

CSC 155: 3D GRAPHICS AND SHADER PROGRAMMING

In Workflow

1. CSC Committee Chair (tdk@csus.edu; haiquan.chen@csus.edu)
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Approval Path

1. Fri, 09 Feb 2024 18:30:14 GMT
Anna Baynes (shaverdian): Approved for CSC Committee Chair
2. Fri, 09 Feb 2024 18:39:31 GMT
Jinsong Ouyang (jouyang): Approved for CSC Chair
3. Fri, 16 Feb 2024 19:02:00 GMT
Masoud Ghodrat Abadi (abadi): Rollback to Initiator
4. Thu, 29 Feb 2024 20:04:36 GMT
Ted Krovetz (tdk): Approved for CSC Committee Chair
5. Thu, 29 Feb 2024 20:04:55 GMT
Jinsong Ouyang (jouyang): Approved for CSC Chair
6. Fri, 01 Mar 2024 18:44:28 GMT
Masoud Ghodrat Abadi (abadi): Approved for ECS College Committee Chair
7. Fri, 01 Mar 2024 18:45:52 GMT
Behnam Arad (arad): Approved for ECS Dean

Date Submitted: Thu, 29 Feb 2024 04:39:58 GMT

Viewing: CSC 155 : 3D Graphics and Shader Programming

Last edit: Thu, 29 Feb 2024 04:39:56 GMT

Changes proposed by: V Gordon (101052142)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
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Catalog Title:

3D Graphics and Shader Programming

Class Schedule Title:

3D Graphics+Shader Programming

Academic Group: (College)

ECS - Engineering & Computer Science

Academic Organization: (Department)

Computer Science

Will this course be offered through the College of Continuing Education (CCE)?

No

Catalog Year Effective:

Fall 2024 (2024/2025 Catalog)

Subject Area: (prefix)

CSC - Computer Science

Catalog Number: (course number)

155

Course ID: (For administrative use only.)

112106

Units:

3

Is the only purpose of this change to update the term typically offered or the enforcement of existing prerequisites at registration?

No

In what term(s) will this course typically be offered?

Fall, Spring

Does this course require a room for its final exam?

Yes, final exam requires a room

This course complies with the credit hour policy:

Yes

Justification for course proposal:

The reasons for these changes are as follows:

- (1) course description brought up to date
- (2) reduced prerequisite list so that students can take the course earlier
- (3) course name change to better reflect the course content

Course Description: (Not to exceed 80 words and language should conform to catalog copy.)

Computer graphics systems that utilize modern GPU hardware are built using shader programming. This course covers the graphics pipeline architecture of GPUs and shader programming for real-time 3D rendering. The topics include 3D coordinate systems, homogenous representation, 3D matrix transformations and matrix stacks, rasterization, perspective projection, hidden surface removal, synthetic camera paradigm, representation and generation of 3D models, texture mapping, lighting and materials, shadows, skyboxes, normal and height mapping, blending for transparency, stereoscopy, and ray tracing.

Are one or more field trips required with this course?

No

Fee Course?

No

Is this course designated as Service Learning?

No

Is this course designated as Curricular Community Engaged Learning?

No

Does this course require safety training?

No

Does this course require personal protective equipment (PPE)?

No

Does this course have prerequisites?

Yes

Prerequisite:

CSC 130, CSC 131

Prerequisites Enforced at Registration?

Yes

Does this course have corequisites?

No

Graded:

Letter

Approval required for enrollment?

No Approval Required

Course Component(s) and Classification(s):

Discussion

Discussion Classification

CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)

Discussion Units

3

Is this a paired course?

No

Is this course crosslisted?

No

Can this course be repeated for credit?

No

Can the course be taken for credit more than once during the same term?

No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Build 3D graphics models in the following ways: (a) constructing simple ones by hand, (b) importing external models in a common interchange format, and (c) constructing them procedurally.	Exam and programming project
2	Control a virtual camera in a 3D scene.	Programming project
3	Utilize 3D transformation matrices for translation, scale, rotation, view, perspective	Exam
4	Implement real-time animated rendering programs on a graphical processing unit (GPU) rasterization pipeline using a modern shader language such as GLSL.	Programming project
5	Implement lighting and reflection models, and generating shadows in a 3D scene.	Exam and Programming project
6	Use 3D graphics techniques such as texturing, normal and height mapping, skyboxes, blending, stereoscopy, etc.	Programming project
7	Describe how rasterization and hidden surface removal are performed in a graphics API.	Exam
8	Describe how simple shapes can be rendered using ray tracing.	Exam

Attach a list of the required/recommended course readings and activities:

155v4.pdf

Is this course required in a degree program (major, minor, graduate degree, certificate?)

No

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?

No

Will there be any departments affected by this proposed course?

No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.

I/we agree

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Intellectual and practical skills

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?

No

Reviewer Comments:

Masoud Ghodrat Abadi (abadi) (Fri, 16 Feb 2024 19:02:00 GMT): Rollback: 1) Please consult with computer engineering program as they are also affected by this change 2) Please make course description more descriptive (see university policy regarding course description here: <https://sacramentostate.policystat.com/policy/11442454/latest#autoid-nb9q4>) 3) Please revise your syllabus to provide details of assessment techniques (e.g., grading policy),

Key: 1051