Syllabus

Spring 2021

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Meeting Times: Tuesday / Thursday

11:00 AM - 1:30 PM

SCAD®

The University for Creative Careers®

School of Digital Media, Department of Visual Effects, Savannah

VSFX 319 - Programming Models and Shaders I

Section: 01 CRN: 31234

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, March 23, 2021	Topics • 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, March 25, 2021	**Review** the student self images on their portfolio index web pages. RfM Topics • rendering and rerendering (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, March 30, 2021	**Review** the students popup book models. RfM Topics • 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, April 01, 2021	RfM Topics • archives • custom batch rendering
Class 5: Tue, April 06, 2021	Topics • finalizing the lighting, • layout and structure of a technical breakdown, • linking images to a web page, • linking MP4 movies to a web page.
Class 6: Thu, April 08, 2021	**Review** the current progress of the technical breakdowns of the popup book on the student the web pages. RfM Topics • depth of field • motion blur • Complete the popup book technical breakdown.
Class 7: Tue, April 13, 2021	**Final review** of the technical breakdowns for the "Popup Book" assignment. Introduction to the Open Shading Language. • using Cutter to write osl shaders, • compiling an OSL shader, • using an OSL shader as a Pattern with a PxrOSL node in HyperShade 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. Complete the st shading exercise ready for review session 11.

Class 8: Thu, April 15, 2021	Topics • metadata • using OSL with Maya + RenderMan
Class 9: Tue, April 20, 2021	Topics - 2D Noise • developing noise shaders driven by texture space
Class 10: Thu, April 22, 2021	Topics - 3D Noise and other effects • developing noise shaders driven by 3D space • 3D space and coordinate system transformations • 3D textures
Class 11: Tue, April 27, 2021	**Final Review** the ST displacement assignment. Topics • adding custom primvars using mel/python scripts • Complete Scanning Electron Microscope Imagery (SEM) for session 20
Class 12: Thu, April 29, 2021	Topics • primvars and polygon brightness and coloration
Class 13: Tue, May 04, 2021	Topics • primvars and polygon face color
Class 14: Thu, May 06, 2021	Topics • displacements and color variations by height
Class 15: Tue, May 11, 2021	Topics • color variations by "facing ratio"
Class 16: Thu, May 13, 2021	Topics • adding attributes for special shading effects
Class 17: Tue, May 18, 2021	Topics • 3D color ramps

Class 18: Thu, May 20, 2021	Final look-development.
Class 19: Tue, May 25, 2021	Preparation of the technical breakdowns.
Class 20: Thu, May 27, 2021	**Final Review** the non-photorealist rendering assingment.

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):

Savannah
3/26/21
4:00pm - 6:00pm
Introduction To Unreal Engine
Charles Shami https://scad.zoom.us/meeting/register/tJAqfuGspjkpG9LSanAt1vZLWN7lUki8Vnka
Montgomery Hall room 111
Students will be introduced to the fundamentals of the Unreal Game Engine user interface, the settings, and game engine components. Students will be more familiar with the Unreal Engine workflow.

Savannah
4/2/21
10:00am - 12:00pm
Career Development: Professionalism Dos and Don'ts Adriana
https://scad.zoom.us/meeting/register/tJwkce2tqjgtH9RPgIMlE30UaTcS5uiHNiWB
In this workshop , students will learn tips and advice regarding professionalism- from dos and don’ts in interviews- to techniques on how to prepare. Give a good first impression and stay calm in an interview.

Savannah
SCAD GamingFest 2021
April 9-10, 2021
Team up with game design and digital media pros.

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.

Savannah
4/16/21 10:00am - 12:00pm
Monster Madness! Character Design Workshop
Brian Bowes https://scad.zoom.us/meeting/register/tJErdeCtqj8iGN36toihwAqK0JeR9Gk_Vupt
Students will have the opportunity to develop a unique creature character with Professor Bowes. this hour long workshop we’ll work through thumbnails, research and development, and tight pencil sketches.

Atlanta
4/30/21 1:00pm - 3:00pm
Defining the Human Figure through Shadow Shapes
Thomas Dang Vu https://scad.zoom.us/meeting/register/tJEpcroom
567cmgpjMuGtMIt9HYng4z4mUMHkLICGyb
Learn about life drawing and how to focus on seeing shape rather than detail through personalized instruction. Applicable for students in all majors - especially for

students majoring in fine arts, animation and sequential arts.
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Savannah - Equestrian Center
5/7/21 1:00pm - 3:00pm
Joe Regan https://scad.zoom.us/meeting/register/tJItdumrqT4vH9CaqK7MUsXRy2Apsq8RmeKu
Observational Drawing: Drawing Animals
Spend an afternoon with the horses at the SCAD Equestrian Center! Students will learn the classic art of drawing animals from observation and how to get accurate representation with an animal in motion.
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Atlanta VIRTUAL
5/14/21 4:00pm - 6:00pm
Introduction to Color Theory
Stephen Thorpe https://scad.zoom.us/meeting/register/tJAkc-GprzkpGNH9NcrFKsr6gTU2TnnKPaeV
Introduction to the weird and wonderful world of color. We shall examine and explore how color is always influencing our thoughts, our decisions, our moods and how color and our eyes constantly deceive us.

Savannah - Gulfstream room 139b
5/21/21 1:00pm - 3:00pm
Sung Park https://scad.zoom.us/meeting/register/tJwtcu6qpzssE9M0F9fNLgNVKZeyRdOX8Trv
Designing for Artificial Intelligence
A hands-on workshop for designing and prototyping AI including vision recognition and VUX(Voice User Experience). Demonstration with voice interactive devices(Amazon Echo, Google Home) and a short lecture on how to design and then hands-on prototyping by students.

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:

Other Course Information

Review the "Selected Works" from the winter quarter 2021.

https://sdm.scad.edu/faculty/mkesson/vsfx319/wip/best/best_winter2021/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.

Enrollment policies:
Students are responsible for assuring proper enrollment. See scad.edu 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.