bottle. Add texture, bump and materials to the Rhino model for rendering. Annotate the Rhino model by adding dimensions. Work with the Options dialog box to refine the Rhino modeling environment. Generate 2-D views of a model for detailing and exporting. Output wireframe images directly to printers and plotters from Rhino. Time permitting: Customize Rhino toolbars and workspaces. Use the Flamingo plug-in to render a model and compare the finished rendering with Rhino's renderer.

- Setup the hammer model
- Create the hammer with precision and build the hammer surfaces
- Create the syrup bottle and build the syrup bottle surfaces
- Add the threads
- Lighting and rendering
- Import and export models
- Generate 2-D drawings from 3-D model and export
- Create layout for printing the model
- Edit and create new toolbars and tool buttons for rhino