Course Syllabus

ENT3320-OL60 (26409) — Interactive Sound and Music for VR
Prof. Louis Goldford (version #1, revised on 1/21/22)

View the online version of this syllabus at the Course Website.

I. Essential Course + Contact Information

Course Number: ENT3320
Semester: Spring 2022
Section: OL60 (26409)
Location + Time: Tuesdays 11:30-2:00 + 2:30-5:30 [ONLINE]

Professor: Louis Goldford
Email: LGoldford@citytech.cuny.edu

Office Hours: by appointment, scheduled via Calendly: **https://calendly.com/LouisGoldford**
Office Location: Zoom (scheduled through the Calendly link above)
Course Slack: **http://goldford-ent3320-s22.slack.com/**
Course Website: **https://einbahnstrasse.github.io/Goldford-ENT3320/**

II. Course Description

In this course, students will create an immersive VR environment with interactive sound and music. Our goal will be an expressive VR experience with musical and sonic events that change depending on user interaction and movement — rather than simply a game with fixed sound files that are periodically triggered. Emphasis will be on sound and music within VR, and not sound that merely accompanies a visual world. We'll consider excerpts from film to better understand the role sound plays in an audio-visual experience. Our soundtracks will become vital components of the virtual experience we build, and as such, we'll be using tools for real-time music generation alongside those that allow us to shape recorded and environmental sounds, etc.

The theme for this semester's project will be memory. Together we'll develop a narrative around how a person's daily activities can be interrupted and shaped by their memories and their dreams. To do this, we'll be embedding a real-time music and sound synthesis program called RTcmix inside Unity. Briefly, we will also consider digital audio spatialization and other synthesis techniques using the program MaxMSP.

This course will be taught entirely online. Students participating at home will need access on their computers to MaxMSP, Unity, a reliable text editor (e.g. VS Code, Atom, etc.), GitHub, and Google Drive accounts accessible through CityTech email addresses. Occasional libraries may be installed together in class. A pair of headphones is highly recommended.

III. Course Goals

To create an immersive VR experience with algorithmically-generated audio and music while:

1. Introducing students to the *RTcmix* sound synthesis programming language
2. Refining students' workflow/workspace in MaxMSP, especially as related to the development of polyphonic synthesizers and in composing scheduled sequences of music and audio
3. Embedding *RTcmix* within *Unity*; to import composed/sculpted sound into a gaming engine

IV. Learning Outcomes (Particular to this Course)

By the end of the course students will be able to:

- ***Create*** original music and sound sequences using *MaxMSP* and *RTcmix*.
- ***Understand*** the fundamentals of poly~ design in Max.
- ***Implement*** a personal workspace for creating sound using the *bach* Library for Max.
- ***Establish*** a personal creative vision, and communicate it to your team member(s).
- ***Implement*** a shared workspace and develop work collectively.
- ***Respect***, and ***Respond*** to the ideas and the critique of peers and team members.

IV.A. Gen Ed Learning Outcomes

After taking this class, students will be able to...	This will be demonstrated by...
Systems: understand and navigate systems	Differentiate the component disciplines required to achieve a complex technical project and identify their intersections.
Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.	Collaboratively plan and implement part of a complex technical project; each individual works on a project component that corresponds to that individual's skill strengths.
Communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means, and in more than one language.	Students must communicate effectively with one another (verbally, via "napkin drawings" and prototypes) to plan and achieve integration of project components. Students orally present and demonstrate project outcomes.

V. Software + Other Course Resources

See the SOFTWARE TAB on our Course Website for download and documentation links.

- MaxMSP
- Unity
- RTcmix (algorithmic sound language with MaxMSP external for synthesis prototyping)
- uRTcmix (Unity package)
- the bach Library for Computer-Assisted Composition in MaxMSP
- Reaper
- git, GitHub and git-lfs (large file storage)
- Flash drive & other portable drives or Dropbox/Google Drive account for local back-up
- *Additional software, libraries, or plugins may be assigned as needed throughout the course*.

VI. Expectations

- **Arrive on time** and attend all classes — See Attendance + Participation Policy below.
- Spend at least **1-4 additional hours a week** *(outside of class)* on the timely completion of all class assignments, readings, and your contributions towards our final project *(i.e. developing and revising your sounds, animation and/or video elements, etc.).*
- **Back up and organize your work REGULARLY** on external media and/or your preferred cloud. *Catastrophic loss of materials is no excuse for missed deadlines!* Some tips...
    - Use **GIT** where appropriate — e.g. for your Max patches and other text files, etc.
    - Adopt an **incremental backup** file-naming system of your choice, as appropriate (e.g. *MySound-v856.wav* is more effective than *MySound-FinalVersionThisTimeIPromise.wav*).
- **Bring headphones and an appropriate audio adaptor** to all classes. You will need these for all work in Max, Unity, etc.
- **Push yourself creatively and technically.** Be ambitious. Work hard. Stay open and curious!
- Listening to or watching any media in class (other than what is assigned) is strictly prohibited.
- **No smartphones or mobile devices**. You may charge them out-of-sight.

VII. Communication

- Weekly course sessions will be held on Zoom. Use the recurring virtual Zoom classroom link emailed to you at the start of the semester.
- City Tech email accounts are our official means of communication, but we will also use Slack for additional discussion.
- **Requests to the instructor for assistance:** Send an email, or a message on Slack. I will respond during normal working hours; requests arriving "after hours" will be answered on subsequent weekdays.
- Professional communication etiquette is expected in our written correspondence. In emails and messages, this includes polite and appropriate salutations, greetings, and courtesies.
- **Virtual office hours are available through my Calendly link** (see I. Essential Course + Contact Information, above). If you are frequently missing from class discussions, missing lab assignments, or demonstrating poor comprehension of our materials, **I may occasionally require office hours visits with you, in which case I'll send you a message through Slack or in**

an email. It is my expectation that you respond promptly and sign up for a time to discuss any such perceived issues, and failure to do so will be reflected in negative participation points.

- Slack should be used during regular hours. Please respond during the workday as promptly as you can to inquiries from the instructor (both for email and messages sent on Slack). *Multiple successive days without a response is unacceptable*.
- **Actively participate** in our online class discussions. **Thoughtfully contribute to a positive classroom environment**, while supporting and challenging your colleagues' ideas.
- **Check Slack and email regularly** for group and private messages.
- If you have a question that may be relevant to the group (about assignments, etc.), post in the #general channel on Slack.
- Use Slack for easy communications with your classmates as well — you can DM individuals or selected groups.

VIII. Attendance + Participation Policy

- Your participation will form the bulk of your grade in this class.
- Students are expected to arrive promptly to all class sessions and to participate and engage in our activities, discussions, group project work and individual assignments.
- Follow this **Procedure for Absences:**
    1. Contact a classmate for notes on what you missed (e.g. on Slack).
    2. Check our Course Website for assignments.
    3. After these 2 steps, contact the instructor for any additional questions.
- **Excused absences/lateness must be accompanied by documentation** and/or include advance notice with the instructor where possible. Excused absences/lateness will not impact on your grade. Absences may be excused in cases of: documentation of illness provided by a doctor, religious observance with advance notice, official school-related activity (always with documentation and advanced notice), and on a case-by-case basis for other critical events with similar advance notice, at the discretion of the instructor.
- *A lack of communication with the instructor about any planned absence will therefore be treated as unexcused.* Be in touch early about any such absences.
- **Unexcused absences/lateness result in lowered participation grades**. Prompt 11:30 (2:30) arrival earns you an immediate 5 points (i.e. full participation) but is subject to your engagement in class. For late arrivals, the following weighted score system will be adopted:

Arrival ("Sign-on") Time	Participation Points
11:30/2:30 or earlier	5 points (full credit)
11:31/2:31—11:40/2:40	4 points
11:41/2:41—12:00/3:00	3 points
12:01/3:01—12:30/3:30	2 points
after 12:30/3:30	1 point
absent	0 points

- Your engagement in class will be corroborated with points incurred by your arrival time for the complete participation score in each session (out of 5 points total). In other words, to a limited

extent points can be *earned back through active engagement and contribution*. So for a 12:00 arrival, for example, positively contributing can still increase your score beyond 1 point.

- **Three (3) unexcused absences** will lower your final course grade by 10% (i.e. one letter grade).
- **Each additional unexcused absence** will further lower it by 5%.
- Quietly and occasionally excuse yourself for restroom breaks or to take an important phone call. Frequent and recurring self-excusals, or those made for any other reason (e.g. to get food from the vending machine) will also result in lowered participation marks.
- We depend on everyone's presence and full participation because our work is collaborative. *Your participation will therefore impact everyone else in the class*.
- **Assignment critiques are mandatory** and cannot be made up. Missing a critique will result in a deduction of one letter grade for the corresponding assignment.
- **Slack notifications must be enabled during regular hours (between 9:00 AM and 5:00 PM on weekdays)**, and must check their University email accounts regularly (recommended at least once per day where possible) for communication within and between teams, as well links to our online sessions, and details about our evolving project and course structure.

IX. Academic Integrity Policy

IX. Part I. General Notes on Academic Integrity

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the university recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Instructor Note: *Code borrowed from another source must be attributed as a comment within your own code. If you are unsure of whether or not your work may constitute plagiarism, please check with the instructor before submitting. Where applicable and where marked within our course materials, follow the provisions of the Creative Commons Attribution-ShareAlike 4.0 International License.*

IX. Part II. Academic Integrity Pledge

By enrolling in this course, you pledge to uphold the policy on Academic Integrity described below:

I understand the value of personal integrity and ethical behavior in all aspects of my professional and personal life. By committing to honesty and personal responsibility, I earn the respect and trust of others. As a student at New York City College of Technology, I recognize that the value of my education is not just being able to say I am a college graduate, but it also incorporates the skills, values, and knowledge I have acquired. I thus commit myself to upholding academic integrity as an important aspect of my personal integrity and professional growth. I understand that academic integrity includes:

1. Fully observing the rules governing exams and assignments regarding resource material, electronic aids, copying, collaborating with others, or engaging in any other behavior that subverts the purpose of the exam or assignment, and the directions of the instructor.

2. Only turning in work that I have done myself, and not using unattributed work done by others. While working and studying with others can be an effective way to learn, submitted work will be my own.
3. Giving full and proper credit to sources and references, and acknowledging the contributions and ideas of others, in my academic work.

Further, I have read and understand the college's Academic Integrity Policy found in the New York City College of Technology College Catalog, p. 56 of the spring 2020 catalog:
http://www.citytech.cuny.edu/catalog/docs/catalog.pdf#page=56

Modified from the Marquette University Honor Code, PB, RB; AM; 12/23/2020

X. GENERAL GRADING RUBRIC

Score	Grade	Description
93-100%	A	**Outstanding:** pushing the limits of both the student's creativity and the assignment.
90-92.9%	A-	**Impressive:** demonstrates maximum aptitude and/or organizational skills.
87-89.9%	B+	**High Achieving:** thoughtful and creative approach to the assignment.
83-86.9%	B	**Thorough:** clear articulation of skills, concepts, and preparation.
80-82.9%	B-	**Above Average:** quality work, but lacking in some problem-solving areas.
77-79.9%	C+	**Well Intentioned:** submitted on time, completed according to minimum requirements.
70-76.9%	C	**Average:** may need help with certain concepts and/or organization of ideas.
60-69.9%	D	**Poor:** does not meet the minimum requirements.
< 60%	F	**Fail:** not turned in, excessively late, or incomplete.

For a detailed list of assignments, points, and deadlines as they evolve and change throughout the semester, see the GRADING TAB on our Course Website.

XI. Course Accommodations for Students with Disabilities

In order to receive disability-related academic accommodations students must first be registered with the Student Support Services Program (SSSP). Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with Ms. Linda Buist, the program manager of SSSP (Phone: 718–260–5143, e-mail: lbuist@citytech.cuny.edu). If you have already registered with SSSP, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her/them.

A Note on City Tech's Counseling Center

The Counseling Services Center supports the educational, emotional and career development of City Tech students by providing opportunities for skill development, counseling and referrals that address obstacles to success. The Center is currently available to students remotely. For questions and appointments, contact the Center at counseling@citytech.cuny.edu or 718-260-5030.

XII. Inclusivity

XII. Part I. Name + Pronoun Usage

This course consists of individual work and group discussion. We must therefore strive to create an atmosphere of inclusion and mutual respect: all students will have their chosen gender pronoun(s) and chosen name recognized. If the class roster does not align with your name, gender, and/or pronouns, please inform the instructor.

XII. Part II. Inclusivity Statement

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as an asset, resource, strength, and benefit, rather than a checklist item or worse, a hindrance. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged and appreciated. Please let me know about ways to improve the effectiveness of this course for you personally, or for other students or student groups. Feel free to reach out to me via email at any time about issues concerning you or with any such ideas.

VIII. General Schedule of Topics

Please note: *Our schedule of topics and their precise order may change. See the SCHEDULE TAB on our Course Website for a precise breakdown of all assignments, and other resources as the semester develops. Course Schedule is based on the official CityTech Calendar. For a detailed list of assignments, points, and deadlines, see the GRADING TAB.*

Week	Date	Topic(s)
1	2/1	Voice management in MaxMSP using poly~ and the bach library
2	2/15	Introduction to RTcmix~ instruments
3	2/22	Connecting RTcmix~ to bach, Making MIDI and RTcmix~ “sequences”
4	3/1	Introduction to uRTcmix: the RTcmix-to-Unity Bridge
5	3/8	Basic Unity Scenes with RTcmix~ Sound Sources
6	3/15	Establish TEAMS: [1] Max/RTcmix~ [2] uRTcmix [3] Graphics/Unity, Storyboarding
7	3/22	Sound File Treatments with RTcmix~ and Using Sound Files in uRTcmix
8	3/29	ReaSamplomatic 5000 (sampling Instrument in Reaper), Making Samples
9	4/5	Intermediate RTcmix~ instruments
10	4/12	Using RTcmix~ “sequences” inside Unity scenes
11	4/26	Linking different Unity scenes together
12	5/3	Final Project Work
13	5/10	Final Project Work
14	5/17	Final Project Work
15	5/24	Complete Final Project, Talkback Session