CTAN 499 Digital Effects Animation / Special Topics 17911D

2 Units, Mondays 1-3:50pm, RZC117

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Course Description:
This course will survey the tools and techniques to successfully create a spectrum of effects-based animation in computer-generated imagery (CGI), using Autodesk Maya and Side Effects Houdini 3D animation software. Equal in importance but complementary to character animation, effects animation has a long tradition of creating environmental performances such as water, fire, explosions, and destruction in film. The course will expose the advancing 3d animation student with all aspects of digital effects animation, including particle dynamics, cloth simulation, paintFX, CG hair and fur, fluids, and oceans. Several weeks will also be designated for an introduction to the rich procedural capabilities of Houdini, the standard application used in the industry for effects animation. The course will encompass a series of hands-on exercises, so a prior basic working knowledge of Maya or other 3d application is essential.

Recommended Prior Courses:
CTAN 462, Visual Effects, or CTAN 452, Introduction to 3D Computer Animation

Course Length:
15 weeks, meeting once a week, three hours each class meeting.

Optional Books:

“Maya Visual Effects: The Innovators Guide”, Eric Keller, Sybex, 2007. ($26.00)
“Maya Studio Projects: Dynamics”, Todd Palamar, Sybex, 2009. ($30.00)
"Elemental Magic: The Art of Special Effects Animation", Joseph Gilland, Focal Press 2009. ($32.00)
“Digital Effects Animation Using Maya”, Kian Bee Ng, Charles River Media, 1999. (Out of Print)
“The Magic of Houdini”, Will Cunningham, Couse Technology PTR, 2005. ($35.00)
“Houdini On The Spot”, Craig Zeroni, Couse Focal Press, 2007. ($30.00)

Supplemental Educational DVD’s:

“Houdini 101: Interface and Workflow”, Garmin Herigstad, The Gnomon Workshop, 2005.
“Maya Fluid Effects: Fundamentals”, David Schoenfeld, The Gnomon Workshop, 2005.

Supplemental Online Tutorials:

“Maya Particle Effects”, Audri Phillips, Lynda.com
“Maya 2011: Creating Natural Environments”, Aaron Ross, Lynda.com
“Maya Dynamics Category”, DigitalTutors.com
“Houdini Category”, DigitalTutors.com

Software Used:

Autodesk Maya 2012, Side Effects Houdini 11, Foundry Nuke 6.3

Grading Breakdown:

Participation @10%
Weekly Assignments @30%
Final Project @30%
Final Exam 30%

The final project consists of (1) scene animation from both Maya and Houdini, reflecting a myriad of effects animation. The work will serve to demonstrate the range of techniques conveyed throughout the class, and allows the student to develop polished, elaborate work for their showreel.

Weekly assignments are due in the following class from when they are assigned.

Final exam is multiple choice in format.

Schedule:

Week 1: ***Introduction to Effects Animation***

Traditional Methods
Use in Feature Animation
Use in Feature Film VFX
Intro to Maya Dynamics
Particles and Emitters
Dynamic Fields
Software Rendering
Hardware Rendering

In-Class Exercises: Particles, Fields

Assignment: Create Rain, Smoke

Week 2: ***Maya Dynamics***

Rigid Body Dynamics
Soft Body Dynamics
Collision Events
Geometry Instancing
Sprites

In-Class Exercises: RBD, SBD

Assignment: Create Rockfall, Car Denting

Week 3- Labor Day*: No Class*

Week 4: *Maya Dynamics*

Nucleus
Nparticles
Springs

In-Class Exercises: Jumprope, Leaves Blowing

Assignment: Create UFO Invasion

Week 5: *Maya Expressions*

Expressions and MEL

In-Class Exercises: MEL Scripting, Bird Flapping

Assignment: Write Simple Randomizer

Week 6: *Maya Cloth, Hair, and Fur*

Cloth Simulation
Hair Simulation and Dynamics
Fur Simulation and Dynamics

In-Class Exercises: Flag Waving

Assignment: Animate Hair, Beard, and Bandana

Week 7: *Maya PaintFX*

PaintFX
Strokes
Trees
Dynamics

In-Class Exercises: Grass, Forests

Assignment: Create Natural Scene

Week 8: *Maya Fluids*

Fluid Simulation
Oceans
Clouds
Rain
Explosions

In-Class Exercises: Boat Interaction

Assignment: Create Ocean and Rain

Week 9: *Introduction to Houdini*

Intro to Houdini
Benefits to Procedural Approach
User Interface and Navigation
Operators (OPS)
Simple Expressions

In-Class Exercises: SOPS, Expressions

Assignment: Image Reference for Environments

Week 10: *Houdini Surface Operators (SOPs)*

SOP, VOP
Instancing

In-Class Exercises:

Assignment: Create Procedural Terrain and Forest

Week 11: *Houdini Particles (POPs)*

POPs
Copy Stamping
Particle Sprites
Flocking

In-Class Exercises: Rain, Hail, Snow, Clouds

Assignment: Add Weather to Scene

Week 12: *Houdini Rendering (ROPs)*

Rendering Engines
Mantra
IPR, HDR

In-Class Exercises: UVs, Fog, ROP

Assignment: Finish Rendered Scene

Week 13: *Houdini Dynamic Simulation (DOPs)*

Rigid Bodies
Collisions
Destruction
Fracturing

In-Class Exercises: RBD, Collisions

Assignment: Add Collisions to Shot

Week 14: *Houdini Fluid Simulation*

Particle Fluids
Flip Fluids
Solvers
Sinks
Forces
Emitters
Shading

In-Class Exercises: Overview of Fluids

Assignment: Add Particle Fluids

Week 15: *Houdini CHOPs*

Driving Animation w/ Sound
Channel Operators

In-Class Exercises: Drive Animation w/ Sound

Assignment: Add Music and Sound FX

Final Exam, Submission of Final Project, Wed Dec 14, 11-1pm.

STUDENTS WITH DISABILITIES:

Any student requesting academic accommodations based on a disability is required to register withDisability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure that the letter is delivered to the Professor as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

MISSING AN EXAM, INCOMPLETES:

The only acceptable excuses for missing an exam or taking an incomplete in the course are personal illness or a family emergency. Students must inform the professor before the exam and present verifiable evidence in order for a make-up to be scheduled. Students who wish to take incompletes must also present documentation of the problem to the instructor or teaching assistant before final grades are due and are available only after the week 12 withdrawal deadline.

ACADEMIC INTEGRITY:

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *Scampus,* the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.