

Alternative Controller Workshop

USC School of Cinematic Arts, CTIN 486

A USC Games Course

Instructors:

Guest Instructor and Subject Matter Expert:

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Course Description:

There's an old saying: "when all you have is a hammer, everything looks like a nail." When all you have is two sticks and eight buttons, everything looks like... a console game.

This is when an alternative controller can make a big difference. As interactivity and novel play experiences expand to include hands-on themed entertainment, immersive theater, VR, AR, and XR, the development of creative and exciting interfaces isn't just part of the fun. It becomes an essential part of the design process. Additionally, all designers of interactive games and experiences benefit from a better understanding of hardware, how it works, what it can do, and how fabrication fits into the business of interactive entertainment. All of these are goals of the Alternative Controller Workshop.

The class introduces students to the concepts of wiring, programming, and fabricating custom devices consisting of microcontrollers, sensors, and their many forms, as well as integrating them into digital games and mixed reality experiences. The main emphasis of the class is on doing the conceptual design work and then physically making and coding a working prototype.

This is a largely solo studio class with a mix of inspirational lectures, hard tutorialization, and workshop time. As this is a small studio class, participation, critique, and troubleshooting with your peers is an essential element of the class. The central work in the class centers around four projects designed to build on each other with the goal of producing an "alt arcade" game as a final project. You must take into account the timeline of the course and the resources available to you to complete the project.

Throughout this class you will be encouraged to take risks and stray from the traditional. Very little restrictions will be placed on the content or methods of your games so long as they are **safe** and are not harmful or fall outside protected speech and decency for any project turned in at this university. Some materials will be provided (mailed) to you, but this is a studio class with expendable materials like any studio art class. You are being provided with a recommended set of supplies you are responsible for purchasing or acquiring. You are also expected to devote time outside of class to accessing resources, and doing enough development work each week to bring progress to class for help and critique.

Meeting Information:

Class meets online for the Fall '20 Semester.

Wednesdays 1-3:30 PM Pacific

Units: 2/2

Class Discord Server: get help, share tricks, stay on top of assignments. Invite sent first week of class.

Course Materials:

Extensive PDFs, manuals, video tutorials, and resources are provided for this class at no cost, as is the starter Circuit Playgrounds, a gift from your instructor. As no textbook is required, you are expected to purchase some supplies and equipment. The suggested shopping list will be provided on Week 1, but plan on spending \$100-\$200 depending on your ambitions.

Grading and Due Dates:

Class Participation - 10%

Student Presentation - 10%

Week 2 - Circuit Playground Exercise - 5%

Week 3,6 - Arduino Exercises - 5%

Week 4 - No Button or Screen Game - 15%

Week 7 - Found Object Controller - 15%

Week 9 - Ludicrous Unity Game - 15%

Week 14 - Final Project: Alt Arcade: 25%

Course content (summarized by class meeting)

Wk	In-Class	On Your Own
1	Introduction to Alt Controllers Supply List Check-in Hardware Tutorial: getting started on Circuit Playground Quickfire Exercise #1	Assigned: Circuit Playground Basic Exercises Due Week 2 Sign up for Presentations
2	Lecture: Digital and Analog - getting inputs with sensors and coding analog and digital outputs Tutorial: Getting Fancy with RGB LEDs Homework check-in and troubleshooting	Assigned: The No-Buttons or Screens Game Due Week 4
3	Student Presentation #1 Lecture: Arduino basics, survey of microcontrollers, getting started breadboarding	

	<p>Tutorial: getting values in Unity</p> <p>Quickfire Exercise #2</p> <p>Workshop Time</p>	<p>Assigned: Have your basic materials ordered. Complete the button/blink exercise on your Arduino</p>
4	<p>Student Presentation #2</p> <p>DUE: The No-Buttons or Screens Game Review in class!</p> <p>LECTURE: Picking the right sensor for the job, picking inputs and outputs, review of getting values into Unity</p>	<p>February 5</p> <p>Assigned: PROJECT 2: The Found Object Controller Due Week 7</p>
5	<p>Student Presentation #3</p> <p>LECTURE: Haunting Objects, analog and Digital</p> <p>Tutorial: Soldering Basics and best Practices</p> <p>Quickfire #3</p> <p>Workshop Time</p>	<p>Do Second Arduino/soldering exercise</p>
6	<p>Student Presentation #4</p> <p>Guest Lecture: Escape Room Tech</p> <p>Quickfire #4</p> <p>Workshop Time</p>	
7	<p>Student Presentation #5:</p> <p>Present: Found Object Controllers</p>	<p>Assigned: PROJECT 3: Ludicrous Unity Game DUE: Week 9</p>
8	<p>Student Presentation #6</p> <p>LECTURE: "soft" controllers, conductivity, and wearables - and VOICE with Alexa/Google/TensorFlow</p> <p>Quickfire #5</p>	

9	Student Presentation #7 LECTURE: Alt Arcade Games Tutorial: Make:Arcade	Assigned: Final Project Alt Arcade Game DUE - FINAL EXAM PERIOD
10	Student Presentation #8 LECTURE: IoT Basics, IFTTT. Quickfire #6 Workshop Time	
11	Student Presentation #9 Lecture: Making Sounds, using alt displays Workshop Time	
12	Student Presentation #10 Lecture: Motors and servos Guest Lecture: TBD Workshop Time	
13	April 13 Lecture: wrap-up and weirder things	
14	FINAL: Show your Work - alt arcade Game	Final Part 2: Ready to submit to ALT CTRL, IndieCade, ETC

More on the Assignments

Student Presentations: At the start of the semester, each student will sign up for one presentation slot over the course of the semester. Students will research 2 topics for their presentation: an innovative alt controller they're interested in (contemporary or historical) and a technology/sensor/tool from a list. The presentation to the class should last under 10 minutes.

Circuit Playground Exercises: Students need to complete 3 short exercises to practice coding hardware on their provided Circuit Playground Express boards. 2 of the 3 can be coded using only Make:Code's visual programming environment, but one will require basic scripting that can be followed along with provided materials.

Arduino Exercises: Students will have short at-home assignments to practice wiring, breadboarding, soldering, and coding microcontrollers and physical computing devices.

Quickfire Challenges: Students will work in teams in short in-class exercises to brainstorm and pitch novel controllers and game ideas according to prompts.

The No Button No Screen Game: Students will create a game playable on the Circuit Playground that does not use a screen or the two buttons on the device **as buttons**. The object of the assignment is to familiarize yourselves with using different inputs and outputs while making a very simple game. The CP's many onboard sensors and lights/speaker/serial port should be sufficient to accomplish this assignment.

The Found Object Controller: Students must convert an object in their homes into a controller that can deliver accurate data to Unity via an Arduino or compatible microcontroller. Can a hairbrush be a videogame controller? Can a coaster? Emphasis is on taking a non-electronic option with an interesting property and choosing and attaching the proper sensors. Students will not be required to make a game controlled by this object for the assignment, but should set up their Unity environment to read the data from the controller and demonstrate its functionality.

The Ludicrous Unity Game: Given a stock simple arcade game from the Unity Asset Store, students must create a silly/unconventional alternative controller for the game. Controllers will be evaluated based in part on how creative and unconventional the controller is, but also its fidelity and accuracy. It should be possible to deliberately and successfully control the game.

Reviews & Critiques: In addition to formal testing, projects will also undergo extensive peer review and critique during the class sessions. Students are expected to participate actively in both the giving and receiving of feedback as a crucial part of the design process. These reviews will cover both creative and technical aspects of the project.

Final Project: For the final project, students must create an original game and a novel controller for the game. The game should be simple, suitable for installation in an arcade (think Dave & Buster's or 2bit Circus) and the focus should be on the controller itself. Students will present concepts in class and get workshop and peer feedback. The final games will be presented during the final period, and deliverables will mirror submission materials to submit the game to festivals like IndieCade and ALT:CTRL at GDC.

Missing an Assignment Deadline, Incompletes:

The only acceptable excuses for missing an assignment deadline or taking an incomplete in the course are personal illness or a family emergency. Students must inform the instructors before the assignment due date and present verifiable evidence in order for a deadline extension to be granted. Students who wish to take incompletes must also present documentation of the problem to the instructors or student assistant before final grades are due.

For assignments turned in after the assignment deadline without prior permission from the instructor, a penalty will be imposed equal to 10% of the total available points for the assignment, for each day or part of a day that the assignment is late, up to a maximum of seven days.

Attendance Policy:

Punctual attendance at all classes is mandatory. Students arriving more than five minutes late to three classes, more than ten minutes late to a single class, or leaving early, will be marked as having an unexcused absence from class, unless prior permission has been obtained from the instructors. The following guidelines are from the Interactive Media Division & Games handbook regarding absences and grading and apply to all students.

Guidelines for absences affecting grading:

Two unexcused absences: lowers grade $\frac{1}{2}$ grade (for example, from A to A-)

Three unexcused absences: lowers grade one full grade

Four or more unexcused absences: request to withdraw from course (instructor's discretion)

Excused absences are:

Illness (with a doctor's verification)

Family or personal emergency (with verification)

Social media use, including text messaging, Internet messaging and email, is not permitted in class unless explicitly permitted by the instructors. A 0.5% grade reduction will result from each occurrence of a student being found using social media in class.

A Safe Space

In this class, we make a commitment to foster a welcoming and supportive environment where students of all identities and backgrounds can flourish. This means that we will use preferred pronouns and respect self-identifications. While debate and discussion are welcome, please remain aware of the implications of your words and the images that you include in your work. If the instructor or another student points out that something you have said or shared with the group might be offensive, avoid being defensive; this is a valuable opportunity for us to grow and learn together. If you have a concern about any aspect of the class, you are encouraged to speak with the instructor. If you feel uncomfortable speaking with the instructor, you are also welcome to speak with either the undergraduate or graduate advisor for the division, who can discuss the issue with you directly or point you toward other on- and off-campus resources for addressing your concern.

Fair Use

Fair use is a legal principle that defines certain limitations on the exclusive rights of copyright holders. The Interactive Media & Games Division of USC's School of the Cinematic Arts seeks to apply a reasonable working definition of fair use that will enable students and instructors to develop multimedia projects without seeking authorization for non-commercial, educational uses. In keeping with section 107 of the Copyright Act we recognize four factors that should be considered when determining whether a use is

fair: (1) the purpose and character of use, (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (4) the effect of the use upon the potential market for or value of the copyrighted work. In general, we regard the reproduction of copyrighted works for the purposes of analysis or critique in this class to be covered by the principle of fair use.

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, up to and including expulsion from the program and the university. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, *Behavior Violating University Standards* policy.usc.edu/student/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/.

You are welcome to make use of code libraries, Unity extensions, and the like, as appropriate to your project. However the substance of the project must be your work, and you must document the sources (links to the original work) in a text file submitted with your project. If you are not sure whether you need to document something, document it. If you are uncertain about what constitutes plagiarism, it is your responsibility to ask the instructors for clarification.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* equity.usc.edu or to the *Department of Public Safety* dps.usc.edu/contact/report. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *Relationship and Sexual Violence Prevention and Services* (RSVP, formerly known as the Center for Women and Men) engemannshc.usc.edu/rsvp provides 24/7 confidential support, and the *Sexual Assault Resource Center* sarc.usc.edu describes reporting options and other resources.

Harassment, sexual misconduct, interpersonal violence, and stalking are not tolerated by the university. All faculty and most staff are considered Responsible Employees by the university and must forward all information they receive about these types of situations to the Title IX Coordinator. The Title IX Coordinator is responsible for assisting students with supportive accommodations, including academic accommodations, as well as investigating these incidents if the reporting student wants an investigation. The Title IX office is also responsible for coordinating supportive measures for transgender and nonbinary students such as faculty notifications, and more. If you need supportive accommodations you may contact the Title IX Coordinator directly (titleix@usc.edu or 213-821-8298) without sharing any personal information with me. If you would like to speak with a confidential counselor, Relationship and Sexual Violence Prevention Services (RSVP) provides 24/7 confidential support for students (213-740-9355 (WELL); press 0 after hours).

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services* and

Programs dsp.usc.edu provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology.

Disruptive Student Behavior:

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

Syllabus Updates:

This syllabus is liable to change up to the beginning of class and possibly over the semester. Please check the posted syllabus regularly, and note all changes that are shared by the instructor in class.