CTAN 462 Visual Effects: Contemporary Approaches to Image Creation
Fall 2010

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Course Description:

This course will survey contemporary concepts and approaches to production in the current state of film and video effects work. Digital and traditional methodologies will be covered, with a concentration on digital exercises illustrating modern techniques. The course is taught by Eric Hanson, a seasoned visual effects artist active in the effects field in Hollywood. Eric is a digital set designer specializing in 3D digital set work with Maya and RenderMan, and his credits include “Fifth Element", "Atlantis", "Fantasia 2000", "Bicentennial Man", "Mission to Mars", "Hollow Man", "Cast Away”, “The Day After Tomorrow”, and "Stealth".

Prerequisites:

None mandatory, but basic Maya literacy helpful. Familiarity and COMFORT with computers essential.

Course Length:

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

Books Required:

“Special Effects: The History and Technique” (2nd edition), Richard Rickitt, Billboard Books, 2007. ($45.00)

Optional:

"Encyclopedia of Visual Effects", Damian Allen and Brian Connor, Peachpit Press 2006. ($40.00)
“Maya 6 Killer Tips”, Eric Hanson, New Riders 2004. ($26.00)
“The Art of Maya”, Alias Wavefront, 2000. ($60.00, www.sybex.com)
“Introducing Maya 6, 3D for Beginners”, Dariush Derakhshani, Sybex, 2004. ($26.00)
“Digital Lighting and Rendering”, Jeremy Birn, New Riders 2000. ($35.00)
“Light- Science and Magic”, Fil Hunter, Focal Press, 2007. ($32.00)
“Digital Compositing for Film and Video”, Steve Wright, Focal Press, 2002. ($38.00)
"The ASC Treasury of Visual Effects", Dunn and Turner, ASC, 1983. (out of print?)
“The Invisible Art: The Legends of Movie Matte Painting”. Craig Barron, Chronicle Books, 2002.
“Creating Special Effects For TV and Video”, Bernard Wilkie, Focal Press, 2000. ($30.00)
“Filming the Fantastic, a Guide to VFX Cinematography”, Mark Sawicki, Focal Press, 2007. ($45.00)
“Visual Effects Cinematography”, Zoran Perisic, Focal Press, 2000. ($32.00)
“From Word To Image”, Marcie Begleiter, Michael Weise Productions, 2001. ($19.00)
“The Visual Story”, Bruce Block, Focal Press, 2001. ($25.00)
“Digital Storytelling, the Narrative Power of VFX in Film”, Shilo McClean, MIT Press, 2007. ($30.00)
“Digital Domain, The Leading Edge of Visual Effects”, Piers Bizony, Billboard Books, 2001, ($50.00)

Grading Breakdown:

Project @50% (Required tasks to complete: Tracking, Roto, Modeling, Lighting, Texturing, Rendering, Particle Effects, Green Screen, and Compositing of UFO over downtown Los Angeles)
Additional Bonus Points Possible
Final Exam 30%
Participation @20%

Computer Lab Time:

3 hrs/ Week.

Computer Programs Used:

Boujou 4.0, Photoshop CS5, Maya 2011, Mental Ray, Nuke 6.0

Week 1: History and Origins of Special Effects in Film

Last 100 Years
Melies, Griffith
Case Studies:
Metropolis
Just Imagine
Things To Come
Ray Harryhausen
50's and 60's
2001
Star Wars/ Lucas/ ILM
Blade Runner
Fifth Element
Gladiator
The Phantom Menace
Present Day

Screening: "Reel Image/ Digital Filmmaking"

Reading Assignment: “Special Effects”, pg 8-47.
(optional) "ASC Treasury of Visual Effects", pg 15-82.

Week 2: Practical Methodologies Survey

Historic Effects Practices:
In-Camera Technique
Use of Mirrors and Projections
Use of Miniatures, Static and Action
Use of Stagecraft, Sets and Cameras
Matte Painting
Extractive Screens
Optical Printing Precedence
Introvision
Motion Control
Pyrotechnics and Explosions
Creating Weather Effects

Screening: Excerpts from "Things To Come"

Reading Assignment: “Special Effects”, pg 38-89, 114-153, 244-265, 306-337.
(optional) “Creating Special Effects For TV and Video”, pg 26-31, 48-69, 102-125, 148-159.
(optional) "ASC Treasury of Visual Effects", pg 91-115, 167-174, 211- 220, 265-282.

Week 3: Modern Effects Facilities Survey

Modern Digital Workflow
Modern Effects Facility
Integration w/ The Film Process
EFX Facility Staff Structure
Chain of Command/ Roles
EFX Production Software
EFX Facility Components
Resource Allocation
Naming Conventions
Production Pipeline Diagrams
Color Space Basics
Lin/ Log
LUT's
Gamma Pipeline
Effects Work Scheduling

Screening: "The Making of Visual Effects in Pearl Harbor"

Reading Assignment: (optional) “The Art And Science of Digital Compositing”, pg 245-251, 141-171.

Week 4: 2D Digital Methodologies- Rotoscoping

Class Project Introduced
Roto Matte Extraction
Review of Nuke 5.0
Hands On Session

EXERCISE: Roto Background Plate (Nuke 5.0)

Reading Assignment: (optional) “The Art And Science of Digital Compositing”, pg 80-89.

Week 5: 3D Camera Tracking- MatchMoving

Basic Principles, Workflow
Survey Packages
Stage Issues
Lens Distortion Review
Review of Boujou 4.1
Hands On Session

EXERCISE: Track Background Plate (Boujou 4.1)

Reading Assignment: (optional) “The Art And Science of Digital Compositing”, pg 104-113.

Week 6: Introduction to 3D CGI

Basic Principles, Workflow
Survey of Packages
3D Modeling Basics
Hands On Session

EXERCISE: Model UFO for Scene (Maya)

Reading Assignment: (optional) “The Art of Maya”, pg 3-30.

Week 7: Intermediate 3D Modeling Technique

Modeling Efficiency
Use of 2D Cards
Poly vs Degree 1 Nurbs vs Degree 3 Nurbs
Proper Modeling Methodology
Character vs Hard Models
Hands On Session

EXERCISE: Continue UFO Model (Maya)

Reading Assignment: (optional) “The Art of Maya”, pg 63-88.

Week 8: CGI Lighting Technique

Review of Classic Cinematic Lighting
Review of CG Methods
Exterior vs Interior Methods
Current vs Future Directions
Direct vs Global Methods
Simulating Radiosity
Simulating Optical Effects
Incandescence Mapping
Case Study: Fifth Element
Hands On Session

EXERCISE: Light UFO (Maya)

Reading Assignment: (optional) “The Art of Maya”, pg 137-148.
(optional) “Digital Lighting and Rendering”, pg 9-33, 241-249.

Week 9: CGI Texturing/ Shading

Shading Models
Procedural vs 2d Mapping
Review of Rendering Applications
Photoshop Techniques
Shader Network Basics
Importance of Specular Mapping
TriPlanar Projections
Weathering Surfaces
Future Directions
Texture Painting Review
Hands On Session

EXERCISE: Paint and Apply Texture Maps for UFO (Photoshop, Maya)

Reading Assignment: (optional) “The Art of Maya”, pg 117-133.
(optional) “Digital Lighting and Rendering”, pg 193-232.

Week 10: CGI Animation

Review of Methods
Character vs Effects Animation
Keyframe vs Procedural Techniques
Dynamic Simulations
Particle Effects
Hands On Session

EXERCISE: Animate UFOs, Dust Effect in Scene (Maya)

Reading Assignment: (optional) “The Art of Maya”, pg 45-60.

Week 11: CGI Camerawork

Visual Composition
Vanishing Points
Perspective Correction
Natural Movement
Proper Camera Setup
Motion Control Rigs
Camera Projection
Hands On Session

EXERCISE: Render Scene Frames (Maya)

Reading Assignment: (optional) “The Art of Maya”, pg 149-152.

Week 12: Introduction to 2D Compositing

Survey of Operations
Pulling Mattes
2D Tracking
Formats
Color Space
Image Manipulation
Handling Disparate Elements
Hands On Session

EXERCISE: Composite UFO into Scene (Shake)

Reading Assignment: (optional) “The Art And Science of Digital Compositing”, pg 13-32, 65-102, 121-131.

Week 13: Intermediate 2D Compositing

Nodal Trees
Scripting for Command Line

Using Alpha for Shadowing
Using Particles for Heat Signature

EXERCISE: Composite UFO into Scene (Shake)

Week 14: PROJECT WRAPUP

Week 14: PROJECT WRAPUP/ LAST CLASS

STUDENTS WITH DISABILITIES:

Any student requesting academic accommodations based on a disability is required to register with Disability 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.

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/.