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 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 particles, dynamics, and fluids. The course will encompass a series of hands-on exercises, so a prior basic working knowledge of Maya or other 3d application is essential. Exposure to Side Effects Houdini, a leading effects 3D application, is also provided from additional workshops.

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:
"Elemental Magic: The Art of Special Effects Animation", Joseph Gilland, Focal Press 2009. ($32.00)
“Maya Studio Projects: Dynamics”, Todd Palamar, Sybex, 2009. ($30.00)

Supplemental Educational DVD’s:

Supplemental Online Tutorials:
“Maya Particle Effects”, Audri Phillips, Lynda.com (free to USC students)
“Maya 2011: Creating Natural Environments”, Aaron Ross, Lynda.com (free to USC students)
“Maya Dynamics Category”, DigitalTutors.com

Software Used:
Autodesk Maya 2015

Grading Breakdown:
Participation @10%
Weekly Assignments @30%
Final Project @30%
Final Exam 30%
The final project consists of (1) scene animation, 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- Jan 12: Introduction to Effects Animation**
- Traditional Methods
- Use in Feature Animation
- Use in Feature Film VFX
- Intro to Maya Dynamics
  *In-Class Exercises: Particle Demos*
  *Assignment: Show Film Samples*

**Week 2- Jan 19: MLK Day- NO CLASS**

**Week 3- Jan 26: Maya Dynamics**
- Particles and Emitter Review
- Software Rendering
- Hardware Rendering
  *In-Class Exercises: Particle Demos*
  *Assignment: Create Rain*

**Week 4- Feb 2: Maya Dynamics**
- Collision Events
- Rain
- Texture Emission
- Sprites
  *In-Class Exercises: Particle Demos*
  *Assignment: Create Rain Collisions*

**Week 5- Feb 9: Maya Dynamics**
- Sprite Wizard
- Geometry Instancing
- Particle Emission from Particles
- Particle Instancer
- Fields
- Goals
  *In-Class Exercises: Particle Demos*
  *Assignment: Create Sprite Scene*

**Week 6- Feb 16: President’s Day- NO CLASS**

**Week 7- Feb 23: Maya Expressions**
- Particle Summation Scene- Volcano
- Expressions and MEL
- Creation vs Runtime
  *In-Class Exercises: MEL Scripting, Bird Flapping*
  *Assignment: Animate w/ Expressions*

**Week 8- Mar 2: Maya Dynamics**
- Rigid Body Dynamics
- RBD Particle Interaction
- Constraints
  *In-Class Exercises: Dynamics Demos*
  *Assignment: Create Rube Goldberg Device*
Week 9- Mar 9: Maya Dynamics
Springs
Soft Body Dynamics
Caching
In-Class Exercises: Dynamics Demos
Assignment: Create Soft Body Scene

Mar 16: Spring Break Week, NO CLASS

Week 10- Mar 23: Maya Nucleus System
Shatter
nParticles
nEmitters
In-Class Exercises: Nucleus Demos
Assignment: Create nParticle Scene

Week 11- Mar 30: nCloth
nCloth Interactions
Flags
Clothing
In-Class Exercises: nCloth Demos
Assignment: Create nCloth Scene

Week 12- Apr 6: Maya Fluids
Fluid Containers
Presets
Clouds
In-Class Exercises: Fluids Demos
Assignment: Create Fluids Scene

Week 13- Apr 13: Maya Fluids
Geometry Interaction
Explosions
Fire
In-Class Exercises: Fluids Demos
Assignment: Create Fluids Scene

Week 14- Apr 20: Maya Paint Effects
Tubes
Strokes
Custom Brushes
In-Class Exercises: Paint FX Demos
Assignment: Create PaintFX Scene

Week 15- Apr 27: Maya Hair, Fur, BiFrost
Maya Hair Presets
Custom Hair
Custom Fur
Grass
In-Class Exercises: Hair, Fur Demos
Assignment: Create Hair Scene

Final Exam, Submission of Final Project, Wed May 6 2-4pm
Statement on Academic Conduct and Support Systems

Academic Conduct
Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct/.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity http://equity.usc.edu/ or to the Department of Public Safety http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other

Support Systems
A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information http://emergency.usc.edu/will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other

Disruptive Student Behavior
Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.