

CG Cookie Workshop: Mastering Mesh Modeling

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This CG Cookie workshop is intended to provide an in-depth study of the key theories, fundamentals, and techniques you need to know about subdivision surface modeling. This course makes use of Blender but the majority of the material is applicable to any software that supports subdivision surface modeling. This course covers all the fundamentals that are vital to modeling, including topology, subdivision surfaces, organic modeling, hard-surface modeling, sculpting, low polygon modeling, and more.

Course Objective

The goal of this course is to guide the students towards mastering mesh modeling by gaining a deeper understanding of surface, form, topology, modeling tools, and the modeling process. Ideally, the student will walk away from the workshop with the understanding of how to approach modeling anything, regardless of the subject matter, by focusing on the topology, workflow, and forms of the subject; not the subject itself.

At the end of the course each student has the opportunity to submit a final exercise model which will be reviewed by the instructor. If the model passes inspection the student will receive a certificate signed by CG Cookie stating they have completed the course. Basic members will receive a PDF version of the certificate, while Premiere students will receive a printed and laminated certificate in the mail, along with the PDF.

All students will also receive a badge on their CG Cookie profile indicating they have participated in a CGC workshop.

Course Topics

1. Understanding topology in depth
2. Grasping different modeling techniques, such as box modeling, sculpting, etc
3. Organic modeling
4. Hard-surface modeling
5. High-resolution Sculpting
6. Retopology

Pricing and Access Levels

The workshop is broken up into four and five weeks, depending on the access level chosen. Students may purchase one of two access levels to the workshop:

1. **Basic Access** - gives students access to all course material, discussion forum, peer reviews, and weekly live Q/As with the instructor.
2. **Premiere Access** - gives students the same as basic but with the additional opportunity to submit exercise results directly to the instructor for in-depth review and critiques each week for additional support. Additionally, premiere students are given an extra week dedicated to polishing their skills in a chosen area, such as organic or hard surface modeling. Premiere students also get access to a additional forum for more direct and focused instructor communication.

Note: CG Cookie Citizens will receive a 5% discount; applies to both access levels.

Price	
Student Limit	Complete Course
10	Premiere: \$440
Unlimited	Basic: \$220

Key Points

The below are a list of things the student will learn during the course and should walk away with:

3. Solid understanding of what topology is, how to create clean topology, and why it is vital to everything in modeling
4. Understand how to approach any model, regardless of subject, and model it with good topology
5. To grasp the modeling workflow in a way that they can model with confidence
6. Ability to model organic and hard surfaces
7. Understanding of the different modeling techniques, including box modeling, edge by edge, and sculpting.
8. The ability and understanding to produce models ready for texturing and animation.

Course Structure

Each week is divided into four distinct parts: lectures, fundamental skill-sets, practical tutorials, and exercises.

All material is provided as pre-recorded video lessons that are available for either streaming or download on a week-by-week basis. All necessary, and additional resources will also be provided each week.

Lectures

Lectures are a look into specific topics, focusing on the theory, fundamental concepts and workflow that make up that topic.

Fundamental

Fundamentals are skills or skill-sets that every modeler should know. These range from concepts to techniques that apply to modeling, regardless of subject matter.

Practical Tutorials

These tutorials are meant as a guided walk-through of using specific techniques and concepts by applying them to a real project. Tutorials are also geared more specifically to Blender, while Lectures and Fundamentals are not app specific.

Exercises

Exercises are tasks performed by the students as assigned by the instructor, with the help of other students and instructor guidance as needed, making use of the concepts, techniques and skills learned in the previous lectures and tutorials.

Live Questions and Answers

Two live Q/A sessions will be held each week of the workshop to help answer any additional questions students may have. Each session is 45 minutes and will be recorded for later viewing.

Q/As are held on **Friday** at 6pm CST and **Saturday** at 11am CST.

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Pre-Week Starters Pack: Resources for Getting Started

This collection of resources is intended as a means for even the newest user to get up and running in preparation for the workshop. These resources cover many of the key fundamentals and basics that every 3D modeler should know. The fundamentals below are not Blender specific, while the tutorials are directly related to Blender.

Before starting this workshop, every student is expected to be familiar and comfortable with each of the below topics.

Introduction: *Welcome to the Starter Pack*

Lecture: *Basic structure of a model*

Learn the basics of what makes a model and how we construct meshes during the modeling process.

Lecture: *Understanding the modeling workflow*

This lecture looks at the modeling process as a whole to help you understand how to modeling fits into the larger production pipeline and steps you need to take to ensure your model is fit for everything from texturing to animation.

Fundamental: *Introduction to Subdivision Surfaces*

Learn what subdivision surfaces are, what we use them for, and why they are fundamental to most modelers workflow.

Fundamental: *Primitive mesh objects*

Keep it simple by getting an overview of the basic mesh objects that are the starting point for many more complicated models.

Fundamental: *Working in Global and Local space*

Learn what it means to work in Global and Local space while modeling and why it can accelerate your workflow and accuracy.

Tutorial: *Quick-start to modeling in Blender*

This is an introduction to the primary modeling tools Blender offers that you will use over and over again.

Tutorial: *Using modifiers for non-destructive modeling*

Modifiers can help create a much more stream-lined, less destructive workflow to yield better models in less time and with less effort.

Week One: Focusing on Topology

The first week of this Mastering Modeling workshop is focused exclusively on topology. Topology is the underlying concept and structure that affects everything we do in modeling. By understanding topology, we can not only better understand the modeling process but we can also vastly improve our modeling; regardless of whether that is lowpoly modeling, high poly modeling or even sculpted forms.

Introduction: *What is topology?*

A introduction and rundown on what topology is and how it affects the way that we model.

Lecture: *Edge loops and edge rings*

A look at three of the key terms in topology that directly influence how we structure our models and how we create good, clean topology.

Lecture: *Triangles, Quads, NGons, and Poles*

These are key terms in topology, and modeling as a whole, this lecture breaks each of them down to understand what they are, how they effect surfaces, and how/when to use them.

Lecture: *Quad-only Models*

A look at why we generally aim for quad-only topology when constructing models and how it affects our workflow and end result.

Fundamental: *Using all-quad junctions for topology flow and density*

As models become more and more complex, managing the topological flow and density can become quite challenging, this lesson looks at some ways this can be done.

Fundamental: *Using topology flow to your advantage*

A look at how to construct better, more efficient models by managing your topology flow well.

Fundamental: *Using poles effectively*

A look at how to use poles to your advantage to better capture detail with a clean mesh..

Tutorial: *Topology study of a fire hydrant*

Get an overview of the key topological aspects of a common hard-surface object.

Tutorial: *Topology study of a sports car*

See what makes the topology of a sports car difficult and vital to creating a good model.

Tutorial: *Topology study of a human head*

Learn how to structure the topology of a human face and head so it'll work for animation.

Tutorial: *Reducing topology and redirecting topology flow*

See several techniques for reducing the number of polygons in a specific area so as to avoid overly dense meshes.

Tutorial: *Using NGons as a temporary topology block*

A look at how to use topology blocks to isolate topology changes for a less destructive workflow

Student Exercise: *Topology clean up*

The student is provided a model with poor topology and tasked with cleaning it up as they best see bet by taking into account the information from the past week.

Week Two: Poly Modeling Intensive

The second week of this workshops is an intensive focus on poly modeling. The goal is to apply all of the topology fundamentals and theory we learned in the first week to an actual workflow by modeling several different subjects while using different modeling techniques.

By the end of the week you should have a good understanding of different modeling methods, along with a deeper understanding on applying the topology topics covered in week one.

Lecture: *Keep the mesh simple*

An overview of why it's advantageous to always keep your mesh as simple as possible.

Lecture: *Breaking complex forms down to simple shapes*

A look at how approach complicated models by first simplifying them down to their basic forms.

Lecture: *Modeling Organic and Hard-surface forms*

The key difference between organic and hard-surface modeling is how you treat the edges and surfaces; this fundamental lesson looks at the basics of how this can be done and why topology is essential.

Fundamental: *Using the Box Modeling method*

This is an overview of the box modeling technique, where you start from a simple shape and gradually increase the complexity by extruding and cutting into the mesh.

Fundamental: *Using the Edge by Edge Modeling Method*

This is an overview of the edge by edge modeling technique that works by essentially tracing out the topology of your model an edge at a time.

Fundamental: *Proximity loops and creases*

A look at how to use proximity loops and creases in order to create sharp edges with subdivision surfaces.

Fundamental: *Using detail loops to create better surfaces with clean topology*

An explanation of how to create much cleaner surfaces by adding a detail loop around major details.

Tutorial: *How to use references as background images*

References are often used in the modeling work flow to speed up the process and achieve better results. Learn how to use them in Blender.

Tutorial: *Box-modeling a house*

Find out how to quickly model a house or other architectural form with the box-modeling technique.

Tutorial: *Modeling a cartoon character head*

Learn how to model a cartoon character head with a variety of techniques by starting with a provided piece of concept art.

Tutorial: *Modeling a hard surface, rugged revolver*

Learn how to model a hard-surface fictional weapon based on a provided design.

Exercise: *Modeling a cartoon dog*

The student is tasked with modeling a cartoon dog, based on the provided reference, with clean topology by using either the box modeling or edge by edge method.

Week Three: Sculpting

The third week of this workshop moves the focus to sculpting. This week will introduce the student to the basics of sculpting, explain why sculpting is such a powerful tool and walk the student through the complete sculpting workflow. This week covers sculpting from primitives, sculpting with a basemesh, techniques for sculpting everything from hard surfaces to wrinkles and folds of cloth and finally in-depth walk-throughs of specific subjects.

Intro to sculpting in Blender

An introduction to sculpting in Blender that will give you an overview of how sculpting works, the basics of sculpting in Blender, and some general tips and guidance to working with sculpting.

Lecture: Fitting sculpting into the modeling workflow

A look at how the sculpting process fits into the rest of the modeling workflow for animation, rendering, games, etc.

Lecture: Separating the artistic and technical aspects of the workflow

An examination of how sculpting can help separate the more artistic and technical aspects of the modeling process to provide better, more natural results.

Lecture: Keeping it simple, focusing on the form before detail

It's very easy to be compelled to add detail immediately to a sculpt, but this can cause many problems. This lecture looks at why you should work methodically and focus on forms first.

Fundamental: Using brushes

A look at the different brushes available for sculpting in Blender and what each of them do.

Fundamental: Using base meshes

An introduction to using base meshes as a starting point for sculpting.

Fundamental: Sculpting organic forms

A look at how to sculpt organic forms with clean surfaces and detail.

Fundamental: *Sculpting hard-surface forms*

A look at how to sculpt hard-surface forms with sharp details, corners and flat surfaces.

Fundamental: *Sculpting creases and wrinkles*

An overview of some techniques for sculpting creases and wrinkles for organic forms.

Fundamental: *Changing Viewport Lighting to visualize your sculpt better*

A quick look at how to adjust the 3D viewport lights to visualize your model under different lighting

Tutorial: *Generating a basemesh with the skin modifier*

See how you can quickly generate a base mesh by using the skin modifier.

Tutorial: *Using the remesh modifier to optimize a sculpt*

You can use the remesh modifier to help consolidate and optimize the mesh of a sculpted model to gain better performance.

Tutorial: *Sculpting a creature bust*

Learn how to sculpt a creature bust from the provided concept art.

Tutorial: *Sculpting high-frequency detail with alpha brushes*

Learn how to use alpha brushes to sculpt high-frequency detail such as wrinkles, cracks, pores, and more.

Exercise: *Creature head*

The students are tasked with sculpting a creature head from the provided basemesh.

Week Four: Retopology

The fourth week of this workshop moves on to look at retopology. The retopology process is used to create an animation friendly model from a high resolution, sculpted model. This works by recreating the form with clean, methodical topology that is laid out to support deforming joints and surfaces.

Note: the final student exercise review will be posted the following Monday

Introduction: *Overview of retopology and why we do it*

An introduction to the workflow and techniques of retopologizing a model

Lecture: *Modeling for animation*

A look at how ensure your models are ready for animation with correct topology and mesh density

Lecture: *Keeping the mesh simple*

An examination of why you should always keep your model as simple as possible.

Fundamental: *Working with joints*

An explanation for general rules of thumb for deforming joints on models.

Fundamental: *Capturing the original surface and form*

Learn how to improve the quality of your retopologized model by focusing on the original surface and form.

Fundamental: *Mapping out the topology with the grease pencil*

A look at how to map out the topology for your mesh before starting for a faster workflow.

Tutorial: *Surface snapping and the shrinkwrap modifier*

A quick look at how to use the surface snapping mode and the shrinkwrap modifier for retopology

Tutorial: *Retopologizing with BSurfaces*

How to use the BSurfaces add-on for fast retopology and mesh generation

Tutorial: *Retopologizing a creature head*

A walk-through of retopologizing a high-resolution, sculpted creature head.

Exercise: *Retopologize a creature head*

The students are tasked with retopologizing a provided, high-resolution, sculpted creature model.

Week 5: Premiere Student Focus

This final week is exclusive to premiere students and gives them the opportunity to choose an area of focus and apply all they have learned throughout the rest of the workshop to a real project. Throughout the week the instructor will be available to answer questions, critiques models and provide direction on the students projects.

Several additional lectures are also available that introduce the student to more professional industry-specific topics for modeling.

1. **Focus:** students will choose a focus area, such as character modeling, organic modeling, hard surface modeling, sculpting, or other.
2. **Support:** students will receive direct support throughout the week from instructor to improve their skills in chosen area.

All premiere student communication will be done through the premiere section of the forums. Students will be able to upload screenshots, videos, and models for review by the instructor.

A final **live Q/A** will be held at the end of the week to answer and final questions, concerns, or problems.

Introduction: *Choosing a focus*

This is an overview to give you some suggestions and guidance when choosing a focus for the fifth week.

Lecture: *Low poly modeling for games*

An overview of the key aspects to modeling real-time assets, including polycount, silhouette, topology, etc.

Fundamental: *Modeling for production*

A look at how to model within a production environment by preparing your model for UV Unwrapping, Texturing and Animation

Tutorial: *Using Dynamic Topology for Sculpting*

Get a first tutorial how to use the new Dynamic Topology features currently in development for a much more fluid, and freeing sculpting workflow.

Conclusion: Where to go next?

The closing video for premiere students explores the possibilities for where students can go next, including how to choose what to do after modeling, how they can apply their modeling skills, etc.

Bonus Videos

This bonus video is provided as an additional overview of a modeling process, to help give a more complete picture of other workflows available to users.

Creating a Dog Sculpture with Dynamic Topology

Watch an overview of the process involved with creating a dog sculpture from reference with the new dynamic topology tools that are currently in development.