



Rhino and Grasshopper Course: Parametric Facades, Data Trees and Panel Schedules



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Introduction:

Rhino and Grasshopper for parametric facades, data trees and panel schedules is a 5-day course for architects, facade designers and design technologists, ending with a parametric facade model and panel schedule for a case building. Design units lose weeks when every facade change means redrawing hundreds of panels by hand, and fabricators receive geometry with no consistent numbering, flatness check or quantities. Nominees already model buildings in 3D software and work hands on in software labs, building every definition live on their own machines. CoreConcept Training Center delivers this Rhino and Grasshopper course.

Course Objectives:

- Build accurate NURBS curves and freeform envelope surfaces in Rhino that serve as clean inputs to parametric definitions
- Construct Grasshopper definitions that manage lists, data matching and data tree branches without geometry errors
- Generate facade patterns, apertures and fin arrays driven by attractors, sliders and surface subdivision
- Rationalise facade panels for planarity and fabrication size limits and test design options with an evolutionary solver
- Export numbered panels, unrolled cutting files and IFC geometry for fabricators and BIM coordination teams
- Produce a parametric facade model with a panel schedule of identifiers, types and areas for a case building

Target Audience:

- Architects responsible for envelope concepts and the geometry of facade options during design development
 - Facade designers responsible for panel layouts, joint lines and fabrication-ready geometry
 - Design technologists responsible for building parametric definitions, templates and scripts for design teams
 - Computational design staff responsible for automating repetitive modelling and documentation tasks
 - BIM coordinators responsible for receiving complex geometry from Rhino into building information models
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Course Outline:

Day 1: Rhino NURBS Modelling Foundations and Computational Design Context

- Computational Design and Parametric Design Definitions for Architects
- Propagation-Based and Constraint Systems in Facade Design Logic
- Rhino NURBS Curves, Control Points, Degree and Knots
- Rhino Freeform Surface Creation by Loft, Sweep and Network
- Current Facade Workflow Audit and Repetitive Task Mapping

Day 2: Grasshopper Canvas, Data Structures and Parametric Geometry

- Grasshopper Canvas, Components, Wires and Parameter Inputs
- Grasshopper Data Matching Rules for Lists and Items
- Data Tree Paths, Branches, Grafting and Flattening Operations
- Parametric Point Grids, Curve Division and Pattern Generation
- Number Sliders, Domains and Remapping for Design Variables

Day 3: Attractors, Surface Subdivision and Parametric Facade Panels

- Point and Curve Attractors Driving Aperture Size Gradients
- UV Surface Subdivision into Quad and Triangular Panels
- Panel Component Morphing onto Doubly Curved Facade Surfaces
- Parametric Fin and Louvre Arrays Along Facade Grids
- Panel Flatness Checks and Planar Quad Rationalisation Methods

Day 4: Performance Feedback, Optimisation, Fabrication Output and BIM Exchange

- Environmental Analysis Plug-In Overview for Solar Exposure Mapping
- Evolutionary Solver Optimisation Basics with Fitness and Genomes
- Panel Numbering, Unrolling and Laser Cutting Output in DXF
- Rhino to BIM Exchange via IFC, VisualARQ and Dynamo
- Python and RhinoScript Scripting Components for Custom Logic

Day 5: Software Lab on a Parametric Facade and Panel Schedule

- Case Building Envelope Brief and Rhino Base Surface Setup
 - Case Facade Subdivision and Attractor-Driven Perforation Logic
 - Case Panel Rationalisation Against Fabrication Size Limits
 - Case Panel Schedule Export with Identifiers, Areas and Types
 - Parametric Facade and Panel Schedule Completion and Peer Review
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Skills You Will Gain:

- NURBS Surface Modelling
- Visual Programming Logic
- Data Tree Management
- Attractor-Based Patterning
- Facade Panel Rationalisation
- Design Option Optimisation
- Fabrication Data Preparation
- Geometry Interoperability

Why Attend This Course:

- Hand a parametric facade model and panel schedule for a case building to the design lead and the facade fabricator
- Decide which panel types, subdivision grids and aperture rules a facade can carry before fabrication drawings start
- Avoid redrawing panels by hand after each design change and the fabrication errors caused by unnumbered or warped panels
- Share Grasshopper definition templates, data tree conventions and export routines with design colleagues

Conclusion:

Back at work, the participant gives the design lead, the facade fabricator and the BIM coordinator a parametric facade model with a panel schedule that lists every panel identifier, type and area. The design team uses it to fix the panel family and grid before tender, the fabricator uses it to price and plan cutting, and the BIM coordinator links it to the building model. After the first design revision, the unit should review rebuild time, panel type count and fabricator queries, then refine its definition templates.

Frequently Asked Questions FAQ:

What should participants know before the Rhino and Grasshopper parametric facade course?

Participants should already model buildings in a 3D design tool and read facade drawings. Prior Grasshopper use helps but is not needed. Bringing a facade elevation or envelope surface from current work lets them apply the labs to their own geometry.

How does a Rhino and Grasshopper parametric facade course differ from an AI design or energy simulation course?

It teaches how to build rule-based geometry and fabrication data for facades in Rhino and Grasshopper. Image generation tools and whole-building energy simulation appear only as context, since separate courses cover AI-assisted concepts and energy models in depth.

Why do Grasshopper data trees matter in parametric facade design?

Data trees decide how panels, points and curves are grouped and matched. Correct branch paths keep each facade bay, floor and panel row separate, so attractors, numbering and schedules apply to the right elements instead of mixing geometry across the envelope.

What do participants take back from the Rhino and Grasshopper parametric facade course?

Participants take back a parametric facade model for a case building with attractor-driven panels, a rationalised panel set, a panel schedule with identifiers, types and areas, cutting files and reusable Grasshopper definition templates.