ITP 380 – Video Game Programming
Units: 4
Fall 2021 Sections:
T/Th 10-11:50AM – Matthew Whiting (whitingm@usc.edu)
T/Th 5-6:50PM – Sanjay Madhav (madhav@usc.edu)
T/Th 7-8:50PM – Clark Kromenaker (kromenak@usc.edu)

Location: Maybe in-person (OHE 540), maybe online.

Instructors: See above
Office: See Piazza
Office Hours: See Piazza
Contact Info: Ask all general course/assignments questions on Piazza (every student will receive an invitation at the start of the semester).

Personal questions and questions from prospective students should be directed via email to the instructor(s).

Teaching Assistants: TBD
Office: TBD
Office Hours: TBD
Contact Info: Via Piazza

Course Description
This course provides students with an in-depth introduction to technologies and techniques used in the game industry today. Students will learn to program and create several different games in C++, starting with 2D games and moving on to 3D. This course focuses on practical, hands-on information that's critical to learning to be a successful video game programmer.

Learning Objectives
At semester's end, students will have:
1. Gained an understanding of core game systems (incl. rendering, input, sound, and collision/physics)
2. Developed a strong understanding of essential mathematics for games
3. Written several functional games in C++ individually
4. Learned critical thinking skills required to continue further study in the field

Prerequisite(s): CSCI 104L *or* ITP 365

Course Structure
Most weeks, we have a lecture on Tuesday and a lab assignment assigned in class on Thursday. Students are required to submit part of each assignment by the end of day on Thursday, and the final submission is due the following Wednesday at the end of day.

Exams
There is a midterm and a cumulative final exam.

Textbook
Madhav, Sanjay. *Game Programming in C++*. Pearson. 2018. ISBN-10: 0134597206.

Students can read this book for free through the USC library website (here).
Alternatively, students can purchase a copy of the book from Amazon or the USC bookstore.

Course Notes
Lecture slides and assignments will all be posted on Blackboard. Lectures will automatically be recorded and links will be posted on Blackboard. Course discussions will occur on Piazza. Assignments will be submitted through Bitbucket.

Hardware Requirements
Students should have access to a computer running either Windows or MacOS. Students who do not have a computer may check one out on a weekly basis from the ITP office in OHE 412. Linux may work, but is technically unsupported.

Grading
In-class labs are graded Credit (CR)/No Credit (NC).

Exams are graded on a points scale from 0 to 100.

Lab assignments are graded using a specification-based grading system. You can receive one of four grades: A, B, C, or F. We will discuss what each of these grades constitutes in the first class meeting.

Your lab assignments will be graded by Course TAs. With the exception of the final assignment, all assignments will due at the end of day on a Wednesday, and you will receive your initial grade on Saturday (three days after the due date). When you receive your initial lab assignment grade, you will also receive

feedback on recommended changes. You may resubmit your lab for a regrade by the end of Tuesday (three days after receiving your grade). Upon regrade, you can increase your grade by at most one letter on the scale. Eg., an initial grade of F can potentially regrade it to a C, an initial grade of C can potentially regrade to a B, and an initial grade of B can potentially regrade to an A.

Final letter grades are assigned using a combined criteria. Possible grades are A, A-, B+, B, B-, C+, C, C-, D, and F.

As an example, here is the criteria to receive an A in the course:
- Get Credit (CR) on at least 9/12 in-class labs
- Get a B or higher on all 12 lab assignments
- Get an A on at least 8/12 lab assignments
- Have an average exam grade of at least 85%

The full table is listed on the next page.

Assignment Submission Policy
All assignments must be submitted on GitHub in order to be graded. Instructions will be provided in class and on Blackboard.

Late Policy
We may make exceptions on the "at most one letter on a regrade" rule on a case by case basis, if you provide a documented and sufficient reason to the instructor. Beyond this, the regrade policy allows students to resubmit to improve their grade by one letter grade.

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 documentation. Make-up exams are only allowed under extraordinary circumstances.

Plagiarism and Individual Work Policy
In this class, programming assignments are expected to represent the individual effort of each student. All programming assignment submissions will be compared with current, previous, and future students' submissions using MOSS, which is a code plagiarism identification program. If your code significantly matches another student's submission, you will be referred to SJACS with a recommended penalty of an F in the course.

It is okay to discuss solutions to specific problems with other students, but it is not okay to look through another student's code. It does not matter if this code is online or from a student you know, it is cheating. Do not share your code with anyone else in this or a future section of the course, as allowing someone else to copy your code carries the same penalty as copying the code yourself.

Course Material Policy
Do not reproduce, distribute, or post any lecture material, assignments, assignment solutions, or exams publicly without written consent of the instructor. You may take notes and make copies of course materials for your own use. You may not post course materials on sites like CourseHero. Doing so is a copyright violation and in some cases may also be an academic integrity violation that will be dealt with accordingly.

Final Grade Criteria

Students must satisfy all criterion under a grade in order to receive that grade.

Grade	Criteria
A	● Credit (CR) on at least 9/12 in-class labs ● Get a B or higher on all 12 lab assignments ● Get an A on at least 8/12 lab assignments ● Average exam grade of at least 85%
A-	● Credit (CR) on at least 9/12 in-class labs ● Get a B or higher on at least 11/12 lab assignments ● Get an A on at least 6/12 lab assignments ● Average exam grade of at least 80%
B+	● Credit (CR) on at least 8/12 in-class labs ● Get a B or higher on at least 11/12 lab assignments ● Get an A on at least 4/12 lab assignments ● No Fs on any lab assignments ● Average exam grade of at least 75%
B	● Credit (CR) on at least 7/12 in-class labs ● Get a B or higher on at least 10/12 lab assignments ● Get an A on at least 3/12 lab assignments ● No Fs on any lab assignments ● Average exam grade of at least 75%
B-	● Credit (CR) on at least 6/12 in-class labs ● Get a B or higher on at least 9/12 lab assignments ● No more than 1 grade of F on any lab assignments ● Average exam grade of at least 70%
C+	● Credit (CR) on at least 6/12 in-class labs ● Get a B or higher on at least 8/12 lab assignments ● No more than 2 grades of F on any lab assignments ● Average exam grade of at least 70%
C	● Credit (CR) on at least 5/12 in-class labs ● Get a B or higher on at least 7/12 lab assignments ● No more than 2 grades of F on any lab assignments ● Average exam grade of at least 65%
C-	● Credit (CR) on at least 4/12 in-class labs ● Get a B or higher on at least 6/12 lab assignments ● No more than 3 grades of F on any lab assignments ● Average exam grade of at least 60%
D	● Credit (CR) on at least 3/12 in-class labs ● Get a B or higher on at least 5/12 lab assignments ● No more than 4 grades of F on any lab assignments ● Average exam grade of at least 55%
F	● Fail to meet criteria for a D

Note: D+ or D- grades are not assigned in this course.

Course Schedule

(*Note that the labs we ultimately assign in may be different games than those listed below, but this should give you an idea of the type of work*).

Date	Lecture Topics	Readings	Due Dates
8/24	Course Intro; Game Programming Basics	Ch. 1 (pp. 1-14; 23-31)	
8/26	Lab 1 – Pong		
8/31	Game Object Models; Vector Basics	Ch. 1 (pp. 14-23); Ch. 3 (skip dot/cross product)	**Lab 1: 9/1 @ 11:59PM**
9/2	Lab 2 – Asteroids		
9/7	More Vector Math; AABBs; Levels	Ch. 3	**Lab 2: 9/8 @ 11:59PM**
9/9	Lab 3 – Frogger		
9/14	Platforming & Basic Sounds		**Lab 3: 9/15 @ 11:59PM**
9/16	Lab 4 – Mario		
9/21	Graphics Basics & 2D Techniques	Ch. 2	**Lab 4: 9/22 @ 11:59PM**
9/23	Lab 5 – Zelda		
9/28	Artificial Intelligence	Ch. 4 (pp. 91-116)	**Lab 5: 9/29 @ 11:59PM**
9/30	Lab 6 – Pac-Man		
10/5	Midterm Practice/Review		
10/7	**Midterm Exam**		
10/12	3D Graphics and Transforms	Ch. 5 (pp. 148-161)	**Lab 6: 10/13 @ 11:59PM**
10/14	*Fall Recess (No Class)* Lab 7 – Space Tunnel		
10/19	More 3D Graphics; Cameras	Ch. 9 (pp. 275-283)	**Lab 7: 10/20 @ 11:59PM**
10/21	Lab 8 – Mario Kart		
10/26	Topics for Lab 9; FPS Cameras	Ch. 10 (read sections corresponding to slides)	**Lab 8: 10/27 @ 11:59PM**
10/28	Lab 9 – Parkour's Edge, Part 1		
11/2	Topics for Lab 10; Collisions	Ch. 10 (read sections corresponding to slides)	**Lab 9: 11/3 @ 11:59PM**
11/4	Lab 10 – Parkour's Edge, Part 2		
11/9	Miscellaneous Topics		**Lab 10: 11/10 @ 11:59PM**
11/11	Lab 11 – Parkour's Edge, Part 3		
11/16	More Graphics Topics		**Lab 11: 11/17 @ 11:59PM**
11/18	Lab 12 – Parkour's Edge, Part 4		
11/23	TBD/Guest Lecture		
11/25	***Thanksgiving Break (No Class)***		
11/30	Getting Hired in the Game Industry	Ch. 6 (pp. 183-190); Ch. 9 (pp. 292-295); Ch. 11	**Lab 12: 12/1 @ 11:59PM**
12/2	Final Exam Practice/Review		
FINAL	**Final Exam**		

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" 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, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.