Syllabus

Fall 2019
Malcolm Kesson

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Meeting Times:	Monday / Wednesday
	08:00 AM - 10:30 AM

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: 10797

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 3-D 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 3-D 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 3-D 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 3-D 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 3-D 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	Review the best technical breakdowns, images and animation of the Fall 2018 quarter paying particular attention to the different communication styles of the students. https://sdm.scad.edu/faculty/mkesson/vsfx319/wip/best/best_fall2018/index.html
Class 1: Wed, September 11, 2019	Topics • Montgomery Hall evacuation procedure • plagiarism • pre/post test • 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: Mon, September 16, 2019	**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 andHistogram • Complete your popup book model model ready for session 3.

Class 3: Wed, September 18, 2019	**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: Fri, September 20, 2019	RfM Topics - archives - custom batch rendering
Class 5: Mon, September 23, 2019	Please note change of date due to MLK being observed on Monday 21st January. 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: Wed, September 25, 2019	Please note change of date. **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: Mon, September 30, 2019	**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 displacements exercise ready for review session 9.
Class 8: Wed, October 02, 2019	Topics - metadata - using OSL with Maya + RenderMan
Class 9: Mon, October 07, 2019	**Final Review** the ST displacement assignment. Topics - 2D Noise - developing noise shaders driven by texture space - Complete Scanning Electron Microscope Imagery (SEM) for session 11

Class 10: **Wed, October 09,** **2019**	Topics - 3D Noise and other effects • developing noise shaders driven by 3D space • 3D space and coordinate system transformations • 3D textures
Class 11: **Mon, October 14,** **2019**	**Final Review** the students models for the SEM assignment. Topics • adding custom primvars using mel scripts • using rifs to achieve unusual effects
Class 12: **Wed, October 16,** **2019**	Topics • primvars and polygon brightness and coloration • primvars and polygon face color
Class 13: **Mon, October 21,** **2019**	Topics • adding and reading attributes for special shading effects
Class 14: **Wed, October 23,** **2019**	Topics - Color and 3D space • synchronizing displacements and color variations by height • synchronizing displacements and color variations by "facing ratio" • 3D color ramps
Class 15: **Mon, October 28,** **2019**	**Final Review** the non-photorealist rendering assingment. Complete the individual project ready for final review on session 20.
Class 16: **Wed, October 30,** **2019**	Students introduce the topic they intend to complete as an independent projects.
Class 17: **Mon, November** **04, 2019**	Students work on their independent project.
Class 18: **Wed, November** **06, 2019**	Studemts present to their peers the progress they have made so far on their independent project.
Class 19: **Mon, November** **11, 2019**	Students begin preparing their technical breakdowns for review on the WWW,
Class 20: **Wed, November** **13, 2019**	Final student presentation of their personal project. Student feedback/appraisal of the course.

Grading Opportunities:

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

Assignment	Weight
popup book model	10%
popup book technical breakdown	10%
popup book - final	25%
osl: st displacements	15%
osl: non photorealism	35%
individual project	5%
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):

MOA
Liu Jiakun
'West Village'
Sept. 11, 2019

MOA
Raphaël Barontini
'The Golden March'
Oct. 09, 2019

Friday Sept 27th
MOA 3pm
Visual Effect Show

Extra Help Session(s):

Friday 4 October 8am room 223 Montgomery Hall
Friday 25 October 8am room 223 Montgomery Hall

Extended Learning Opportunities:

MOA
Group exhibition
'Leather, Lace and Luster'
Oct. 14, 2019

Other Course Information

Review the "Selected Works" from the Spring quarter 2019.
https://sdm.scad.edu/faculty/mkesson/vsfx319/wip/best/best_spring2019/index.html

Course Materials:
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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):

A notebook and pen.

University Policies:
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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 and Personal Conduct:
Only students who are properly registered for a course may attend and participate in that class. Students are expected to attend and participate in all scheduled classes and examination periods. Absences in excess of four class periods per quarter, or 20 percent of the course, result in the student receiving a failing grade for the course. Tardiness, early departure or other time away from class in excess of 15 minutes per class session is considered absence for the class session.

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:
SCAD offers students the opportunity to evaluate all scheduled courses during each quarter term. Student feedback is essential to continuously improve academic services at SCAD. Evaluations will be available the end of each quarter at the beginning of Week 8 and must be completed online by the end of Week 10. A sample course evaluation for on-ground courses is available here.
In order to access course evaluations, the student should take the following steps:

1. Log on to MySCAD
2. Click on the Student Workspace Tab
3. Locate the Course Evaluations link under My Courses channel
4. This will bring up a page that says current surveys and lists all the courses that are currently available for evaluation.

For more information or questions, contact us at evaluations@scad.edu.

Student Surveys:
Students are strongly encouraged to provide feedback on their university experience through SCAD's institutional surveys. The SCAD Student Survey and the Noel-Levitz Student Satisfaction Inventory will both be administered in spring quarter. SCAD Student Survey will be emailed to every student's email account starting in Week 1. The Noel-Levitz Student Satisfaction Inventory will be administered on paper during Week 4 of spring quarter. SCAD's office of institutional effectiveness is responsible for gathering and delivering survey results to decision-makers on campus. For more information or questions, contact us at surveys@scad.edu.