ITP 380 – Video Game Programming

Units: 4

Fall 2020 Sections:
T/Th 5-6:50PM – Sanjay Madhav (madhav@usc.edu)
T/Th 7-8:50PM – Clark Kromenaker (kromenak@usc.edu)

Location: OHE 540

Instructors: See above
Office: See Piazza
Office Hours: See Piazza

Contact Info: All general course/assignments questions should be asked 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. The first
part of each lab assignment is due at the end of class on Thursdays, and the final submission is due the
following Wednesday.

Exams
There are two midterms and a final exam. All exams are cumulative.

Textbook

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. 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:
Exemplary (E), Meets Expectations (M), Needs Revisions (N), or Zero (Z). We will discuss what each of these
grades constitutes in the first class meeting.

Your lab assignments will be graded by Course TAs. When you receive your lab assignment grade, you will
also receive feedback on recommended changes. You will have 1-2 weeks from when you receive this initial
grade to resubmit for regrades, with multiple resubmissions allowed (timeline and number of resubmissions
discussed further in class). Please note that if your initial grade on a lab is a Z, you cannot get higher than an R for your final grade on that lab (unless it is an exception as outlined in class).

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 10/12 in-class labs
- Get a Meets Expectations (M) or higher on all 12 lab assignments
- Get an Exemplary (E) on at least 8/12 lab assignments
- Have an average exam grade of at least 85%

The full criteria for each letter grade will be posted on Blackboard.

**Assignment Submission Policy**

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

**Grading Timeline**

Students will receive grades on programming assignments within one week after the due date. You will have 1-2 weeks from when you receive this initial grade to resubmit for regrades, with multiple resubmissions allowed (timeline and number of resubmissions discussed further in class).

**Late Policy**

We may make exceptions on the “Z cannot regrade higher than R” rule on a case by case basis, if you provide a documented reason to the instructor. Beyond this, the regrade policy allows students to resubmit to improve their grade provided that their initial grade was R or better.

**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.
<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topics</th>
<th>Readings</th>
<th>Due Dates</th>
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<tbody>
<tr>
<td>8/25</td>
<td>Course Intro; Game Programming Basics</td>
<td>Ch. 1 (pp. 1-14; 23-31)</td>
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<tr>
<td>8/27</td>
<td>Lab 1 – Pong</td>
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<tr>
<td>9/1</td>
<td>Game Object Models; Vector Basics</td>
<td>Ch. 1 (pp. 14-23); Ch. 3 (skip dot/cross product)</td>
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<td>9/3</td>
<td>Lab 2 – Asteroids</td>
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<td>Lab 1: 9/2 @ 11:59PM</td>
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<tr>
<td>9/8</td>
<td>More Vector Math; AABBs; Levels</td>
<td>Ch. 3</td>
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<td>9/10</td>
<td>Lab 3 – Blocks</td>
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<td>Lab 2: 9/9 @ 11:59PM</td>
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<td>9/15</td>
<td>Platforming &amp; Basic Sounds</td>
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<td>Lab 3: 9/16 @ 11:59PM</td>
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<td>9/22</td>
<td>Graphics Basics &amp; 2D Techniques</td>
<td>Ch. 2</td>
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<td>9/24</td>
<td>Lab 5 – Zelda</td>
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<td>Lab 4: 9/23 @ 11:59PM</td>
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<td>9/29</td>
<td>Midterm I Practice/Review</td>
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<td>10/1</td>
<td><strong>Midterm Exam I</strong></td>
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<tr>
<td>10/6</td>
<td>Artificial Intelligence</td>
<td>Ch. 4 (pp. 91-116)</td>
<td>Lab 5: 10/7 @ 11:59PM</td>
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<td>10/8</td>
<td>Lab 6 – Pac-Man</td>
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<td>10/13</td>
<td>3D Graphics and Transforms</td>
<td>Ch. 5 (pp. 148-161)</td>
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<td><strong>Fall Recess</strong></td>
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<td>10/15</td>
<td>Lab 7 – Space Tunnel</td>
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<td>Lab 6: 10/14 @ 11:59PM</td>
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<td>10/20</td>
<td>More 3D Graphics; Cameras</td>
<td>Ch. 9 (pp. 275-283)</td>
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<td>10/22</td>
<td>Lab 8 – Mario Kart</td>
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<td>Lab 7: 10/21 @ 11:59PM</td>
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<td>10/27</td>
<td>Topics for Lab 9/10</td>
<td>Ch. 10 (read sections corresponding to slides)</td>
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<td>10/29</td>
<td>Lab 9 – Parkour’s Edge, Part 1</td>
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<td>Lab 8: 10/28 @ 11:59PM</td>
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<td>11/3</td>
<td>Midterm II Practice/Review</td>
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<td>11/5</td>
<td><strong>Midterm Exam II</strong></td>
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<td>11/10</td>
<td>Graphics Topics; Collisions</td>
<td>Ch. 10 (read sections corresponding to slides)</td>
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<td>11/12</td>
<td>Lab 10 – Parkour’s Edge, Part 2</td>
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<td>Lab 9: 11/11 @ 11:59PM</td>
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<td>11/17</td>
<td>Miscellaneous Topics</td>
<td>Ch. 6 (pp. 183-190); Ch. 9 (pp. 292-295); Ch. 11</td>
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<td>11/19</td>
<td>Lab 11 – Parkour’s Edge, Part 3</td>
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<td>Lab 10: 11/18 @ 11:59PM</td>
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<td>11/24</td>
<td>TBD</td>
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<td><strong>Thanksgiving Recess</strong></td>
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<td>11/26</td>
<td>Lab 12 – Parkour’s Edge, Part 4</td>
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<td>Lab 11: 11/25 @ 11:59PM</td>
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<td>12/1</td>
<td>Tricks and Industry Advice</td>
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<td>12/3</td>
<td>Final Exam Review</td>
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<td>Lab 12: 12/2 @ 11:59PM</td>
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<td><strong>FINAL</strong></td>
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<td><strong>Final Exam according to final exam schedule:</strong></td>
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<td>For the T/Th 5-6:50PM section: Thursday, December 10, 4:30-6:30PM</td>
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<td>For the T/Th 7-8:50PM section: Thursday, December 10, 7-9PM</td>
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<td>Per university policy, students <strong>cannot</strong> anticipate their final exam (meaning you cannot take it earlier than the scheduled date).</td>
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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/](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](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/](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](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/](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/](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/](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/](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](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/](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](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](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](http://dps.usc.edu)