CS 6491 Foundations of Computer Graphics

Semester and Academic Year: Spring 2027

Credits: 3 Credit Hours

Instructor Information

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General Course Information

Course Description

Mathematical/physical/perceptual principles and modeling/rendering techniques used to create, represent, display, and animate models of 3D shapes and their properties.

Course Learning Outcomes

By the end of the course, students should be able to:

- Explain mathematical, physical, and perceptual foundations used in computer graphics.
- Implement basic rendering techniques including ray tracing and surface interaction calculations.
- Represent and manipulate three-dimensional geometry for graphics applications.
- Evaluate tradeoffs among graphics algorithms, data representations, and implementation techniques.

Required Course Materials

- Digital textbooks are freely available for GT students. Access details provided on Canvas.
- Students need access to a Windows or macOS computer capable of running the required course programming tools. Programming is performed in Java with the Processing graphics library.
- Recommended: Fundamentals of Computer Graphics, Fourth Edition, Peter Shirley and Steve Marschner.
- Recommended: Physically Based Rendering, Third Edition, Matt Pharr, Wenzel Jakob, and Greg Humphreys, https://pbr-book.org/.

Grading Policy

- Programming assignments: 80% total
  - Five programming projects demonstrating course techniques such as ray tracing, implicit surfaces, and mesh manipulation: Combined 80%
- Module quizzes: 20% total

Assignment details, due dates, and final grading logistics are maintained in Canvas.

Late Policy

A 24-hour grace period is allowed for late submission with no penalty. Submissions are not accepted beyond the grace period unless institutionally approved.

Additional Criteria for Successful Completion

- Complete programming assignments as individual work.
- Complete module quizzes according to Canvas instructions.
- Submit work by the stated deadlines, subject to the course late policy and any approved accommodations.

Attendance and Participation

For on-campus sections, lecture attendance is recommended but not required. Asynchronous lecture materials are available. For OMSCS offerings, attendance is asynchronous.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the Georgia Tech Academic Honor Code. Suspected academic misconduct will be referred to the Office of Student Integrity. Unless assignment instructions explicitly state otherwise, all graded assessments are individual effort. AI-based assistance is treated like collaboration with another person. Assignment instructions may restrict AI use, and copied or uncited AI output is treated as plagiarism.

Student Conduct

Students and faculty are expected to maintain an atmosphere of mutual respect, acknowledgement, and responsibility consistent with Georgia Tech's Student-Faculty Expectations Agreement.

Accommodations for Students with Disabilities

Students with learning needs that require accommodation should contact the Office of Disability Services as soon as possible to discuss their needs and obtain an accommodations letter. Students should also contact the instructor so approved accommodations can be implemented.

Core IMPACTS

Not applicable.