## NYU | Tisch School of the Arts | NYU Game Center

## GAMES-GT 213

# Music and Gameplay

## (Graduate Syllabus)

**Spring 2022**
**4 Credits**
**(All times in U.S. Eastern Time)**
**Schedule/Room: Monday 5 pm - 7:40 pm**
**370 Jay Street, Room 626**

**Office Hours: By appointment (over Zoom until further notice)**

**Instructor: Corey Bertelsen**
**Email: crbertelsen@nyu.edu**

### Class Website:
**https://github.com/8ude/UG213_MusicAndGameplay_Spring2022**

**All assignment instructions will be posted to the Readme page on the class Github.**

## Course Description

Music and Gameplay is an intensive course concerned with digital games in which the gameplay is fundamentally influenced by, or oriented around a musical system.

In this course, students will engage with music games in a variety of ways: through critical play, design practice, and hands-on development. This multifaceted approach will foster an understanding of how interactive game mechanics can be linked to music expression.

Throughout the course, we'll be drawing inspiration from a variety of music games across 3 major categories:

**Sound Toys**:
Sound toys are undirected or quasi-directed “playful instruments” that can enable the player to create or compose music.
*Examples: ElectroPlankton, Thicket, Musyc*

**Rhythm Games:**
In rhythm games, player input is measured against the rhythm of a pre-existing musical piece. Success depends on the player’s dexterity and timing.
*Examples: Rock Band, Dance Dance Revolution, Beat Saber*

**Synesthesia Games:**
A catch-all category for games in which musical content has a direct impact on gameplay. These games may not require beat-matched rhythmic timing, as in Rhythm Games, nor do they afford player-directed composition, as with Sounds Toys, but find other ways to center music in the interactive experience. This includes hybrid-genres (“musical brawler”, “musical puzzle game”, “musical platformers”).
*Examples: Rez, Fract OSC, No Straight Roads*

# Course Objectives

At the end of this course, students will be able to:
- Understand the history and design evolution of music games
- Develop prototypes for sound toys and rhythm games.
- Identify the various feedback, control, and UI designs used in music games
- Incorporate audio reactive visual “juice” into gameplay projects
- Construct levels and challenges from musical data files
- Create music-driven gameplay with a unique theme or artistic voice

# Course Format

Music and Gameplay focuses on project-based learning. Weekly meetings consist of a three-hour lecture class, which will consist of demos, lectures, critical play, listening exercises & critical feedback sessions.

**Note that this Syllabus is intended as an outline, and is subject to change.**

**Check the class Slack and Github for up-to-date information and any syllabus revisions.**

# Prerequisites

The following courses are required as prerequisites:
Intermediate Game Development or equivalent Unity/C# experience.

Audio for Digital Games, Game Audio 1 (Steinhardt class), or equivalent digital audio knowledge (synthesis, sound editing, DAW's and game audio integration). Knowledge of MIDI is helpful.

Students should be familiar with Unity or another contemporary 3D game engine & capable of scripting. Knowledge of Coroutines, Event Systems, and general game audio (Audio Sources, Spatialization, Attenuation curves, etc) is assumed. Students who have completed an introductory digital studio class will be adequately prepared. Other students may join at the professor's discretion.

This class may require some musical composition. It's expected that students are able to compose some music in a Digital Audio Workstation, or will work in groups with those who are.

# Software

Class demos and template projects will use the **Unity Game Engine** and the **Wwise Audio Engine**. We will be using the latest version of Unity 2020 LTS (2020.3.18 at time of writing), and the relevant version of Wwise.

Students are welcome to use other game engines, audio plugins, and alternate controllers as they see fit for both prototypes and projects. However, it is their responsibility to make sure their assignments are well documented with video and are playable on Windows 10.

# Attendance

Attending and arriving on time to all class sessions is required and expected. For the purposes of remote classes, this means that your camera is on. This includes all labs, recitations, and critiques. If you will be missing a class due to illness, or unavoidable personal circumstances, you must notify your professor in advance via email for the absence to be excused. The same applies for turning the camera off during class.

Unexcused absences and being late to class will lower your final grade. Three unexcused absences lower your final grade by a letter. Each subsequent unexcused absence will lower another letter grade. Two tardies will count as one unexcused absence. Arriving more than 15 minutes late to class will also count as an unexcused absence.

# Statement of Academic Integrity

Plagiarism is presenting someone else's work as though it were your own. More specifically, plagiarism is to present as your own:

- a sequence of words quoted without quotation marks from another writer
- a paraphrased passage from another writer's work
- facts, ideas, sounds, or images composed by someone else

# Accessibility

Academic accommodations are available for students with documented disabilities. Please contact the Moses Center for Students with Disabilities at 212 998-4980 for further information.

# Counseling and Wellness

Your health and safety are a priority at NYU. If you experience any health or mental health issues during this course, we encourage you to utilize the support services of the 24/7 NYU Wellness Exchange 212-443-9999. Also, all students who may require an academic accommodation due to a qualified disability, physical or mental, please register with the Moses Center 212-998-4980. Please let your instructor know if you need help connecting to these resources.

# Title IX Statement

Tisch School of the Arts is dedicated to providing its students with a learning environment that is rigorous, respectful, supportive and nurturing so that they can engage in the free exchange of ideas and commit themselves fully to the study of their discipline. To that end, Tisch is committed to enforcing University policies prohibiting all forms of sexual misconduct as well as discrimini\ation on the basis of sex and gender.

Detailed information regarding these policies and the resources that are available to students through the Title IX office can be found by using the following link:
https://www.nyu.edu/about/policies-guidelines-compliance/equal-opportunity/title9.html

# Grading

Assignments students complete will be evaluated with special attention paid to:

**Comprehension & Application** - Does the assignment reflect an understanding of the concepts covered in class? Does it follow rules or guidelines outlined in class? If not, does it intentionally & meaningfully subvert these rules?
**Musical Incorporation** - Does the assignment make use of music to inform design decisions? Are visual elements cohesive with the music? If the music has lyrics, how are they represented or contextualized?
**Technical Application** - Can the assignment be played? If precision or challenge is a component, does the challenge feel "fair"?

**Creativity** - Does the work represent a unique perspective? Is it innovative & unique either in its execution or juxtaposition?

Introduction prototype assignments will be evaluated on a Pass/Partial/Fail basis, according to the following criteria:
**Full credit** (100%) if a functional interactive prototype is delivered by the due date (or later, with a pre-approved extension);
**Partial credit** (70%) if a prototype is delivered late without an extension, or if the prototype cannot be evaluated due to technical issues.
**No credit** (0%) if the prototype is not delivered.

# Grade Calculation

Students will be given grades based on a 100-point scale. Each assignment will be graded on a point scale, and these points will be added up to determine the final grade, according to the following:

| | |
|---|---|
| 92-100 | A |
| 90-91 | A- |
| 88-89 | B+ |
| 82-87 | B |
| etc. | |

The following are the components of the grade:

18% Participation & In-class preparedness

32% Weekly Assignments:

- 4% Music Game Critical Play Presentation, graded Pass/Partial/Fail

- 4% Sound Toy Prototype 1, graded Pass/Partial/Fail
- 4% Sound Toy Prototype 2, graded A-F
- 4% Sound Toy Prototype 3, graded A-F

- 4% Rhythm Game Prototype 1, graded Pass/Partial/Fail
- 4% Rhythm Game Prototype 2, graded A-F

- 4% Hybrid Game Prototype 1, graded A-F
- 4% Hybrid Game Prototype 2, graded A-F

20% Midterm Project, graded A-F.
20% Final Project, graded A-F.

Small prototypes and critical play presentations will form the assignments during the first few weeks. We will develop sound toys, and will learn the technical side of implementing “Beat Matching” rhythm game mechanics into gameplay.

Starting on Week 5, students will begin work on a larger midterm game project. It's expected that students will enter the class with more experience in one of the applicable sub-disciplines of game development (programming, visual design, music composition, etc). Students are encouraged to work in groups of 2-4 on the prototyping exercises, midterm and final.

The course will culminate in a final project. This can be an extension of the midterm assignment, or a new project. The only requirement for the final project is that music informs gameplay in a fundamental, inextricable way.

# Assignment Submissions:

All assignments will be uploaded as a **page to itch.io**, with a gameplay video uploaded to Google Drive. Check class github for specifics.

**Note that WebGL builds are not ideal**, unless you're supplementing them with an external sound library (like Tone.js). We will talk about this in the first class.

Students will be randomly assigned to each other as design peers, and will be expected to play each others' games and provide written feedback on their itch.io page.

**As graduate students**, I also expect to see 2-3 paragraph written post morts on each prototyping, midterm, and final assignment (you can make a blog page on your itch submission). Detail what you were trying to accomplish, where you succeeded, and where you could improve for the future.

Also include at least 1 reference to another work, this could be a piece of media or a reading that served as a point of inspiration.

# Schedule

## Week 1 : Jan 24 - Defining Music Games

- Class overview
- Music game history part 1
- Play and Music: Yoko Ono, Brian Eno, John Zorn and others

### *Assignment*

Music Game Presentation - Choose a music game or sound toy from the list (you can also suggest one, but clear it with the instructor first). At some point in the semester, you will give a 5

minute presentation on the game. Check the Github for a sign up sheet and list of suggested music games.

As a graduate student, you also need to have at least 2 visual diagrams of how music and gameplay interact. In the case of a sound toy, this could illustrate the mapping between the game space and the musical one. For rhythm games, you could show how the “cue” visually relates to the “now.”

## Week 2 : Jan 31 - Sound Toys 1 - Physics and Musical Feedback

***[Unity]***

- Toshio Iwaii: Otocky, SimTones, Electroplankton and interactive game music systems.
- Sound toys and playful composition techniques: Teenage Engineering, Thicket, toys vs instruments
- Design patterns for music-making games
- Discussion about Thicket, Electroplankton, Patatap

### *Assignment*

Sound Toy Prototype 1 - Given an example project, begin making a simple sound toy prototype where sound and music are the core feedback mechanisms, but where there is no directed goal.

## Week 3 : Feb 7 - Sound Toys 2 - Synthesis

***[Unity]***

- Samples vs Synthesis - options in the Unity game engine; alternatives in Javascript and Unreal
- Synthesis Basics
- Control surfaces and MIDI inputs

### *Assignment*

Sound Toy Prototype 2: Using some of the new synthesis tools, explore a different sound toy, or an extension of last week’s project.

## Week 4 : Feb 14  - Sound Toys 3 - Rhythm and Temporal Structure

***[Unity + Wwise]***

- Working with Musical Time - keeping things synchronized
- Deconstructing rhythm - physical rhythmic processes, gridded vs freeform cycles
- Demo: Introducing the Wwise audio engine

### *Assignment*

Sound Toy Prototype 3: Create a third sound toy prototype. If prior sound toys were based on tones, maybe base this one off rhythm (or vice versa). You may work on a prior sound toy if you wish, but I encourage you to explore a different avenue, or use some of the new prefabs that I'm providing.

## Feb 21 - NO CLASS

## Week 5 : Feb 28  - Introducing Wwise and Rhythm games - Call and Response Gameplay

***[Unity and Wwise]***

- Simon Says, Parappa the Rapper, Japanese Arcade Games
- Basic game loop, time synchronization, and programming for rhythm games
- Working with the Wwise editor

### *Assignment*

Prototyping: Using Wwise and Unity, create a rhythm game prototype based on the provided template

## Week 6 : Mar 7 - Rhythm Games 2 - Mapping the Song

- Review of prototypes, do they feel "fair"?
- Rock Band, Rhythm Heaven and Thumper
- Technical Demo -Beatmaps and music game level editing
- Additional features of Wwise

### *Assignment*

Developing: Revise your rhythm game prototype, or pursue a new concept, incorporating midi data into your song

## NO CLASS March 14 - Spring Break

## Week 8 : Mar. 21 - Rhythm Games 3 - Input Device Affordances

- Controllers - MIDI controllers, and other devices.
- In-class experiments in remapping input.
- Approaches to adapting beat-matched gameplay to motion controls
- Case studies from Carnegie Mellon's research team

### *Assignment*

Developing: You can work solo, or in groups of 2-4, to begin developing your midterm. You can either work from scratch or from a previous prototype.

## Week 9 : March 28 - Synesthetics and visualization

- Check-In on midterm projects
- Music Visualizers and Interactive Music Videos (3 Dreams of Black, Pale Machine, Bjork)
- Musical/audio data to Visual Systems (animations, shaders, particle systems)

### *Assignment*

Work on midterms

## Week 10 : April 4 - Mid Term Critique

- Mid-Term Critiques and Self Evaluation
- In Unity - Taking an existing game and turning the audio-visual feedback into a musical system

### *Assignment*

Reskin the Musical Walking Simulator *Proteusque*- either use the template or create your own hybrid music game

## Week 11 : Apr 11 - Synesthetic Game Design

- Synesthetics and Hybrid Genres
- Music-Shooters, Music-Puzzlers, Music-RPGs
- Effective cross-genre design with music
- Rez, SoundShapes, Fract OSC, Sayonara Wild Hearts and others

### *Assignment*

Musical Walking Sim - expand on last week's assignment, or go in a different direction

## Week 12 : April 18 - Procedural Music for Hybrid Games1

- Uses of branching stems
- Horizontal/Vertical interactive music in Wwise
- Incorporating these techniques into Proteusque project

### *Assignment*

Introducing Final Project

## Bonus - Case study with Genesis Noir- Jeremy Abel of Feral Cat Den

- outside of normal class schedule - date and time TBD
- Musical Systems and Musically-informed aesthetics in Genesis Noir
- Note - this will be also be recorded

## Week 13 : April 25 - Approaches to Algorithmic Music 2

- MIDI-based procedural Music (sampled or synthesized)
- Stochastic (semi-random) approaches - Markov Chains; obtaining ML midi data from Magenta, organizing MIDI data.
- Methods of incorporating player improvisation

### *Assignment*

Final Project

## Week 14 : May 2 - Final Project Work Time

- This week is reserved for dedicated work time, as well as focused critique, technical help, and playtesting of the final projects

### *Assignment*

Final Project

## Week 15 : May 9 - Final Critique

- Presenting our music games!
- Discussion/Feedback about the class

### You May Submit Updates to Your Final Project Until May 16
### All Late Work is Due May 16, 2022