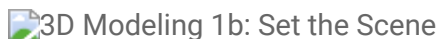


Course Syllabus

What you will learn in this course



3D Modeling 1b: Set the Scene

Many buildings that are rendered in the real world first are constructed in a digital 3D world that depicts the aesthetics, environment, and conditions of what will come to be. In this course, you will be introduced to the tools and techniques needed to create works of 3D art. You will bring your objects to life with color, textures, lighting, and shadow all while simulating the movement of world around. Are you ready to bring beautiful objects to life in a 3D world? Let's get started today!

Unit 1: The 3D Industry and Production Process

With a range of great modeling skills in hand, you're now ready to more carefully consider the career paths that best suit your style and passions. That might be entertaining with games and movies, helping patients and doctors with modeled body parts, or diving into a passion such as geology or architecture. With a career path in mind, we'll explore how to present your work to the world and how to work online in a safe, ethical, and collaborative manner. We'll also review the 3D modeling production process that you'll move through in more detail during the rest of the course.

What will you learn in this unit?

1. Make informed decisions about which 3D modeling career opportunities best suit you
2. Discuss online ethics and laws relating to 3D modeling
3. Use online resources to identify trends and collaborate with other modelers
4. Describe the production process of a 3D modeling project

| UNIT 1 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 1 Critical Thinking Questions | Homework |
| Unit 1 Activity 1 | Homework |
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|---------------------|------------|
| Unit 1 Activity 2 | Homework |
| Unit 1 Discussion 1 | Discussion |
| Unit 1 Discussion 2 | Discussion |
| Unit 1 Quiz | Quiz |

Unit 2: Surfaces, Shadows, and Lighting

Lights! Camera! Action! It's time to become the director of the next block buster. We will start off by learning how to focus the camera and the different properties of light. But how should we dress our actors? We will cover that too by learning about color schemes and how they make us feel. Ever notice how some movies look visually darker than others? We'll cover lighting techniques so we can set our own tones. And how will we light our scenes? We'll investigate the Blender lamps and other light sources to illuminate our models and minds.

What will you learn in this unit?

1. Manipulate depth perception and opacity to recreate perception and light in Blender
2. Recommend a color scheme to convey a message with a 3D render
3. Describe different lighting techniques for a scene and associated mood or tone
4. Explain the differences between the light sources used in Blender
5. Add realistic lighting details to a Blender scene

| UNIT 2 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 2 Critical Thinking Questions | Homework |
| Unit 2 Activity 1 | Homework |
| Unit 2 Activity 2 | Homework |
| Unit 2 Discussion 1 | Discussion |
| Unit 2 Discussion 2 | Discussion |
| Unit 2 Quiz | Quiz |

Unit 3: Adding Materials and Textures

Almost everything around us has some sort of texture. Even when it's not obvious at a glance, we can still feel it with our fingers. Indeed, if we take a closer look, we will start to notice many differences. Light reflects differently on paper, for instance, than it does on the surface of a desk. Some desktops even reflect near-perfect reflections, while most paper does not. The different light interactions are a result of their textures. We don't have to feel it. We only have to see it. In Blender, we can actually give our objects rough or smooth or bumpy surfaces, but more often, we change the way light reflects off of our surfaces. This lets us both color our models and give the appearance of different textures.

What will you learn in this unit?

1. Explain how light interactions are employed in Blender
2. Apply materials using a network of nodes
3. Choose between three ways to texture 3D objects
4. Map an image onto a 3D object as texture
5. Paint a texture onto a 3D object
6. Render a textured 3D object with a transparent background

| UNIT 3 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 3 Critical Thinking Questions | Homework |
| Unit 3 Activity 1 | Homework |
| Unit 3 Activity 2 | Homework |
| Unit 3 Activity 3 | Homework |
| Unit 3 Discussion 1 | Discussion |
| Unit 3 Discussion 2 | Discussion |
| Unit 3 Quiz | Quiz |

Unit 4: Camera and Rendering

Ever wonder how 3D artists synthesize realistic scenes? Did they learn programming to do so? Or did they just simply hit a button to activate realistic effects? Let's look at the benefits and drawbacks of different rendering methods, how to manipulate the Blender camera like a

Hollywood director, what features to activate for realistic effects, and what the most popular video file in the world is. Take a seat in the director's chair because it's time to render.

What will you learn in this unit?

1. Describe the different types of rendering methods
2. Manipulate the Blender camera
3. Use rendering aids
4. Render an MP4 file

| UNIT 4 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 4 Critical Thinking Questions | Homework |
| Unit 4 Activity 1 | Homework |
| Unit 4 Activity 2 | Homework |
| Unit 4 Discussion 1 | Discussion |
| Unit 4 Discussion 2 | Discussion |
| Unit 4 Quiz | Quiz |

3D Modeling 1b Midterm Exam

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from the **first** half of the course (Note: You will be able to open this exam only one time.)

| MIDTERM Assignments | |
|----------------------------|-------------|
| Assignment | Type |
| Midterm Exam | Exam |
| Midterm Discussion | Discussion |

Unit 5: Rigging and Animation

The phrase “the magic of animation” is commonly used to describe animated works of art. Once we learn what that magic is, we can become wielders of it. Ready to learn the rough and tough technical skills used to animate in 3D? We’ll start with a flipbook analogy to learn about frames. Then we’ll learn about Disney’s secret recipe for making great animations and learn about how being a rigger is essentially being a digital puppeteer. We’ll close things out with a look at how physics and audio can be applied to animations to make them even more realistic.

What will you learn in this unit?

1. Explain the animation process in terms of frames and keyframes
2. Define the 12 principles of animation
3. Set up an armature rig
4. Create a physics simulation
5. Import audio into Blender

| UNIT 5 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 5 Critical Thinking Questions | Homework |
| Unit 5 Activity 1 | Homework |
| Unit 5 Activity 2 | Homework |
| Unit 5 Discussion 1 | Discussion |
| Unit 5 Discussion 2 | Discussion |
| Unit 5 Quiz | Quiz |

Unit 6: Environmental and Mathematical Modeling

3D software is more than just video games and special effects. It can be found in science and urban development. It can be used to predict trends and improve efficiency. It can be used to better understand and analyze mathematical formulas with 3D graphs. In this unit, we will learn how to use free heightmap data to recreate real-world terrain. Ever wondered what a 3D graph looks like? We can use multi-variable formulas to create 3D models of 3D graphs. Want to work in urban planning? Let’s make a quick and easy traffic flow simulation. What happens when two

things collide but don't want to spend money destroying the two objects? We'll wrap things up by exploring rigid body physics which can be used to safely create collision simulations.

What will you learn in this unit?

1. Model real-life terrain using heightmap data
2. Formulate a 3D graph
3. Simulate traffic flow with a particle system
4. Describe rigid body physics

| UNIT 6 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 6 Critical Thinking Questions | Homework |
| Unit 6 Activity 1 | Homework |
| Unit 6 Activity 2 | Homework |
| Unit 6 Discussion 1 | Discussion |
| Unit 6 Discussion 2 | Discussion |
| Unit 6 Quiz | Quiz |

Unit 7: Quick Effects and Animation Editors

Do we have to be physicists to create 3D physics simulations? Thanks to computers, we don't! Learn how to make gas and liquid simulations in just a few clicks as well as a few ways to better track and control animations using various editors available in Blender. Let's create some cool effects!

What will you learn in this unit?

1. Apply a Quick Effects simulation to a mesh object
2. Alter the topology of a mesh to resemble particle system simulations
3. Identify animated keyframes in the Dope Sheet Editor
4. Edit an animation curve in the Graph Editor
5. Describe Drivers and Action Strips

| UNIT 7 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 7 Critical Thinking Questions | Homework |
| Unit 7 Activity 1 | Homework |
| Unit 7 Activity 2 | Homework |
| Unit 7 Discussion 1 | Discussion |
| Unit 7 Discussion 2 | Discussion |
| Unit 7 Quiz | Quiz |

Unit 8: Heavyweight Champ

Look at how far we've come. Let's pull it together. We'll start off by throwing our weight around with weight painting. That'll let everyone know that we're 3D artists, by making Suzanne the monkey smile. The Movie Clip Editor will allow us to create CGI special effects. Then we'll flash into some more movie magic with the Compositor to help us with some post-processing edits. Last unit. It's a wrap!

What will you learn in this unit?

1. Explain weight painting in Blender
2. Animate independent vertices with weight painting
3. Add Shape Keys to a mesh
4. Track motion from real-world footage
5. Render animation with real-world footage
6. Edit a video using the Compositor nodes

| UNIT 8 Assignments | |
|------------------------------------|-------------|
| Assignment | Type |
| Unit 8 Critical Thinking Questions | Homework |
| Unit 8 Activity 1 | Homework |
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|---------------------|------------|
| Unit 8 Activity 2 | Homework |
| Unit 8 Discussion 1 | Discussion |
| Unit 8 Discussion 2 | Discussion |
| Unit 8 Quiz | Quiz |

3D Modeling 1b Final Exam

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from the **second** half of the course (Note: You will be able to open this exam only one time.)

| FINAL Assignments | |
|--------------------------|-------------|
| Assignment | Type |
| Final Exam | Exam |
| Final Exam Discussion | Discussion |