KOENIG
step forward

AUTODESK
Authorized Training Center

Autodesk 3ds Max Fundamentals

Target Audience

This course is designed for aspiring 3D artists, architects, interior designers, game designers, animation students, and digital media professionals who want to build comprehensive skills in Autodesk 3ds Max. It is ideal for individuals entering the fields of architectural visualization, game development, product design, film, VFX, and animation — as well as for working professionals who want to upgrade their 3D modeling, texturing, lighting, animation, and dynamics knowledge using industry-standard tools.

Course Objective

This course aims to equip learners with complete, practical knowledge of Autodesk 3ds Max — starting from foundational interface and primitive creation, through spline-based and polygon modeling, materials, lighting, rendering, animation, dynamics, NURBS, particle systems, and character kinematics. By the end of this course, learners will be capable of producing professional-quality 3D models, scenes, animations, and rendered outputs, culminating in a full real-world production project.

Course Outcome

- **3ds Max Interface Proficiency –** Navigate and customize the 3ds Max interface, viewports, command panel, and toolbars with confidence.
- **3D Modeling Mastery –** Create and modify standard primitives, extended primitives, architectural objects, splines, and polygon meshes using modifiers and the Graphite Modeling Toolkit.
- **Materials and Texturing Skills –** Apply, configure, and manage materials and texture maps using the Slate Material Editor for photorealistic surface representation.
- **Lighting and Rendering Expertise –** Set up lights, configure render settings, and produce high-quality rendered outputs using Arnold and standard renderers.
- **Animation Foundations –** Animate objects using keyframes, the Track Bar, Graph Editor, and animation controllers for motion-based projects.
- **Dynamics and Simulation –** Simulate physics-based rigid body motion, apply helpers and constraints using the MassFX dynamics system.
- **Advanced Modeling Techniques –** Build complex organic and hard-surface models using NURBS, compound objects, and advanced modifier workflows.
- **Systems, Particles, and Kinematics –** Create and control character rigs with hierarchy and IK systems, build particle effects, and use space warps for dynamic scene simulation.
- **Real-World Project Application –** Apply all learned skills to complete a full production project — building and rendering a complete 3D Diner scene from scratch.

Course Outline

The course comprises **48-hours** of theory and labs and is divided into **18 different chapters**. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.

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Chapter 1: Introduction to Autodesk 3ds Max

Overview of the 3ds Max Interface

- Understanding the 3ds Max workspace: viewports, menu bar, toolbars, and Command Panel
- Using the Time Slider, status bar, and prompt line
- Navigating viewports: Orbit, Pan, Zoom, and Perspective controls

Customizing the Workspace

- Setting up units and grid preferences
- Customizing toolbars, keyboard shortcuts, and workspaces
- Using the Quick Access Toolbar and ribbon

Working with Scene Files

- Creating, opening, saving, and merging scene files
- Using Auto-backup and scene file management
- Importing and exporting basic file formats

Chapter 2: Standard Primitives

Creating Standard Primitive Objects

- Creating Box, Sphere, Cylinder, Torus, Teapot, Cone, GeoSphere, Tube, Pyramid, and Plane
- Adjusting primitive parameters: segments, radius, height, and smoothing
- Interactive vs. keyboard entry creation methods

Modifying and Managing Primitives

- Moving, rotating, and scaling primitives using transform tools
- Using the Align tool to position objects precisely
- Grouping and naming objects in the Scene Explorer

Chapter 3: Extended Primitives

Creating Extended Primitive Objects

- Creating Hedra, Torus Knot, Chamfer Box, Chamfer Cylinder, OilTank, Capsule, Spindle, L-Ext, Gengon, C-Ext, RingWave, Hose, and Prism
- Adjusting segment and fillet parameters for complex shapes

Combining Primitives in a Scene

- Building composite shapes from standard and extended primitives
- Applying materials and basic modifiers to extended objects
- Using snaps and alignment for precise object placement

Chapter 4: Working with Architectural Objects

AEC Extended Objects

- Creating Walls, Doors (Pivot, Sliding, BiFold), and Windows (Fixed, Casement, Sliding, Projected, Pivoted, Awning)
- Adjusting architectural object parameters: width, height, depth, and frame settings
- Inserting doors and windows into wall objects

Stairs and Railing Objects

- Creating Straight, L-Type, U-Type, and Spiral Stairs
- Setting stair parameters: rise, run, width, and railings
- Adding and configuring Railing objects along paths

Foliage Objects

- Adding vegetation using the Foliage (AEC Plants) system
- Adjusting plant density, height, and pruning level
- Using foliage in architectural visualization scenes

Chapter 5: Splines and Extended Splines

Drawing 2D Splines

- Creating Line, Circle, Arc, Rectangle, Ellipse, Donut, NGon, Star, Text, Helix, and Section splines
- Using corner, smooth, Bezier, and Bezier Corner vertex types
- Setting spline rendering properties: thickness and sides

Extended Splines

- Creating WRectangle, Channel, Angle, Tee, and Wide Flange extended spline profiles
- Using extended splines for architectural and structural section profiles

Lofting and Surface Creation from Splines

- Extruding and Lathing splines to create 3D surfaces
- Using Bevel and Bevel Profile for complex spline-based geometry
- Creating Sweep modifier-based objects along spline paths

Chapter 6: Modifying Splines

Spline Subobject Editing

- Editing at Vertex, Segment, and Spline subobject levels
- Adding, removing, and welding vertices; refining and breaking segments
- Reversing spline direction and setting first vertex

Spline Operations

- Attaching multiple splines into a single object
- Using Trim, Extend, Fillet, and Chamfer on spline segments
- Boolean spline operations: Union, Subtraction, and Intersection
- Outlining and mirroring splines

Using Splines as Modeling Guides

- Using splines as path constraints and motion paths
- Applying the Normalize Spline and Smooth modifiers
- Converting splines to editable meshes and polys

Chapter 7: Materials and Maps

Understanding the Slate Material Editor

- Navigating the Slate Material Editor: node view, material/map browser
- Creating, naming, and assigning materials to objects
- Working with OpenPBR Surface and Standard material types

Material Properties

- Adjusting diffuse color, specular, glossiness, opacity, and self-illumination
- Applying reflection, refraction, and bump attributes
- Using Multi/Sub-Object materials for multi-surface assignment

Applying Texture Maps

- Using 2D maps: Bitmap, Checker, Gradient, Noise, and Tiles
- Using 3D procedural maps: Cellular, Marble, Wood, Dent, Stucco
- Applying UVW Map modifier for texture projection control
- Using Bump, Specular, Opacity, and Reflection map channels

Chapter 8: Modifying 3D Mesh Objects

Editable Mesh and Editable Poly

- Converting objects to Editable Mesh and Editable Poly
- Working with subobjects: Vertex, Edge, Border, Polygon, and Element
- Extruding, beveling, chamfering, and bridging polygon components

Key Mesh Modifiers

- Applying Bend, Taper, Twist, Stretch, Squeeze, Skew, and Wave modifiers
- Using Symmetry, Shell, Smooth, TurboSmooth, and MeshSmooth modifiers
- Applying Edit Poly modifier for non-destructive polygon editing

Retopology and Cleanup

- Using Cap Holes, Optimize, and ProOptimizer modifiers
- Checking normals and applying STL Check for mesh validation
- Managing modifier stack: collapsing, copying, and reordering modifiers

Chapter 9: Graphite Modeling Technique

Graphite Modeling Tools Overview

- Accessing the Graphite Modeling Ribbon and its panels

- Using Polygon Modeling panel: constraints, topology, edge loops, and rings
- Using the Build panel: Bridge, Cap, and SplineConnect

Freeform and Painting Tools

- Using Freeform tools: PolyDraw, Paint, Relax, Smear, Flatten, Pinch, and Spread
- Drawing and extending geometry freehand on surfaces
- Using Conform and Offset Paint for adaptive surface modeling

Selection and Advanced Operations

- Using advanced selection tools: Dot Loop, Dot Ring, and Loop/Ring selection methods
- Using Object Paint tools: painting instanced geometry across surfaces
- Applying symmetry constraints and soft selection in Graphite mode

Chapter 10: Compound Objects

Boolean Operations

- Creating Union, Subtraction, and Intersection Boolean compound objects
- Using ProBoolean for advanced multi-operand Boolean operations
- Managing Boolean operands and re-editing operations non-destructively

Other Compound Object Types

- Morphing between objects using the Morph compound object
- Creating terrain objects from contour splines using Terrain
- Working with BlobMesh for organic fluid-like shapes
- Using ProCutter for precise cutting and slicing operations

Loft Compound Object

- Creating loft objects from path and shape splines
- Applying multiple cross-sections along a loft path
- Deforming lofts: Scale, Twist, Teeter, Bevel, and Fit deformations

Chapter 11: Modifiers

Selection Modifiers

- Applying Mesh Select, Poly Select, Vol. Select, and FFD Select modifiers
- Using Face Extrude, Normal, and Smooth selection-based modifiers

Parametric and Deformer Modifiers

- Applying FFD 2x2x2, 3x3x3, 4x4x4, Box, and Cylinder Free Form Deformers
- Using Noise, Displace, Push, Relax, Ripple, and Spherify modifiers
- Applying Lattice modifier to create wireframe cage structures

UV and Surface Modifiers

- Applying UVW Map, UVW Xform, and Map Scaler modifiers
- Using Unwrap UVW modifier and Edit UVWs interface for manual UV editing
- Applying Subdivide, HSDS, and TurboSmooth for subdivision surface modeling

Chapter 12: Lights and Rendering

Light Types and Creation

- Creating standard lights: Omni, Target Spot, Free Spot, Target Directional, Free Directional, and Skylight
- Creating photometric lights: Target Light, Free Light, and Sun Positioner
- Adjusting light intensity, color, shadow type, and attenuation

Advanced Lighting and HDRI

- Using HDRI map and Environment & Exposure settings
- Enabling Global Illumination and setting up the Physical Sky
- Positioning the Sun system for time-of-day and location-based lighting

Rendering Configuration and Arnold

- Setting up Render Output: resolution, file format, frame range, and render elements
- Using the Rendered Frame Window for region rendering and IPR
- Configuring Arnold renderer: sampling, ray depth, denoising, and AOVs
- Rendering a final high-quality scene output

Chapter 13: Animation Basics

Keyframe Animation

- Using Auto Key and Set Key modes for keyframe creation
- Moving, copying, and deleting keys using the Track Bar
- Setting frame rate, time range, and playback speed

The Graph Editor and Dope Sheet

- Editing animation curves: tangent types, easing in/out, and cycle conditions
- Filtering tracks and adjusting key timing in the Dope Sheet
- Using the Motion Panel for trajectory and controller adjustment

Animation Controllers and Constraints

- Assigning Noise, Path Constraint, LookAt, and Orientation Constraint controllers
- Using Wiring Parameters for linked object animation
- Previewing animation with Playblast and RAM Player

Chapter 14: Rigid Body Dynamics and Helpers

Introduction to MassFX Dynamics

- Understanding physics-based animation with MassFX
- Setting up Dynamic, Kinematic, and Static rigid body objects
- Baking simulation results to animation keyframes

MassFX Constraints and Helpers

- Applying MassFX constraints: hinge, slider, ball-and-socket, universal joint
- Using Rigid Body Helpers for multi-object interaction and stacking
- Adjusting mass, friction, bounciness, and collision geometry

Cloth and Soft Dynamics (mCloth)

- Creating and configuring mCloth objects for cloth simulation
- Setting cloth stiffness, damping, and gravity parameters
- Using Ragdoll system for character physics simulation

Chapter 15: NURBS Modeling

Introduction to NURBS

- Understanding NURBS curves and surfaces vs. polygon modeling
- Creating NURBS Point and CV Curves and Surfaces
- Editing NURBS control vertices, points, and hulls

NURBS Surface Operations

- Creating surfaces from curves: Extrude, Lathe, Ruled, Cap, U-Loft, UV-Loft
- Blending, filleting, and offsetting NURBS surfaces
- Trimming NURBS surfaces using projected and intersected curves

Converting and Refining NURBS

- Converting NURBS to editable poly/mesh for further editing
- Adjusting tessellation settings for render-ready NURBS geometry
- Using NURBS Sub-Object toolbox for advanced surface editing

Chapter 16: Systems, Hierarchy, and Kinematics

Object Hierarchy and Linking

- Building parent-child hierarchies and understanding pivot inheritance
- Using the Schematic View to visualize and manage scene hierarchies
- Working with linked objects and the Link and Unlink tools

Bones System and Rigging

- Creating and editing bone chains using Bone Tools
- Setting bone parameters: taper, fin display, and squash/stretch
- Understanding Forward Kinematics (FK) vs. Inverse Kinematics (IK)

Inverse Kinematics and Skin

- Creating HI Solver, HD Solver, and IK Limb systems
- Applying the Skin modifier: adding bones, painting and mirroring weights
- Using CAT (Character Animation Toolkit) for advanced character rigging

Chapter 17: Particle Systems and Space Warps – I

Introduction to Particle Systems

- Understanding event-driven vs. non-event-driven particle systems
- Creating Spray and Snow particle systems: size, speed, and lifespan settings

- Using Super Spray for directional cone-based particle emission

Advanced Particle Systems

- Using Blizzard for turbulent volumetric particle effects
- Creating PArray for object-surface particle emission and fragmentation
- Using PCloud for volume-filling particle distribution
- Applying particle system maps for textured particles

Introduction to Space Warps – Forces

- Creating and binding Gravity, Wind, and Drag space warps
- Using Motor, PBomb, and Path Follow force space warps
- Combining force space warps with particle systems for dynamic effects

Chapter 18: Particle Systems and Space Warps – II

Particle Flow System

- Understanding event-driven Particle Flow using the Particle View Editor
- Creating and connecting events: Birth, Position, Speed, Shape, Display
- Using test operators: Age Test, Collision, Speed Test, and Find Target

Particle Flow Actions and Helpers

- Using Material, Spawn, Delete, and Force actions in Particle Flow
- Adding Particle Flow Helpers: Deflector, UDeflector, and SDeflector
- Debugging and optimizing Particle Flow simulations

Deflector and Geometric Space Warps

- Using Deflector, SDeflector, UDeflector, and PDynaFlect space warps
- Applying geometric space warps: FFD, Wave, Ripple, Displace, and Conform
- Combining particle systems with deflectors and forces for complex effects