

# USC Viterbi

School of Engineering

**ITP-382 “Mobile Game Programming”**

**Units:** 4

**Fall 2024**

Mon&Wed 10:00-11:50 am

**Location:** KAP 267

**Instructor:** Matt Whiting

**Office:** RRB 221

**Office Hours:**

TBD See Piazza for latest

**Contact Info:**

Email: [whitingm@usc.edu](mailto:whitingm@usc.edu)

Skype: crashlotus

Discord: Matt Whiting#2805

**IT Help:** Viterbi IT

**Hours of Service:**

Monday – Friday, 8:30 a.m. – 5:00 p.m.

**Contact Info:**

DRB 205

(213) 740-0517

[engrhelp@usc.edu](mailto:engrhelp@usc.edu)

## Course Description

Cell phones and tablets are everywhere today. Everyone has at least one, and they usually carry one around at all times. Everyone plays mobile games – even people who don't consider themselves video game players.

With just a few extra skills, any programmer can learn to build and distribute unique and creative mobile games.

## Catalogue Description

Application of techniques used to develop games for mobile devices. Sprites, mobile input, mobile graphics and monetization.

## Learning Objectives

This course provides students with an in-depth introduction to technologies and techniques used to create successful cross-platform mobile games.

At semester's end, students will have:

1. Developed a solid foundation in software engineering for mobile games
2. Gained an understanding of Unity & programming in C#
3. Demonstrated an understanding of the unique design requirements of supporting mobile devices
4. Deployed a game onto multiple different iOS and Android devices
5. Distributed a game via App Store Connect and Google Play
6. Applied these concepts creatively to develop their own unique game and deploy it to mobile devices

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

**Co-Requisite(s):** n/a

**Concurrent Enrollment:** n/a

**Recommended Preparation:** prior experience with Unity

## Course Notes

Each week is centered around a specific mobile game project. Each class session will begin with a lecture where we discuss new topics. After the lecture, the remainder of the in-class period will be devoted to building that week's Lab Project. These projects are individual week-long mobile game programs, and the due dates are listed in the schedule below. Lab Projects are always due by 10 am before the start of the class on that day.

In this way, students get hands-on practice with the concepts while also getting an overview of several influential mobile games and the design lessons they have to teach us.

The in-class lectures are supplemented by pre-recorded videos to augment the lecture material and fill in the gaps for students with varied previous experience.

We will use a variety of online services in the classroom. Assignments and lecture notes can be found on Blackboard. The Lab Projects are in Github Classroom. Outside the class, questions and discussion can be found on Piazza.

## Technological Proficiency and Hardware/Software Required

We will be programming in C#, so previous experience with either C# or C++ is required. Students with significant previous experience with C# in Unity may be allowed to waive the C++ prerequisite.

## Required Readings and Supplementary Materials

*Introduction to Game Design, Prototyping, and Development: From Concept to Playable Game with Unity and C#*. 2nd Ed. Jeremy Gibson Bond. ISBN-10: 0134659864.

### Recommended:

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

## Description and Assessment of Assignments, Grading Breakdown

Assignment	% of grade
<a href="#">Lab Projects</a>	30
<a href="#">In-Class</a>	10
<a href="#">Lab Report Summary</a>	10
<a href="#">Individual Project</a>	10
<a href="#">Midterm Exam</a>	20
<a href="#">Final Exam</a>	20
<b>TOTAL</b>	<b>100</b>

### Lab Projects

Each week is focused on an individual mobile game project. We will use roughly half of our in-class time each day to work on these projects with the help of the instructor and TA(s).

Each Lab Project begins with base requirements that all students must fulfill. After that, the assignment is divided into three Tracks: Programming, Design, and Art. After fulfilling the base requirements, each student may choose a track and perform the tasks called for on that track.

### In-Class

Roughly half of our lecture time is devoted to working on the [Lab Projects](#) each day. As such, it is expected that students attend the session and dedicate themselves to working on the appropriate assignments during that time.

Students will receive credit for being present and working on class-related material each day.

In-Class credits will also be accumulated for use as [Late Credits](#) (see below).

### Lab Report Summary

Along with completing the functional game, each lab assignment concludes by filling out a short form where the students reflect on what they learned and accomplished with the project.

## Individual Project

The series of weekly [Lab Projects](#) culminates with a unique, individually designed and created game project. The project will be formally presented to the class during the last in-class session.

The individual project will take place over several weeks, and the grade has been subdivided into milestones along the way.

Design	10%
Prototype	20%
Presentation	20%
Game	50%
<b>Total</b>	<b>100%</b>

## Midterm Exam

There will be a midterm exam in the form of a programming task that must be completed in the classroom during the specified lecture period. The midterm exam instructions will be on Blackboard, and it will be turned in via Github Classroom.

## Final Exam

Finally, there will be an exam in the form of a programming task that must be completed in the classroom during the final exam period. The final exam instructions will be on Blackboard, and it will be turned in via Github Classroom.

## Assignment Submission Policy

[In-Class](#) checkoffs are recorded during the class period.

[Lab Projects](#), the [Individual Project](#), and the exams are submitted to Github Classroom.

Finally, the [Lab Report Summaries](#) are Google Forms.

## Lab Project Late Credits

Each student begins the semester with 2 Late Credits.

For every 5 [In-Class](#) credits they earn, each student will accrue 1 additional Late Credit.

Each Late Credit can be exchanged for a 24-hour, no questions asked extension on a [Lab Project](#) (including the [Lab Report Summary](#)).

There is a form (<https://forms.gle/LzaGcahrfVjjkEEem8>) for requesting the extension, and it must be filled out no later than the due date for the affected [Lab Project](#).

Late credits cannot be applied to exams nor any step of the [Individual Project](#).

**Exams will not be accepted late unless specific exceptions have been arranged in advance.**

**Grading Scale**

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. For instance, 89.50% is an A-, but 89.49% is a B+.

## Course Schedule: A Weekly Breakdown

**Subject to modification and update prior to the beginning of class August 26, 2024**

	Topics	Assignment	Read it Before Class
<b>Week 1 8/26</b>	Course Introduction, Building to Device, Mouse 0 as Touch	<b>In-Class 01:</b> github	Gibson: Chapter 17, Appendix C
<b>Week 1 8/28</b>	GameObjects, Transforms	<b>Begin:</b> Blackjack	Gibson: Preface, Chapters 18-24
<b>Week 2 9/2</b>	No Class Labor Day		
<b>Week 2 9/4</b>	Sprites, Prefabs	<b>Continue:</b> Blackjack	<a href="#">Supplementary [1]</a>
<b>Week 2 9/9</b>	Accelerometer, XML Resource Data	<b>Due 10am:</b> Blackjack <b>Begin:</b> Heads Up!	Gibson: Chapters 24-26, Appendix A
<b>Week 3 9/11</b>	Coroutines	<b>Continue:</b> Heads Up!	Gibson: Appendix B ("Math Concepts" and "Interpolation")
<b>Week 4 9/16</b>	Sprite Animation	<b>Due 10am:</b> Heads Up! <b>Begin:</b> Missile Command	
<b>Week 4 9/18</b>	Collision Detection, Audio	<b>Continue:</b> Missile Command	Gibson: Appendix B ("C# and Unity Coding Concepts")
<b>Week 5 9/23</b>	Infinite Scrolling, Procedural Levels	<b>Due 10am:</b> Missile Command <b>Begin:</b> Flappy Bird	
<b>Week 5 9/25</b>	Swipe Input, UI	<b>Continue:</b> Flappy Bird	Gibson: Chapter 1
<b>Week 6 9/30</b>	3D and 3D Animation, Screen-to-World Transform	<b>Due 10am:</b> Flappy Bird <b>Begin:</b> Candy Crush	
<b>Week 6 10/2</b>	Custom Shaders	<b>Continue:</b> Candy Crush	Gibson: Chapter 2
<b>Week 7 10/7</b>	Midterm Review	<b>Due 10am:</b> Candy Crush	
<b>Week 7 10/9</b>	Midterm Exam		Gibson: Chapter 7
<b>Week 8 10/14</b>	Object Pools	<b>Begin:</b> Subway Surfer	
<b>Week 8 10/16</b>	Save/Load	<b>Continue:</b> Subway Surfer	Gibson: Chapter 8
<b>Week 9 10/21</b>	Streaming Assets, Android Asset Packs	<b>Due 10am:</b> Subway Surfer <b>Begin:</b> Clash of Clans 1	

<b>Week 9</b> <b>10/23</b>	Camera	<b>Continue:</b> Clash of Clans 1	Gibson: Chapter 9
<b>Week 10</b> <b>10/28</b>	Virtual Joysticks	<b>Due 10am:</b> Clash of Clans 1 <b>Begin:</b> Fortnite	<a href="#">Supplementary [2]</a>
<b>Week 10</b> <b>10/30</b>	Animation Blend Trees	<b>Continue:</b> Fortnite	Gibson: Chapter 10
<b>Week 11</b> <b>11/4</b>	AI Navigation	<b>Due 10am:</b> Fortnite <b>Begin:</b> Clash of Clans 2	<a href="#">Supplementary [3]</a>
<b>Week 11</b> <b>11/6</b>	AI State Machines	<b>Continue:</b> Clash of Clans 2	Gibson: Chapters 11 & 12
<b>Week 12</b> <b>11/11</b>	Project Setup	<b>Due 10am:</b> Clash of Clans 2 <b>Begin:</b> Project	<a href="#">Supplementary [4]</a>
<b>Week 12</b> <b>11/13</b>	Sprite Atlas	<b>Due 10am:</b> Project Design <b>Continue:</b> Project	Gibson: Chapter 13
<b>Week 13</b> <b>11/18</b>	In-App Purchases	<b>Continue:</b> Project	<a href="#">Supplementary [5]</a>
<b>Week 13</b> <b>11/20</b>	In-Game Ads	<b>Due 10am:</b> Project Prototype <b>Continue:</b> Project	Gibson: Chapter 14
<b>Week 14</b> <b>11/25</b>	Analytics	<b>Continue:</b> Project	
<b>Week 14</b> <b>11/27</b>	No Class Thanksgiving Break		
<b>Week 15</b> <b>12/2</b>	Language Support	<b>Continue:</b> Project	
<b>Week 15</b> <b>12/4</b>	Project Presentations	<b>Due 10am:</b> Project	
<b>Final Exam</b>	In the Classroom Monday Dec 16 8-10am		

## Supplemental Reading:

[1] *147 Mobile Gaming Statistics for 2022 That Will Blow Your Mind*

Andrea Knezovic, April 12, 2023

<https://www.blog.udonis.co/mobile-marketing/mobile-games/mobile-gaming-statistics>

[2] *Cost Per Thousand (CPM)*

Will Kenton, June 11, 2023

<https://www.investopedia.com/terms/c/cpm.asp>

[3] *Demystifying Cost Per Install: Understanding the CPI of Your Mobile Game*

Annabel Youens, 2021

<https://get.theappreciationengine.com/2021/01/25/demystifying-cpi/>

[4] *How Much Do Games Make From Ads*

Maria Martinez, Nov 30, 2022

<https://nextgenhero.io/what-do-games-make-from-ads/>

[5] *The Average Revenue for an iPhone Game*

David Weedmark

<https://smallbusiness.chron.com/iphone-advertising-strategy-13596.html>



## 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](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, [policy.usc.edu/scientific-misconduct](https://policy.usc.edu/scientific-misconduct).

### Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call  
[studenthealth.usc.edu/counseling](https://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](https://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](https://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](https://equity.usc.edu), [titleix.usc.edu](https://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.symplcity.com/care\\_report](https://usc-advocate.symplcity.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](https://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](http://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](http://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](http://dps.usc.edu), [emergency.usc.edu](http://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](http://dps.usc.edu)

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

[ombuds.usc.edu](http://ombuds.usc.edu)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.