



ITP 499 Game Programming Professional Development

Units: 2

Spring 2019—Meeting once per week for 2 hours each.

Time/Date TBD

Location: TBD

Instructor: Matt Whiting

Office: OHE 530 E

Office Hours:

TBD

Contact Info:

Email: whitingm@usc.edu

Skype: crashlotus

Teaching Assistants:

TBD

Office: TBD

Office Hours: TBA

Contact Info: TBD

Commented [SKM1]: Maybe put down “one meeting for 2 hours a week” or something until we figure out the exact day/time

Course Description

This course will focus on the practical math and other topics relevant to new professionals in 3D video game programming.

Students will get practice with the application of mathematics, physics, and geometry in the context of common video game scenarios.

Learning Objectives

Solving common video game programming challenges using 3D geometry, linear algebra, and simple kinematics. Develop confidence needed in a professional game development environment.

Prerequisite(s):

Co-Requisite(s):

Concurrent Enrollment:

Recommended Preparation: ITP-380

Course Notes

In a typical class meeting, we will begin by covering some theory from the fields of physics, mathematics, and computer science, and then cover practical applications of these topics in the context of video game programming.

Most weeks will include homework to practice with these concepts. These homework assignments must be completed *individually*. Each week, the students will be expected to present their assignment solutions for discussion with the class to develop their professional communication skills.

There will be three exams which are comprehensive of all topics covered. The exams are “closed-book”. Two of these exams will be written, and one will be conducted as a 20 minute oral exam.

Technological Proficiency and Hardware/Software Required

We will discuss topics in the context of the programming languages of video game development (C++ and/or C#), but the course will be built around written and verbal exercises. There will not be any particular hardware or software required for the course.

Required Readings and Supplementary Materials

Required:

Mathematics for 3D game programming and computer graphics (3rd Edition). Eric Lengyel. ISBN-13: 978-1-4354-5886-4.

Cracking the Coding Interview: 189 Programming Questions and Solutions (6th Edition). Gayle Laakmann McDowell. ISBN-13: 978-0984782857.

Optional:

Real-Time Collision Detection. Christer Ericson. ISBN-13: 978-1-55860-732-3.

Essential Mathematics for Games and Interactive Applications (3rd Edition). James M. Van Verth, Lars M. Bishop. ISBN-13: 978-1482250923.

Description and Assessment of Assignments

There are 10 written homework assignments each consisting of multiple problems applying the topics covered up to that point in practical examples of common video game situations. These

assignments are to be completed individually prior to the beginning of the following class meeting. In addition to turning these assignments in to be graded, each student must be prepared to present their solutions for discussion with the class.

It is expected that students will spend about 4 hours per week working on these assignments outside of class.

Grading Breakdown

Assignment	% of Grade
Homework	35
Participation	10
Midterm (Written)	20
Midterm (Oral)	15
Final Exam	20
TOTAL	100

Grading Scale (Example)

Course final grades will be determined using the following scale

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Half percentage points will be rounded up to the next whole percentage. So for instance, 89.5% is an A-, but 89.4% is a B+.

Assignment Submission Policy

Assignments should be worked on paper and will be turned in at the beginning of each class meeting. Hand-written assignments are expected to show all work and include clearly understandable diagrams illustrating the concepts being applied.

Exams are conducted on paper and will be turned in at the end of the course period.

Grading Timeline

All assignments are expected to be graded within 1 week of the due-date.

Additional Policies

There is generally no curving. Students will receive the grade they earn.

Extra credit is generally not offered.

Make-up policy for exams: To make up for a missed exam, the student must provide a satisfactory reason (as determined by the instructor) along with proper documentation. Make-up exams are only allowed under extraordinary and emergency circumstances.

Late Assignments: Late assignments will be accepted with a deduction of 20% plus 10% for each additional 24 hour period past the original deadline.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
Class 1 1/10	Introduction	McDowell §TBD Homework #1 (Resume)	
Class 2 1/17	Vector Operations	Lengyel §2.1-2.3 Homework #2 (Vectors)	Homework #1 (Resume) due
Class 3 1/24	Linear Algebra and Transformation Matrices	Lengyel §3.1-3.3; §4.1-4.6 Homework #3 (Matrices)	Homework #2 (Vectors) due
Class 4 1/31	Intersections: Spheres, Lines, and Planes	Lengyel §5.1-5.2; §12.1; §12.4 Homework #4 (Intersections)	Homework #3 (Matrices) due
Class 5 2/7	Intersections: Hulls and Triangles	Homework #5 (Triangles)	Homework #4 (Intersections) due
Class 6 2/14	Frustum and Spatial Partitioning	Lengyel §5.3; §8.2-8.3	Homework #5 (Triangles) due
Class 7 2/21	Midterm #1 (Written)		
Class 8 2/28	Basic Kinematics, Rotational Physics,	Lengyel §13; §14.1-14.2 Assignment #6 (Physics)	
Class 9 3/7	Common Algorithms	McDowell §TBD Homework #7 (Algorithms)	Homework #6 (Physics) due
3/14	Spring Recess	Spring Recess	Spring Recess
Class 10 3/21	Dynamic Programming	McDowell §TBD	Homework #7 (Algorithms) due
Class 11 3/28	Midterm #2 (Oral)		
Class 12 4/4	C++	McDowell §TBD Homework #8 (C++)	
Class 13 4/11	Integer Representations	Homework #9 (Fixed-Point)	Homework #8 (C++) due
Class 14 4/18	Cache and Hardware Concerns	Homework #10 (Cache)	Homework #9 (Fixed-Point) due
Class 15 4/25	Final Review		Homework #10 (Cache) due
FINAL TBD	Final Exam	TBD	Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at www.usc.edu/soc .

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. <https://engemannshc.usc.edu/counseling/>

National Suicide Prevention Lifeline - 1-800-273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. <https://equity.usc.edu/>

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. <http://dsp.usc.edu>

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. <https://studentaffairs.usc.edu/ssa/>

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. <https://diversity.usc.edu/>

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, <http://emergency.usc.edu>

USC Department of Public Safety – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime.

Provides overall safety to USC community. <http://dps.usc.edu>