

Introduction to Computer-Aided Animation CGS 3034, Credits 3

Prerequisite: Precalculus - Algebra and Trigonometry MAC 1147 or equivalent

Instructor: Brent Rossen

Course Webpage: <http://www.cise.ufl.edu/~brossen/cgs3034.php>

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Office Hours: TBA

Justification for Course:

CGS 3034 introduces undergraduates, especially those within the Digital Arts and Sciences degree programs, to applied computer graphics topics for non-real-time rendered media. The course will not be limited to DAS students and can be taken by anyone who meets the prerequisite course requirement. The interdisciplinary nature of this course stresses the application of computer science and engineering to creative disciplines.

Catalog Course Description:

Introduction to topics relating to computer-aided animation. Rigging for forward and inverse kinematics. Skin weighting. Morph targets. Expression-driven animation, rigid-body and particle simulation.

Goal of Course:

Introduce students to topics in applied computer graphics, specifically in computer aided animation. Present standard animation techniques, forward and inverse kinematics, morph targets, expression-driven animation, rigid-body and particle simulation.

Course Content Overview:

1. Regular multimedia-enhanced lectures in a CIRCA-equipped classroom
2. Peer critique and Socratic seminars to discuss relevant works
3. Multimedia demonstrations (VHS, DVD, Internet)

Required Text:

Book: John Edgar Park, *Understanding 3D Animation Using Maya (With CD)*, Springer Science+Business Media, Inc. 2005. ISBN 0-387-00176

Recommended Text:

Book: Alias, *The Art of Maya: An Introduction to 3D Computer Graphics*, Sybex, 2005. ISBN 1894893824

Required Software:

Maya Unlimited (currently 6.5). Available in UF computer labs, students do not need to purchase. The course book includes a CD with Maya Personal Learning Edition 6.

Makeup Policy:

Late submissions will be penalized by 10% per day. This is specifically to accommodate miscalculations of rendering time. Please plan final renderings for one to two days in advance.

Make-ups are permitted only in the following circumstances: religious holidays, student illness or medical impairment, absence subject to the twelve-day rule, examination conflicts, or legal impairment. In these circumstances the student should notify the instructor as soon as they are aware of a potential exam or deadline conflict so that an alternative may be established.

Grading:

1. Projects.....	50%
2. Participation.....	10%
4. Midterm Exam.....	10%
5. Final Exam.....	10%
6. Final Project.....	20%

Lecture Topics:

1. Basic 3-D Concepts: Cartesian Coordinate System, Pivots, Transformations, Scene Graph, Coordinate Spaces (World, Object, Local)
2. Introduction to types of animation: path, keyframe, nonlinear.
3. Animation curves: reading, editing, manipulation of tangents to control easing.
4. Mesh set-up for rigging. Default bind pose. Skinning.
5. Forward kinematics rigging. Joint hierarchies.
6. Lattice deformation.
7. Inverse kinematics rigging. Effectors. Locators. Gimbal Lock.
8. Expressions.
9. Morph targets and blend shapes.
10. Particle systems and point masses. Emitters, forces, and constraints.
11. Rigid-body dynamics. Active and passive bodies. Resistance and moments. Stand-ins.

Projects:

1. Keyframe Animation, Tangents, Animation Curves
2. Animated Camera, Animation Hierarchies, Repeated Animation
3. Depth of Field Camera, Easing, Tangents, and Gobo Lighting
4. Non-Linear Animation, Transform Order, Bump Maps
5. Motion Paths, Driven Keys, Added Attributes, Camera Cuts, Particle Simulation
6. Skeletons, Character Setup and Rigging, IK Animation, Skin Weighting, 3d Painting, Optical Effects, MEL Shelf Buttons
7. Final Project – Putting it all together – Design, Modeling, Animation, Shading, Lighting, Rendering

Class Attendance Policy:

You are strongly encouraged -- but not required -- to attend/view all lectures. However, you are responsible for all in-class announcements and course content.

Required Computer Facilities:

A CISE Computer account, this can be acquired in CSE E114 Lab. Just tell the person at the help desk you need a CISE account and they will help you set it up. This account is used during lab in E115 and for projects.

Academic Integrity:

All students admitted to the University of Florida sign a statement of academic honesty committing themselves to be honest in all academic work and acknowledging that failure to comply with this commitment will result in disciplinary action.

Accommodation for Students with Disabilities: Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals.

The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Software Use: All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.