

Sci-Fi Hard-Surface Kitbashing Workflow

Build sci-fi ships and mechs using reusable greeble libraries. For game and film artists.

Design Instructor: Daniel Mercer • 5 sections • 50 lessons • 9.75h total

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About this course

This course tackles the common bottleneck of creating detailed sci-fi hard-surface models from scratch. We will show you how to build a modular library of greebles and mechanical parts, then combine them to produce complex ships and mechs without endless hand-modeling. The lessons focus on practical techniques you can apply to your own projects.

You will learn how to organize assets, apply smart snapping and alignment tools, use procedural modifiers, and polish final models for rendering or game engines. The format includes short video demos, downloadable templates, and real case studies from studios.

Course curriculum

Foundations of Kitbashing

- **Setting Up Your 3D Workspace for Kitbashing (12m)**
Configure scene units, layers, and snapping options to streamline part placement from day one.
- **Understanding Greeble Anatomy and Scale (9m)**
Learn how to break down complex surfaces into reusable elements and keep proportions consistent.
- **Gathering and Curating Source References (8m)**
Identify high-impact visual references and translate them into modular components.
- **Creating a Base Library Structure (14m)**
Set up folder hierarchies, naming conventions, and metadata for quick asset retrieval.
- **Modeling Your First Greeble Pack (18m)**
Build a small set of bolts, panels, and vents using low-poly techniques and proper edge flow.
- **Applying Consistent UV Layouts (11m)**
Create UV templates that work across multiple parts, saving texture time later.
- **Exporting and Managing Asset Versions (7m)**
Use version control basics to keep your library organized and avoid duplication.

Building Your Greeble Library

- **Designing Modular Hull Panels (15m)**
Model interchangeable hull sections that snap together for varied ship silhouettes.
- **Creating Mechanical Joint Systems (13m)**
Develop reusable hinges, pistons, and articulation points for mech limbs.
- **Generating Procedural Detail with Modifiers (10m)**
Leverage array, bevel, and noise modifiers to add instant complexity.
- **Building a Library of Surface Fast (16m)**
Create panels, grilles, and armor plates that can be mixed-and-matched on any model.
- **Adding Fast-eners and Small Parts (9m)**
Model bolts, screws, and rivets that bring realism to any surface.
- **Creating a Catalog of Propulsion Units (14m)**
Design thrusters, exhaust vents, and engine pods for ships and mechs.
- **Organizing Assets with Tags and Metadata (8m)**
Implement a tagging system that lets you filter parts by size, style, or function.
- **Building a Quick-Swap Asset Browser (12m)**
Set up a custom UI or script to drag-and-drop parts directly into the scene.
- **Creating a Printable Asset Checklist (6m)**
Provide a downloadable PDF to track which library pieces you need for each project.
- **Optimizing Poly Count for Real-Time Use (11m)**
Apply retopology and LOD strategies to keep models game-engine ready.

Advanced Assembly Techniques

- **Layered Construction of Complex Ship Hulls (13m)**
Combine hull panels, internal frames, and surface greebles in a logical order.
- **Dynamic Joint Placement for Mech Limbs (12m)**
Use bone-driven constraints to align mechanical joints quickly.
- **Procedural Symmetry and Mirroring (9m)**
Create mirrored halves of a model with live updates to keep both sides in sync.
- **Applying Boolean Operations Safely (10m)**
Learn clean Boolean workflows to cut openings and merge parts without mesh errors.
- **Integrating Hard-Surface Details with Sub-Division (14m)**
Blend low-poly greebles into high-poly meshes while preserving edge sharpness.
- **Using Custom Scripts for Bulk Placement (16m)**
Write simple Python or MaxScript tools to scatter panels and vents automatically.
- **Real-World Case Study: Ship Design from Concept (18m)**
Walk through a full ship build, from concept art to final kitbashing assembly.
- **Real-World Case Study: Mech Arm Assembly (15m)**
Break down a detailed mech arm using modular joints and greeble packs.

Optimizing Workflow for Complex Builds

- **Creating a Master Asset Reference Sheet (8m)**
Compile a visual guide that maps each part to its intended location on the model.
- **Implementing Layer-Based Visibility Controls (9m)**
Toggle groups of parts on/off to focus on specific sections during refinement.
- **Automating UV Layouts for Repeated Parts (11m)**
Use UV scripts to apply consistent mapping across dozens of identical greebles.
- **Batch Exporting Asset Variants (10m)**
Set up export presets that output multiple LODs and file formats in one click.
- **Integrating Texturing Pipelines with Substance Designer (13m)**
Link your greeble library to procedural textures for fast material iteration.
- **Performance Profiling for Large Scenes (12m)**
Identify bottlenecks and optimize draw calls when assembling massive ships.
- **Collaborative Asset Sharing Across Teams (14m)**
Set up a shared repository and naming standards for multi-artist projects.
- **Version-Controlled Iteration of Kitbashing Builds (9m)**
Use Git-LFS or similar tools to track changes to your modular assets.
- **Managing Scale and Proportion Across Multiple Models (10m)**
Maintain consistent unit systems when mixing ship and mech components.
- **Creating a Rapid Prototyping Template (11m)**
Build a starter scene that includes pre-wired snapping and default libraries.
- **Advanced Lighting for Hard-Surface Showcases (15m)**
Set up HDRI and studio lights that highlight the depth of your kitbashed models.

- **Exporting Production-Ready Assets for Game Engines (13m)**
Prepare FBX/GLTF files with proper pivot points, collision meshes, and material IDs.

Project Completion and Portfolio Ready Output

- **Planning a Complete Ship or Mech Project (12m)**
Outline scope, asset list, and timeline before you start building.
- **Building a Full-Scale Ship Using the Library (18m)**
Apply all learned techniques to assemble a detailed sci-fi vessel from start to finish.
- **Constructing a Complex Mech with Modular Limbs (16m)**
Create a fully articulated mech using joint systems and greeble packs.
- **Polishing Surface Details and Hard-Edges (13m)**
Refine bevels, creases, and edge loops for crisp hard-surface appearance.
- **Texture Baking and Material Assignment (14m)**
Bake ambient occlusion, curvature, and normal maps for final renders.
- **Rendering a Portfolio-Ready Turntable Animation (15m)**
Set up camera rigs and render settings to showcase your model in motion.
- **Creating a Technical Breakdown Sheet (9m)**
Document asset counts, poly counts, and workflow steps for client presentations.
- **Preparing Assets for 3D Printing (Optional) (8m)**
Adjust wall thickness and manifold checks for physical model production.
- **Building a Showreel Clip for Online Platforms (12m)**
Edit short video snippets with music and captions to attract recruiters.
- **Gathering Feedback and Iterating Quickly (10m)**
Use peer review sessions to spot issues and apply rapid fixes.
- **Exporting a Complete Asset Package (11m)**
Bundle models, textures, and documentation into a clean delivery folder.
- **Marketing Your Kitbashing Skills on Portfolio Sites (9m)**
Write compelling project descriptions and tag assets for discoverability.
- **Planning Future Library Expansions (8m)**
Identify gaps and sketch new greeble sets to keep your workflow evolving.

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