Syllabus

CS-UY 4553 Game Design

New York University Tandon School of Engineering

Computer Science & Engineering

CS-UY 4553 Game Design

Spring 2020

Professor Brad MacDonald

Wed 6:00 pm - 8:30 pm

Rogers Hall room 205

To contact professor: bmack@nyu.edu

Office hours: By appointment

Course Prerequisites

Interactive Computer Graphics, Artificial Intelligence, or Introduction to Game Programming for CS students. Instructor permission required otherwise.

Course Description

This course is about experimental, minimal game design. Minimalism in this context pertains to every aspect of the game, and these can be broadly characterized as the game system, control, visuals, audio, and resulting theme. We will explore these aspects through the creation of a few very focused (video)game prototypes using a variety of engines and frameworks such as Unity, GameMaker, Processing, and others. This will allow us to obtain a better understanding of what makes games appealing, and how game mechanics, systems, audiovisuals, and a variety of player experiences can be designed and iteratively improved by means of rapid prototyping and playtesting.

Course Objectives

The course is a combination of technology, design, and philosophy underlying contemporary game creation in the small, as well as the real-world implementation and design challenges faced by practicing game designers. Students will learn design practices and principles by which minimal games can be conceived, prototyped, and fully developed within a one-semester course, and will create a minimal video game from start to finish. The course is a lot of (team)work, but it's also a lot of fun. Basic programming skills are required. Artistic skills, or a willingness to learn them are a plus.

Course Structure

An introduction to minimalist game design: abstraction, prototyping, systems and feedback loops, input and control, space-time discretization, minimal graphic design, game feel, design patterns, human perception, game programming, etc. Each student will design and implement 3-5 video game prototypes within the first 7 weeks (prototype phase), followed by a development cycle of 7 weeks, in which teams of 4 students will fully develop one of the prototypes to finished, complete game (production phase). For the prototype phase, each student will design every aspect of the game (system, control, visuals, audio), while the production phase will see each team member focusing on a specific aspect of the game, while still contributing to the big picture. Each class meeting will consist of a lecture, followed by student presentations, critique, and class discussion.

Computer/Software

You need to use either a Mac or Windows computer. You do not need a powerful machine as we are not writing anything super complicated. You can use any game making tool that you are comfortable with, however Unity is highly recommended. You can use the free personal edition: https://store.unity.com/#plans-individual

Topics

This list might change a bit throughout the semester. The schedule for each week is as follows:

Introduction, Syllabus, Overview of Course

Systems

Characteristics of Games Part 1

Characteristics of Games Part 2

Difficulty

Level Design

Game Feel and Polish

Narrative Mechanics

Procedural Generation

Playtesting

From Prototype to Published

Readings

There is no textbook for this course. All instruction is through the lectures. We will discuss articles on (minimalist) game design, game feel, game theory, and systems theory, as well as analyze a variety of video games such as Getting Over It, Desert Golfing, Spelltower,

Super Hexagon, Spelunky, Osmos, Canabalt, Flappy Bird, Tetris, etc. A playing and reading list will be provided throughout the semester.

Grade Calculation

Students will design, implement, play-test, and present 5 prototypes and one large game project. In which way these are implemented (i.e. using different game engines) is up to the student(s), and it is possible to try different means of implementation for different prototypes. Each of the prototypes as well as the large project will be presented by the student or team in class. It is expected that each class participant set aside 1-2 full days per week (outside of class) to work on their games.

Exams

There will be a final presentation by each team (including each team member) on the design and development of the large project. Aside of the final game, each team is expected to hand in a 2-page post-mortem document prior to the final presentation.

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Grading Distribution

- **Prototypes: 45%**
- **Large Project: 45%**
- **Class Participation: 10%.**

General Policy

To ensure a quality course for all participants, presence at the weekly class meetings is mandatory, unless otherwise stated.

Projects

All projects must be uploaded to personal itch.io pages as a Web GL project to be considered for grading. All accompanying documentation, playtest notes, etc should live on each projects respective itch page. URls for projects will be tracked here and instructions for publishing WebGL builds and posting to itch.io are here.

All of your projects for this course must be new! You can not use previous games you have

made for other courses.These must be an actually playable games! Not just a screenshot/mockup/etc.

Project	Due date	Description
		Use only circles/spheres. (use color and size to your advantage)
Prototype 1: **Just Circles**	**2/12**	**Create a new very small game prototype using the tool of your choice. It must have an Winning/Losing/End condition. Be ready to talk about the mechanics, rules and system in your game. Feel free to explore a working or flawed system. It must be an actually playable game! Not just a screenshot/mockup/ etc.**
		Make a super simple, simpler than you think you need to, go even more simple than that 2 player game (mouse + keyboard, etc.)
		It must have a winning/losing/end condition.
Prototype 2: **Simple** **Multiplayer**	**2/19**	**Be ready to talk about the mechanics, rules and system in your game.**
		Create a new very small game prototype using the tool of your choice.Keep it simple! Use simple geometric shapes! Be ready to talk about the length, depth and heuristics in your game.
		Take an existing game or game standard (video game or other) and make a minimal prototype version of it with a twist!
Prototype 3: **Standard** **Game Update**	**2/26**	**Keep it simple and minimal! Drop/reduce features, artwork, etc.**
		Think about how you can change its ending conditions and add or remove rules to make it interesting. Can you

		introduce or remove asymmetry?
		Make a game that is difficult or almost infuriating to play. Communicate it clearly and be fair! Be ready to explain why your game is difficult.
Prototype 4: Difficulty	**3/4**	**- OR -**
		Make a game with adjustable difficulty. The result must affect more than one thing in your game. Be ready to explain what the settings mean.
		Think of a very simple mechanic or two for a game (such as jumping, shooting, slicing, pushing, pulling, etc.)
Prototype 5: Level Design	**3/11**	**Make a level that teaches how to use that mechanic.**
		Make two more levels (total of 3 levels).
		Keep it simple!
Team Project: Polish	**5/6**	**Take any one of the previous prototypes and add some polish to it.**
		These could be: Menus, Sound Effects, Background Music, Updated graphics for your main character(s)/enemies, Updated graphics for your screen/level, Visual effects / Special effects (explosions, etc.)
		You must be able to talk about the reasons for adding audio/visual effects.
		You must add something audio or visual that improves the signaling in your game (and be able to talk about it).

Final Project Report	**5/6**

Schedule

Weekly lectures will be adjusted according to the current design topic most relevant to the student projects. Topics include prototyping, visual abstraction, game feel, systems design, feedback loops, strategy and dexterity, uncertainty and luck, physics-based control and animation, game complexity, design patterns, accessibility and human perception, semiology of graphics, game difficulty and balance, sources of creativity, AI methods and procedural content generation (PCG), characteristics of games, and interaction design (lecture in italics, homework and presentation in boldface, subject to change)

Week	Date	Topic
1	1/29	Introductory lecture
2	2/5	Lecture; Prototype 1 assigned
3	2/12	Lecture; Prototype 1 presentation, prototype 2 assigned
4	2/19	Lecture; Prototype 2 presentation, prototype 3 assigned
5	2/26	Lecture; Prototype 3 presentation, prototype 4 assigned
6	3/4	Lecture; Prototype 4 presentation, Prototype 5 assigned
7	3/11	Lecture; Prototype 5 presentation + final prototype pitches
	3/18	Spring Break
8	3/25	Lecture; Voting + team formation, team presentation 1 assigned
9	4/1	Lecture; Team presentation 1, team presentation 2 assigned
10	4/8	Lecture; Team presentation 2, team presentation 3 assigned

11	**4/15**	**Lecture; Team presentation 3, team presentation 4 assigned**
12	**4/22**	**Lecture; Team presentation 4, team presentation 5 assigned**
13	**4/29**	**Lecture; Team presentation 5, final presentation assigned**
14	**5/6**	**Presentation of final games**

Moses Center Statement of Disability

If you are a student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 3rd floor.

NYU School of Engineering Policies and Procedures on Academic Misconduct Complete Student Code of Conduct here

1. **Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.**
2. **Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:**
    1. **Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.**
    2. **Fabrication: including but not limited to, falsifying experimental data and/or citations.**
    3. **Plagiarism: intentionally or knowingly representing the words or ideas of another as**

one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.

4. **Unauthorized collaboration: working together on work meant to be done individually.**
5. **Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.**
6. **Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.**

NYU School of Engineering Policies and Procedures on Excused Absences – complete policy here

1. **Introduction: An absence can be excused if you have missed no more than 10 days of school. If an illness or special circumstance has caused you to miss more than two weeks of school, please refer to the section labeled Medical Leave of Absence.**
2. **Students may request special accommodations for an absence to be excused in the following cases:**
    1. **Medical reasons**
    2. **Death in immediate family**
    3. **Personal qualified emergencies (documentation must be provided)**
    4. **Religious Expression or Practice**

Deanna Rayment, deanna.rayment@nyu.edu, is the Coordinator of Student Advocacy, Compliance and Student Affairs and handles excused absences. She is located in 5 MTC, LC240C and can assist you should it become necessary.

NYU School of Engineering Academic Calendar – complete list here.

The last day of the final exam period is May 19th 2020. Final exam dates for undergraduate courses will not be determined until later in the semester. Final exams for graduate courses will be held on the last day of class during the week of May 11th 2020. If you have two final exams at the same time, report the conflict to your professors as soon as possible. Do not make any travel plans until the exam schedule is finalized.

Also, please pay attention to notable dates such as Add/Drop, Withdrawal, etc. For confirmation of dates or further information, please contact Susana: sgarcia@nyu.edu

Timezone: America/New_York

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