



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Advanced Computer Graphics

## CSE 5545

**Credit Hours:**

3.00

---

**Course Levels:**

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

---

**Course Components:**

Lecture

---

**Course Description:**

Advanced topics in computer graphics; image synthesis, lighting and rendering, sampling and material properties, volume rendering.

---

**Prerequisites and Co-requisites:**

Prereq: 3541 or 5541 or 581.

---

**Course Goals / Objectives:**

- Be competent with software realizations of physically based ray tracing
  - Be competent with underlying physics of optical transport
  - Be competent with algorithms of light propagation including volume rendering
  - Be competent with signal processing and texture mapping
  - Be familiar with methods for efficient realization
-

**Course Topics:**

- Introduction to Realistic Rendering and Literate Programming
  - Geometry, Transformations, Shapes
  - Acceleration Structures
  - Color and Radiometry
  - Sampling and Reconstruction
  - Reflection Models, Texture
  - Volume Rendering and Scattering
  - Monte Carlo Methods
  - Unbiased Light Transport
  - Biased/Importance-Sampled Light Transport, Photon Mapping, Metropolis Light Transport, Irradiance Caching
  - Project Presentations
- 

**Designation:**

Elective