

# MMSP 147 - 3d Imaging for Multimedia

Batmal Hall 241

Tuesday / Thursday 9-12 noon

office hours: will be announced (by appointment only)

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**online materials and resources:** <http://www.myholler.com/flash/>

This class is a basic introduction to the 3d industry, applications, tools, and techniques with regards to model creation, texture making, lighting, rendering, and animation. The primary 3d tool used in this class is 3ds Max 9+ as well as the common 2d bitmap tool – Photoshop and video composition/editing software of your choice (we have Windows Movie Maker in the lab).

You will learn to choose the correct tool for the correct job, become familiar working within the 3d world space, learn the basics of 3d Studio Max and learning to model with polygons and patches as well create an animation. You will also learn to integrate graphics and textures into your scene using Photoshop. Strategies to make more efficient models and using fail safe methods in creating objects will be addressed. The final project in this course will be a short animation or a series of still compositions focusing on modeling, architecture, or your own designation.

## **Prerequisites:**

IDST 120 or equivalent course (practice using Illustrator, Photoshop, Audacity, and Final Cut Pro - or similar application)

IDST 125, equivalent graphic design course, or portfolio (general understanding of design, color, composition)

Basic PC Skills

Must have independent knowledge of Video Editing software, sound editing software (such as open source software - Audacity), Flash, or similar tool for Animated Storyboards.

## **Required Supplies:**

USB Drive and/or Blank write-able CD-ROMs

Sketchbook (*any size*)

Pencil(s)

*Optional Book:* Mastering 3ds Max Design 2010, Mcfarland

## **Supplementary Reading:**

### **Animation:**

#### Digital Character Animation 2, Volume 1: Essential Techniques

George Maestri, New Riders, 1999. ISBN: 1-56205-930-0

This book clarifies how to animate a character step by step with a very clear discussion on different methods of modeling (polygon, patch, NURB, metaballs). The books in this series do not follow a specific platform and the techniques here can be applied within any 3d software application.

#### Digital Character Animation 2, Volume 2: Advanced Techniques

George Maestri, New Riders, 2002. ISBN: 0-7357-0044-3.

A nice addition to Volume 1. Many of the practices for this class are pulled from this book. This book is more theoretical and less of a 'how to' but it gets you thinking about how a character should think, how to tell a good story and why a character moves the way it does.

#### Cartoon Animation

Preston Blair, Walter Foster Publishing, 1994. ISBN: 1-56010-084-2.

The book is written by a veteran 2D cartoon animator who worked for Disney and MGM. Blair's discussion on animated motion, timing, rhythm and exaggeration is crucial for any animator to understand.

### **Lighting, Texturing, and Rendering:**

#### Digital Lighting and Rendering

Jeremy Birn, New Riders, 2001. ISBN: 1-56205-954-B.

A comprehensive discussion on lighting from a technical and visual perspective as applied in the 3d space. This book quantifies what many film books say in easy to understand words. Illustrations are very helpful and useful.

#### Digital Texturing and Painting

Owen Demers, New Riders, 2001. ISBN: 07357-0918-1.

A comprehensive discussion on textures. Not only does it cover creating a texture library and how to texture an object (although this section is a bit thin and only touches the top of the iceberg when it comes to texturing organic models) but, most importantly, it gives you ways of seeing and asking questions about the objects you are texturing.

### **Photorealism:**

#### Advanced 3d Photorealism Techniques

Bill Fleming, Wiley, 1999. ISBN: 0-471-34403-6.

Wonderful book showing how to take photographs and build realistic models with them using any 3d software and Photoshop.

<b>Grading Policy:</b>	100% total
Attendance and Participation	15%
Attendance and on-time arrival to class is REQUIRED. Tardiness will result in <b>50%</b> off your <i>daily</i> attendance grade. If you are late, it is your responsibility to make sure I mark you present. <i>E-mail me at <a href="mailto:elissa@myholler.com">elissa@myholler.com</a> before class to notify me of your absence.</i> <b>Participation = lab hours during class time.</b> If you plan on leaving early and not use lab time during class hours please tell me. Many in-class exercises are due the same day they are assigned.	
Exercises	20%
These skill-building exercises will be worked on during lab time and due at end of class unless otherwise noted. Exercises turned in late will have deducted 25 from a total of 100 points. Anything turned in more than one class late will not be accepted without overriding exceptions. There are no re-do's on exercises or assignments.	
Quizzes	10%
Pre-production Materials for team project	10%
Team Project	15%
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Pre-production Materials for final project	10%
Final Project	20%

**No redos allowed:** all grades on exercises, assignments, and final projects are final.

**Class Time/ Lab Time:**

Each class session will be generally broken down into a 1-hour lecture, 2 hours hands-on / skill-building lab. Class time should be sufficient for 'most' classroom exercises. Final Projects will require time outside class averaging 3 – 6 hours per week depending on individual skill level and project complexity. To the best of my knowledge there are no open lab hours on this campus. I will attempt to provide more info. Therefore all 3d Studio Max work must be done in class; all Video Editing, Sound editing should be done in one of the open labs on the Phelan Campus. If you are unable to use the lab due to other time conflicts and do not have 3DS Max at home it will be close to impossible to finish your final project!!!

**SCANS:**

This course has been revised to integrate workplace competency skills as outlined by the Secretary of Labor. This course, besides teaching you the basic 3d application, should also help you 'think' in terms of workplace. The 'team project' at midterm is an example of SCANS competencies in use. How do we work as a team on a single project in 3d? How do we bring our personal talents to the 3d project? One of the largest obstacles we must, as multimedia artists, overcome is time itself. This is also a SCANS competency skill. There will be more pre-production materials that address the issue of time management such as media asset lists and timesheets estimating the project schedule and deadline.

## Class Schedule

all reading assignments reference the Visual Quickstart Guide

1/19	<p>Introduction to 3d, Surveys, and requirements for class. 3d space; history of 3d.</p> <p>Examples of previous student work; examples of industry work.</p> <p>3dS Max interface, geometry primitives; basic transformations (translate, scale, rotate); 3d terms, Types of modeling (polygon, patch, NURBs).</p>	Exercise: Primitives and 3d space.
1/21	Basic Cameras Pt. I: Storytelling and Shot Composition.	Exercise: Shot Composition.
1/26	<p>Basic Cameras Pt. II: <i>continued</i>.</p> <p>Basic Modeling Intro: Shapes, Bezier Tool. Edit Spline &amp; other modifiers in 3ds Max; gizmos; changing center axis.</p>	Shot Composition Exercise DUE!
1/28	Basic Modeling <i>review and continued</i> : grids, snap; changing center axis. Instances, copies, references.	<p>Exercise: Still life.</p> <p>Bring in your sketchbook</p>
2/2	<p>Storytelling and Simple Animation: Conflict and Resolution. Knowing your Characters.</p> <p>Basic Animation: Key frames; animated modifiers; animation track; playback and control. Preview Rendering.</p>	Exercise: Simple Expressive Animation.
2/4	<p>Track View: Animation and curves. Deformation. X-Form and FFD Modifiers!</p> <p>Lab: continue working on simple animation exercise...</p>	Exercise: Simple Expressive Animation Due at end of class!
2/9	<p>Inspiring Animation Day!</p> <p>Asset manager in 3dS Max. Effective Teamwork and organization and 3DS Max. Team project discussion and surveys.</p> <p><i>TEAM MIDTERM PROJECT begins</i>: Break into your assigned team for team project. Brainstorm in your team a list of 10 premises for story ideas. Choose one to do.</p>	TEAM: Turn in at the end of class a list of 10 story premises brainstormed out in class + chosen story premise.
2/11	<p>Work in Teams: Media Asset List and Storyboards.</p> <p>Compound objects - Lofts. Using Source Images for modeling.</p> <p>Begin work on Team Project: Modeling Day.</p>	TEAM: Turn in Media Asset List, Estimated Timeline, and Storyboards.

2/16	Lofting (day 2) – deformations... Continue Working on Team Project: continue Modeling Day.	Exercise: Create Grecian temple... <i>extra credit</i>
2/18	Forward kinematics. Robot hand-robotic machine. Continue Working on Team Project: Camera and Model Rigging Day.	Exercise: Robot hand and bouncing ball. <i>extra credit</i>
2/23	Continue Working on Team Project: Animation.	---
2/25	Continue Working on Team Project: Animation.	---
3/2	Rendering. Adding Sound. Continue Working on Team Project: Animation.	---
3/4	Continue Working on Team Project: Animation.	---
3/9	Continue Working on Team Project: Rendering.	---
3/11	Continue Working on Team Project: Rendering.	---
3/16	Finish Up Midterm Project (ie. Video editing and sound and titles) Review movie with team.	---
3/18 End of midterm	Team Project Due. Presentations.	<b><i>Team Project Due at 10am.</i></b>
3/23	Final Project Discussion. Pre-production. <i>Project Proposal.</i> 4 choices – animation, model, fly through, or experimental. Editing Polygons: Part I: Sub object selection; editing polygons – vertex, face, edge poly level. Mesh Smooth. Preparing ( <i>on paper</i> ) - model creation.	( <i>Choose 1 for final project premise idea.</i> )  Exercise: Model a hand using Box Modeling.
3/25	Editing Polygons: Part II: cleaning it up, what if it goes wrong. Finessing it and modifiers to help! Organic Modeling: Box Modeling.	Box Model of Hand Exercise DUE.  Final Project: Brainstormed Project Proposal- story or sketches due.
3/30 – 4/1	spring break	---

4/6	Basic Lighting Pt. I: Types of lights color. Lighting for drama effect or mood. How to set it up!	Media Asset List due.  Exercise: Lighting.  Bring a printed image from a magazine or film that resembles the mood you want to affect in the Lighting Exercise.
4/8	Basic Lighting Pt. II: Cookies, Effects. Shadows.	Lighting Exercise DUE!
4/13	Intro to Materials. Maps. Pt. 1. Material Editor; materials verses maps.	---
4/15	Mapping and Materials: Pt. 2. Photoshop and Texture mapping. UVW Mapping modifier.	Exercise: Texture Mapping Exercise DUE.
4/20	Lab...	---
4/22	Lab...	---
4/27	Lab...	---
4/29	Lab...	
5/4	Lab...	Prototype due...
5/6	Lab...	---
5/11	Lab...	
5/13	Lab...	---
5/18	Finals. Final project Presentations...	<b><i>Animation or series of still images due.</i></b>  <b><i>All pre-production materials due!!!</i></b>

### **Exercises:**

*All exercises are to be completed in class and reviewed by me (unless otherwise noted) for credit. They will **NOT** be turned in via the server. When you have completed the exercise call me over and have me evaluate it to receive credit. This way we can go over the project, correct it, discuss work-arounds, or more optimal solutions.*

*All exercises, unless otherwise noted, are due at the end of class the day of assignment (or if we run out of time) before the beginning of class the following day. If you are absent the day an exercise is assigned you must email me to receive an excused absence as well as have your assignment excused from being late. All handouts on exercises will be posted at my website - [www.myholler.com/flash/course.htm](http://www.myholler.com/flash/course.htm) and you can download the PDF and work on the exercise outside of classtime. It will be your responsibility to make up any exercises when absent.*

**Paragraph on 3d Animation:** Review a 3d animation of some sort and type out 1-2 short paragraphs listing multiple and specific ways 3d animation visually differs from live action or cel (2d) animation. This can include the way it is colored, light, or how the characters or objects are animated. Be observant and creative in your conclusions. *Turn in typed paragraph(s).*

**Primitives and 3d space** - Build a 3d character out of multiple primitives. This exercise helps you adjust and learn how to use your multiple viewports simultaneously when creating objects and transforming them within the world space. *Show me your 3d scene for evaluation.*

**Camera Shot Composition** - Come up with a simple story premise, write it down, and use 3-4 cameras in the scene to develop this story idea; Emphasis will be placed on depth of field, rule of thirds, contrast. Be sure to name your cameras! *Show me both story premise and animation for evaluation.*

**Lighting** - Bring in an image from a magazine or film that resembles the mood you want to affect in the previous camera composition. Light the previous exercise (*camera shot composition, exercise 2*) using the image you have as a reference to help develop the mood of your simple story. *Show me both print reference and animation for evaluation.*

**Still Life** - Bring in your sketchbook and sketch out 2 out of the many objects set on the table. Use these sketches as reference to modeling. You only need to model a total of 2 objects on the table but they will be evaluated based on realism, similarity to the original objects, and attention to detail. *Show me both sketches and animation for evaluation.*

**Animation Exercise** - write down a simple story that has in it a conflict (such as a wall) and a resolution (such as jumping over the wall); animate 1 - 2 primitives using modifiers and transformation tools; Have it so the 1- 2 primitives are not just abstract objects but anthropomorphic creatures interacting with each other or another simple unanimated object. Try to exhibit them with expressiveness and feeling. *Examples of motive: fear of a high cliff, a fence in the way of an ice cream truck, etc. Show me both story premise and animation for evaluation.*

**Lofts** - Loft a Grecian temple from an Image source. Using a bitmap source image provided you trace the basic column shape and path to loft a column for a Grecian temple. You will place the source image into the viewport background as a reference photo. Once again resemblance to the original column is important and stressed. *Show me your 3d scene for evaluation.*

**Box Modeling** – Sketch or trace your own hand or use the reference photo provided you to create an organic hand. Begin your modeling process with a box and using an Edit Mesh modifier extrude fingers and shape details. Finally add a Mesh Smooth Modifier onto the stack to tessellate your model adding more polygons and more dimensions. Your model will be evaluated on how well your polygons are organized in the Edit Mesh (no twisting or odd angles) and how sophisticated your Mesh Smooth Hand is. *Show me your 3d scene for evaluation.*

**Patch Modeling** – Taking a bitmap image of a leaf provided, you will recreate the leaf using patches (spline-based modeling technique). Then, after you create the front and/or back of the leaf you will apply a texture to it and render it out for show.

**NURBs Modeling** – Taking the same hand sketch of your hand used for the box modeling exercise you will attempt to recreate the same model of a hand using a different technique – NURBs (non-uniform b-splines). The end result should provide you with the differences between the 3 methods of modeling (box –or polygon – modeling, patch – or spline – modeling and NURBs modeling).

**Forward Kinematics** - Robot hand and bouncing ball – Follow the instructions on rigging up the robot hand max scene provided you. This exercise will teach you how to change the pivot points of your jointed object as well as linking joints for a simple moving arm. For extra credit do the second half of the exercise and animate the ball being released and bouncing on the ground. In order to do this you will have to use a link constraint on the ball. *Show me your 3d scene for evaluation.*

**Texture Mapping** – Materials and Mapping Exercise. Map the provided max scene using bitmaps (also provided) as well as max materials and mapping. This exercise should help you become acquainted with the UVW modifier as well as the sub-object material that allows you to map specified faces. You will also learn to add diffuse and bump maps as well as how to name and navigate easily your materials in the library. *Show me your 3d scene for evaluation.*

#### **Pre-production Materials:**

**Brainstormed Story Premises:** Fill a page of paper with at least 10 1-line story premises.

**Story Premise Rough Outline:** Use your premise as a guide and come up with a series of simple story points within your premise. These should be each on separate note cards for ease of reorganization.

**Proposal:** Typewritten document describing your final project.

**Timeline:** A breakdown of your project; an estimated schedule for completion of models, lighting, textures, cameras, and/or animations, renderings.

**Media Asset List:** A list of all the objects required within your project as well as whether you will be required to model them yourself, or whether you will use a local or on-line resource for possible models.

**Storyboards:** Pictorial representations of your final animation describing composition, camera angle, POV and direction of movement and any audio or narration tracks.

**Animatics:** (animated storyboards) Scanned storyboards composed in Premiere with soundtrack and timed worked out.

### **Team Project:**

This will be a 5-week mini project that you will collaborate on in your appointed team. You will be appointed to a team based on a survey you fill out describing your qualifications as a modeler, animator, lighting and camera operator, renderer and art director. These given qualifications will be based on your familiarity and comfort with the exercises previously finalized in class or past experience.

This project should be considered 'practicing' for your final project. Because it is a micro version of your final project you will have some basic sense of the amount of time it takes to create an animation from the development of a story to the modeling, lighting and rendering. This is also a SCANS project to practice your abilities in a team-based environment with real time constraints (remember it must be finished in 4 weeks).

Once you are appointed to your team of 3-4 persons, you will sit and discuss (*brainstorm*) story premises for a very short production animation no longer than 30 - 40 seconds (no exceptions!!!). Consider it to be a larger production than *Exercise 5: Animation Exercise*. As a team you will break into your roles as Art Director, Modeler/Rigger, Animator, Camera/Lighting/Renderer. You may take on two roles depending on your qualifications. You will also put together a set of pre-production materials listed above minus the Proposal and Animatics (*animated storyboards*).

This project will be evaluated on effective teamwork, time management, as well as creative use of resources and materials, and sophistication of animation and composition as it relates to your story. *This can be a silent film although it is preferable and more conducive to your animation that a sound track is added.*

### **Final Project:**

#### **Make 1 (one) choice from the following**

- a) Quality Rendered series of still shots emphasizing modeling, lighting, textures, composition, and mood.
- b) Character animation emphasizing realistic and lively animation.
- c) Basic camera fly through of virtual world (VRML or QuickTime) emphasizing model construction and composition in 3d space.
- d) Abstract emphasizing any or all the qualities above.

**Final Project is limited to 60 seconds or less in length!** You may work individually or in teams. If you work in teams each individual is responsible for part of the work. Do not try and do or create everything... if your interest is animation involve yourself in animation of primitives or simple shapes. If you interest is modeling then consider creating a simple scene and working on effective composition and lighting. Final projects should be edited in a digital video suite of some sort such as Premiere, Final Cut Pro or After Effects. This equipment is available to students in ARTX 264 during specified lab hours. Textures can be made in Photoshop. Once again, Photoshop is available in ARTX 264.

**Note:** *If the project is a team project, each individual must state their role, responsibilities and goals in their own individual proposal. Additionally, the team needs to submit a team proposal that describes the project as a whole and what the team goals are.*