

Masters of Science in Digital Imaging and Design Spring 2005
3D Modeling – MAYA Y35.1030 001, Y35.1030 002

Instructor: David Halbstein
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Class Time: Tuesday 12:30pm – 3:00pm

Term Dates Jan 18 –May 13
March 14th-18th (Spring Break)
Room TBA

COURSE DESCRIPTION

This course introduces the basic modeling tools and techniques within the AliasWavefront Maya software. Students will use Maya to create complex models, and scenes using the three basic modeling toolsets; NURBS, Polygons and Subdivision Surfaces

COURSE OBJECTIVES

- § A clear understanding of the Maya interface
- § Foundation of complex modeling techniques
- § Understanding the differences between different modeling methods and tools
- § Basic lighting, rendering and turntable animation for presentation
- § Rendering for print
- § To use Maya as a tool to express creative innovation

WEEKLY OUTLINE

1/18 Session 1 The Maya Interface

- Ø Menus, windows, interface organization
- Ø Creating and Setting projects; saving work, archiving projects
- Ø NYU Networking setup; working within the system

- ∅ Primitive Objects
- ∅ Object manipulation; move, rotate, scale, snap
- ∅ Pivot manipulation, move, snap
- ∅ Grouping, parenting
- ∅ Duplicate, duplicate with transforms, smart duplicate

Session 1 ASSIGNMENT

“The Greek Temple”

Create a simple model of a Greek temple using primitive objects

1/25 Session 2 Nurbs Modeling Tools

- ∅ Revolve, Extrude, Planar, Loft
- ∅ NURBS components – manipulate shapes and detach

ASSIGNMENT

Revise the Greek Temple adding detail and modifications based on new modeling tools and techniques.

2/1 Session 3 Image planes, Modeling Strategies Temple Model Due

- ∅ Understanding Camera Views
- ∅ Import and Manipulation of Image Planes as modeling references
- ∅ Use of layers for organization of model

IN-CLASS EXERCISES

Strategic model layout, identification of character lines

Model of a Calculator

ASSIGNMENT

Finish the calculator model. Create several models of your own choice based on real objects. Choose objects that you can bring into class with you so we can compare and critique. Choose challenging objects that will present good questions that you can bring to class with you. Some suggested objects:

Pens, pencils, markers
Computer Mouse
Tea Set
Notebooks

Toys

Scotch Tape dispenser

Make sure that you derive your model from a real object, don't make it up as you go along.

2/8 Session 4 Questions and Answers

During this class I will address difficulties you had with the models, discuss alternative approaches and methods and troubleshoot any other issues that have come up.

ASSIGNMENT

Complete your more complex models based on critiques and suggestions in class

2/15 Session 5 Curves on Surface, Trims, Intersections, Booleans, "Holistic Modeling Methods"

- Ø Derivation of complex shapes through character lines and trims
- Ø NURBS curve and surface theory
- Ø Surface continuity; Positional, Tangent, Curvature
- Ø Maya positional and tangent tolerance overrides

IN CLASS EXERCISE

Bicycle Helmet

ASSIGNMENT

Work on completing the bicycle helmet model. The model should be complete and ready for texturing and rendering for next week

2/22 Session 6 Realistic Lighting and Shadowing Bicycle Helmet Due

- Ø 3 Point Lighting Principals
- Ø Lighting for Industrial Design Presentation
- Ø Decay Rate
- Ø Raycast Test Rendering
- Ø Depth-map shadows
- Ø IPR Rendering
- Ø Basic Elements of Hypershade Window

ASSIGNMENT

Create a still life using models of your own choice. A bowl of fruit, bottle of wine and glasses, a desk arrangement. Don't overthink the model, the main purpose of this assignment is to light the scene effectively. Assign a white lambert shader to everything in the scene. Set up the camera Use a 3-point light setup to create good key lighting, fill lighting and back-lighting with soft shadows.

3/1 Session 7 Lighting, Texturing, Rendering Wrap-Up **Still Life Lighting Due**

- Ø Lighting Critiques
- Ø Render Tessellation, Antialiasing
- Ø Batch Rendering, render setup, Pixel/Device Aspect Ratio
- Ø Setting up a Turntable Render
- Ø Command Line Rendering

ASSIGNMENT

Create a turntable render (150 frames, plus or minus) of each of your projects. The helmet should be rendered as an industrial design presentation, showing off the surfaces and shapes clearly, whereas the still life and should be lit more like a mood piece; with attention given to the shadows and grayscale values. No textures or colors should be used, the model should be rendered in grayscale only. Pay attention to render quality issues such as good composition, tessellation and antialiasing.

3/8 Session 8 Presentation and Critique **Helmet and Still Life Due**

ASSIGNMENT

If you want to re-work and re-submit the helmet and still life models based on the critique you received, this is the time to do it.

3/22 Session 9 Intro to Polygon Modeling

- Ø Polygon Toolset
- Ø Create, Extrude, cut Polygons
- Ø Smooth Polygons
- Ø Polygon Modeling Strategies (Box method, "Create Polygon" "Convert Polygon")

ASSIGNMENT

You will be given several tutorials to work from. Choose one model in a tutorial and construct that object or one similar. Provide sketches as you model.

3/29 Session 10 Continuation of Polygon Modeling

- Ø Troubleshooting and assistance on current modeling projects
- Ø Split, Bevel, Smooth revisited;
- Ø Creation of Polygons from NURBS curves and surfaces
- Ø Boolean Surfaces
- Ø Modeling in Proxy mode

ASSIGNMENT

Re-do, refine and finish the chosen tutorial using Polygon surfaces

4/5 Session 11 Polygon wrap-up, intro to SubDivisions

- Ø Final troubleshoot on current projects
- Ø Intro to Subdivision Surfaces
- Ø Class Demonstration of Human Hand tutorial
- Ø Convert to SubDivision/Polygon/Nurbs
- Ø Using Sub-D's for finer detail

ASSIGNMENT

Complete the hand tutorial demonstrated in class. Add knuckles, fingernails, skin details using subdivision surfaces

4/12 Session 12 Organic Modeling using All Methods

- Ø The Human Form – Torso tutorial
- Ø Modeling Theory – NURBS surface parameterization
- Ø Attach/Detach
- Ø Using Lattices, Non-Linear deformers, “Sculpt Surfaces” tool for organic results
- Ø Using MEL scripts for tangency (TangentCVWin.mel, hullTangencyWin.mel)
- Ø Nurbs to Polygons/SubDivisions revisited
- Ø Sculpt Surfaces toolset

ASSIGNMENT

Choose or take a photograph of a human torso, front and side. Import them as image planes as references. Using all of the modeling methods we have learned, sculpt the torso into a

realistic human form.

4/19 Session 13 Organic Modeling continued

- ∅ Troubleshoot, QA on Torso model
- ∅ Revisit model conversion strategies
- ∅ Render Quality strategies for Polygon, SubD surfaces

ASSIGNMENT

Finish Torso model. Submit one NURBS, one POLY and one SUBDIVISION version for review and critique

4/26 Session 14 Modeling Wrap-up

- ∅ Optimizing your scenes
- ∅ Open Q and A – Anything Goes. Revisit any and all projects, demonstrations, concepts learned in class.
- ∅ Discussion of final project

FINAL ASSIGNMENT

All models are to be submitted in final form. Presentation should include a final wireframe of each model, one or two high-resolution “Beauty Shots” and a turntable animation.

FORMAT:

Absolutely everything submitted MUST have your name embedded in the project name. Putting your models in a folder with your name is insufficient. For example:

halbsteinTorso.mb
halbsteinHelmet.jpg
halbsteinHelmetTurntable.mov

Follow the “Hungarian text” naming convention we discussed in class for everything.

Wireframes:

- **Must be CLEAN. No extraneous curves or surfaces. No extra layers, no null nodes. Grouping must be sensible and accurate. No extra history. Important objects named.**

Beauty Shots:

- **Must be in JPG format, 720x486 resolution or higher.**

Turntables:

- **Must be in Quicktime Format, compressed to no more than 20 megabytes.**

5/3 Session 15**Final Project Presentation , critique****CLASS POLICY**

- Class will begin as scheduled.
- Attendance to all classes is required
- An accumulation of 3 or more unexcused absences will likely result in failure
- In the event of an excused absence, you are still responsible for the work covered
- **NO CELL PHONES IN CLASS.** If you must be in contact with family or children, please set your phone to “vibrate” and excuse yourself from class quietly.

GRADING POLICY

- Attendance and class participation will count for 30% of your grade.
 - Participation means submitting work in progress for troubleshooting and critique
 - Participation means offering questions and critique of other submissions
- Projects will account for the remaining 70%. Projects will be graded based on several factors:
 - “The Rubric For Grading Art” handed out with this syllabus
 - Show of progress throughout the semester. If the first time I see your work is at the critique, it will be graded less favorably than one I have seen progress on throughout the semester
 - Progress, progress, progress. Some people start out very slowly in grasping this material; others “shoot out of the box” quickly. Hard steady work will be rewarded, and more weight will be given towards later grasp of the material.

Projects must be submitted on time in finished format per requirements, even if the projects themselves are not finished. You will be given the opportunity to re-submit everything at the end to improve your grade.