



## **CTAN 462 Visual Effects Creation**

17899R Fall 2020, 2 units

**Instructor:** Eric Hanson, hanson@usc.edu

Class meets Tuesdays 1-3:50p PST ONLINE

Lab/ Office Hours meets Fridays 10-12:50p PST ONLINE

**IT Help:** Creative Tech Help Desk, creativetech@sca.usc.edu or 213-821-4571

### **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 technique. The class is taught by Eric Hanson, a visual effects designer specializing in the creation of digital environments for VR and feature film. Having worked with leading visual effects houses such as Digital Domain, Sony Imageworks, Dream Quest Images, and Walt Disney Feature Animation, his work can be seen in "The Day After Tomorrow", "Cast Away", "Mission to Mars", "Fantasia 2000", and "The Fifth Element", among others.

### **Prerequisites:**

None mandatory, but basic Maya literacy helpful. Familiarity and COMFORT with Win10 computers essential.

### **Course Length:**

13 weeks, meeting once a week, three hours each class meeting and optional three hours lab.

### **Optional Books:**

"The VES Handbook of Visual Effects" (2<sup>nd</sup> edition), Susan Zwerman et al, Routledge, (\$41.00)

"The Visual Effects Producer", Charles Finance/ Susan Zwerman, Focal Press, (\$32)

"Special Effects: The History and Technique" (2<sup>nd</sup> edition), Richard Rickitt, Billboard Books, 2007. (\$69.00)

"Maya 6 Killer Tips", Eric Hanson, New Riders 2004. (\$26.00)

"Introducing Autodesk Maya 2016", Dariush Derakhshani, 2015. (\$35.00)

"Digital Lighting and Rendering", Jeremy Birn, New Riders 2000. (\$52.00)

"Light- Science and Magic", Fil Hunter, Focal Press, 2007. (\$32.00)

"Digital Compositing for Film and Video", Steve Wright, Focal Press, 2017. (\$58.00)

"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.

"Filming the Fantastic, a Guide to VFX Cinematography", Mark Sawicki, Focal Press, 2007. (\$45.00)

"The Visual Story", Bruce Block, Focal Press, 2001. (\$25.00)

"Digital Domain, The Leading Edge of Visual Effects", Piers Bizony, Billboard Books, 2001, (\$50.00)

### **Software Used:**

Autodesk Maya 2020, Redshift, SynthEyes, Foundry Nuke, Adobe Photoshop

### **Grading Breakdown:**

70%: Class Project:

(10%) Shoot BG plate, Camera Tracking - Due Week 5/Sept 15

(20%) 3D Modeling - Due Week 7/Sept 29

(20%) Animating, Texturing, and Lighting - Due Week 10/Oct 20

(20%) Rendering, Rotoscoping and Final Compositing - Due on Final Exam/Nov 24

30%- Final Exam- Nov 24

### **Schedule:**

#### **Week 1, Aug 18: 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

Present Day

Optional Reading Assignment: "Special Effects", pg 8-47.

"ASC Treasury of Visual Effects", pg 15-82.

#### **Week 2, Aug 25: Practical Methodologies to Present Digital**

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

Motion Control

Pyrotechnics and Explosions

Modern Digital Workflow

Modern Effects Facility

EFX Facility Staff Structure

Chain of Command/ Roles

EFX Production Software

EFX Facility Components  
Production Pipeline Diagrams

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

### **Week 3, Sept 1: 2D Digital Methodologies- Beginning Compositing & Rotoscoping**

EXERCISE: Roto Background Plate (Nuke)  
Class Project Introduced  
Review of Nuke  
Roto Matte Extraction  
Hands On Session

### **Week 4, Sept 8: 3D Camera Tracking- MatchMoving**

EXERCISE: Track Background Plate (SynthEyes)

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

### **Week 5, Sept 15: Introduction to 3D CGI (WORK DUE: BG plate shot, conformed, and tracked)**

EXERCISE: Model UFO for Scene (Maya)

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

### **Week 6, Sept 22: 3D Modeling Technique**

EXERCISE: Continue UFO Model (Maya)

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

### **Week 7, Sept 29 (MID-TERM): CGI Lighting Technique (WORK DUE: Modeling of Saucer)**

EXERCISE: Light UFO (Maya)

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

### **Week 8, Oct 6: CGI Texturing/ Shading**

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

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

### **Week 9, Oct 13: CGI Animation**

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

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

### **Week 10, Oct 20: CGI Camerawork (WORK DUE: Animation, Texturing, Lighting)**

EXERCISE: Render Scene Frames (Maya)

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

### **Week 11, Oct 27: Introduction to 2D Compositing**

EXERCISE: Composite UFO into Scene (Nuke)

Survey of Operations  
Pulling Mattes  
2D Tracking  
Formats

### **Week 12, Nov 3: Intermediate 2D Compositing**

EXERCISE: Composite UFO into Scene (Nuke)

Color Space  
Image Manipulation  
Handling Disparate Elements  
Hands On Session

### **Week 13, Nov 10: LAST CLASS MEETING, Project Wrap Up**

EXERCISE: Finalize Compositing

**Study Days: Saturday Nov 14- Mon Nov 16**

**Tuesday Nov 24, 11a-1p PST: FINAL EXAM, (FINAL VFX PROJECT DUE)**

## **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 Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

### **Support Systems:**

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*  
[studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*Student Health Leave Coordinator – 213-821-4710*

Located in the USC Support and Advocacy office, the Health Leave Coordinator processes requests for health leaves of absence and advocates for students taking such leaves when needed.

<https://policy.usc.edu/student-health-leave-absence/>

*National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call*  
[suicidepreventionlifeline.org](https://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call*  
[studenthealth.usc.edu/sexual-assault](https://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298*  
[equity.usc.edu](https://equity.usc.edu), [titleix.usc.edu](https://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following *protected characteristics*: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*  
[usc-advocate.symplicity.com/care\\_report](https://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

*The Office of Disability Services and Programs - (213) 740-0776*  
[dsp.usc.edu](https://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*USC Campus Support & Intervention - (213) 821-4710*  
[campussupport.usc.edu](https://campussupport.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity at USC - (213) 740-2101*  
[diversity.usc.edu](https://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*  
[dps.usc.edu](https://dps.usc.edu), [emergency.usc.edu](https://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu)

Non-emergency assistance or information.

*Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)*

[ombuds.usc.edu](https://ombuds.usc.edu)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

PLEASE NOTE:

FOOD AND DRINKS (OTHER THAN WATER) ARE NOT PERMITTED IN ANY INSTRUCTIONAL SPACE IN THE SCHOOL OF CINEMATIC ARTS COMPLEX