TEXAS A&M UNIVERSITY

SYLLABUS

Course title and number	Visual Studies Studio IV - VIST 406 section 500
Term	Spring 2011
Meeting times and location	TR 9:35am – 12:05pm, Langford Architecture Center, Building C, Room 306 A

Course Description and Prerequisites from the Undergraduate Course Catalog

Theory and practice in the development of the digital image; non-traditional modeling methods; camera control and animation techniques; special effects; creative lighting methods; non-photorealistic rendering; integration of traditional and digital media in the creation of visual works. Prerequisites: VIST 305, CARC 301, or VIST 494. Credit hours: 3. Lecture-lab: (1-5).

Subject Matter Philosophy Specific to this Offering of the Course

VIST 406 is the final studio course of the Bachelor of Science in Visualization program curriculum. It is expected that students will draw upon all of their experience, skills, and knowledge from prior studios, math, programming, technical and art electives to succeed in this course.

This course will focus on the production of rigging and animation for both a group project and a personal project. Rigging of digital characters combines analytical, technical, and aesthetic skill sets. Other key components of the course include team collaboration and familiarity with forms of animation that lend themselves to procedural description including effects, cloth, and hair animation. Use of the python programming language in either Blender or Maya will be required.

The group project portion of this course features collaboration with team members from other campuses including Texas A&M students studying in Bonn, Germany, students in the ATEC program at the University of Texas at Dallas, and high school students at the Design and Technology Academy in San Antonio. This portion of the course is part of a project funded by the National Science Foundation (NSF project number: 0855908). The goal of the project is to understand how information technology, specifically levels of connectivity, contribute to creative and technical problem solving among students collaborating in computationally intensive studios when not co-located.

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, and animation. Students will have a fundamental grounding in the artistic (interpretive) and technical (applied) issues surrounding technical animation. Specific learning objectives include:

- Analyze story and action needs to determine methods for the creation of expressive performances using digital characters.
- Analyze the story, action, and performance needs to determine and efficient number and location of articulation points for digital characters and props.
- Apply 3D graphics software and the python programming language to the creation of articulated rigs for digital characters and props.
- Apply 3D graphics software to create deformations for softbody characters.
- Create animation control systems for digital characters that balance efficiency and operability.
- Create expressive performance animation for digital characters.
- Plan and schedule a 3D animation workflow that completes a specified amount of work in a set amount of time.
- Appraise, compare, revise, and integrate the work of others.
- Demonstrate the ability to communicate effectively for creative problem solving with local collaborators.
- Demonstrate the ability to communicate effectively for creative problem solving through digitally mediated methods such as email, chat, and tele-conferencing.
- Demonstrate comprehension of effects animation.
- Demonstrate comprehension of cloth and hair simulation.

Instructor Information

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Recommended Textbooks and Information Sources

- *Learning Python: Powerful Object-Oriented Programming* by Mark Lutz. Published by O'Reilly.
- *The Art of Rigging* by Kiaran Ritchie and Karim Biri. Published by CG Toolkit.
- *The Animator's Survival Kit* by Richard Williams.
- *The Visual Story* by Bruce Block, 2nd ed.
- *Animals in Motion* by Eadweard Muybridge. Published by Dover.
- *Humans in Motion* by Eadweard Muybridge. Published by Dover.

Technical Requirements

Successful completion of the projects for this course will require access to graphical computing workstations, 3D animation software, and connectivity with the internet. 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.
- Rendering of cast shadows and motion blur.
- Rendered image output.

Grading Policy

This is a project-oriented course. Most assignments will be completed using computers as the primary tool, 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.

Attendance, contribution to group discussions, and participation in critiques is a requirement of this course. An additional 15% of the final grade is composed of an Attendance/Participation grade on a 0 to 100 scale.

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

5% Project #1 –Cycle Animation (project grade * 0.05)
12% Project #2 –Character Breakdowns and Analysis (project grade * 0.12)
12% Project #3 –Form Analysis (project grade * 0.12)
12% Project #4 –Procedural Rigging (project grade * 0.12)
12% Project #5 –Blocking Animation (project grade * 0.12)
12% Project #6 –Final Animation (project grade * 0.12)
5% Project #7 –Idea for Final Personal Project (project grade * 0.05)
10% Final Group Project (project grade * 0.1)
5% Teamwork (grade * 0.05)
10% Final Personal Project (project grade * 0.1)
5% Attendance/Participation (grade * 0.05)

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

Late projects, including the final project, will incur a 10% penalty per class session that they are late. It is advisable to demonstrate incomplete work on the due date for partial credit rather than having the entire grade for the project penalized.

Course Topics, Calendar of Activities, Major Assignment Dates

(All information below is subject to change)

Date	Topic	Due Dates / Readings to be Discussed
Tues. 1/18	Introduction to course topics and expectations. Collaborative work; Distance collaboration; Performance animation; Technical animation; Action vs. performance; Cycles, Motion Tests; Introduce project #1.	
Thurs. 1/20	Terminology; History of digital characters; Learning to see; Time, timing & perception of motion; Motion blur; Driving points & force.	Chapter 6.6-6.12 (pp 93-104) of DCD. "Taxonomy of Digital Creatures: Interpreting Character Designs as Computer Graphics Techniques" SIGGRAPH 2005 course notes by Tim McLaughlin.
Tues. 1/25	Rigging for performance animation. Facial animation; Exaggeration; Abstraction; Trends in performance animation.	Project #1 – Cycle Animation
Thurs. 1/27	1st virtual meeting between all participants (TAMU, AIB, UT-D, and DATA). Story ideas pitched.	
Tues. 2/1	Lecture: Analysis of concept art; Rest poses; Orientation; Scale; Joints; Rotations.	Project #2 – Character Breakdowns and Analysis.
Thurs. 2/3	Guest speaker: Jay Davis, formerly of Walt Disney Animation and Double Negative. Topics include: character exploration, character sheets.	"Principals of Traditional Animation Applied to 3D Computer Animation" SIGGRAPH 1987 course notes by John Lasseter
Tues. 2/8	Lecture: Structure and action of hips, legs, and feet; Structure and action of the neck, head, and eyes.	"The Morphology of Digital Creatures" SIGGRAPH 2007 course notes by Tim McLaughlin & Stuart Sumida
Thurs. 2/10	Lecture: Structure and action of shoulders, arms, and hands.	
Tues. 2/15	Begin development of animation control systems and character pose sheets.	
Thurs. 2/17	1st virtual project review: turnover of rough models, layout and visual development (TAMU, AIB, and UT-D). Modeling for animation and deformations.	
Tues. 2/22	Begin character animation tests; Python & Mel scripting tutorial #1. Hierarchy; Workflow organization;	Project #3 – Form Analysis
Thurs. 2/24	2nd virtual project review: turnover of final models, layout and visual development (TAMU, AIB, and UT-D). Python & Mel scripting tutorial #2.	
Tues. 3/1	Node types; Direct & indirect connections; Conditional actions; Procedural animation.	
Thurs. 3/3	Mid-term evaluation of course topics and student progress. Animation control systems continued.	
Tues. 3/8	Switches; Kinematics. Deformers; Pose space deformations; Volume preservation; skin relaxation	
Thurs. 3/10	Python & Mel scripting tutorial #3. McLaughlin out.	
Tues. 3/22	Balance & center of gravity; Staging; Posing; Straight-ahead action; Cameras & camera animation. Hair, cloth, and flesh simulation.	Project #4 – Scripted Rig Build
Thurs. 3/24	3rd virtual project review: rough animation and	Project #5 – Blocking Animation

	materials (TAMU & UT-D).	
Tues. 3/29	In class "dailies" of Project #4; Layering; Function curves; Dope sheets; Reference material; Determining scope of work.	"Taxonomy of Digital Creatures: Defining Character Development Techniques Based Upon Scope of Use" SIGGRAPH 2006 course notes by Tim McLaughlin
Thurs. 3/31	4th virtual project review: animation, surfacing, and lighting tests (TAMU, UT-D and DATA). Possible field trip to Dallas to visit Reel FX Studio and UT-D collaborators.	
Tues. 4/5	Contours and silhouettes; Skin deformations: stretch, compress, fold, wrinkle, and bulge; Out-of plane and in-plane deformations; Basic deformation systems. Introduce final project.	
Thurs. 4/7	5th virtual project review: final animation (TAMU & UT-D). Discuss individual projects.	Project #6 – Final Animation
Tues. 4/12	Rendering and shading. McLaughlin out.	
Thurs. 4/14	6th virtual project review: lighting and effects (TAMU, UT-D, and DATA). Pitch individual project ideas.	Projects #7 – Ideas for Final Personal Project
Tues. 4/19	In class work on individual projects.	
Thurs. 4/21	In class "dailies" of individual projects (must present work)	
Tues. 4/26	In class work on individual projects.	
Thurs. 4/28	Final Review of collaborative project (TAMU, AIB, UT-D, DATA). In class "dailies" of individual projects (must present work).	Final Group Project
Tues. 5/3	Final review of individual projects.	Final Personal Project
Wed. 5/4	VIST Spring Show	
Thurs. 5/5	No class.	

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

For additional information please visit: http://www.tamu.edu/aggiehonor

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

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.