



//3D Animation & Visual Effects

... *Redefine Reality with Imagination!*



Step 5—3D Modeler

3D Modeling Techniques

Activity Sheet

Immediately after completing the requirements for Special FX Technician, this module is the first of a series that will enable you to develop skills as a 3D Modeler. Expand your communication skills—we've all heard it before, a picture is worth a thousand words—how much more valuable is an accurate 3D model in communicating your message?

GET THE JOB! IN THIS PHASE, YOU WILL master the following skills:

Modeling Techniques:

Adopts modeling techniques to support industry-standards and solve 3D Modeling challenges. These techniques can be applied to real-world unpredictable situations and include: Create polygon models, subdivision surface models, NURBS models, conversion to/from polygon, subdivision, and NURBS; normals, topology, and modifiers.

Modifiers: Utilizes appropriate modifiers to achieve project goals. This includes: Deformation, Animation, etc.

A detailed checklist of skills you may be required demonstrate is provided on the following page.

Prepare with Purpose | Pursue | Persist | Polish | Produce | Problem-Solve | Perform with Promise



Competencies Checklist:

Demonstrate the skills you need to get the job!

Modeling Techniques:

- Adopts modeling techniques to support industry-standards and solve 3D Modeling challenges. These techniques can be applied to real-world unpredictable situations and include: Create polygon models, subdivision surface models, NURBS models, conversion to/from polygon, subdivision, and NURBS; normals, topology, and modifiers.
 - Gather concept art, assets, character sketches, environment sketches, and storyboard/animatic information. From this information, determine model requirements for the story.
 - Determine model media format and delivery output.
 - Construct objects or characters that appear lifelike by manipulating light, color, texture, shadow, and transparency and/or manipulating static images to give the illusion of motion using visual effects through Maya 3D software.
 - Manipulate UVs within the UV Texture Editor.
 - Use the Planar Map as a method of creating a UV layout.
 - Create polygon models using various techniques: extrude, bridge, planar, vertex edge, and face manipulation, mirror geometry, merge, add divisions and edge loops, sculpting, extract, boolean operations to combine geometry, chamfer, bevel, crease, smooth/average vertices, reduction of geometry, revolve, loft, smooth, and reducing geometry—while conforming to appropriate naming schemes.
 - Convert to and from polygon, subdivision, and NURBS.
 - Perform vertex, edge, and face manipulation; mirror and extrude geometry.
 - Understand Normals and their role.
 - Construct NURBS models (primitives, project curve on surface, hulls, surface point, surface patch, isoparm manipulations, reverse, rebuild, etc.)
 - Create subdivision surface models: understand polygon proxy modes, set component display levels, etc.
 - Clean topology.
 - Demonstrate lighting techniques for project.
 - Render a turntable view.

Modifiers:

- Utilizes appropriate modifiers to achieve project goals. This includes: Deformation, Animation, etc.
 - Work with modifiers: deformation, (lattice, bulge, twist, noise, bend, jiggle, lattice, squash, and twist.)
 - Animate with deformers: (blendshapes, soft modification/soft selection, etc.)



Resources and Skill Mastery



College Credit:

TECH 1003 DM02 3D Graphics Modeling/Rigging Tech.

Certification:

ODCTE Media Production: 3D Modeler

What

Expand your artist abilities through 3D modeling while working through creative and practical projects.

Objective:

Students will acquire and/or enhance skills and texturing, rendering, and lighting techniques for 3D characters and/or scenes.

Why

Expand your communication skills—we've all heard it before, a picture is worth a thousand words—how much more valuable is an accurate 3D model in communicating your message?

How

Instruction:

Maya 3D Modeling

UV Layout/Texturing/Shading Networks

Rendering: Lights/Materials/Final Output



Creative Blitz Portfolio Challenge

Model a New Concept Car/Vehicle of the Future OR a Baseball Stadium with unique features OR Choice *

* (If choice, must be pre-approved)

Project Guidelines—**READ & PREPARE** before starting

Creative Brief: Concept Vehicle OR Baseball Stadium

Client: Dana Myers

Industry: Transportation/Sports

Project Goals: Design and model your dream vehicle of the future OR a Baseball Field with unique features.

Objectives:

- Vehicle/Field should be unique, completely different from anything created previously.
- Vehicle/Field should be energy-efficient and/or use alternative energy from the future

Target Market:

Gender: M & F

Age: 16+; must be school and Mrs. Myers appropriate ☺

Additional Info: Use all of your imagination as you design and model your vision for your “dream” mode of transportation for the year 2050 OR a baseball field with unique features.

Message:

What will life be like in 2050? Will there still be cars? Bugatti Veyron, Koenigsegg Agera R, SSC Ultimate Aero, Saleen S7 Twin-Turbo, McLaren F1, Gumpert Apollo, and the list goes on—what is your dream mode of transportation? Combine your biggest dream with a vision for the future, and you’ll have a great start on this project! OR

A new baseball team is in town and they need a modern, unique baseball field with some cool features and amenities.

Initial reference ideas:

- Research!
- Develop concept art, prototypes
- Develop a profile to represent your model; include your vision and rationale for your selections
- Start with a DT Tutorial for techniques
- Consider transportation devices other than a car/truck OR a field that deviates from the norm
- Research energy trends/projections for future transportation
- Remember, there are some neat FREE textures on the resources page of our class site.

Technical requirements listed on following page.



Technical requirements:

- Deadline: 30 hours
- No personal “Beam me up” ports.
- Develop a model **profile**; include your vision for the model, its characteristics, era, and the rationale for decisions made during the process. (No more than 1 page; must be grammatically correct. Google character/model profiles to see some examples.)
- Design an appropriate background scene for model. (May be 2D)
- Review rubric prior to starting for quality indicators for success.
- Model must be shown at different **angles** and **shots** and incorporated into a **turntable**. Be sure the shots give the viewer time to see them before moving to another angle/view. Show off your details! Suggestions include:
 - Wide/Establishing Shot
 - Close-Up Shot
 - Pan OR Zoom, use for emphasis, but sparingly
 - Extreme Close-Up Shot(s)
 - Closing Shot
- Use appropriate **materials, lighting, textures, and rendering** techniques to complement your model.
- May include **audio** (Can be background music—must be royalty free; or recorded voice introduction, or both. Refer to class site for background music selections.)
- **At least 5 Peer Reviews** completed *immediately after developing prototypes, before modeling final* (ask instructor to assign one peer)
- Use **IShowU** and/or **Grab** to document development as well as advanced techniques used to develop vehicle. Save often and save **versions**; consider using these versions in documentation. This will enable you to show **various stages of development**, the **wireframe**, and progression of your model.
- Compile any sketches and prototypes you create as well as a storyboard of angles; consider incorporating these into a turntable.
- **Publish** modeling, as completed in phases, to Behance, using the Work in Progress section to communicate regularly with your client to keep them updated. Final should include various model views, turntable, reflection.
- **Calculate** the approximate costs associated with printing your 3D model. You will need to calculate the total cubic inches. The formula is Length X Width X Height. For more information, <http://www.gradeway.com/lessons/math/findvolume3d.aspx>. The printer software will also approximate the costs, so you can compare your estimate.
- Prior to publishing, print & complete **self-evaluation** on rubric and submit **reflection**.
- Use **Grab** to get/save screen shots of the following items:
 - Good **file naming** scheme for your model parts.
 - Use Heads Up Display to provide a screen shot showing the **number of polygons, faces**, etc., of your model.
 - **Grouping/Parenting** as shown in Outliner.
 - **Hypershade** assignments.
 - Show the **wireframe** topology; clean it up, if necessary.
 - Schedule a meeting with client for final approval and payment.



This is for a **Quack** award and will be featured in your portfolio. **Do your best** 😊 You are responsible for reviewing the rubric prior to beginning for additional requirements, and to be sure you earn all your points. During production, **problem-solve** and **refine** your design as needed to **submit an awesome project you will be proud of showcasing in your portfolio**.





Quack Award

It's time to do your very best work—this project will be featured in the Quack Award entries 😊

Concept Vehicle Model OR Baseball stadium OR Choice

Refer to the rubric and project guidelines for quality indicators.



NAME:

SHOT NUMBER:

SHOT TYPE: _____
CAMERA MOVEMENT: _____
ACTION: _____

AUDIO: _____

SHOT NUMBER:

SHOT TYPE: _____
CAMERA MOVEMENT: _____
ACTION: _____

AUDIO: _____

SHOT NUMBER:

SHOT TYPE: _____
CAMERA MOVEMENT: _____
ACTION: _____

AUDIO: _____

SHOT NUMBER:

SHOT TYPE: _____
CAMERA MOVEMENT: _____
ACTION: _____

AUDIO: _____



Peer review

Prior to beginning, ask the instructor to assign a classmate to conduct periodic peer reviews.

Overview

Revision is an important part of the design process. In addition to conducting review and redesign cycles personally and with your client, using peer review can also be beneficial to your project. Peer review occurs in many professional environments, and it is an essential skill to starting learning.

When giving a peer review, be sure to **make both positive and negative points**. Give critiques as suggestions, not commands. When receiving peer review, do not feel disenchanting or think you did a bad job based on one review. Every review is different and what one person may not approve, the next person may find exemplary.

Once you have a draft developed of your project, have your assigned classmate read this document and review your work to give suggestions. They should also review it again before you present your final project to the instructor. They should use the Final Evaluation Grade Rubric form as a guide, and the form on the following page for comments.

Evaluatee:

Process for presenting work for peer review

- Ask the instructor to assign a peer for review purposes—you want a different, objective perspective
- When presenting your work for a peer review, state the purpose, audience, and goals of your project and point out any concerns you have.
- After someone else reviews your work, your first response should be to reiterate their suggestions, make sure you understand their comments, and ask for additional clarification, if needed.
- To conclude, have the student summarize the suggestions on the back side of this form, and start revising, as needed.

Evaluator:

Guidelines for giving comments and suggestions

- Before making any comments, review the goals of the project and then the entire project, making sure you understand the student's intentions.
- Point out the strengths as well as the weaknesses of the project (composition, storyboard, research, design, technical skills, timing, so on).
- Offer suggestions, not commands. For instance, do not say "You should do this...." Instead, use "I" statements: "I see that..." or "I'm confused about..."
- Be respectful and considerate of your peer's feelings. Do not say or write anything you wouldn't want to hear about yourself. There is no reason to be rude.
- Make sure your comments are clear and specific so your peer knows what you are referring to. Give specific examples and point to techniques, examples, script writing, and so on to make your point. (Comments such as "This is unclear" or "This is too vague" are too general to be helpful. Rather, make a comment such as "I'm confused by this scene because it seems out of place.")
- When you are writing your comments, reread them before giving them to your peer. **Make a list of positive comments and a list of suggested improvements.** Make sure your comments make sense and are easy to follow.



Assessment

Concept Vehicle OR Baseball Stadium OR Choice 3D Model—Challenge

Category	Excellent 4	Good 3	Satisfactory 2	Needs Improvement 1	Points Received Self/Teacher	
Prototypes, Sketches, Research, Image Planes	<p>Three or more prototypes were developed. Sketches and versions showing progression of design were completed before starting final. Selection process, including colors and textures, were explained. Image Planes created, utilized.</p>	<p>At least three prototypes were developed. Sketches and versions showing progression of design were completed. Image Planes created, utilized.</p>	<p>Only two prototypes were developed and shared with instructor or not pre-submitted. Image Planes utilized.</p>	<p>Only one prototype developed. Image Plans may not have been utilized.</p>		
Profile	<p>Was grammatically correct; did not exceed one page.</p> <ul style="list-style-type: none"> o Developed from research following prompt o Goals and artistic vision developed for scene/model o Provides rationale for submission o Portrays personality, era, appropriate details. 	<p>Grammatically correct; didn't exceed one page. Additional details and rationale could have improved profile.</p>	<p>Was grammatically correct; did not exceed one page. Missing more than one component.</p>	<p>Grammar req'd. correction and/or was too long or too brief. Missing more than two components.</p>		
Length, Camera shots, Angles, Message, Timing, Audio and/or Narration	<p>Model presented in "turntable" fashion and included prototypes, development, wireframe, shaded, textured, and lighted modes. Royalty-free audio/narration was clear and appropriate. Examples of shots/angles to include:</p> <ul style="list-style-type: none"> o Wide/Establishing Shot o Close-Up Shot o Pan OR Zoom, use for emphasis, but sparingly o Extreme Close-Up Shot(s) o Closing Shot 	<p>Model presented in "turntable" fashion, but was missing one or more components listed.</p>	<p>Model not presented in "turntable" style with different angles. Stages of development and/or missing requirements, and/or timing not appropriate. Audio needed improvements.</p>	<p>No consideration given to message, camera angles, shots, or modes. Timing needed improvement. Audio not used or not royalty-free.</p>		



Grab Screen Shots; file-naming conventions	Documented file naming scheme for model parts, filename. Showed number of polygons, faces , etc. Grouping/Parenting Hypershade assignments shown in Outliner. Showed the wireframe topology ; cleaned it up.	Documented all items using Grab. Topology required minor clean-up before publishing to portfolio.	Most items provided using Grab. Topology and clean-up process not completed; not portfolio-ready.	Grab not utilized to provide evidence of items listed.		
Accuracy, Details, Quality, Realistic Modeling according to theme	Model accurately designed; includes exceptional detail , and follows project guidelines. Materials, lighting and finishes appear natural and realistic for theme .	Model was accurately designed with average detail, and followed project guidelines. Most of materials, lighting, and finishes appear natural and realistic.	Model was designed with average detail, and followed most of project guidelines. Most of materials, lighting, and finishes appear natural and realistic. Minor tweaks required before publishing to portfolio.	No consideration given to detail, accuracy, or realistic finishes.		
Originality	Model shows significant evidence of originality and inventiveness and is unique. Majority of content and ideas are fresh, original, and inventive. No copyright laws are violated.	Model is average; original, but not unique.	Model shows evidence of some originality however resembles current icon of existing business or product. May have violated copyright laws.	Model copied or very closely resembles current icon for existing business/product.		
Reflection and Self-Evaluation	Reflection/self-eval completed and submitted prior to evaluation. Reflection was grammatically correct , used paragraphs , answered all questions , and was appropriate to share with potential employer. Links to resources used were shared and explanation of why resource was helpful provided.	Submitted prior to evaluation. Reflection had a few errors, or some answers were missing.	Reflection and self-evaluation submitted prior to evaluation. but had a few errors, or some answers were missing.	Reflection and/or self-evaluation not submitted prior to evaluation; and/or reflection lacking info or required correction.		



<p>Project management: Updates to project and Behance. Communications with client regarding achievements and progress.</p>	<p>Project was thoroughly planned & documented before starting. Weekly updates were published to Behance and Basecamp. Design process and techniques were documented using Grab and/or IShowU, Multiple versions of work were saved. Client was updated weekly regarding progress and achievements.</p>	<p>Project planned & documented. At least one update published to Behance and Basecamp. Multiple versions of work saved. Client updated regularly.</p>	<p>Project was planned before starting. No updates were published to Behance and Basecamp. Client was familiar with progress and achievements.</p>	<p>No evidence project was planned before starting. Client was unfamiliar with progress and achievements..</p>		
<p>Peer Review and Problem-Solving</p>	<p>Thorough peer review completed by assigned mentor prior to beginning final phase; revisions made based upon peer suggestions and self-evaluation. Student took initiative in problem-solving and correcting as needed, and was able to explain revision and problem-solving process.</p>	<p>At least 5 peer reviews completed; revisions made based upon suggestions and self-evaluation. Problem-solving skills and explanation of techniques used were adequate.</p>	<p>Less than 5 peer review completed; revisions made based upon peer suggestions and self-evaluation. Problem-solving skills need improvement and/or student couldn't explain problem-solving process.</p>	<p>Peer review lacking; and/or design lacked revisions for improvements; and/or there was a lack of problem-solving.</p>		
<p>Target Market; Branding, Marketing; Collaboration</p>	<p>Model is unique, age appropriate, and depicts the intent of the client. Turntable was engaging and provided sufficient product details. Community forums utilized for problem-solving and/or review of work; links to resources were shared with client and peers, including an explanation of their value.</p>	<p>Design is unique, designed for target market and met all objectives specified. Model was appealing, met goals, and provided credits at end. Community forums utilized for problem-solving and/or review of work; links to resources were shared.</p>	<p>Design is unique, age appropriate, and integrated most of client requests. Additional details at could have improved model. Links to resources were shared.</p>	<p>Model did not meet all objectives and/or there was no collaboration regarding problem-solving or sharing resources</p>		



Effective Use of Time; Pride and Quality of Work Established Delivery Date:	Design was not rushed, and was also completed on time. Time was taken to critique design and make improvements so that final version represents student's best work. Design submitted in a timely manner, according to guidelines. All products submitted (reflection, video, and design,) are at a high level of quality, appropriate for portfolio.	Model was rushed and/or completed up to two days late. Design was average and could have been improved prior to publishing. Most products submitted were at an average level of quality, but appropriate for portfolio.	No delivery date established. Design was rushed and/or not completed on time. Design was average and could have been improved prior to publishing. Most products submitted were at an average level of quality, but appropriate for portfolio.	Improvements required, but not made prior to publishing. Design was rushed when more time would have resulted in improvements. Some products needed improvements or were lacking.		
<hr/> Actual Delivery Date: <hr/>	3D techniques employed exceeded a basic skill level. Student could compare techniques used to skills acquired during instruction; explanation was thorough, and demonstrated understanding. Model parts scaled appropriately.	3D techniques were average. Student could compare techniques used to skills acquired during instruction. Model parts scaled appropriately.	Modeling techniques were basic when more advanced techniques would have improved, or student could not compare skills or give explanation.	More than one item in this category was not met.		
Creative Artistry, Entertainment Value	Model is very creative and appealing. Good design principles have been applied. Model demonstration was exceptional.	Model is creative and/or appealing. Good design principles applied. Model demonstration was average.	Model is average; Good design principles applied and design is neutral.	Model is not appealing, and/or techniques used need improvement.		
52 Points Possible: Total Points Earned:						



Technical Competencies:

4 - Skilled; 3 - Moderately Skilled; 2 - Limited Skill; 1 - No Exposure

Skill	Competency Rating
Planning/Modeling Determine/Plan Model requirements, complexity, media format and delivery output, prototypes, concept art, etc.	
Manipulate UVs within the UV Texture editor. Demonstrate various methods, including Planar mapping, UVs--layout, unwrapping, etc.	
Modeling Techniques (1/2 point each) Create polygon models, subdivision surface models, NURBS models, conversion to/from polygon, subdivision, and NURBS; normals, topology. Extrude Bridge Curves Vertex Edge Face Manipulation Mirroring Merging Edge Loops Combining/Extract/Separate Geometry Reducing Geometry Revolve Loft Convert to/from NURBS, Sub-DIVs, etc. Explain normal and their role	
Modifiers Deformation, Animation (lattice, bulge, twist, noise, bend, jiggle, lattice, squash, and twist.) Animate with deformers (blendshapes, soft modification/soft selection, etc.)	
Surface Texture Techniques Apply surface material to models, texturing, manipulating; create/assign textures to polygons; materials.	
Scene Composition/Finishing Layout, camera angles and techniques, lighting, shadows, transparency, render a turntable view/wireframes, etc.	
Rendering Settings, formats, mental ray.	
Performance Test/Modeling Fundamentals/ DT Test Critique/analyze completed results to determine if objectives are achieved. (1 point each)	
Pull up Modeler's Toolkit—what did you do/learn?	
Pull up Intro to Lighting—what did you do/learn?	
Week 6 Take Charge! Pull up your completed projects—what did you do/learn?	
Demonstrate four unique things you learned not on this list.	
14 Points Total	

