

# ART/CSC/FST 220: Introduction to 3-D Computer Graphics



12:30 - 1:45 p.m. TR (Section 1)  
3:30 p.m. - 4:45 p.m. TR (Section 2)  
CI 2006  
Labs: Digital Arts Lab (CIS 1017), BR 165

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CIS 2031, Office Hours 10:00 - 11:00 a.m., TR; 10:00 a.m. - 12:00 p.m., W; or by appointment.

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**CSC 220. (ART 220) (FST 220) 3-D Computer Graphics Tools and Literacy (3)** Prerequisites: CSC 105, 121 or permission of instructor. Project-based approach to learning fundamental principles of 3-D computer graphics using high-level software tools. Modeling of objects, geometrical transformations, surface algorithms, lighting and shading, alternative rendering techniques, and providing background skills necessary to create animated movies.

### Additional Course Information:

This class provides an introduction to the artistic and technical field of computer graphics and animation, focusing on 3-D modeling, shading, lighting, and rendering. Related concepts are covered and discussed, then applied in several projects using advanced software, building to a final course project where comprehensive knowledge gained is applied in an interdisciplinary nature. (Students may choose to continue developing skills in the succeeding course, ART/CSC/FST 320).

### Required Materials:

*Learning Autodesk Maya 2008: The Modeling & Animation Handbook*, Autodesk Maya Press.

Access to a still camera, recordable CD or DVD discs, and art supplies such as drawing paper and pencils.

### Optional:

*The Art of 3-D Computer Animation and Imaging* by Issac Kerlow, John Wiley & Sons, Inc.

*The Art of Maya*, Autodesk Maya Press.

*Maya Visual Quickstart Guide* by Robinson & Stein, Peachpit Press.

### Useful:

Deep Paint 3D, Photoshop, Illustrator, Final Cut Pro, etc. installed on computers in Digital Arts Lab.

<https://renderman.pixar.com/>

<http://www.learning-maya.com>

<http://www.highend3d.com>

<http://www.autodesk.com>

<http://www.aqsis.org>

Maya Resources housed in the Randall Library (easily located with a search), including:

*The Art of Maya*

*MEL Fundamentals Courseware*

*Learning Maya: Character Rigging and Animation*

*Learning Maya: Games and Interactive*

*Maya Seminars: Optimizing a Production Pipeline*

*Maya Techniques: Rendering 2D Effects in a 3D Environment*

*Maya Techniques: Particles for Visual Effects*

*Maya Techniques: Exploring Advanced Shading Networks*

*Maya Techniques: Polygon Texturing, Lighting, and Shading*

*Maya Techniques: Inside the Maya Architecture*

*Maya Techniques: Hyper-Realistic Body Setup*

*Maya Cloth Courseware*

*Learning Maya: Foundations*

*Learning Maya: Dynamics*

*Learning Maya: Rendering*

*Maya Techniques: Patch Modeling for Visual Effects*

*Maya Techniques: Integrating a Creature Animation Rig*

*Maya Techniques: Understanding Maya Shading Networks*

*Maya Techniques: MELBot Wars: Virtual Fighting Robots*

*Maya Techniques: RigidBody Simulations for Visual Effects*

*Maya Techniques: Hyper-Realistic Modeling*

*Maya Techniques: Hyper-Realistic Facial Setup*

*Digital Tutors discs covering topics such as modeling, animation, shading, MEL, and Python for Maya.*

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## Grades:

Project 1: 3-D modeling and lighting exercise.	15%
Project 2: Modeling, shading, and lighting exercise, more complexity.	20%
Project 3: Final comprehensive project selected from options.	20%
Homework and short exercises focused on improving basic skills.	20%
Quizzes (possibly unannounced) based on readings and class material.	20%
Class participation, discussion, and presentations.	5%

## Project Description Summaries:

1. Choose a semi-complex object to model from options provided, such as items that could be a prop for a film or game. Use reference photos and/or drawings as image planes to aid modeling. Any techniques such as polygons, NURBs, or subdivision surfaces may be used. Model for detail, realism, and accuracy in regard to reference material. Also, complete basic lighting and rendering.
2. Model a more complex object in a simple scene. Create shading and lighting for the scene, employing a variety of methods. Complete high-quality renders of the object. Strive for detailed surface materials and expressive lighting and composition.
3. Complete a professional quality project demonstrating skills learned during the course. Choose from selections given which will likely include organic modeling with shading, lighting, and rendering objectives. Assemble a portfolio or reel of all course work for presentation.

All projects are to be completed individually. Begin thinking early about the final project. Selections for ideas may include options such as a 3-D character, complex 3-D scene, or Python or MEL script for procedural graphics generation. Objectives require instructor-approval but allow for choices that focus on more traditional art, computer science, or film goals *or* an interdisciplinary combination of these. Projects will be presented during class on their due dates with open critiques and discussion.

### **Student Learning Outcomes**

1. Demonstrate the ability to critically analyze, appreciate, and make cogent judgments regarding form, lighting, shading, composition, and other visual elements.
2. Demonstrate an understanding of visual concepts, their development, and their application for creating works with computer graphics tools.
3. Demonstrate an understanding and appreciation of the significance of major historical, cultural, and technological developments for the medium of computer graphics, as well as its importance to modern visual art and communication.
4. Demonstrate knowledge of the importance of the medium of computer graphics as a tool for expression, communication, and visualization of meaningful ideas.
5. Students gain experience in presenting, discussing, and critiquing visual works.
6. Students gain the artistic and technical knowledge necessary to create their own computer graphics works.

### **Class Policies**

Quizzes will cover materials presented in class, whether lecture, video, tutorial, etc., as well as material from the required texts. Quizzes may include written questions or practicum.

General computer literacy is required for this course. Also desirable are artistic and cinematic interests. 3-D graphics work is very time-consuming, akin to an art-studio, film-workshop, or programming course. Plan carefully to complete projects in a timely manner. Late work will be reduced in grade by 5 points each day. There are no make-up quizzes. Please contact me in advance, if possible, if you must miss any graded work.

Attendance is required and will both directly and indirectly affect grades -- covered material is very pertinent to completing homework and projects effectively. Unless special circumstances are involved, more than three absences will result in class failure. Students are individually responsible for keeping current with course material and assignments.

Class announcements supersede posted material.

Academic honesty in all your work is required for a passing grade.

This syllabus and course materials may be subject to change with reasonable notice.