

# Alternate Controller Workshop

## **USC School of Cinematic Arts**

A USC Games Course

### **Instructors:**

Jesse Vigil
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### **Course Description:**

Controllers are the absolute least interesting thing we're building in this Workshop.

Games are about modes of play and interactions, and there are many more modes of play and interactions than buttons or keys – and there are countless more interesting interactions than just what can be put on screens.

The purpose of this workshop is to arm you with the skills you can use to design the perfect *interaction* for your experience, be it game, immersive, themed attraction, or something new and wonderful. Taking equal inspiration from Carter the Great and Tony Stark, this class is designed to give you a solid foundation in how to design and actually build something that looks like magic but works every time in the hands of end users.

This is a hands-on building class. You will get your hands dirty. You do not need any previous experience with soldering, circuits, microcontrollers, or mechanical components. A basic working familiarity with the Unity Game Engine is helpful. This is, however, a multidisciplinary class, and those with other skills in the related arts may find working with a partner versed in game engines for the final project yields the best results.

Please note: there is no required book purchase for this class. All useful and relevant instructional tools will be provided. HOWEVER: You will need to spend ~\$100 on supplies and software to complete the projects in this class. When possible, the instructor can provide specialty materials, but everyone will need a basic kit.

### **Meeting Information:**

Class meets online for the Fall '23 Semester. Wednesdays 10-11:50AM PT

**Units:** 2/2

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

### **Grading and Due Dates:**

Class Participation - 10%

In-Class Exercises - 10%

Week 3 - CPX Exercises - 10%  
 Week 6 - No Screens Game - 20%  
 Week 7 - Arduino Exercises - 5%  
 Week 9 - Unity Object Project - 20%  
 Week 10- Pitch/Ideation- 5%  
 Week 11 - Final Project: Alt Control Arcade: 20%

	<i>Topics/Daily Activities</i>	<i>Readings and Homework</i>	<i>Deliverable/ Due Dates</i>
Week 1	<i>Introduction! Basics of Alternative Controllers/Philosophy of Why To Build One</i> <i>MINI LECTURE: Cockpits</i> <i>Basics of the Circuit Playground</i>	<i>Exercise 1 and 2 using the CPX</i>	Week 2
Week 2	<i>The Medium is the Message, The Point of Alternative Controllers</i> <i>MINI LECTURE: What Is A Circuit?</i>	<i>CPX Ocarina</i>	Week 3
Week 3	<i>Basics of Micocontrollers</i> <i>MINI LECTURE: Survey of Early Electronic Do-Dads</i>	<i>PROJECT: No Screens Game using CPX</i>	Week 6
Week 4	<i>No Class (Jesse will share something fun in his absence)</i>		
Week 5	<i>Help And Troubleshooting With Guest</i> <i>No-Screens Game is Due next week!</i>		
Week 6	<i>Review of Student Projects</i> <i>Arduinos and Advanced Microcontroller Work</i> <i>MINI-LECTURE: Resistors</i>	<i>Basic Arduino Exercises 1 and 2</i>	Week 7

Week 7	<i>Writing to Serial: The Foundation of Alt Controllers Soldering Basics Connecting to Unity</i>	<i>PROJECT: Get an Object to Talk to Unity</i>	Week 9
Week 8	<i>Troubleshooting and Workshop MINI LECTURE: Light Guns, Lots of Light Guns</i>	<i>Exercise: Ideation</i>	
Week 9	<i>Review Student Work MINI LECTURE: Survey of Wild Arcade Machines</i>	<i>Team Pitch for Final Projects</i>	
Week 10	<i>MINI LECTURE: The Internet of Things, and using IOT devices in your games  Team Pitch</i>	<i>FINAL PROJECT: Tech Demo 1</i>	Week 11
Week 11	<i>DESIGN CLINIC: Workshopping Ideas for the Arcade Project MINI LECTURE: Servos, Or How I Once Utterly Ruined Everything</i>	<i>Tech Demo 2</i>	Week 12
Week 12	<i>MINI LECTURE: TBD (based on student projects, this will highlight a technology and approach used)</i>	<i>FINAL PROJECT: Cardboard Build-In</i>	Week 13
Week 13	<i>MINI LECTURE: Lights, FX, and JUICE in the physical world</i>	<i>FINAL PROJECT: Screen/Game Beta</i>	Week 15
Week 14	<i>NO CLASS - THANKSGIVING</i>		
Week 15	<i>FINAL Project Checkin and class wrap-up</i>	<i>FINAL PROJECT Final Integration</i>	<i>Final Period</i>
FINAL	<i>Final Turn-in</i>		

**More on the Assignments**

CPX Exercises: Students will be given challenges in class to be completed using the Circuit Playground Express, a no-solder microcontroller programmable using the Scratch-like visual programming language Make:Code, or via python or java (not required)

The No Screen Game: Students will use their Circuit Playground Express to design and build a playable short game that does not make use of a screen. .

Arduino Exercises: Basic familiarity with wiring circuits, getting data from sensors, and programming a microcontroller using the Arduino IDE.

Object Project: Taking an Object that is NOT already electronic, students will use sensors and their Arduino microcontroller to transform that object into a controller that can reliably transmit data about its state to the Unity Game Engine

Ideation Project: In small teams, students will brainstorm and pitch a novel controller arcade game with concepts and a technical design for how the alternate controller will work

Final Project: Working in teams, create a functional prototype of the novel arcade game presented in the Ideation Project. The final project should have a functional polished controller, but the arcade game can be rudimentary. Depending on the skill level of teams, they are encouraged to take this concept forward. There are no restrictions on size or scope for this project (within reason) but cardboard prototypes are permissible and encouraged.

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.

#### 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 ½ 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](https://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/](https://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](https://equity.usc.edu) or to the *Department of Public Safety* [dps.usc.edu/contact/report](https://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](https://engemannshc.usc.edu/rsvp) provides 24/7 confidential support, and the *Sexual Assault Resource Center* [sarc.usc.edu](https://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](mailto: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](https://dornsife.usc.edu/ali), which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [dsp.usc.edu](https://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](https://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.