



**MERCER**  
COUNTY COMMUNITY COLLEGE

# COURSE OUTLINE

**Course Number**  
**DMA 120**

**Course Title**  
**3D Modeling**

**Credits**  
**3**

**Hours:**  
**Lecture/Lab/Other**  
1 / 4 / 0

**Co- or Pre-requisite**  
No Pre-requisites

**Implementation**  
Spring 2022

### **Catalog description:**

This course develops three-dimensional visual problem-solving skills using computers as an art and design tool. Students will create and manipulate three-dimensional forms and scenes in professional 3-D modeling software. Student will define 3-D assets and scenes with the application of color, surface textures, lighting. 3-D objects and scenes will be further developed by defining in-software camera movement to design effective compositions in virtual 3-D space.

**General Education Category:**  
**Not GenEd**

**Course coordinator:**  
Mauro Zamora, ext. 3340 zamoram@mccc.edu

### **Required texts & Other materials:**

Recommended Text but not required:

**Autodesk Maya 2022 Basics Guide**

By Kelly L. Murdock

Published August 9, 2021

ISBN: 978-1-63057-450-5

### **Course Student Learning Outcomes (SLO):**

***Upon successful completion of this course the student will be able to:***

1. Visualize and express an idea graphically using the computer as a medium of expression. [Supports ILG # 1, 4; PLO # 1, 2, 3, 4]
2. Understand and discuss 3-D graphic concepts. [Supports ILG # 4; PLO # 6]
3. Demonstrate an understanding of Polygonal and NURBS modeling, texture mapping, lighting, and rendering. [Supports ILG # 4; PLO # 4, 5]
4. Demonstrate proficiency in Maya software tools and commands, effectively solving 3-D graphic modeling problems. [Supports ILG # 4; PLO # 5]
5. Demonstrate an understanding of basic design principles and design elements as they relate to 3-D computer graphic design issues. [Supports ILG # 4; PLO # 4, 5]

### **Course-specific Institutional Learning Goals (ILG):**

**Institutional Learning Goal 1. Written and Oral Communication in English.** Students will communicate effectively in both speech and writing.

**Institutional Learning Goal 4. Technology.** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

### **Program Learning Outcomes for Digital Media Arts (PLO)**

1. Understand the pre-production process, for applied design in the areas of animation, multi-media, web design, and digital asset distribution on the internet.
2. Understand and apply storytelling principles applicable in the areas of animation, multi-media, web design, and digital asset distribution on the internet.
3. Produce and manage digital assets for various production scenarios including animation, multi-media, web design.
4. Produce and manage two-dimensional and three-dimensional digital assets containing change over time and throughout pagination using professional software.
5. Use professional 3-D modeling, animation, prototyping, or text editor software applications.
6. Develop and present ideas in both written and oral formats.
7. Use professional software applications to design websites with accessible design and content.
8. Use design principles to develop websites that communicate effectively.
9. Create a professional portfolio to serve in the pursuit of further education or employment.

### **Units of study in detail – Unit Student Learning Outcomes:**

#### **Unit I**            **Hybrid Toy (Primitives, Booleans and Deformers)** [Supports Course SLO # 2, 3, 4]

##### **Learning Objectives**

##### ***The student will be able to:***

- Demonstrate ability to manage Maya files properly (network, hard drive, and external storage).
- Demonstrate ability to use various display modes and view ports.
- Demonstrate ability to create a simple model by using primitive shapes, deformers, and Boolean combinations.
- Demonstrate ability to use manipulate shapes at the object and component levels.
- Demonstrate ability to conceptualize and articulate visually his/her idea in a composition.
- Discuss his/her work during a critique and critically evaluate and justify his/her own artistic and vocational practice.

#### **Unit II**            **Polygonal Modeling** [Supports Course SLO # 1, 2, 3]

##### **Learning Objectives**

##### ***The student will be able to:***

- Demonstrate ability to communicate a message visually with clarity. Demonstrate ability to create organic models using Polygons.
- Demonstrate ability to use the extrusion and smoothing techniques.
- Demonstrate ability to edit polygonal models on the points, edges, and faces levels.
- Demonstrate understanding of the materials and textures, including using Bump and Color maps.
- Demonstrate ability to use a scanner to acquire textures maps.
- Discuss his/her work during a critique and critically evaluate and justify his/her own artistic and vocational practice.

**Unit III**      **Environment (Materials, Lights and Cameras)** [Supports Course SLO # 1, 3, 5]

**Learning Objectives**

***The student will be able to:***

- Demonstrate ability to conceptualize and articulate visually his/her idea in a series of rendered images.
- Design using the following principles of two-dimensional design: Balance, Unity, and Focal Point.
- Demonstrate ability to use computer-generated lights effectively and to understand the difference between different light types.
- Demonstrate ability to use materials and textures effectively, including Materials library.
- Demonstrate ability to use cameras effectively.
- Demonstrate ability to use various scene elements to construct a compelling visual narrative.
- Discuss his/her work during a critique and critically evaluate and justify his/her own artistic and vocational practice.

**Unit IV**      **NURBS Part 1** [Supports Course SLO # 3, 4]

**Learning Objectives**

***The student will be able to:***

- Demonstrate ability to use various NURBS techniques, including Revolve, Loft, and Planar.
- Demonstrate understanding of the difference between NURBS and Polygons.
- Demonstrate understanding of the benefits and disadvantages of NURBS.
- Demonstrate ability to apply materials/textures to NURBS models.
- Demonstrate ability to use Layers effectively.
- Design using the following principles of two-dimensional design: Balance, Unity, and Focal Point.
- Discuss his/her work during a critique and critically evaluate and justify his/her own artistic and vocational practice.

**Unit V**      **Constructed Reality (NURBS Part 2)** [Supports Course SLO # 3, 4, 5]

**Learning Objectives**

***The student will be able to:***

- Demonstrate ability to conceptualize and articulate an idea visually in a series of images.
- Design using the following principles of two-dimensional design: Balance, Unity, and Focal Point.
- Demonstrate ability to use various NURBS techniques.
- Demonstrate ability to composite a computer-generated model with a photograph effectively.
- Discuss his/her work during a critique and critically evaluate and justify his/her own artistic and vocational practice.

**Unit VI**      **Utopian Architecture** [Supports Course SLO # 2, 4, 5]

**Learning Objectives**

***The student will be able to:***

- Demonstrate ability to combine various 3-D modeling tools and techniques to create a complex 3-D environment.
- Demonstrate ability to conceptualize and articulate an idea visually in a series of images.
- Design using the following principles of two-dimensional design: Balance, Unity, and Focal Point.
- Learn to conceptualize a layout on paper before attempting in on the computer.
- Discuss his/her work during a critique and critically evaluate and justify his/her own artistic and vocational practice.

## **Evaluation of student learning:**

Evaluation of progress and grades are determined by the instructor, based upon the following considerations: attendance, participation, estimate of quality of class work and homework assignments.

<b>Grade Breakdown</b>	<u>Percent Overall Grade</u>
Class Attendance and Participation	10%
Project 1: Hybrid Toy (Primitives, Booleans and Deformers)	15%
Project 2: Polygonal Modeling	15%
Project 3: Environment (Materials, Lights and Cameras)	15%
Project 4: NURBS Part 1	15%
Project 5: Constructed Reality (NURBS Part 2)	15%
Project 6: Utopian Architecture	15%
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Total	100%