COURSE NUMBER/TITLE: CS-343 [354-343] MATHEMATICAL FOUNDATIONS OF COMPUTER GRAPHICS

CREDITS: 3

COURSE DESCRIPTION: Fundamental hardware, software, mathematics, data structures and algorithms for computer graphics. Prerequisite: CS-244 Data Structures, MATH-275 Linear Algebra, and of the following: MATH-154 Calculus II, MATH-158 Calculus III, or PHYS-281 University Physics I.


Previous:
Inventor Mentor, 1st Ed. by Wernecke (adopted F00)
Computer Graphics w/Open GL, 3rd Ed., by Hearn/Baker (adopted F06)
Interactive Computer Graphics, 1st Ed., by Angel (adopted F97)
OpenGL Programming Guide, 2nd Ed. by Neider (adopted F96)
Graphical Kernel System for Turbo PASCAL by Mikkelson (adopted F96)
Guide to Modula-2, 1st Ed., by Christian (prior to F96)
Computer Graphics, 1st Ed., by Hearn (prior to F96)
Mathematical Elements for Computer Graphics, 1st Ed., by Rogers (prior to F96)

COURSE OBJECTIVES:
As a result of taking this course the student shall:
1. Understand how to implement graphics systems from low level device drivers to higher level applications programs.
2. Be able to construct computer graphics using the appropriate mathematics, data structures, algorithms and models.
3. Become acquainted with a current standard graphics programming tool such as GKS, CORE or RGL.
4. Have enhanced his/her abilities in linear algebra, data structures, and program design.

COURSE OUTLINE:
1. Overview of graphics hardware and software.
2. Two-dimensional graphics systems--algorithms and data structures for points, lines, curves, clipping, windowing, and transformations.
3. Three-dimensional graphics systems--algorithms and data structures for surfaces, hidden line removal, perspective, and transformations.
4. Solid modeling--algorithms and data structures for solids, hidden surface removal, shading, and color.
5. Overview of advanced topics in computer graphics such as image processing and image enhancement.