REU Modeling Course - Part 3

AutoDesk Maya

More Modeling
Workshop Workflow

- Let’s Review last session
- Creating & Applying Materials
- Rendering
- Today’s mini goal
Today’s Mini Goal Inspiration
Let’s Review

Did I....

- Boolean
- Extrude
- Bevel
Let’s Review

- Did I....
  - Boolean
  - Extrude
  - Bevel
Let’s Review

What are Hierarchies used for?
Let’s Review

๏ What is grouping used for?
๏ How is it different from hierarchies?
Let’s Review

What are layers used for?
Let’s Jump in to Maya
Materials allow you to add colors and textures to your objects.

When you start working with materials, you also start to work with rendering.
Materials determine the character of an object’s surface: color, texture, shininess, bump mapping, and other attributes.

**Basic Shader types:** blinn, lambert, phong, phong e, and anisotropic.

When we select any of these shader types, the attribute editor is triggered (further manipulation).

Materials can be applied to multiple objects equally and simultaneously.

**Assign:** Right click on object > assign new material > select desired OR select object and click on the desired basic shader.
Basic Shader Types: Blinn

๏ Blinn:
๏ Is a material (shader) that is particularly effective at simulating metallic surfaces (for example, brass or aluminum) which typically have soft specular highlights.
๏ Blinn is the most computationally expensive of the 3 common shaders: Lambert, Phong, and Blinn
๏ Can set attributes of the material to control the size of shiny highlights and the ability of the surface to reflect its surroundings.
Basic Shader Types: Lambert

○ Lambert:

○ Is a material (shader) that represents **matte surfaces** (such as chalk, matte paint, unpolished surfaces) with no specular highlights.

○ The initial (default) shading group uses a special Lambert surface material. Do Not modify it; instead, create and apply a new Lambert material.

○ Can set attributes of the material to control its appearance.
Basic Shader Types: Phong

Phong:

- Is a material (shader) that represents **glassy or glossy surfaces** (such as car moldings, telephones, bathroom fittings) with a hard-specular highlight.

- Specular shading attributes can control the size of shiny highlights on the surface. (valid range is 2 to infinity)

- It’s one of the first materials to be created due to its simple highlight calculation.
Basic Shader Types: Phong E

- **Phong E:**
  - Is a material (shader) that is a **simpler version of the Phong** material. The specular highlights on Phong E surfaces are softer than those on Phong surfaces.
  - **Renders faster!**
Basic Shader Types: Anisotropic

○ **Anisotropic:**
  ○ Is a material (shader) that represents **surfaces with grooves** (such as CD, feathers, or fabrics like velvet or satin.
  ○ The appearance of **specular highlights on an Anisotropic material depends on the properties of these grooves** and their orientation.
  ○ The specular shading attributes (shiny highlights) determine the direction of the grooves as well as their properties.
  ○ Reflects specular light differently in different directions. If you spin an anisotropic sphere, its specular highlights changes, depending on the direction of the grooves.
Create/Apply Maps(texture)

1. Select desired object (fence example)
2. Default is Lambert, create or apply a new one!
3. Once the new material is created, we can see checkerboard next to each material attribute (press the one next to “color”)
4. This will open a new menu that allows you to add textures (select wood for this example)
5. Can’t see it in the viewport: go to Shading > hardware texturing (TA DAH!)
6. We can also see the sample of that texture (each texture will have its own set of controls and attributes)
   1. To go back to the original (new lambert we created) go to the two little boxes above “Sample” next to focus in the attribute.
   2. Press the one that says output connection; this will bring us back to the new lambert we created (use these boxes to navigate in and out of the material’s levels)

NOTE: It is a good idea to save all external texture images in the “Source Image” folder of the project directory
Multiple Materials on Polygonal Objects

๏ Have the ability to apply multiple materials to a single object
  ◦ Materials can apply to the face of an object (select face(s) and apply the material you want)
  ◦ Apply new material (similar process as previous)
Today’s Mini Goal

Apply materials or textures to all of your objects.

(~ 30min session)
BREAKE
TIME
Lights & Light Types

- **Rendering is a lot like photography;** it works with light. In Maya there are virtual lights.

- **Basic lights:** spot light, ambient, area, directional, and point.

- **Insert:** Create > lights > type of light OR rendering shelf > first couple of icons

- **To see lights:** (make sure you are in “renderer” > viewport 2.0) lighting > use all lights (hotkey 7)

- Lights can be moved and manipulated (W,E,R) hotkey T will give more manipulators
Lights & Light Types: Spot Light

Spot light:

- Created at the origin
- Creates a cone of light in one direction.

Useful for: Beams of light (ex. flashlight, lighthouse)

Target = light will point at object/manipulator and the other is for the light itself
Lights & Light Types: Ambient

- **Ambient:**
  - Brightens all parts of the scene uniformly
  - **Useful for:** Simulating a combination of direct and indirect lighting.
Lights & Light Types: Area

Area:
- 2D rectangular light sources (soft box)
  - It gets stronger as it gets closer to an object, or it gets bigger in size
- Useful for: Window, ceiling lights.
- Longer render time.
Directions:

- Even illumination of a scene using parallel rays of lights.

**Useful for:** Extremely far away sources (ex. sunlight)

- Points in a specific location, unlike spot light, it’s not limited to a specific cone.
Point:

- Light radiates in all directions from a single point.

Ideal for: Omni-directional sources (ex. lightbulb)
Lights & Light Types

- To further manipulate the lights and see through it like a camera:
  - **panels > look through selected** (make sure the light source is selected). Shows exactly what the light is doing
  - Go into the orthographic viewports to see all perspectives
  - Can also edit the light in the Attribute Editor: color, intensity, type of light, etc.
Creating Shadows

‑ When working with lights, we also need to think about shadows; in the real world, every light casts a shadow.

‑ Maya allows us to create or eliminate shadows.

‑ Select type of light > in attribute editor find “shadows”

‑ 2 types of shadow:
  
  ○ Depth map = uses bitmap to calculate the shadow
  
  ○ Retrace = shadows are sharper, accurate, support transparency

‑ Also change: color, resolution, filter size, light radius, shadow rays…
Creating Shadows: Depth Map

**Depth Map:**

- Under light shape attribute editor.
- Less accurate shadows
- Faster render time
Creating Shadows: Raytrace

**Raytrace:**

- Under light shape attribute editor
- Slight difference from Depth map
- More accurate shadows
- Longer render time
Camera Basics

- **Cameras are where/what you view your scene;** they are important for framing and getting the look you want.

- **Create more cameras:** Create > cameras > select desired

- **Basic cameras:** camera, camera and aim, camera aim and up.
Camera Basics: Camera

- **Simple camera:**
  - **View through it:** select camera > panels > perspective > camera OR panels > look through selected
  
- Can manipulate camera’s position in the viewports; perspective window will show what the camera sees
Camera Basics: Camera and aim

- **Camera and aim:**
  - Similar feature to the “target” in lights
  - Helps keep camera in place while the aim point focuses on the desired area
  - Great way to keep your camera pointed at the object of interest while moving your camera freely
Camera Basics

- **Editing**: (attribute editor)
  - **Angle of view** = determines how wide or narrow the camera is seeing
  - **Focal length** = same as a 35mm lens (photography); when I bring the number higher, the camera zooms in (but it’s not moving the camera, just narrowing the field of view)
  - **Environment** = determines the background color of your image
  - **More**: View > Camera settings
  - **Resolutions gate** = shows exactly the area of the scene is going to render (widescreen or more squared off)
- **Find:** Windows > rendering editors > render settings OR icon on the second toolbar
- Various rendering options
- **Render settings:** image size, type of image, aspect ratio, etc
  - Frame/animation option will change the type of image
- **Renderable cameras** = provides different camera perspectives (affects how we see an image … warping?)
- **Image size** = various options (considers size and pixelation)
Render view will pop up as separate menu/screen.

You can instantly render your current frame.

We have the capability to save images in various formats and compare various renders (good when you make small quick changes).
Today’s Mini Goal

Apply 1 or more lights in your scene and render.

(~ 30min session)
Today’s Mini Goal Inspirations
Final Maya Task: Prepare for export

- Save scene as another name *(File > Save Scene As... > “title_no_render”)*
  - Delete all added objects needed to render in Maya (lights & cameras)
- Create an export folder in the Maya project directory
- Make sure all texture files are in a single folder
- Unity course will go through import process
  
  Note for all FBX models: Import the texture assets before importing the model
Final Maya Task: Export

- Export all items in the scene to .FBX (File > Export All)

(Export All Settings: FBX export > title > check Embed Media > Export All)

Note: see next slide for errors that occur during export process

- The Unity course will go through the import process

Note: When importing FBX files, always import texture first then the model
Final Maya Task: Export Error with textures

 отметить текстуру, где произошла ошибка, в окне предупреждений

 1. Ошибка переноса текстуры (Windows > Render Editors > Hypershade)

 2. Выберите текстуру, которая имела ошибку > Edit > Convert to File Texture (Maya Software)

 3. Закройте Hypershade, сохраните проект и попробуйте экспорт снова.
References/More on...

- [lynda.com](https://www.lynda.com) Provides a video playlist under “MAYA 2019 Essential Training”
- Youtube
- [autodesk.com](https://www.autodesk.com)
- [https://www.youtube.com/user/MayaHowTos](https://www.youtube.com/user/MayaHowTos)

- Google Search Terms, write “Maya” + :
  - Rendering scenes
  - basic shader types
  - material or texture maps
  - multiple materials in polygonal objects
  - light types or lighting
  - creating shadows
  - basics of cameras, rendering