

## Rhino 3d – LEVEL I NURBS Modelling

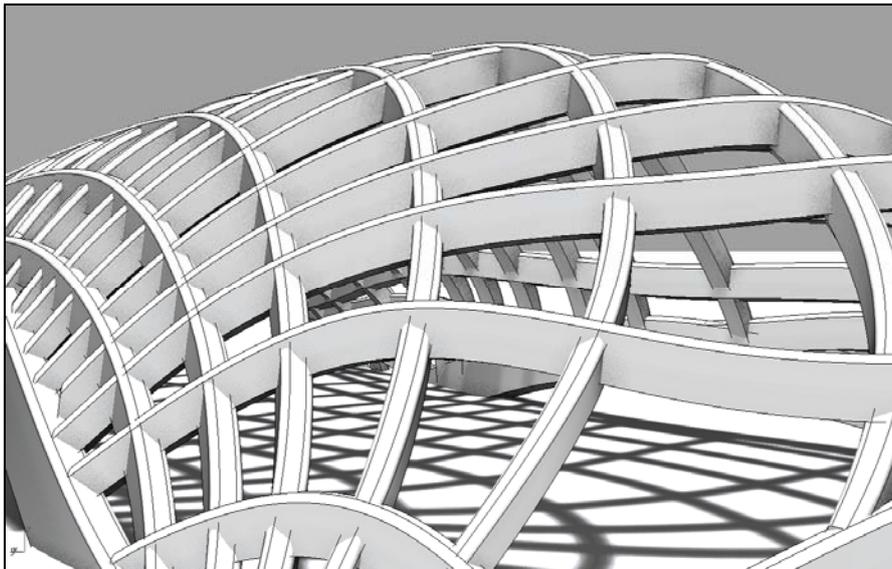
### Course Outline:

The course is intended for Architects/Engineers/Interior Designers with some prior experience in CAD and it aims at introducing advanced digital design to the attendees as well as to demonstrate ways of applying it to Building Design. The comprehensive 3-day course guides the trainee through acquiring the basic skills in the core software Rhino 3D, a high-end free-form 3D NURBS modeler. After completion, the trainee will receive a Rhino 3D Official training Certificate.

### Expected Outcomes :

The main objectives of the course are to:

- Facilitate the participant through Rhino 3d User Interface.
- Create basic geometries – lines, circles, arcs, curves, solids and surfaces
- Develop modeling technics by utilizing precision design methods (coordinates, planes, Euclidean Space)
- Create and Modify geometry (curves, surfaces, solids) with edit commands
- Analyze and evaluate geometry (curvature, volume, area)
- Generate and modify models or geometry for digital fabrication
- Export models to other formats for different uses (digital fabrication)
- Create and Modify free-form geometry (control point modeling)



Rhino3d Modelling Example

**Teaching Methods:** Lectures, Computer Demonstrations, Tutorials, Discussions, Presentations, Hands-On Practice

## Course Indicative Content:

### Day 1 - Morning

#### 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
- Modeling setup
- The Rhino layering system
- Understanding Rhino Geometry (1D/2D/3D)
- Construction Planes (C-PLANES)
- Delete objects
- Discover display commands used to view different parts of the model.
- Pan, zoom and reset model views

### Afternoon

#### Precision Modeling, 2d Drawing and basic editing

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. Use edit commands to produce complex and detailed variations on the curves.

- Create 2-D lines, polylines, and NURBS curves
- Model free-form curves
- Draw with absolute, relative rectangular, and polar coordinates
- Distance and angle constraints
- Construction Planes (C-PLANES) (revision)
- Drawing Aids (Osnaps/ Additional Aids)
- Drawing circles, arcs, rectangles, ellipses and polygons
- Create helix and spiral curves
- Editing 2d Objects (Fillet, Chamfer, copy, move rotate, mirror, join/explode, trim/extend, offset)
- Analysis Commands
- Modelling in 3d Space ( Chair Modelling, time allowing)

### Day 2 - Morning

#### Advanced 2d editing and basic surfacing.

Loft and extrude curves into surfaces and solids. Learn additional editing commands and use them to build practice models. Point editing and rebuilding

- Free-form curves revision- revolve (pear/screwdriver)
- Edit curves with fillet and chamfer -examples
- Loft and extrude curves
- Array polar and rectangular
- Boolean union, difference, and intersection (finish off screwdriver)
- Offset curves and surfaces
- Trim and split for curves and surfaces
- Fillet and chamfer for surfaces
- Extend and extend to surface
- Practice modeling and editing
- Point Editing and geometry rebuilding

## Afternoon

### 3d Modelling 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.

- 3d Modelling overview
- Primitive solid generation
- Solid Editing, modifying solids with Booleans
- Primitive Surface generation
- Generate curves from objects—contour, duplicate edge, project, section
- Revolve curves into surfaces
- Sweep 1 and 2 rail curves
- Surface with network of curves
- Advanced modelling examples

## Day 3 - Morning

### More advanced modelling, from 3D to 2D.

Process of passing from a 3d Model to 2d Drawings, Annotate the Rhino model by adding dimensions. Generate 2-D views of a model for detailing and exporting.

- Advanced Modelling Examples
- Import and export 3d models to 2d
- Creating contours and sections
- Fabrication principles, unroll, flatten 3d models. 2d Jointing options
- Layout, dimensioning and presenting

## Afternoon

### Digital fabrication and 3d Printing and Rendering

Add texture and materials to the Rhino model for rendering. Digital fabricating and 3d Printing preparation. Design of a small project in full 3d.

- Lighting and basic rendering
- Generate 2-D drawings from 3-D model and export to other formats
- Create layout for printing the model
- 3d Model analysis and preparing for 3d Print
- 3d Modelling exercise

## Indicative Schedule :

Time	Duration	Content	Trainer
<b>Day 1</b>			
9-10:45AM	1:45	Introduction, Rhino interface	O.G /M.G
10:45-11	15'	15 min Break	
11AM-12:45PM	1:45	Rhino interface, panning & zooming	O.G
12:45-14:00PM	1:15	Lunch	
14:00-15:45PM	1:45	Creating geometry	O.G
15:45- 16:00	15'	15 min Break	
16:00 -18:00PM	1:45	Creating geometry	O.G
<b>Day 2</b>			
9-10:45AM	1:45	Editing	O.G
10:45-11	15'	15 min Break	
11AM-12:45PM	1:45	Editing	O.G
12:45-14:00PM	1:15	Lunch	
14:00-15:45PM	1:45	Editing	O.G
15:45- 16:00	15'	15 min Break	
16:00 -18:00PM	1:45	Control point editing, modeling with solids	O.G

Day 3			
9-10:45AM	1:45	Surfacing	O.G
10:45-11	15'	15 min Break	
11AM-12:45PM	1:45	Surfacing- 3D to 2D	O.G
12:45-14:00PM	1:15	Lunch	
14:00-15:45PM	1:45	Modeling practice	O.G
15:45- 16:00	15'	15 min Break	
16:00 -18:00PM	1:45	Import/export, rendering, dimensioning, printing, customization	M.G



©HUB Design + Engineering Platform – 2013 – [www.hub.com.cy](http://www.hub.com.cy)