Course content

This course serves as an elective for computer science majors and provides a comprehensive introduction to the principles and techniques of computer graphics. Students will explore the evolution and core methodologies of the field, gaining both theoretical knowledge and practical skills. The course combines lectures with hands-on programming exercises to ensure students understand and can implement key algorithms used in graphical applications.

Key topics covered include:

1. Basic graphics rendering algorithms and shape filling.
2. Geometric transformations in 2D and 3D spaces.
3. Viewing in 2D and 3D, including projection techniques.
4. Representation of curves and surfaces.
5. Algorithms for visible surface determination.
6. Illumination models and texture mapping.

Course objectives

Knowledge

1. Understand the foundational concepts, principles, and methods of computer graphics.
2. Learn key algorithms used in visualization and graphical computations, such as surface rendering and transformations.
3. Gain familiarity with the application of illumination and texture mapping techniques.

Skills

1. Implement classic computer graphics algorithms using programming languages and relevant libraries.
2. Analyze and design data visualization solutions to simulate real-world problems.
3. Evaluate and optimize graphical algorithms and code for efficiency.

Competencies

1. Develop a small-scale graphical application or visualization system, integrating learned algorithms and techniques.
2. Articulate computer graphics concepts and solutions effectively through oral, written, and visual presentations.
3. Cultivate self-directed learning skills to engage with professional literature and emerging trends in the field.