3Ds MAX 2013 Comprehensive Training for Architects

OVERVIEW

This course covers Autodesk 3DS Max from the ground up, providing a thorough training of this advanced 3D graphics and modeling package. Covering the interface and walks through common tasks such as modeling, texturing, lighting, and rendering. The course is centered around real-world projects that provide designers practical tips and tricks on using the basic architecture modeling tools to create architectural elements. Learn time-saving techniques and tested production-ready tips for maximum speed and efficiency in creating professional-level architectural visualizations in 3ds Max.

The Course Covers the Following:
- Overall modeling, materials and lighting techniques
- Modeling Architectural elements including tips and tricks for speed and efficiency in architectural modeling.
- A thorough training for the V-Ray render engine, and performing a render post-production enhancement using Photoshop.
- Modeling and rendering an exterior and interior scene as student project.

COURSE STRUCTURE

SECTION 01: Software Anatomy

1. Some Higher-Level Concepts
   - Understanding the 3D world and Computer Graphics [3D history, 3D software's, calculations]
   - Vector vs. Raster graphics concept [Pros and cons, conversion]
   - Color System and color depth [munsell colors, 24 bit colors, monitor]
   - Computer Hardware in conjunction with 3Ds MAX [cpu, vga, ram, hdd, fps, traffic jam]

2. Getting Started With the Interface
   - Getting familiar with the Interface [Caption bar, menu bar, tool bar, app menu, layout bar, command panel, sub-panels, time line]
   - Using the 3Ds MAX demonstrative Help [Search AutoCAD, tutorial]
   - Customizing your workspace CUI [Keyboard shortcut, tool bar]
   - Setting user Interface Defaults [max.vray, light or dark scheme]
   - Setting your Preferences [Undo levels, autoback]
   - Understanding Units setup [System units, display units]

3. Working with Files
   - Saving, saving as saving selected object(s) and saving incremented files
   - Exporting to other 3D application formats
   - Importing, Merging and Linking models
   - Holding and Fetching a scene
   - Viewing scene Summary info
   - External referencing an object(s) or a scene

4. Controlling Viewports
   - Viewport Navigation and Configuration [Navigation tools, maximize viewport toggle Alt+w, layout bar, viewport shortcuts T, F, P, L]
   - Using mouse buttons to navigate [Alt + middle mouse button, pan middle mouse button, activate viewport]

5. Display in Viewport
   - Creating Standard Primitive objects [Create panel, geometry sub-panel, keyboard entry]
   - Hiding, unhiding, Freezing, unfreezing objects
   - See through object property [Alt+X]
   - Isolating an object(s) selection [Alt+Q]
   - Hiding by object Category [display panel]
   - Object Properties [Display as box, backface cull, show frozen in gray, visibility, renderable]
   - Layer Manager

IN-CLASS PRACTICE 01: [Creating One of the Standard Primitives and Manipulating It’s Parameters]

HOME WORK 01: [Creating Each One of the Standard Primitives]

6. Performing Smart Selections
   - Selecting by Click and Crossing/Window
   - Different Selection Windows [Circular, fence, lasso, paint,Q]
   - Selecting by Material and Name [H]
   - Inverting current selection [Ctrl+H]
   - Selecting Similar objects using shortcut [Ctrl+Q]
   - Using Viewports for objects Selection
   - Selection Filter
   - Selection Set
   - Vol. Select modifier
   - Selection Lock using [space bar]
   - Hiding selection Brackets [/]

7. Working with Objects
   - Changing object Name and Color [random colors]
IN-CLASS PRACTICE 02: [Full Furnishing of a Bedroom Interior] images and max file of the room is provide in class

HOME WORK 02: [Furnishing an Entire Office Floor of Administrative Building] images and max file of the floor is provide in class

8. Objects Distribution
- Using the Align tool
- Normal Aligning objects face-to-face
- Understanding the Spacing Tool for mass distributions [shift+I]
- Using the Array tool
- Using the Paint Tool for blocks distribution
- Snapping types and settings [S for snap, A for angle snap]

SECTION 03: Modeling In Depth
9. Modeling Basics
- Surveying different Modeling Methods
- Understanding the Level of Detail
- The concept of Sub-Object levels [1, 2, 3, 4, 5, vertex, edge, border, polygon, element]

10. Modeling with Architectural Primitives
- Creating Extended Primitive objects
- Creating architectural objects pt. 1: Walls
- Creating architectural objects pt. 2: Doors
- Creating architectural objects pt. 3: Windows
- Creating architectural objects pt. 4: Stairs
- Creating architectural objects pt. 5: Railings

IN-CLASS PRACTICE 03: [Creating Each Element of the Demonstrated Primitives]

HOME WORK 03: [Modeling a Modern Interior with Elegant Stairs] images of the interior is provide in class

11. Modeling with Splines
- Creating shapes [starting new shape, auto grid]
- Creating lines
- Using different Vertex Types
- Introducing the Extrusion modifier
- The concept of Nested shapes

- Generating shapes based on a Cross-Sectional slice through mesh objects
- Working with Editable Spline

IN-CLASS PRACTICE 04: [Drawing a Cross-Section of Drinking Glass]

12. Working with Compound Objects
- Performing Boolean and Pro-Boolean operations
- Tackling common Boolean Problems
- Projecting the vertices of one object onto another by the Conform tool
- Embedding a shape in a mesh using the ShapeMerge compound object
- Lofting shapes along path [Adding multiple shapes, moving rotating scaling and cloning shapes after lofting, make vertex first]

IN-CLASS PRACTICE 05: [Using Each Tool to Simulate the Demonstrated Example] max file of the conform tool is provide in class

13. Modeling with Modifiers
- Working with the Modifier Stack [Show end result, modifiers arrangement, pin, remove, on/off modifier]
- Manipulating the Bend modifier parameters [Limit effect, angle, direction]
- Twisting objects using the Twist modifier
- Creating a tapered contour by scaling both ends of an object's geometry by the Taper modifier
- Simulating the traditional effect of “Squash-and Stretch” using the Stretch modifier
- Creating a 3D object by rotating a shape about an axis using Lathe modifier [lathing a classic roman column]
- Converting the edges of an object into cylindrical struts with Lattice
- Applying random variations in an object’s shape with Noise modifier
- Using Push modifier to add inflation effect to a mass
- Producing a uniform offset in an object’s geometry by the Skew modifier
- Giving a thickness to an object by Shell modifier
- Distorting an object into a spherical shape using Spherify modifier
- Building a faces in the holes in a mesh object by CapHoles modifier
- Exploring the Relax modifier effect on an object
- Slicing through a mesh using the Slice modifier
- Adding a wave effect in an object's geometry by the Wave modifier
- Adding a concentric rippling effect using the Ripple modifier
- Using the Sweep modifier to extrude a cross-section along an underlying spline
- Deforming an object using a spline as a path using the PathDeform modifier
- Modeling with the FFD Modifier
- Using the Symmetry modifier
o Reducing the number of faces in an object while preserving the object’s appearance by ProOptimizer
o Subdividing faces in the current selection by Tessellate modifier
o Smoothing geometry in your scene by TurboSmooth modifier
o Applying Modifiers at the Sub-Object level
o Saving your machine effort by Collapsing the modifier stack
o Copying and Pasting modifiers from object to another

IN-CLASS PRACTICE 06: [Modeling the Famous CCTV Headquarters China Building] images of the building is provided in class

HOME WORK 04: [Modeling the Riyadh Dancing Towers, Dubai Revolving Towers] images of the buildings is provided in class

14. Graphite Polygon Modeling
o Creating a Box and converting it to an Editable Poly
o Sub-object level Rollouts
o Further Selection in Sub-Object level
o Understanding Soft-Selection
o Understanding surface Normals
o Controlling detail with Remove and Cut
o Attaching polygon meshes to a single object
o Detaching polygon mesh to a separate object
o Bridging parts of a mesh
o Smoothing and hardening edges
o Using the Caddy to extrude
o Beveling a single or multiple polygons
o Offsetting a polygon edges using the outline tool
o Inserting a polygon
o Flipping a polygon normals
o Tessellating a polygon into multiple polygons
o Collapsing a sub-object into a point
o Chamfering or filleting an edge
o Connecting two edges with multiple edges
o Quick Slice meshes to add more edges
o Using Paint Deformations tool to mimic land topography
o Using the Graphite ribbon interface
o Generate Topology tool for edges
o Inserting edge loops with SwiftLoop
o Random Selection tool in practical example
o Dot Loop selection tool

IN-CLASS PRACTICE 07: [Modeling the France Defense Building] images of the building is provided in class

15. Utilities and Helpers
o Creating a user grid
o Measure utility for single objects
o Reset X-Form
o Measuring with the Tape Helper

16. Modeling Architectural Elements
o Modeling with AutoCAD drawing workflow
o Modeling a plaza Landscape

o Real world car Parking Details
  [sweep, enable in viewport and renderer]
  Modeling a simple building Entrance Stairs
  Modeling a glazed façade Curtain Wall
  [Plane, line extrude, connect, create shape from selection, sweep, enable in viewport and renderer, slice, quick slice, shell]
  Modeling Floor Tiles with real reveals
  [Inset, extrude]
  Modeling a Swimming Pool
  Modeling a Building Roof in few seconds
  Modern entrance Space Truss shade
  Façade Grooves
  Signage with 3D text
  Spiral car Ramp

HOME WORK 05: [Modeling an Entire Scene of a Residential Villa Including Exterior, Interior and Landscape] images of the building is provided in class

17. Filing the Scene with Models
o Using the models Library
o Installing the Copy and Paste script
o Dealing with Scene Entourage

SECTION 04: Organic Modeling

18. NURMS Modeling
o Enabling NURMS and understanding subdivision surfaces
o Setting the Number of Iterations used to smooth the poly object
o Determining how Sharp a Corner must be using the Smoothness value
o On/Off the Wireframe, that shows the editable poly object before modification by the Show Cage button
o Using Isoline to show the object’s original edges before smoothing

19. Subdivision Surface Modeling
o Creating a Box and converting it to an Editable Poly
o Working with TurboSmooth
o Shaping the model

20. NURBS Modeling
o Understanding NURBS
o Creating NURBS curves
o Creating arcs and lines
  [weld, converting all points to Bézier]
  Converting Bézier splines to a NURBS object
o Cloning sub-objects
o Creating an Offset Curve
o Creating a U Loft Surface
o Editing a Dependent Surface using curves
o Creating an Extrude Surface
o Setting surface Approximation

SECTION 05: Materials and Textures

21. Getting Ready with V-Ray
o Introduction to Rendering Engines and V-Ray
  [Other rendering engines, why V-Ray]
o Installing the V-Ray render engine
o Setting up V-Ray as the Renderer
o Locating V-Ray's Tools and features

22. Materials Basics
o Opening the Material Editor
o Exploring the Compact Material Editor
o Working with the Sample Slots and Scene Materials
[Getting material from library, replacing material, putting material to scene, active slot, connected slot, resetting all the slots]
o Propagate Materials to Instances
o Resetting all the material editor slots

23. The V-Ray Materials
o Introduction to V-Ray-specific materials
o Creating a Diffuse color or map
o Controlling the Reflective properties of a material
[reflection intensity, map, glossiness, Fresnel reflections, max depth]
o Controlling the Refractive properties of a material
[faces normals, fog color]
o Explaining the different shaders in BRDF rollout
o Understanding the Translucency effect
o Controlling the different types of Maps
o Exploring the Slate Material Editor
o Explaining the VRayBlendMtl
o Explaining the VRay2SidedMtl

24. Mapping Textures in Depth
o Adding a Map to the diffuse channel
o Getting maps form cgtextures.com
o Using UVW Map Modifier to properly wrap maps on an object
o Understanding the Real-World scale
o Modifying the scale of a map applied to an object by MapScaler modifier
o Show Shaded or Realistic Materials With Maps in viewport globally

25. Working with Procedural Maps
o The Concept of procedural maps
o Modifying a map color and brightness with-in 3ds max interface using the Color Correction procedural map
o Creating tiled material using the Tiles map
o Adding bumpiness to material using the Noise map

26. Standard Materials
o Basic introduction to Standard Materials
o Adding a Map to the diffuse channel
o Adjusting Specular parameters
o Adjusting Opacity and Refraction
o Multi/Sub-Object material methodology
o Randomizing several material over an objects using the MaterialByElement
o Using the V-Ray Scene Converter

27. Texturing Architectural Elements
o Texturing Landscape Platform
o Texturing green areas with Grass
[grass map, tiling, VrayDisplacementMod amount = 0.3 to 0.4, shift = -0.1 to -0.3, 2d mapping]
o Texturing a real street Asphalt
o Texturing a street Kerb
[sweep modifier, generate mapping coordinates, use real world map size]
o Creating a swimming pool Water
[Single model face]

SECTION 06: Lighting and Cameras

28. Cameras
o Exploring the Standard Camera Parameters
[Target camera, free camera, FOV, orthographic projection, clipping planes, type]
o Showing the Safe Frames [Shift+F]
o Choosing an Aspect Ratio
o Using the Print Size Assistant
o Applying Camera Correction Modifier
o The concept of Exposure Control
[Shutter speed, f-number, ISO, depth of field, motion blur]

VRayPhysicalCamera parameters
[Focal length, f-number, guess vert., vignetting, white balance, clipping]

29. Working with V-Ray Lights
o Understanding CG Lighting
o Understanding and manipulating VRayLight types and parameters
o VRay Light Mtl in use
o Lighting with Self-Illumination properties
o Lighting with Bitmap Textures
o Applying a VRayIES light
o VRay Dome Light for environment lighting
o Adjusting VRaySun
o Setting the V-Ray Exposure Control in environment settings
o Working with the VRayHDRi for environment lighting
o Using the VRay Light Lister

30. Standard and Photometric Lights
o Creating a target and free Spotlight
[Light type, shadows, intensity multiplier, color, decay, attenuation, hotspot, and falloff]
o Using Direct Light as sun
o Creating Omni lights
o Creating Photometric target light

31. Configuring 3Ds MAX for MCUBE 3D Library
o Understanding the MCUBE 3D Library Structure
o Introducing the V-Ray Proxies
[Mesh file, linked to max file, material, attach]
o Configuring User Paths to find your maps
o Archiving an entire scene including all its assets into a single file
o Controlling Scene assets using Asset Tracking
[Priority no.1 for the defined path, propriety no.2 for in-folder files, priority no. 3 for the library paths]

IN-CLASS PRACTICE 07: [Texturing an Interior with HDF Material] max file of the scene is provided in class
SECTION 07: Rendering With V-Ray

32. Critical V-Ray Concepts
   - Installing VRay and setting it as the renderer
   - Why V-Ray render engine
   - How VRay Works, understanding the VRay computation workflow

33. Global Illumination
   - Global Illumination (GI) explained
   - Understanding Primary and Secondary Bounces
   - How Irradiance Mapping works
     [HSph. Subdivs: 35 to 70, Interp. Samples: 30 to 50, very low for test, medium to high for final]
   - How Light Cache works
     [Subdivs: 400 to 800 for test, 1500 to 2500 for final]
   - Understanding Brute Force GI

34. Working with Color Mapping Modes
   - Understanding the Color Mapping Role in the rendering process
   - Using the Linear Multiply mode for contrasted renders
   - Using the Exponential for avoiding the light burned scenes
   - Blending between the linear multiply and the exponential modes using the Reinhard
   - The Gamma Correction curve explained

35. Quality Control with Image Sampling
   - Introduction to image sampling
   - Understanding the Anti-aliasing
   - Using the Fixed-Rate sampler
   - How to use the Adaptive DMC sampler
   - Working with the Adaptive Subdivision sampler
   - Comparing image sampling Renders
   - Locating the Subdivs parameter in materials and lights

36. Using the VRay Frame Buffer
   - Enabling the VRay frame buffer
   - Using the frame buffer History Window
   - Rendering only a Region of the image
   - Viewing RGB Channels
   - Tracking the Mouse Cursor while rendering

37. Global Switches in Function
   - Enabling and disabling Displacement calculations globally over the scene
   - Forcing Back Face Culling
   - Disabling the effect of Hidden Lights
   - Rendering old scenes with Legacy VRay models
   - Enabling and disabling Reflection/Refraction calculations globally over the scene
   - Setting an Override Material for the entire scene

38. VRay System Settings
   - Configuring the Dynamic Memory limit
   - Setting the Render Bucket size
   - Frame Stamping rendered images
   - Enabling and disabling the VRay Log window

   - Setting a rendering queue of multiple cameras using the Batch Renderer
   - Saving Scene States and recalling it

39. Image Post-Production with Photoshop
   - Controlling the image Brightness and Contrast
   - Adding more color Saturation to the render
   - Altering the render Color Balance using the Variations tool
   - Adding an artistic glimpse using Glow effect

SECTION 08: Student Project

40. Working on Exterior Scene
   - Modeling the building body
   - Modeling the building Surrounding Layout
   - Applying Materials and textures to the building and the layout
   - Setting the Environment and Lighting
   - Distributing the scene Entourage
   - Applying VRay Rendering Settings
   - Test Rendering
   - Final Rendering

41. Working on Interior Scene
   - Modeling a residential space interior
   - Distributing the Scene Furniture and accessories
   - Applying Materials and textures to the scene
   - Setting the Environment and Lighting
   - Applying VRay Rendering Settings
   - Test Rendering
   - Final Rendering