Introduction to Game Design and Production

CPSC 386-01

Summer 2022

Description & Objectives

From the CSUF catalog:

> Current and future technologies and market trends in game design and production. Game technologies, basic building tools for games and the process of game design, development and production.

A better way to describe this course is we shall endeavor to first understand what a game is and from that understanding compare and contrast computer games to what we shall call traditional games. With our understanding of what a traditional and computer game are, we shall create our own games and develop our ability to criticize games constructively, paying close attention to the frameworks we learn in our lectures and readings. Furthermore, we shall use our understanding of mathematics and formal systems to create games that are challenging and engage the player's intellect and emotions.

Along the way, we shall learn how to program in the Python programming language and use the Pygame library to create games.

COVID-19

Cal State Fullerton has a comprehensive website regarding the ongoing COVID-19 pandemic, «https://coronavirus.fullerton.edu/».

Your health and the health of those around you is the first priority. Please strictly follow all the safety protocols. At this time, the campus requires everyone to wear a face covering while indoors and to have been vaccinated or exempted from vaccination. Face coverings are available at no cost for pick up at convenient campus locations such as Titan Shops and Health Services.

If you feel unwell, please seek COVID-19 testing and isolate yourself. Do not come to campus or class. CSUF's COVID-19 testing and vaccination information is online at «https://coronavirus.fullerton.edu/vaccine-and-testing/».

Prerequisites

CPSC 121; completion of G.E. Category B.4; or Computer Science or Computer Engineering graduate standing.

G.E. Requirements

This class does not meet any CSU General Education requirements.

Learning Goals

1. Identify what a game is; distinguish between a traditional game and a computer game.
2. Define games in terms of formal systems
3. Translate a game's rules into a formal system (a computer program)
4. Understand and apply discrete math to control the complexity of a computer game

Instructor

Professor Michael Shafae
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Office: CS 540
Online office hours links are given in Canvas
Office Hours: Wednesday 17:00-18:00 and by appointment.

Meeting Information

Room: CS 101
Time: Monday 10:35-13:35
Tuesday 10:35-13:35
Wednesday 10:35-13:35

Important Dates

CSUF's Academic Calendar is posted online at «http://apps.fullerton.edu/AcademicCalendar/». The Academic Calendar contains all the campus closures and holidays you should be aware of.

CSUF's Admissions Calendar is posted online at «http://www.fullerton.edu/admissions/Resources/Calendars.asp». The Admissions Calendar contains all the major dates with respect to adding, dropping, and withdrawing from your classes.

There are no campus closures that coincide with this course. All meetings shall be held virtually.
August 3 Final Exam

Textbooks

Required

Half-Real: Video Games between Real Rules and Fictional Worlds, Jesper Juul, The MIT Press, ISBN: 0262101106

Optional

Luck, Logic, and White Lies: The Mathematics of Games, Jorg Bewersdorff (Author) and David Kramer (Translator), A K Peters; Second edition available for reading online through the CSUF library at no cost.)
Fluent Python: Clear, Concise, and Effective Programming 2nd Edition, Luciano Ramalho, O'Reilly Media, ISBN: 1492056359 (Available for reading online through the CSUF library at no cost.)
Supercharged Python: Take Your Code to the Next Level, Brian Overland and John Bennett, O'Reilly Media, ISBN: 0135159946 (Available for reading online through the CSUF library at no cost.)
Random number generators: good ones are hard to find, S. K. Park and K. W. Miller, ACM
Pygame Documentation, Pete Shinners et al.

Many popular technical books may be read online through the campus's subscription to O'Reilly Media's rotating collection of e-books, «https://libraryguides.fullerton.edu/oreilly».

The librarians at the CSUF Pollack Library have developed a number of research guides to support students studying computer science. The LibGuides are online at «http://libraryguides.fullerton.edu/sb.php?subject_id=17830».

Required Material

- Some dice, coins/tokens, paper, colored pens/pencils, decks of cards for making games
- A digital camera (webcam or smartphone)
- The textbook
- A writing instrument
- A notebook
- A USB memory stick or other means of storing and organizing digital files
- A GitHub account
- A personal computer with the requisite development tools or regular access to a computer lab

A personal computer, ideally a laptop, is required for this course. You are strongly urged to install Tuffix on your computer. Using a virtual machine or similar technology is not recommended.

If you do not have a personal computer, you may borrow one for the duration of the semester from the CSUF library. More information is online at
https://www.fullerton.edu/it/students/equipment/longtermlaptop.php.

Announcements & Communication

Announcements will be made via email to each student's @csu.fullerton.edu email addresses, as well as via Canvas (learning management system).

The email account provided by CSUF and the Canvas messaging system are the only way the instructor may reach the student outside of class meeting times. Additionally, it is the only way the instructor knows that he is corresponding with a student enrolled in the class. Please refrain from using your personal non-CSUF email address.

Typically, the instructor shall respond to your emails within 1-2 business days.

Please check, read, and understand all the messages sent to your @csu.fullerton.edu address and posted to the learning management system.

Grading

Plus and minus grading is not used when determining final grades.

Final grades are computed by first finding the average score in each category described in the second table below. All scores are normalized to a scale of 0 to 100 before being averaged. The average score for each category is then used to compute the weighted average according to the weights in the second table below.

Grade	% of Total Points
A	90–100%
B	80–89%
C	70–79%
D	60–69%
F	Below 59%

Category	% of Final Grade
Assignments	40%
Quizzes	30%
Exam	30%

Assignments

Programming and written assignments will be discussed in class and posted to the course website in advance of their due dates. Each assignment description will include the assignment's grading rubric. Reading assignments are outlined in the syllabus and it is the responsibility of the student to stay up to date with the reading.

Written assignments shall be submitted online through the course website. Presentation, spelling and grammar can be worth up to 30% of a written assignment's grade.

All programming assignments must be written in C++, Python, or Javascript programming language, unless specified otherwise. Coding style must conform to professional norms. At a minimum, code must be commented, have descriptive names for identifiers, and contain a comment at the top of each file with pertinent information such as the student's name, email address, and assignment name. A plain text README.TXT must be included with each assignment submission summarizing and documenting the work submitted. For students unfamiliar with coding style, Google's style guides are an excellent starting point, «https://github.com/google/styleguide», particularly their C++ style guide, «https://google.github.io/styleguide/cppguide.html».

At the start of the semester, the instructor will detail the platform and tools used to grade student assignments. It is the student's responsibility to ensure that the assignments execute to his or her satisfaction on the instructor's grading platform.

There are approximately:

- 4 quizzes
- 3-4 written assignments
- 3-4 programing or computer activities
- 1 exam

Technical Proficiency

Technical proficiency with information technology, such as, but not limited to, the use of web-based online services, sending and receiving electronic mail, and desktop computer file systems, is assumed.

Technical proficiency in programming and software engineering should correspond to the prerequisite(s) of the course. In this case, a student is expected to have little to no experience programming or using software development tools.

In order to gain technical proficiency, a student is advised to exercise a growth mindset. You are encouraged to watch a short video about mindset at https://vimeo.com/126645788, replace the word mathematics with computer science when watching the video.

Development Tool Resources

Students enrolled in this class are required to use the Computer Science Department's official GNU/Linux development environment, Tuffix. Tuffix is Tuffy the Titan's Linux distribution. The Tuffix home page is

«https://github.com/kevinwortman/tuffix». A series of captioned videos are available to guide a student through the process of installing and using Tuffix.

Terse instructions on how to install Tuffix or a Tuffix based VM are online at «http://csufcs.com/tuffixinstall».

Students using Tuffix should join the CSUF TUFFIX slack workspace at https://csuf-tuffix.slack.com. Please use the `#general` channel to ask about troubleshooting, installing, and using Tuffix.

You can use your own computer, or borrow a computer from CSUF for free through the Long-Term Laptop Checkout process.

A student who needs immediate access to computer resources may do so through the Virtual Computing Lab. An online video demonstrates how to access and use the service.

A general purpose CentOS (Linux) shell server is available through secure shell (ssh) and secure file transfer protocol (sftp). The hostname is ecs.fullerton.edu.

Three specialized GPU servers are available. The systems are named aries.ecs.fullerton.edu, prudence.ecs.fullerton.edu and turing.ecs.fullerton.edu. Access to these systems may be limited to the campus network; you may use a VPN to access them off campus. Each system has at least one Nvidia Titan X GPU. Please use Docker to create containers for your project. This is the only mechanism for GPU users to install software for their projects. These GPU shell servers are not available off campus. To log into them from outside CSUF's network, first login to ecs.fullerton.edu and then log into the GPU shell server of your choice.

To login to any of the shell servers, all you need is your CSUF Portal login and password. If your email address is taylor@csu.fullerton.edu, then your username is taylor. If you are using a command-line ssh client, then your command to connect to ecs.fullerton.edu will be `ssh taylor@ecs.fullerton.edu`; replace ecs.fullerton.edu with the appropriate target hostname. Your password is the same password as your CSUF Portal password. (Faculty members can login in as well if you specify your Active Directory domain. For example, if your email address is kai@fullerton.edu, then your username is 'AD\kai'; thus the command will be `ssh 'AD\kai'@ecs.fullerton.edu`; note the use of single quotes to escape the username.)

Attendance Policy

Attending in-person class is mandatory. Missing class is not allowed unless it is excused by the instructor.

Missing any class due to COVID-19 impacting yourself or immediate family members is always excused.

Missing class as part of a documented accommodation is guaranteed to be excused. The ADA accommodated student must make a reasonable effort to coordinate any absences with the instructor.

Make Up Policy

Exams and quizzes cannot be taken after they have been given in class. Due to an act of nature, personal medical emergency, a family crisis, an act of terrorism, severe civil unrest, etc. students have 10 calendar days to petition the instructor to retake any exam/quiz or submit an assignment without late penalty.

Exceptions shall be made on a case by case basis, provided there is time to evaluate the merits of such an application.

Participation

In the context of this course, participation is defined as the following:

- Arriving to class prepared and on time.
- Taking notes.
- Actively listening to the lecture and asking questions when appropriate.
- Annotating code listings and handouts.
- Bringing any required materials to class.
- When needed/desired, seeking assistance to complete assignments.
- Barring an emergency, not leaving the class session early unless the instructor consents.
- Not distracting oneself or others with smartphones, games, online diversions, etc.
- Respecting and treating the instructor and the student's peers civilly.

Academic Integrity

Students are encouraged to assist one another and discuss the course materials with your peers. It is your responsibility to be aware of and follow the spirit of CSU Fullerton's academic honesty policy which can be found at «http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20300.021.pdf ». Academic dishonesty will not be tolerated. The University Catalog and the Class Schedule provide a detailed description of Academic Dishonesty under *University Regulations*.

By submitting work for evaluation, you acknowledge that you have adhered to the spirit of the university's academic honesty policy and that your submission is an original work by you unless otherwise directed to work in groups.

Failure to follow the spirit of the academic honesty policy shall result in the following consequences:

- A zero grade for the assignment at a minimum, a failing grade ('F') for the course in most cases.
- Your name, your actions, and the evidence collected submitted to Student Affairs.
- Student Affairs shall contact the department chair and levy their own disciplinary action.

Students with Special Needs

Please inform the instructor during the first week of classes about any disability or special needs that you may have that may require specific arrangements related to attending class sessions, carrying out class assignments, or writing papers or examinations. According to California State University policy, students with disabilities must document their disabilities at the Disability Support Services (DSS) Office in order to be accommodated in their courses. Additional information can be found at «http://www.fullerton.edu/DSS/», by calling 657-278-3112 or email «dsservices@fullerton.edu».

Student Resources

Any student who wishes to discuss any concern may contact the assistant deans of the college. Assistant deans are student advocates who will help you navigate the university's policies and procedures and assist with resolving any conflict.
Assistant Dean for Student Affairs Shannen Allado
CS-206B (657) 278-4407 «shallado@fullerton.edu»
College International Advisor Karen Lau
CS-206A (657) 278-2609 «karenlau@fullerton.edu»

Emergency Procedures

For your own safety and the safety of others, each student is expected to read and understand the guidelines published at «http://prepare.fullerton.edu/campuspreparedness/». Should an emergency occur, follow the instructions given to you by faculty, staff, and public safety officials. An emergency information recording is available by calling the Campus Operation and Emergency Closure line at 657-278-4444.

Instructional Continuity

Due to an event such as an epidemic or a natural disaster that disrupts normal campus operations, students must monitor the course Titanium site and their campus email address for any instructions and assignments that the instructor announces.

Laboratory Safety

Safety is no accident. Learning and following the appropriate safety practices and protocols is an integral part to all laboratory courses. Following the appropriate safety practices and protocols minimizes the chances of repetitive stress injuries, mishandling hazardous materials, and injury to self and others. Additional campus laboratory safety information regarding hazardous materials is online at «http://riskmanagement.fullerton.edu/laboratorysafety/».

Extra Credit

There are no opportunities for extra credit.

Recording & Transcription of Class Content

Recording class content is governed by UPS 330.230, «http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20330.230.pdf ». Each instructor must permit class content to be recorded or transcribed by students when mandated to do so by the Americans with Disabilities Act or by other federal or state laws. Any recording of class content is for private use and study and shall not be made publicly accessible without the written consent of the instructor and students in the class.

Course Rules & Classroom Management

Unless an agreement or accommodation is reached between the student and the instructor, these rules must be followed.

- Abide by the instructor's code of conduct.
- Attendance at all regularly scheduled in-person lecture and discussion sections is mandatory. Attendance to synchronous online class meetings are very strongly encouraged.
- Do not eat during lecture.
- If it makes noise, silence it.
- Computer use is not allowed in lecture except for taking notes.
- The student is responsible to be aware of any course announcements including changes to due dates and requirements.
- Homework, programming assignments, etc. may not be submitted late.
- Third party work (code, artwork, etc.) may not be used in student work without prior instructor consent. Failure to gain and document instructor consent will be construed as willful academic dishonesty.
- When a third party's work is incorporated into student work after gaining instructor consent, failure to wholly document the work's origin, copyright and license will be construed as willful academic dishonesty.

Code of Conduct

WWe shall endeavor to question, discuss, disagree, and debate without resorting to tactics of intimidation, harassment, or personal attack. Insensitive language, harassment, or disruptive behavior shall not be tolerated. The University expects students to know the rules specified at http://www.fullerton.edu/integrity/student/LetterToStudents.php and abide by them.

Whether online or in-person, the instructor expects students to abide by the course's code of conduct.

Course Outline

A recommended reading schedule is online at https://docs.google.com/document/d/1aFyqYa1NGibhG_mokZSWM6_anbtMpwktzwIqenDGM4c/edit?usp=sharing.

Week	Lecture/Videos	Assignments
1	Welcome to CPSC 386 What is a game? Why are games fun? Python Programming	GitHub Accounts Ice Breaker Make your own (traditional) game Blackjack Game Online Discussion Quiz
2	What's a computer game? Complexity & Randomness Making your own game Python Loops, Lists, Dictionaries, Sets, Tuples, & Classes; Modules	Play someone's (traditional) game Online Discussion Quiz
3	Rules, algorithms, formal systems, state machines Emergence & Progression Python Virtual Environment & Pip	Hello Pygame Another Game Online Discussion Quiz
4	Gameplay & Challenge Fiction Time & Narrative Python Data Persistence	Online Discussion Quiz
5	Rules & Fiction	Exam