

# MUS7 Syllabus

## Music, Science, and Computers

Prerequisites: none.

### Welcome to the Course

#### Course Information

<b>Course Description</b>	Exploration of the interactions among music, science, and technology, including the history and current development of science and technology from the perspective of music.
<b>Credits</b>	4
<b>Instructor</b>	Gabriel Zalles Ballivian
<b>IA/TA</b>	egraham@ucsd.edu

#### Course Learning Outcomes

Upon completion of this course, students will be able to:

1. Understand the relationship between science and music.
2. Appreciate the role that machines have in sound generation.
3. Talk about the importance of hearing, mental frameworks, and engineering in music.
4. Give examples of composers who have made important contributions in this area.
5. Create simple musical compositions using computers.

#### Course Format

##### **Synchronous In-person Lectures:**

Location: CPMC 127

Day/Time: M/W 2-5 (Lectures) & 5-6 (Discussion)

##### **Asynchronous (Online) Course Elements:**

UC San Diego's Learning Management System: <https://canvas.ucsd.edu>

Login: UC San Diego Active Directory credentials

Purpose: Canvas will be used for submitting assignments, weekly discussions, and quizzes. You should also be able to find course materials there.

#### A Typical Week in This Course

Each week in this course you will be asked either to attend a live lecture or watch a video (depending if student is studying remotely or not). You will also be asked to read an average of 10 pages of material per week and use the readings to complete online discussions. There are weekly quizzes and bi-weekly discussions. The quizzes come directly from the slides and are multiple choice.

## Overall Course Expectations

What you can do to support your success in the course:	What I will do to support your success in the course:
Read the syllabus and stay current with course information	Be prepared and bring my enthusiasm for teaching to each session
Keep up with readings and lab assignments, as each one builds on the previous one.	Respond to emails within one working day, and provide timely feedback on assignments / submissions.
Contribute to the learning environment with <a href="#">fairness, cooperation, and professionalism</a>	Establish a learning environment with fairness, cooperation and professionalism, and will take action if these principles are violated.
Treat your classmates, instructional assistants and myself <a href="#">honestly and ethically</a>	Treat you honestly and ethically, and will address any concerns you might have
Commit to excel with integrity <sup>1</sup> . Have the courage to act in ways that are honest, fair, responsible, respectful & trustworthy.	Uphold integrity standards and create an atmosphere that fosters active learning, creativity, critical thinking, and honest collaboration.
Manage your time, so you can stay on track with the course and complete tasks on time	Only assign work that is vital to the course, and will work to meet the standard credit hour allotment for the course.
Communicate with me if you determine that a deadline cannot be met due to extenuating circumstances	Consider requests for adjustments and will make reasonable exceptions available to all students when approved

1. Please read UC San Diego's [Policy on Integrity of Scholarship](#) and take the [integrity pledge](#)!

## Course Materials and Tools

### Text/Readings/Other Material

All of the reading materials for this course will be provided in PDF format, or in the form of links to HTML websites. This means you will not need access to library resources for this course. The link to these PDF files will be on the course website and/or directly uploaded to canvas.

### Technology Requirements

Students will need access to a computer in order to complete assignments. All the software programs used for assignments will be cross-compatible (e.g., should work on all operating systems). You will need an internet connection to access course files. Some of the softwares we will be using in this course are Puredata (Pd) and Audacity, both of which are free and can be found online. We also recommend the site Freesound.org for access to sound samples.

## Assignments, Projects, and Grading

### Summary of Grade Criteria

Assignment	Points	Weight	Due Date	Format
Discussion x 5	5	25%	Every other week (FA, WI, SP) or <b>every week during summer.</b>	You will have to answer a prompt on Canvas.
Quizzes x 10	2	20%	Mondays (and Wed) before lecture (*summer only)	Each quiz will have ten questions, each worth 0.2 points. Use Canvas to complete the quizzes.
Assignments x 2	15	30%	Week 3 and 7 during regular quarter (summer this becomes weeks 2 and 4)	1 – record/find a collection of sounds and edit them in Audacity. 2 - record the output of a Pd patch(es). Edit sounds in Audacity. * Each also require a one-page paper (double spaced). These are both 1 minute in length.
Final Project	25	25%	Final's week (9/2 Friday 3-6pm)	3 – The final project will be a musical piece. Work either alone or in groups. 50% of the grade comes from documentation and 50% from music. Musicality

				is subjective, what we want is the music to match the intent discussed in the paper. Max group size = 3.
Discussion	un-graded	0%	N/A	Discussion <u>sections</u> are optional and are treated like office hours. Discussion assignments can be completed without attending these sessions.
		<b>100%</b>		

## Assignments

For your HW1 and HW2 you should focus on using musical ideas which we have spoken about in class and try to reference these in your writing. The cohesion between your intention and your result will be the main criteria used for grading.

## Final

The final project papers should be 2 pages in length (if working alone), 3 pages at least if working in pairs, and 4 pages at least if working in groups of 3. Students will submit a single audio file as long in minutes as the paper is in pages (e.g., 2 pages = 2 minutes).

## Grading Scale

**A** = 90-100%   **B** = 80-89%   **C** = 70-79%   **D** = 60-69%   **F** = 59%-below

## Grading Procedure and Feedback

Students will be graded on an regular scale unless the instructor feels it is necessary to use a curve. Late assignments are allowed up to a week after the deadline (3 days for summer). The student will lose a point for each day the assignment is late. The point deduction begins one second after the deadline, not a week after. Missing assignment receive a grade of zero. If you have an emergency please email me with an attached medical note.

You will receive feedback on your writing and music projects online via Canvas, either from me or from a TA. We expect to have your grades no later than a week after you

have submitted an assignment. There will be no extra credit for this course, however, if you got low marks on an assignment and want to fix it, we will allow re-submissions. The deadline for re-submissions is the end of week 8 (week 4 during summer).

## Attendance and Participation

Attendance is optional for all sections and lectures. Participation is only required for on-line content such as discussion boards. We will attempt to make all materials available both synchronously and asynchronously to accommodate students in different time zones. Religious holidays are recognized – if you need accommodations for religious reasons please speak to me during week 1.

## Instructional Team: Who Are My Instructors?

### Instructor



Gabriel Zalles Ballivian

Gabriel Zalles Ballivian  
PhD Candidate  
[gabrielzalles.com](http://gabrielzalles.com)

I am a Bolivian computer music student specializing in ambisonics recording, synthesis and playback using FOSS.

Virtual Office Hours: [Upon request](#)  
Zoom: [2024413074](#), [zerozero1](#)

## Teaching Philosophy

I believe that education is an equalizing force. UCSD is a very diverse campus with people from various cultural, socio-economic, and political backgrounds. My hope is to create a learning environment which takes into account this diversity and in which nobody feels marginalized or sidelined. An important aspect of this is considering the cost of instructional materials, which is why I opt for low-budget, or free, instructional materials in all my courses.

## Inclusion Statement

[Follow this link](#)

## Connecting with Students

If you are an international student, or you are Latin American, I can empathize with your difficulties regarding studying abroad in a different culture. If you ever want support in these areas feel free to talk with me. For first-gen or transfer students, I should let you know there are communities on campus with people that share your experience. Please visit these links: [first-gen](#), [transfers](#).

## Resources for Support and Learning

<b>Learning and Academic Support</b>	
<p><b><a href="#">Ask a Librarian: Library Support</a></b> Chat or make an appointment with a librarian to focus on your research needs</p> <p><b><a href="#">Course Reserves, Connecting from Off-Campus and Research Support</a></b> Find supplemental course materials</p> <p><b><a href="#">First Gen Student Success Coaching Program</a></b> Peer mentor program that provides students with information, resources, and support in meeting their goals</p> <p><b><a href="#">Office of Academic Support &amp; Instructional Services (OASIS)</a></b> Intellectual and personal development support</p>	<p><b><a href="#">Writing Hub Services in the Teaching + Learning Commons</a></b> One-on-one online writing tutoring and workshops on key writing topics</p> <p><b><a href="#">Supplemental Instruction</a></b> Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses</p> <p><b><a href="#">Tutoring – Content</a></b> Drop-in and online tutoring through the Academic Achievement Hub</p> <p><b><a href="#">Tutoring – Learning Strategies</a></b> Address learning challenges with a metacognitive approach</p>
<b>Support for Well-being and Inclusion</b>	

<p><b><u>Basic Needs at UCSD</u></b> Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live is encouraged to contact: <a href="mailto:food-pantry@ucsd.edu">food-pantry@ucsd.edu</a>   <a href="mailto:basicneeds@ucsd.edu">basicneeds@ucsd.edu</a>   (858) 246-2632</p> <p><b><u>Counseling and Psychological Services</u></b> Confidential counseling and consultations for psychiatric service and mental health programming</p> <p><b><u>Triton Concern Line</u></b> Report students of concern: (858) 246-1111</p> <p><b><u>Office for Students with Disabilities (OSD)</u></b> Supports students with disabilities and accessibility across campus</p>	<p><b><u>Community and Resource Centers Office of Equity, Diversity, and Inclusion</u></b> As part of the <a href="#">Office of Equity, Diversity, and Inclusion</a> the campus community centers provide programs and resources for students and contribute toward the evolution of a socially just campus (858).822-.3542   <a href="mailto:diversity@ucsd.edu">diversity@ucsd.edu</a></p> <p><b><u>Get Involved</u></b> Student organizations, clubs, service opportunities, and many other ways to connect with others on campus</p> <p><b><u>Undocumented Student Services</u></b> Programs and services are designed to help students overcome obstacles that arise from their immigration status and support them through personal and academic excellence</p>
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## Campus and Course Policies

### Course Policies

#### Health and Well-Being Statement

Throughout your time at UC San Diego, you may experience a range of issues that can negatively impact your learning. These may include physical illness, housing or food insecurity, strained relationships, loss of motivation, depression, anxiety, high levels of stress, alcohol and drug problems, feeling down, interpersonal or sexual violence, or grief. Your health is the most important thing!

UC San Diego provides a number of resources to all enrolled students, including:

- Counseling and Psychological Services (858-534-3755 | [caps.ucsd.edu](http://caps.ucsd.edu))
- Student Health Services (858-534-3300 | [studenthealth.ucsd.edu](http://studenthealth.ucsd.edu))
- CARE at the Sexual Assault Resource Center (858-534-5793 | [care.ucsd.edu](http://care.ucsd.edu))
- The Hub Basic Needs Center (858-246-2632 | [basicneeds.ucsd.edu](http://basicneeds.ucsd.edu))

#### Subject to Change Policy

This syllabus is subject to change in the event that a link is broken, some instructional material becomes unavailable, or a certain assignment cannot for some reason be completed. Any changed in the syllabus will be notified to students.

### Letter of Recommendation Policy

In the event that you need a letter of recommendation, please send a request for these at least 2 weeks in advance.

### Technology Policy

I believe it is the responsibility of each student to self-monitor responsible use of technology. I can't monitor what every student is doing; I ask that you refrain as much as possible from using your smartphones in class. The use of computers or tablets for note taking is perfectly fine.

### Campus Policies

- [UC San Diego Policy on Integrity of Scholarship](#)
- [Religious Accommodation](#)
- [Nondiscrimination and Harassment](#)
- [UC San Diego Student Conduct Code](#)

### Course Schedule

Week	Concepts	Read	Listen / Watch	Complete
1 – Fundamentals	Pitch, Rhythm, Harmony, Spectra, Envelopes	Art of Noise (discussion 1)	* Sonata V – Cage * Plunderphonics * Sevish * Laurie Spiegel * Lizard Point * Aphex Twin	Quizz 1 Install Pd
2 – Analog and Digital Audio	Microphones, speakers, radio, sampling, bit-depth	Sousa (discussion 1)	* First Recording (video) * Alvin Lucier – I Am Sitting In A Room * Sabelithe – Chowning * Imaginary Landscape 4 - Cage * Imaginary Landscape 1 - Cage * Alva Noto	Quizz 2 Discussion 1
3 – Musique concrète and electronic music	Musique concrète, elektronischemusik, GRM, Expo58, acousmatic music	Four criteria - Stockhausen (discussion 2)	* Etudes aux chemins de fer - Schaeffer * 4'33" - Cage * None * Concret PH - Xenakis	Quizz 3 Assignment 1



			<ul style="list-style-type: none"> <li>* Ionisation – Varese</li> <li>* Cubic Zirkonia - Hagan (binaural)</li> </ul>	
4 – Electronic and electromagnetic instruments	Telharmonium, theremin, ondes martenot, Hammond organ, vocoder.	Part I – Free Culture	<ul style="list-style-type: none"> <li>* Clara Rockmore – [performing] The Swan</li> <li>* Jean Laurendau (video)</li> <li>* The synthesis of synthesis (video) – moogfoundation</li> <li>* Your time is gonna come – led zeppelin</li> <li>* Zedd – The Middle</li> <li>* Daft Punk – Beyond</li> </ul>	Quiz 4 Discussion 2
5 – Ear physiology and perception	Inner ear, outer ear, basilar membrane, equal loudness, JND	Part II – Free Culture	<ul style="list-style-type: none"> <li>* Music for 18 musicians – Steve Reich</li> <li>* David Tudor – Rainforest V</li> <li>* David A Jaffe – Silicon Valley Breakdown – A film by George Olczak</li> <li>* Solitude – Hans-Christoph Steiner</li> <li>* Any resemblance is purely coincidental – Charles Dodge</li> <li>* Illiac Suite – Lejaren Hiller</li> </ul>	Quiz 5
6 – Digital FX	Distortion, compressors, filters, delay, reverb	Part III – Free Culture	<ul style="list-style-type: none"> <li>* Van Halen (phasers/flangers)</li> <li>* Moog Ladder Filter (video)</li> <li>* ErbeVerb Demo</li> <li>* NoaNoa (various)</li> <li>* Cream – Crossroads (distortion)</li> <li>* U2 – With or Without You (delay)</li> </ul>	Quiz 6 Discussion 3
7 – Spatial Audio	Quadraphonic, octophonic, surround sound, ITD, ILD	Part IV – Free Culture	<ul style="list-style-type: none"> <li>* A menacing plume – Rand Steiger</li> <li>* Pluton – Philippe Manoury</li> </ul>	Quiz 7 Assignment 2

			<ul style="list-style-type: none"> <li>* Pauline Oliveros – Bye Bye Butterfly</li> <li>* Patch Notes – King Britt</li> <li>* Shahrokh Yadegari – Samsara</li> <li>* Jaime Oliver and MSP – Duo</li> </ul>	
8 – MIDI	Velocity, MIDI channels, interfaces, MIDI features, MIDI today.	Treatise on Musical Objects (pick one chapter)	Student selection [you pick the music]	Quiz 8 Discussion 4
9 – History of music programming	Bell Labs, Pd, Max Matthews, CCRMA, IRCAM	Moore – Part I	6 different assignment 1s. Anonymously unless otherwise specified.	Quiz 9
10 – IP and copyright law	Public domain, Copyright, Fair Use, Mechanical/Non-mechanical Licenses	Moore – Part II	6 different assignment 2s. Anonymously unless otherwise specified.	Quiz 10 Discussion 5
Finals				Final Project.

### Discussion Questions

For all these, try to use examples from the readings. In other words, don't answer "off the cuff". Discussion responses should be about 5 to 6 sentences minimum. In your responses you should also try if possible to use material covered in class. For each of the 5 discussion assignments, respond to one of two prompts (or both), based on readings from those weeks.

#### 1. Russolo:

Russolo posits that the tumultuous and cacophonous nature of industrial life is musical and that its component elements make for better sound materials than anything found in orchestral instruments. How do you define music given these positions? Can absolute noise be music? Can absolute silence? Provide three examples of artists operating at the edges of these

absolutes.

2. Sousa:

Sousa's essay deals with the concept of mechanical playback and its effect on performed music. Discuss what you believe is the role of machines in the musical process. Do you believe DJs, for example, are musicians? How does recorded music affect our ability to own and distribute music?

3. Four Criteria (Stockhausen):

What are the four criteria of electronic music? Briefly describe one of each, providing musical examples from the music we've discussed in class, which demonstrates these principles.

4. Free Culture (Part I):

Do you think copyright should be forever? What do you think are the implications of this? Do you think the government should have a role in this discussion? Why or why not?

5. Free Culture (Part II):

This section of the reading explores how copyright can have a limiting result on the dissemination of ideas and art. Given that much of art and ideation is an adaptation process (e.g., there are no new ideas, only new interpretations) what is the danger of copyright? What is the benefit?

6. Free Culture (Part III):

Draw the connection between Free Speech (e.g., the First Amendment) and the perpetual copyright of creative material. What are some potential dangers of this practice? What are some potential benefits (e.g., can subverting free speech be advantageous)?

7. Free Culture (Part IV):

To what degree do you agree or disagree with the following statement found in the reading. Defend both sides of the argument. *"The ability to*

*draw freely on the entire creative output of humanity is one of the reasons we live in a time of such fruitful creative ferment.”*

8. Schaeffer Book Excerpt:

Free discussion. Based on the excerpt you read, summarize what you read and talk about your own opinion about the material. Try using music heard in class to discuss how the reading connects with the compositions we listened to.

9. Moore (Part I):

Discuss the implications of machines being used to compose music. Who is really the composer? Is it cheating to use machines? Argue a single side of the argument and use the music we discussed to make your argument. You can also use pieces discussed in the reading.

10. Moore (Part II):

Defend whichever side of the argument you did not in reading 9. If you argued that machines should not be used in composition, now argue that they should. Try using composers from class or the reading.

## FAQ

**1. I don't have a computer to work on, is there any way to use a school computer to work on my assignments?**

Talk to the instructor on record, we will try to get you access to the studios in CPMC where Pd and Audacity are installed in all our computers (which run OSX).

**2. Where can I download Pd and Audacity?**

<https://www.audacityteam.org/download/>  
<https://puredata.info/downloads/pure-data>

**3. Will this class be graded on a curve?**

Only if we notice many students are struggling which we do not anticipate since the HW is quite easy. If we apply a curve it will only be to improve everybody's grade, we won't ever use a curve to bring the average down.

**Additional Links [(inspiration)]**

- \* [\[circuit bending\]](#)
- \* [\[guthman\]](#)
- \* [\[robotics and music\]](#)
- \* [\[sound art\]](#)
- \* [\[indy music game\]](#)
- \* [\[blobs\]](#)
- \* [\[royalty free music via AI\]](#)
- \* [\[AI Music\]](#)
- \* [\[great channel\]](#)
- \* [\[NASA\]](#)
- \* [\[XTC\]](#)
- \* [\[musical plants\]](#)
- \* [\[more AI\]](#)
- \* [\[conductive ink\]](#)
- \* [\[sound walk\]](#)
- \* [\[jukebox\]](#)
- \* [\[sound in bio-med\]](#)
- \* [\[MORE AI!!!\]](#)