

## COURSE DESCRIPTION

**Department and Course Number:** CSCI 391

**Course Title:** Computer Graphics

**Current Catalog Description:** Introduction to the fundamentals of computer graphics, including elementary figures, shading, geometric transformations, graphics program design, and interactive techniques.

**Total Credits:** 3 hours

**Coordinator:** P. Tobin Maginnis, Associate Professor of Computer and Information Science

**Textbook:** J. Foley, A. van Dam, S. Feiner, and J. Hughes, *Computer Graphics: Principles and Practice in C* (2nd Edition), Addison-Wesley.

**Other required materials:** Study guides and miscellaneous class handouts.

**References:**

Michael Abrash, *Zen of Graphics Programming, 2nd Edition*, The Coriolis Group 1996.  
<http://www.blueparrots.com/blue4.html>

**Course Goals:**

Hands-on introduction to programming computer-generated images. The course begins with the PC graphics architecture and builds on graphics library that offers the ability to create a 3D world with shaded and textured mapped surfaces.

**Prerequisites by Topic:**

1. Familiarity with a general purpose high-level programming language such as C or Java (CSCI 211).
2. Familiarity with general programming concepts (CSCI 211).
3. Familiarity with general computer system concepts (CSCI 223).
4. Differential and integral calculus (MATH 262).

**Major Topics Covered in the Course:**

1. Conceptual framework for interactive graphics (4 hours)
2. Architecture of graphics hardware and subsystems (4 hours)
3. Basic raster graphics algorithms for drawing 2D primitives (3 hours)
4. Geometrical transformations (3 hours)
5. Viewing in 3D (3 hours)
6. Input devices, interaction techniques, and interaction tasks (3 hours)
7. Representing curves and surfaces (3 hours)
8. Achromatic and colored light (3 hours)
9. Visible-surface determination (3 hours)
10. Illumination and shading (3 hours)
11. Image manipulation and storage (3 hours)
12. Advanced geometric and raster algorithms (4 hours)
13. Advanced modeling techniques (3 hours)
14. Animation (3 hours)
15. Tests (5 hours)

**Operating Systems and Languages:** Windows, Linux, IA86 Assembly, C++

**Laboratory projects:**

1. Demonstration of code discussed in class
2. Semester project

**Estimate of ABET/CAC Category Content:**

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	_____	_____ 1 _____	Computer Organization and Architecture	_____	_____ 1 _____
Algorithms	_____	_____ 1 _____	Concepts of Programming Languages	_____	_____
Software Design	_____	_____		_____	_____

**Oral and Written Communications**

Not a significant focus of this course.

**Social and Ethical Issues:**

Not a significant focus of this course.

**Theoretical Content (Foundations):**

Not a significant focus of this course.

**Problem Analysis:**

Not a significant focus of this course.

**Solution Design:**

Design of a significant graphics software project.