

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

At semester's end, students will have:

1. Implemented a smaller individual game project
2. Implemented two larger game projects in a team environment
3. Developed an understanding of Objective-C and Cocos2d
4. Familiarized themselves with mobile usability and design concerns

Concepts Objective-C. Sprites. Mobile input. Mobile game design. Tiled systems. Physics. Artificial Intelligence. Augmented reality games.

Prerequisites CSCI 104 or ITP 365x

Instructor Sanjay Madhav

Contact Email: madhav@usc.edu

Office Hours M/W 3:30–4:50PM and T 2-3PM, all in OHE 530H

Lab Assistant TBA

Lecture M 2-3:20PM in KAP 160

Lab W 2-3:20PM in KAP 160

Course Structure For the first couple of weeks, students will spend the lab time working on an individual lab assignment for a simple 2D mobile game, based on the NES classic *Duck Hunt*. The intent is to familiarize students with the initial concepts covered in the first few lectures. This assignment must be completed *individually*.

Once the individual projects are complete, students will break into groups of 3-4 and work on programming two larger game projects, each of which will be based on an original design that the groups each devise. More information regarding the group projects is on the next page.

There are two exams which are comprehensive of all topics covered.

Textbooks **Required:**
Learn Cocos2d 2: Game Development for iOS. Steffen Itterheim. ISBN-10: 143024416X.
Recommended:
Cocos2d for iPhone 1 Game Development Cookbook. Nathan Burba. ISBN-10: 1849514003.

Grading The course is graded with the following weights:

Individual Lab Assignments	15%
Group Project #1	20%
Group Project #2	25%
Midterm Exam	20%
Final Exam	20%
TOTAL POSSIBLE	100%

Grading Scale Letter grades will be assigned according to the following scale:

93%+	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
69	D+
67-68	D
66	D-
65 and below	F

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+.

There is no curving. Students will receive the grade they earn. Extra credit is generally not offered.

Projects There are two group projects in this class. For each of these projects, you will be in a group of 3-4 students and work on a complete game concept. You are not required to work with the same group of students for both projects, but you certainly can choose to do so.

Group Project #1:

The first group project is intended to familiarize students with the concepts covered during the first half of the semester. Students are encouraged to be creative with their game design ideas, but the overall game concept and proposal must be approved by the instructor. Students should also follow the mobile design principles which are outlined in class when creating this concept. The proposal is required to outline specifically which items will be completed for the playable prototype, and which items are intended to be stretch and/or polish goals.

Group Project #1 is required to utilize most of the following features: texture atlases, mobile-specific input, animated sprites, multiple scene layers. Furthermore, students must create a full game experience, that is, it is required to have instructions for new players, and there needs to be a clear start and end of the project.

The schedule for the first project is as follows:

Week 4 – Form groups, come up with game concept, and get approval.

Week 5-6 – Work on playable prototype milestone for the game.

Week 7 – Demonstrate playable prototype in class (graded).

Week 8 – Perform final polish/bug fixing and implement stretch goals if time allows.

Week 9 – Final Presentation for Group Project #1

The grading breakdown is as follows (as percent of overall course grade):
10% – Playable prototype (includes verification that intended features were implemented in a satisfactory manner)
10% – Final project grade (quality/polish of final resulting game, including lack of bugs, complete game experience, and fun factor)

Group Project #2:

The second group project is required to be a more advanced game than the first project. The game can either be a large expansion of group project #1, or it can be a new game entirely. This will really depend on what your first game project encompassed. The proposal criteria is the same as the first group project, but the game must now also utilize most of the following features: scrolling, tile maps, physics, 3D graphics, and multiplayer/push notifications.

The schedule for the second project is as follows:

Week 10 – Form groups, come up with game concept, and get approval.

Week 11-12 – Work on playable prototype milestone for the game.

Week 13 – Demonstrate playable prototype in class (graded).

Week 14 – Perform final polish/bug fixing and implement stretch goals if time allows.

Week 15 – Final Presentation for Group Project #2

The grading breakdown is as follows (as percent of overall course grade):
10% – Playable prototype (includes verification that intended features were implemented in a satisfactory manner)
15% – Final project grade (quality/polish of final resulting game, including lack of bugs, complete game experience, and fun factor)

Policies *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-ups are only allowed under extraordinary circumstances.

Late Projects: Late projects will not be accepted unless the student(s) meet the same criteria for making up exams.

Before logging off a computer, students must ensure that they have emailed or saved projects created during the class or lab session. Any work saved to the computer will be erased after restarting the computer. ITP is not responsible for any work lost.

ITP offers Open Lab use for all students enrolled in ITP classes. These open labs are held beginning the second week of classes through the last week of classes. Please contact your instructor for specific times and days for the current semester.

Hardware	Programming assignments are for iOS devices (iPad, iPhone, iPod Touch). Students are not required to have their own personal devices, as devices will be available during class as well as on a limited checkout basis from the ITP office.
Academic Integrity	<p>USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. <i>SCampus</i>, the Student Guidebook, (www.usc.edu/scampus or http://scampus.usc.edu) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.</p> <p>Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/. Information on intellectual property at USC is available at: http://usc.edu/academe/acsen/issues/ipr/index.html.</p> <p>In this class, all code submissions will be ran against current, previous, and future students using MOSS, which is a code plagiarism identification tool. If your code significantly matches another student's submission, you will be reported to SJACS.</p> <p>Generally, the rule of thumb is that it is acceptable to discuss solutions to problems with other students, but once you are looking at someone else's code, it crosses over into the realm of cheating. It does not matter if this code is online or from a student you know, it is cheating in all situations. Do not share your code with anyone else in this or a future section of the course, as allowing someone else to copy off your code carries the same penalty as you copying the code yourself.</p>
Students with Disabilities	<p>Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website and contact information for DSP: http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html, (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu.</p>
Emergency Preparedness	<p>In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.</p> <p>Please activate your course in Blackboard with access to the course syllabus. Whether or not you use Blackboard regularly, these preparations will be crucial in an emergency. USC's Blackboard learning management system and support information is available at blackboard.usc.edu.</p>

Course Outline

Week 1 (8/26 and 8/28) – Course Intro and Objective-C

- Course Introduction
- Why Mobile?
- Objective-C
- Cocos2d overview

Reading: *Itterheim*: Chapter 1 and 2

Lab: Begin Duck Hunting Lab.

Week 2 (9/4) – Cocos2d Basics

- Game flow
- Scenes, Layers, Nodes
- Sprite basics

Reading: *Itterheim*: Chapter 3 and 5

Lab: Continue Duck Hunting Lab.

No class 9/2 due to Labor Day.

Week 3 (9/9 and 9/11) – Mobile Game Input

- Basic Touch and Multi-Touch Gestures
- Accelerometer
- Virtual joypads

Reading: *Burba*: Chapter 2

Lab: Duck Hunting DUE Sunday, 9/15 @ 11:59PM

Week 4 (9/16 and 9/18) – Advanced 2D Graphics

- Texture Atlases
- Animation
- Scrolling

Reading: *Itterheim*: Chapter 6 and 7

Lab: Begin work on Group Project #1

Week 5 (9/23 and 9/25) – Designing for Mobile

- Usability
- Game case studies
- Designing for the impatient gamer

Reading: *Itterheim*: Chapter 4

Lab: Continue work on Group Project #1

Week 6 (9/30 and 10/2) – Math and Physics

- Quick overview of vector math
- Physics principles
- Box2d physics system

Reading: *Itterheim*: Chapter 12

Lab: Continue work on Group Project #1

Week 7 (10/7 and 10/9) – Artificial Intelligence

- AI behavior
- Pathfinding

Reading: *Burba*: Chapter 7

Lab: Present playable prototype of Group Project #1

Week 8 (10/14 and 10/16) – Midterm Exam during lecture hours on 10/14

Lab: Continue work on Group Project #1

Week 9 (10/21 and 10/23) – Tilemaps

- Basic tilemaps
- Isometric tilemaps

Reading: *Itterheim*: Chapter 10 and 11

Lab: Present final version of Group Project #1

Week 10 (10/28 and 10/30) – Advanced Graphical and Audio Effects

- Particle systems
- Audio effects

Reading: *Itterheim*: Chapter 9; *Burba*: Chapter 6

Lab: Begin work on Group Project #2

Week 11 (11/4 and 11/6) – Connecting to the World

- Multiplayer principles
- Game Center and competitors
- Push Notifications

Reading: *Itterheim*: Chapter 14

Lab: Continue work on Group Project #2

Week 12 (11/11 and 11/13) – Augmented Reality Games

- “Social” mobile gaming
- ARG case studies
- Design principles

Lab: Continue work on Group Project #2

Week 13 (11/18 and 11/20) – 3D Introduction

- 3D math primer
- Basics of the 3D world
- 3D rendering essentials
- Using UDK for 3D development

Reading: *Burba*: Chapter 8

Lab: Present playable prototype of Group Project #2

Week 14 (11/25) – Advanced 3D on Mobile

- Shaders on mobile
- Advanced 3D effects

Lab: Continue work on Group Project #2

No class 11/27 due to Thanksgiving.

Week 15 (12/2 and 12/4) – Publishing and Conclusion

- Deploying on the App Store
- Thin line between success and failure
- Future of mobile games

Reading: *Itterheim*: Chapter 17

Lab: Present final version of Group Project #2

Final Exam 12/13 @ 2PM
