



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Introduction to Data Visualization

CSE 5544

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate

Course Components:

Lecture

Course Description:

Principles and methods for visualizing data from measurements and calculations in physical and life sciences, and transactional and social disciplines; information visualization; scientific visualization.

Prerequisites and Co-requisites:

Prereq: 5361, Stat 3301, 3541, or 5541.

Course Goals / Objectives:

- Be competent with design principles of creating viable visualizations
 - Be competent with visualization algorithms and data structures
 - Be competent with creation of interactive visualizations
 - Be competent with the collection and processing of diverse collections of data
 - Be competent with including perceptual considerations into visualization systems
 - Be familiar with with practical applications of visualization
 - Be familiar with visualization needs of domains from science, medicine, and commerce
 - Be familiar with the critiques of visualization systems
 - Be familiar with gaining insights into visualization problems and phenomenon
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Course Topics:

- Historical remarks
 - Abstract visualization concepts and the visualization pipeline
 - Data acquisition and representation
 - Principles of visual design
 - Basic mapping concepts
 - Focus+context, and navigation+zoom
 - Perception and color theory
 - Case study: trends application
 - Visualization of matrices, graphs and trees
 - Visualization of high-dimensional data and dimensionality reduction techniques
 - Case study: bioinformatics
 - Visualization of scalar fields (color maps, isosurface extraction, volume rendering)
 - Case study: medical and biological imaging
 - Visualization of vector fields (particle tracing, texture-based methods, vector field topology)
 - Case study: flow visualizations
 - Evaluation and Interaction models
 - Visualization of Large data
 - Visualization of spatio-temporal data
 - Final Presentations
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Designation:

Elective