Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: ART
Course and Section #: 2280-001
Course Title: 3D Modeling
Credits: 3

Course Description

Teaches basic techniques of computer software 3D modeling, focusing primarily on Polygon and Subdivision Surface workflows. Includes basic lighting, surfacing, and rendering techniques.

Course Attributes

This course has the following attributes:

☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Ben Wasden

Student Learning Outcomes

Navigate the 3D software interface;
Create hard-surface, architectural forms using Polygon meshes;
Create curvilinear forms using Subdivision Surface meshes;
Create soft-surface meshes using a combination of Polygon and Sub-D meshes;
Apply surface materials to meshes, and light and render a scene.

Course Materials and Texts

Desktop Computer or Laptop

3D software i.e. Blender

Sketchbook and proper drawing materials

Course Requirements

Course Assignments, Assessments, and Grading Policy

Assignments

Module 1: Introduction to Blender and Basic 3D Concepts

Day 1: Getting Started with Blender

- Introduction to Blender's user interface (UI): Layout, workspaces, and navigation
- Understanding the 3D viewport, cameras, and lights
- Setting up a new project and saving files

Day 2: Basic Navigation and Transformations

- Navigating the 3D space (zoom, pan, rotate)
- Learning basic transformations: move, rotate, and scale
- Introduction to the Object Mode and Edit Mode

Day 3: Introduction to 3D Objects and Primitives

- Creating and manipulating basic 3D shapes: cube, sphere, cylinder, cone
- Understanding the difference between meshes, curves, and lights
- Using the "Add" menu to insert primitives and objects into the scene

Day 4: Understanding the Modifiers Panel

- What are modifiers and how to apply them
- Introduction to basic modifiers: Subdivision Surface, Mirror, and Array
- How to modify object geometry non-destructively

Day 5: Basic Object Editing in Edit Mode

- Introduction to Edit Mode for object manipulation
- Selecting, extruding, scaling, and rotating individual vertices, edges, and faces
- Introduction to basic mesh selection techniques

Day 6: Understanding Meshes and Subdivisions

- Creating and working with subdivided surfaces
- Using the Subdivision Surface modifier for smooth meshes
- Introduction to edge loops, face loops, and supporting geometry

Day 7: Working with Materials and Basic Texturing

- Introduction to Blender's Material properties and the Shader Editor
- Creating simple materials for objects
- Basic UV mapping and applying simple textures to 3D models

Module 2: Modeling Techniques and Advanced Tools

Day 8: Extrusion and Loop Cuts

- Using extrusion to add geometry for complex shapes
- Creating more detailed shapes with Loop Cut and Slide
- Practical exercise: Modeling a simple chair using extrusion

Day 9: Advanced Mesh Editing and Sculpting

- Introduction to sculpting tools in Blender
- Basic sculpting techniques: dynamic topology, smoothing, and adding detail
- Understanding the difference between modeling and sculpting

Day 10: Creating Custom Shapes and Objects

- Modeling more complex shapes by combining primitives
- Working with modifiers to maintain an organized workflow
- Practical exercise: Modeling a simple desk using a combination of primitives

Day 11: Working with Precision Tools and Snapping

- Using snapping tools for precision modeling (vertex, edge, face snapping)
- Working with the grid and increment snapping for clean geometry
- Introduction to the "snap to" feature and snapping in edit mode

Day 12: Introduction to Boolean Operations

- What is Boolean modeling? Using Boolean modifier for complex shapes
- Combining and subtracting meshes using the Boolean tool
- Practical exercise: Modeling a simple door or window with Boolean operations

Day 13: Mirror and Symmetry Modeling

- Understanding and using the Mirror modifier for symmetrical objects
- Creating efficient mirrored models using symmetry
- Practical exercise: Modeling a character's arm or a symmetrical object

Day 14: Understanding Edge Flow and Retopology

- Importance of good edge flow in 3D modeling
- Introduction to retopology: creating low-poly models from high-poly meshes

- Basic techniques for cleaning up topology

Module 3: Refining Models and Preparing for Animation

Day 15: Working with More Complex Models

- Combining multiple meshes into a single model
- Practical exercise: Modeling a basic table with legs and a top
- Introduction to parenting objects for complex models

Day 16: Using the Knife Tool and Inset Faces

- Introduction to the Knife tool for cutting geometry
- Using inset faces to create edge loops and detailed faces
- Practical exercise: Modeling a simple mechanical part (e.g., a hinge or gear)

Day 17: Introduction to UV Unwrapping and Mapping

- What is UV mapping? The process of unwrapping 3D models
- Using the "Unwrap" function to create a UV layout
- Practical exercise: Unwrapping a simple object like a cup or box

Day 18: Adding Detail with Normal and Bump Maps

- Introduction to normal and bump mapping for adding details to low-poly models
- Creating and applying normal/bump maps in Blender's shader editor
- Practical exercise: Using bump maps to detail a wall or surface texture

Day 19: Creating and Using Materials for Realism

- Creating realistic materials in Blender using the Principled BSDF shader
- Introduction to PBR (Physically Based Rendering) materials
- Practical exercise: Applying materials to objects to simulate real-world surfaces (wood, metal, glass)

Day 20: Rigging and Preparing Models for Animation

- Introduction to basic rigging: adding an armature and bones to models
- Understanding bones, weights, and simple constraints for animation
- Practical exercise: Rigging a simple object or character for animation

Day 21: Introduction to Lighting and Rendering

- Working with lighting types: Point, Sun, Spot, and Area lights
- Setting up a simple 3-point lighting system for a model
- Introduction to rendering with the Eevee and Cycles engines

Module 4: Finalizing Models and Exporting for Use

Day 22: Working with Camera and Composition

- Setting up and manipulating the camera in Blender for scene composition
- Framing shots for renders using composition techniques
- Practical exercise: Setting up a render-ready scene

Day 23: Introduction to Animation Basics

- Understanding keyframes, timelines, and simple animation
- Creating basic animations (rotation, position, scaling)
- Practical exercise: Animating a rotating object or character part

Day 24: Lighting for Animation

- Using dynamic lighting for animated scenes
- Creating lighting setups that work with animations
- Practical exercise: Lighting a scene for a simple animation or product render

Day 25: Introduction to Exporting Models

- Exporting your models in various formats (OBJ, FBX, STL, etc.)
- Understanding the limitations and settings for each format
- Practical exercise: Exporting a model for 3D printing or game engines

Day 26: Preparing for Game Engines (Optional)

- Exporting assets for game engines like Unity or Unreal Engine
- How to optimize models for real-time rendering (low-poly models, LOD)
- Practical exercise: Preparing a simple model for export to a game engine

Day 27: Rendering Final Models

- Finalizing the render settings in Blender
- Rendering still images, animations, and turntables
- Practical exercise: Rendering a polished 3D object for portfolio presentation

Day 28: Troubleshooting and Optimization Tips

- Common modeling issues and how to fix them (geometry errors, non-manifold edges, etc.)
- Optimizing models for smoother performance (reducing polygon count, simplifying meshes)
- Practical tips for working faster and more efficiently in Blender

Day 29: Project: Create a Simple 3D Asset

- Students will apply everything they've learned to model a simple asset (e.g., a chair, a cup, or a basic character)
- Working independently with optional instructor support
- Refining the model for final presentation

Day 30: Final Review and Portfolio Preparation

- Final feedback on student projects, polishing models, and optimizing scenes
- Exporting models for portfolio use
- Preparing a final project (either rendered or animated) for presentation

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Course Completion:

At the end of the **30-day course**, students will have gained the skills to:

- Create basic 3D models using Blender's various tools and modifiers.
- Apply materials, textures, and lighting to 3D models.
- Rig and animate simple objects and prepare models for export.
- Develop a small portfolio of 3D models to showcase their skills.

Students will leave with a solid foundation in Blender and 3D modeling that can be applied to more advanced projects in animation, gaming, product design, or 3D printing.

Assessments

- did you meet the concept of the assignment
- did you meet the deadline/is the work complete
- did you follow strong design principles
- did you come up creative and fun solutions
- did you show technical mastery of materials

Grading Policy

- A 90-100%
- A-90-92.9%
- B 80-89%
- C 70-79%
- D 65-69%
- E 0-64%
- UW indicates an unofficial withdrawal from class

Required or Recommended Reading Assignments
N/A

General Description of the Subject Matter of Each Lecture or Discussion
To further explore basic 3D modeling fundamentals and techniques. For more information, see the Course Requirements Section.

Required Course Syllabus Statements

Generative AI

AI programs are not a replacement for your human creativity, originality, and critical thinking. Writing, thinking, and brainstorming are crafts that you must develop over time to develop your own individual voice. At the same time, you should learn how to use AI and in what instances AI can assist you.

The use of generative AI tools (e.g. ChatGPT) is permitted in this course for the following activities:

- Brainstorming and refining your ideas;
- Finding information on your topic;
- Refining Style direction.

The use of generative AI tools is not permitted in this course for the following activities:

- Impersonating your work in classroom contexts, such as by using AI tools to compose discussion board prompts/responses assigned to you or content that you put into a Teams/Canvas chat.
- Generating artwork for class assignments.
- Generating final artwork.

You are responsible for the information you submit and that it does not violate intellectual property laws, or contain misinformation or unethical content. Your use of AI tools must be properly documented and cited in order to stay within university policies on academic honesty.

Any student work submitted using AI tools should clearly indicate what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be generated by AI. If any part of this is confusing or uncertain, please reach out to me for a conversation before submitting your work.

Using Remote Testing Software
☒ This course does not use remote testing software.

☐ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the

student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation

UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.