VIZA 615 - SYLLABUS

VISUALIZATION
TEXAS A&M UNIVERSITY

Spring 2019 – Tim McLaughlin

Course number and title:	VIZA 615-600 Computer Animation
Term:	Spring 2019
Meeting times and location:	TR 2:20pm–4:25pm, Langford Architecture Center, Bldg. C, Room 414

Course Description and Prerequisites from the Graduate Course Catalog

Intermediate level computer animation--focusing on production of three dimensional computer generated animation which may or may not integrate video and photographic elements.

Subject Matter Philosophy Specific to this Offering of the Course

Animation is the interpretation of action. This course focuses on the analysis of actions of animals, the biomechanical systems supporting action, and their re-interpretation and presentation as performance through computer animation.

Computer animation is often viewed through the lens of traditional animation. However, viewers often overlook the degree to which performance animation relies on fundamental principles of biological motion. Computer animation will be approached in this course by the study of movement, how the structure of a body inhibits or promotes particular actions, and how computer graphics techniques can be used to facilitate the perception and comprehension performance expectations of movement.

Learning Outcomes or Course Objectives

By the end of this course it is expected that students will be able to use computer graphics techniques to reproduce believable animal locomotion through modeling, rigging, animation and deformations. Students will have a fundamental grounding in the artistic (interpretive) and technical (applied) issues surrounding technical animation. Specific learning objectives include:

- Explain the history and current uses of computer graphics techniques for character/creature animation.
- Identify and modify the cartesian space and kinematic systems of common 3D animation digital content creation software
- Identify, analyze, and utilize reference material for animation.
- Recognize primary, secondary, and tertiary motion patterns in human and animal movement.
- Create procedural methods for accurate placement of motion system elements for animation.
- Create procedural methods for instantiation of an animation control structure.
- Design, create, and explain a solution to a biological motion authoring problem in computer graphics.
- Distinguish among the variety of deformation problems inherent to soft surface animated objects and utilize appropriate deformation systems to handle a specific problem or problems.
- Create key-frame cycle animation of a biped and quadruped.
- Describe a computer graphics animation problem, prior solutions, and the qualities of a proposed solution.

Instructor Information	
Name:	Tim McLaughlin, Associate Professor and Department Head
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Teaching Assistant:	Mallory Kohut
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Course Communication

The primary communication channel used outside of the classroom will be to your TAMU email address. Other forms of communication will be used, including E-Campus and social media, to draw attention to special events, but these are secondary sources. Additionally, please communicate any questions you have that concern course

Required Technical Resources

Successful completion of the projects for this course will require access to graphical computing workstations and 3D animation software. The 3D animation software must, minimally, have the following components:

- Modeling of 3D geometry as polygons, NURBS, or sub-division surfaces.
- Forward and inverse kinematics.
- Key-framing, including the manipulation of interpolation method used between key-frames.
- Indirect node connections for translation, rotation, and scale.
- Deformation of surfaces driven via the transformation of connected nodes.
- Permit the use of scripting as a substitute for interactive commands. Scripted commands must be able to be saved to file, edited, and re-loaded from the interface. Scripts must also accommodate the inclusion of algebraic and trigonometric functions.
- Rendering of cast shadows and motion blur.
  Rendered image output.

Grading Policy

This is a project-oriented course. Assignments will primarily be completed using computers, however some traditional drawing is required. There are five projects, plus the final project. The specific definition and requirements for each project will be provided in written form in class.

Each project will be given a number grade between 0 (lowest) and 100 (highest). The number grade is based upon a combination of the aesthetic (1/3), technical (1/3), and presentation expertise (1/3) demonstrated.

A small number of opportunities to earn extra credit will be offered during the semester. Each opportunity will be available to all students and will involve an activity, task, or participation that is related to the subject matter of this course.

Each project's value in relationship to the composition of the final grade is:

7.5% Project #1a – Biped Expressive Walk Animation (project grade * 0.075)
7.5% Project #1b – Biped Action Animation (project grade * 0.075)
15% Project #2 – Procedural Motion (project grade * 0.15)
15% Project #3 – Motion Analysis (project grade * 0.15)
15% Project #4 – Motion System and Deformations (project grade * 0.15)
30% Final Project (project grade * 0.3)

10% Attendance/Participation (grade * 0.10)

100 Total Points Possible

A final letter grade is determined as follows:

A = 90 – 100 **B** = 80 – 89 **C** = 70 – 79 **D** = 60 – 69 **F** = below 60

Attendance Policy

Attendance is an important part of the grade received. Attendance equates to showing up on time for class, listening and participating in class discussions. Being late for class, sleeping during class, reading or working on materials other than those required for class, talking or texting on cell phone, and not attending will result in loss of attendance/participation points.

If an absence is excused, the instructor will either provide the student an opportunity to make up work that contributes to the final grade or provide a satisfactory alternative by a date agreed upon by the student and instructor. For project due dates students are expected to attend unless they have a university approved excuse. The make-up work must be completed in a timeframe not to exceed 30 calendar days from the last day of the initial absence. The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for the absence. Among the reasons absences are considered excused by the university are the following (see Student Rule 7 for details http://studentrules.tamu.edu/rule07). The fact that these are university-excused absences does not relieve the student of responsibility for prior notification and documentation. Failure to notify and/or document properly may result in an unexcused absence. Falsification of documentation is a violation of the Honor Code.

Late Turn-in Policy

Projects are due at the beginning of class. Projects are accepted late but will be penalized. If turned-in later than the beginning of class, but during class the penalty is 5%. If turned in after the class period, but on the day due and before the beginning of the next class meeting the penalty is 10%. Each class period thereafter is another 10% penalty for a maximum penalty of 30%, until the deadline for final grades at the end of the semester. Projects and exercises not turned in by 5pm on May 7th will be given no credit.

Extra Credit

Opportunities for extra credit will be provided periodically during the course of the semester. Each opportunity will be available to all students and have a relationship to the focus of this course.

Course Topics, Calendar of Activities, Major Assignment Dates

(All information below is subject to change)

Wk	Date	Topics
1	Tue. 1/15	Course Introduction. Project 1a & 1b assigned. Walk cycles
	Thur. 1/17	Physical and expressive motion; Terrestrial gaits; Project 1a - preview
2	Tue. 1/22	**Project 1a: Biped Expressive Walk Animation** -due
	Thur. 1/24	Motion systems (rigs); History of digital characters; Project 1b - preview
3	Tue. 1/29	**Project 1b: Biped Action Animation** – due
	Thur. 1/31	Visual perception of biological motion; Procedural motion systems
4	Tue. 2/5	Anatomy of hips, legs, and feet; Intro to transforms
	Thur. 2/7	Scripting tools and workflow
5	Tue. 2/12	Project 2 - preview
	Thur. 2/14	**Project 2: Procedural Motion** - due
6	Tue. 2/19	Layering motion; Anatomy of shoulders, arms, and hands

	Thur. 2/21	Viz Industry Fair; Animation, visual effects, games and science
7	Tue. 2/26	Kinematics continued; Anatomy of spine, neck, and head
	Thur. 2/28	Mid-term project check-in
8	Tue. 3/5	Project 3 - preview
	Thur. 3/7	**Project 3: Motion Analysis** - due
	Tue. 3/12	*No class – Spring Break*
	Thur. 3/14	*No class – Spring Break*
9	Tue. 3/19	Anatomy of muscles, tendons, and skin; Intro to deformation systems
	Thur. 3/21	Deformations continued; Anatomy of tails and tentacles
10	Tues. 3/26	UI design for motion systems; Reference for design of motion and form
	Thur. 3/28	Project 4 - preview
11	Tue. 4/2	**Project 4: Motion System & Deformations** - due
	Thur. 4/4	Anatomy of wings; Motion re-targeting
12	Tue. 4/9	Staging, camera, and camera motion; Real-time challenges
	Thur. 4/11	Real-time challenges continued; Shape animation
13	Tue. 4/16	Advanced topics overview
	Thur. 4/18	Final Project – technical preview
14	Tue. 4/23	Final Project – aesthetics preview
	Thur. 4/25	**Final Project** - due
	Tue. 4/30	*No class – Redefined Friday*
	Sat. 5/4	*Viz-a-GoGo Exhibition*

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

For additional information please visit: https://aggiehonor.tamu.edu/Rules-and-Procedures/Rules/Honor-System-Rules

Defacement of Property

"It is unlawful for any person to damage or deface any of the buildings, statues, monuments, trees, shrubs, grasses, or flowers on the grounds of any state institutions of higher education (Texas Education Code Section 51.204)"

The words damage or deface refer specifically to any and all actions, whether direct or indirect, that either diminish the value or mar the appearance of the physical environment.