THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Group Studies in Computer Science and Engineering

CSE 5194.02

Credit Hours:
1.00 - 10.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Designed to give the student an opportunity to pursue special studies not otherwise offered.

Prerequisites and Co-requisites:
Prereq: Permission of instructor.

Course Goals / Objectives:
- Designed to give the student an opportunity to pursue special studies not otherwise offered.

Course Topics:
- Course overview and mathematical foundations.
- Scientific data models and scientific visualization software.
- Scalar data visualization I: basic visualization techniques, isosurface (marching cubes), isosurface topology, efficient isosurface search algorithms.
- Scalar data visualization II: direct volume rendering – optical model, discrete approximation, transfer function design.
- Scalar data visualization III: topological methods.
- Vector data visualization I: basic visualization techniques, numerical integration and particle tracing.
- Vector data visualization II: stream function and stream surface, flow texture synthesis.
- Vector data visualization III: vector field topology.
- Unstructured and scattered data visualization techniques.
- Large data visualization I: parallel algorithms (volume rendering, image compositing, particle tracing).
- Large data visualization II: statistics based data reduction, scientific data compression.
- Machine learning for scientific visualization
- Visualization software
- Visualization applications: case studies

Designation:
Elective