

Syllabus

Fall 2020

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5:00 PM - 7:30 PM

SCAD

The University for Creative Careers®

School of Digital Media, Department of Visual Effects, Savannah

VSFX 319 - Programming Models and Shaders I Section: 03 CRN: 13407

SCAD Mission:

SCAD prepares talented students for creative professions through engaged teaching and learning in a positively oriented university environment.

Course Description:

This course covers intermediate concepts in programming, with an emphasis on understanding the foundations of 3D modeling, lighting and shading, and the use of C/C++ and Pixars RenderMan scene description languages. Students also learn Pixars shading language for rendering special effects. Prerequisite(s): VSFX 210 or ITGM 236 or ANIM 249.

Course Goals: The following course goals articulate the general objectives and purpose of this course:

1. Students will learn the computer science that underpins the operation of modern 3D modeling, animation and rendering applications.
2. Students will be exposed to an industry-standard renderer through class demonstrations and hands-on practice.
3. Students will learn to create and edit shaders to resolve a variety of shading problems commonly encountered in the process of look development.
4. Students will learn how to write and edit 3D scene descriptions.
5. Students will explore the interaction between texture and lighting of real-world objects.

Student Learning Outcomes: The following course outcomes indicate competencies and measurable skills that students develop as a result of completing this course:

1. Students will manipulate named 3D coordinate systems, points, vectors and surface normals to enable a look development artist to conveniently control surface topology, colors and opacities.
2. Students will successfully manage the technical issues of using a stand-alone renderer with 3D modeling and

animation software.

3. Students will create and edit shader source code files in order to generate shaders that can be used effectively by a look development artist to achieve a specific visual effect.
4. Students will use a text editor to prepare and edit scene description files that can be directly and successfully rendered using a stand-alone renderer.
5. Students will synthesize the topological, textural and lighting attributes of a variety of objects in order to replicate them for visual effects.

Schedule of Classes:

Key events including assignments, projects due dates/exam dates:

Pre-quarter assignment	Install the required software http://fundza.com/tishela/vsfx319/required_software.html
Class 1: Tue, September 15, 2020	Topics <ul style="list-style-type: none">• plagiarism• establishing a common directory structure• editing, uploading & testing student web pages• configuring the Cutter text editor• bring your popup page made from paper or card to session 2.
Class 2: Thu, September 17, 2020	Review the student self images on their portfolio index web pages. RfM Topics <ul style="list-style-type: none">• rendering and re-rendering (IPR),• light types,• using Pixar's subdiv attribute,• Image Tool ("it") - Save All and Histogram• Complete your popup book model model ready for session 3.
Class 3: Tue, September 22, 2020	Review the students popup book models. RfM Topics <ul style="list-style-type: none">• create two categories of cameras in Maya MOD_x modelling viewpoints, and DOP_x cinematic viewpoints.• critique the student popup book models• presence maps• linear workflow• occlusion• denoising• Complete the popup book model tech breakdown ready for session 7
Class 4: Thu, September 24, 2020	RfM Topics <ul style="list-style-type: none">• archives• custom batch rendering

<p>Class 5: Tue, September 29, 2020</p>	<p>Please note change of date due to MLK being observed on Monday 21st January.</p> <p>Topics</p> <ul style="list-style-type: none"> • finalizing the lighting, • layout and structure of a technical breakdown, • linking images to a web page, • linking MP4 movies to a web page.
<p>Class 6: Thu, October 01, 2020</p>	<p>Review the current progress of the technical breakdowns of the popup book on the student the web pages.</p> <p>RfM Topics</p> <ul style="list-style-type: none"> • depth of field • motion blur • Complete the popup book technical breakdown.
<p>Class 7: Tue, October 06, 2020</p>	<p>Final review of the technical breakdowns for the "Popup Book" assignment. Introduction to the Open Shading Language.</p> <ul style="list-style-type: none"> • using Cutter to write osl shaders, • compiling an OSL shader, • using an OSL shader as a Pattern with a PxrOSL node in HyperShade <p>The OSL course of study is divided into two sections. In the first section the visual effects produced by an OSL pattern node are derived from 2D (UV/ST) data. In the second section the effects are based on 3D data such as surface position, orientation, curvature and surface motion.</p> <p>Complete the st shading exercise ready for review session 11.</p>
<p>Class 8: Thu, October 08, 2020</p>	<p>Topics</p> <ul style="list-style-type: none"> • metadata • using OSL with Maya + RenderMan
<p>Class 9: Tue, October 13, 2020</p>	<p>Topics - 2D Noise</p> <ul style="list-style-type: none"> • developing noise shaders driven by texture space
<p>Class 10: Thu, October 15, 2020</p>	<p>Topics - 3D Noise and other effects</p> <ul style="list-style-type: none"> • developing noise shaders driven by 3D space • 3D space and coordinate system transformations • 3D textures
<p>Class 11: Tue, October 20, 2020</p>	<p>Final Review the ST displacement assignment.</p> <p>Topics</p> <ul style="list-style-type: none"> • adding custom primvars using mel/python scripts • Complete Scanning Electron Microscope Imagery (SEM) for session 20

Class 12: Thu, October 22, 2020	Topics <ul style="list-style-type: none"> • primvars and polygon brightness and coloration
Class 13: Tue, October 27, 2020	Topics <ul style="list-style-type: none"> • primvars and polygon face color
Class 14: Thu, October 29, 2020	Topics <ul style="list-style-type: none"> • displacements and color variations by height
Class 15: Tue, November 03, 2020	Topics <ul style="list-style-type: none"> • color variations by "facing ratio"
Class 16: Thu, November 05, 2020	Topics <ul style="list-style-type: none"> • adding attributes for special shading effects
Class 17: Tue, November 10, 2020	Topics <ul style="list-style-type: none"> • 3D color ramps
Class 18: Thu, November 12, 2020	Final look-development.
Class 19: Tue, November 17, 2020	Preparation of the technical breakdowns.
Class 20: Thu, November 19, 2020	Final Review the non-photorealist rendering assignment.

Grading Opportunities:

Your overall course grade will be computed according to the following breakdown:

Assignment	Weight
popup book model	5%
popup book technical breakdown	10%
popup book - final	25%
osl: st shading	20%
osl: non photorealism	30%
Non photorealistic technical breakdown	10%
Total Weight	100 percent

Grading Standards	Range
Letter grade: A = excellent	90 — 100 percent
Letter grade: B = good	80 — 89 percent
Letter grade: C = *	70 — 79 percent
Letter grade: D = *	60 — 69 percent
Letter grade: F = failing	0 — 59 percent

*Refer to the student handbooks and departmental standards for minimal acceptance for passing grade.

Course Information:

Field Trip(s):

VISION: A VSFX Virtual Lecture Series
 Dates and Times to be announced.

Crafty Apes with Sean Thigpen VFX Supervisor
 Creature Surfacing with Samuel Alicea, Creature Surfacing at Weta Digital
 Inside ILM with Jeff White, VFX Supervisor
 Color Management with Jenn Lee, Colorist at ECG Productions

Extra Help Session(s):

TBA

University-wide extended learning opportunities

Extended learning opportunities are designed to enrich and expand students' course-based learning experiences. Attend at least three (3) of the following 10 university-wide extended learning opportunities (i.e., Guests & Gusto, Bee Well, SCADextra and SCADamp workshops, or SCAD signature events) either on-ground or virtually to further explore your discipline, discover new information, and deepen academic engagement.

Theater's Next Act? A Show That's All in Your Head
<https://www.nytimes.com/2020/07/08/theater/virtual-reality-the-tempest.html>

Behind the Cover
<https://www.nytimes.com/series/behind-the-cover>

Behind the Cover: A Look Back at a Year Designing The New York Times Magazine
<https://www.nytimes.com/2019/04/26/magazine/behind-the-cover-design.html>.

Looted landmarks: how Notre-Dame, Big Ben and St Mark's were stolen from the east
<https://www.theguardian.com/artanddesign/2020/aug/13/looted-landmarks-notre-dame-big-ben-st-marks-east-stealing-from-the-saracens>

Yves Béhar's underwater research station is inspired by 1960s design
<https://www.wallpaper.com/technology/yves-behar-underwater-research-station-1960s-design>

A View from the Easel During Times of Quarantine
<https://hyperallergic.com/tag/a-view-from-the-easel/>

Black indie creators discuss the importance of sequential art in the age of protest
<https://www.syfy.com/syfywire/black-indie-creators-on-importance-of-sequential-art-as-protest>

Architectural Gifs Restore Damaged Cultural Sites Around the World
<https://www.thisiscolossal.com/2020/07/neomam-unesco-gifs/>

Spirit Yachts Unveils Spirit 111 Superyacht
<https://spiryachts.com/spirit-yachts-unveils-spirit-111-superyacht/>

Statues are lies, selfies in bronze – and you can't bring history to life with a dead art
<https://www.theguardian.com/artanddesign/2020/jul/21/statues-lies-selfies-bronze-slavery-horror-dead-art-edward-colston>

Please refer to the grading opportunities section of this syllabus to see how your participation in the above extended learning opportunities and your completion of related assignments contribute to your overall grade for this course.

Additional extended learning opportunities:

VISION: A VSFX Virtual Lecture Series
Thursday Sept 24, 8:00pm
Creating an Effective Demo Reel
Maribeth Glass
Head Trainer at Sony Pictures Imageworks

VISION: A VSFX Virtual Lecture Series
Thursday Oct 1, 8:00pm
Industry Insight: What artists can do to build a successful career.

Rob Wright
Creative Director at Pixel Rodeo

Other Course Information

Review the "Selected Works" from the winter quarter 2020.

https://sdm.scad.edu/faculty/mkesson/vsfx319/wip/best/best_winter2020/index.html

Course Materials:

Required Text(s):

Computer Graphics through Key Mathematics

Huw Jones

Springer

ISBN 13:9781852334222

Recommended Text(s):

Python Scripting for Maya Artists (on-line)

Chad Vernon

<http://www.chadvernon.com/blog/resources/python-scripting-for-maya-artists/>

Required Material(s):

Required Software (the following resources are free)

- Maya ([Personal Learning Edition](#) is OK)
- [RenderManForMaya and RenderManProServer \(RfM & RPS\)](#)
- [Java Runtime Environment \(JRE\)](#)
- [Cutter text editor](#)
- [ffmpeg](#)

University Policies:

Academic Integrity:

Under all circumstances, students are expected to be honest in their dealings with faculty, administrative staff and other students.

In class assignments, students must submit work that fairly and accurately reflects their level of accomplishment. Any work that is not a product of the student's own efforts is considered dishonest. Students must not engage in academic dishonesty; doing so can have serious consequences.

Academic dishonesty includes, but is not limited to, the following:

1. Cheating, which includes, but is not limited to, (a) the giving or receiving of any unauthorized assistance in producing assignments or taking quizzes, tests or examinations; (b) dependence on the aid of sources including technology beyond

those authorized by the instructor in writing papers, preparing reports, solving problems or carrying out other assignments; (c) the acquisition, without permission, of tests or other academic material belonging to a member of the university faculty or staff; or (d) the use of unauthorized assistance in the preparation of works of art.

2. Plagiarism, which includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. Plagiarism also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.
3. Submission of the same work in two or more classes without prior written approval of the professors of the classes involved.
4. Submission of any work not actually produced by the student submitting the work without full and clear written acknowledgement of the actual author or creator of the work.

Attendance Policy:

Students are expected to actively engage in courses to achieve the required learning outcomes. Absences in excess of 20 percent of the course (e.g., five absences for a 10-week course that meets twice per week) result in the student receiving a failing grade, unless the student withdraws from the course in accordance with the [withdrawal policy](#). Absences due to late registration are included in the overall absences permitted for the course.

For on-ground courses, students are expected to attend and participate in all scheduled class periods. Tardiness, early departure, or other time away from class in excess of 15 minutes per class session is considered an absence for that class session.

Students enrolled in eLearning courses are required to check the online course site regularly and academically engage in the daily work of the course. At minimum, students should log in to the course and participate in academically related activities on two separate days per unit/week.

For students enrolled in real-time virtual courses (i.e., SCADnow), active participation in live lectures is the most beneficial form of academic engagement and the best way to demonstrate attendance. If students are unable to attend live lectures due to time zone or other individual challenges, they should demonstrate academic engagement and attendance by logging in to the course and participating in academically related activities on at least two separate days per unit/week.

SCAD faculty monitor and measure attendance for eLearning and SCADnow by documenting each student's weekly academic engagement. Academic engagement is defined as participating in live lectures, demos, or critiques; posting to discussion forums or blogs; submitting assignments; completing quizzes or examinations; attending extra help sessions, office hours, or midterm conferences; and/or corresponding with professors regarding course content via phone, email, text, etc.

Personal Conduct Policy:

Students' appearance and conduct should be appropriate and contribute to the academic and professional atmosphere of SCAD. Any student whose conduct is detrimental to the academic environment or to the well-being of other students, faculty, staff members, or university facilities will be subject to disciplinary action, up to and including expulsion from the university.

The student's appearance and conduct should be appropriate and should contribute to the academic and professional atmosphere of SCAD. The university reserves the right at its sole discretion to withdraw the privilege of enrollment from any student whose conduct is detrimental to the academic environment or to the well-being of other students, faculty or staff members, or to the university facilities.

Enrollment policies:

Students are responsible for assuring proper enrollment. See the SCAD catalog for information on add/drop, withdrawals, incompletes, and academic standing.

Midterm Conference(s):

Each student enrolled in the course will have a midterm conference scheduled outside of class time with the professor. Students are expected to keep this appointment.

Academic Support and Tutoring:

Academic support for students at all SCAD locations can be found in MySCAD, under the Student Workspace tab, Department Directory, Academic Resources.

Course Evaluations:

Course evaluations offer students a dedicated opportunity to provide constructive feedback on each of their courses. Student feedback gathered through course evaluations is essential to continuously improving the SCAD academic experience. Evaluations are available to students each quarter during Weeks 8, 9, and 10 through MySCAD. For additional information, contact evaluations@scad.edu.

Student Surveys:

SCAD strongly encourages students to provide feedback on their university experience through institutional surveys. The

SCAD Student Survey and the Ruffalo Noel Levitz Student Satisfaction Inventory are administered to students across locations each spring. The National Survey of Student Engagement is administered biennially in winter. Following survey administration, SCAD's institutional effectiveness department analyzes and reports results to various SCAD departments to inform data-driven enhancements. For additional information, contact surveys@scad.edu.