Spring 2021

COM 321-004: Technologies and Tactics of Sound

Andrew Klobucar

COM 321-004 Technologies and Tactics of Sound: An Audio Workshop

Course Outline and Syllabus

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Office Hours: Upon Request
Classroom: Synchronous Online
Term: Spring 2021

Course Format and Objectives

This class will meet on Thursdays between 11:00am and 12:20 pm. Additional material, assignments and online workshops will be scheduled for Tuesday between 11:00 am and 12:20 pm.

Required: Humanities 101/102. Technical pre-requisites require consistent, secure access to a personal computer with up-to-date word processing and graphics software (e.g., HTML5 and/or a trusted video player), along with high-speed internet, as most of the works will be read via screen.

Please refer to the course schedule for details on the assigned readings. Students are expected to read and be familiar with the assigned weekly reading as the course progresses. In addition to reviewing the weekly reading, please create and keep track of your own reading notes, questions, and discussion topics.

Duration: 21 January – 29 April 2021. This course provides three credits for a Humanities course at the undergraduate level. Students should anticipate a workload of 6-9 hours per week, including class time, in order to fulfil course requirements.

General Objectives

This course provides an introduction to sound and its manifold uses and functions in the digital era thanks to ongoing advances in audio and information technologies. Beginning with a broad survey of various timely innovations in recording, production and distribution devices over the last century, the course will offer students an effective primer in the science of how sound has been measured and understood historically as a media format. Complementing this aim, students will be introduced to specific core concepts and terminologies in audio technology, including, sample rates, bit depth, wave forms, hertz and frequency, situated in relation to the principles of human audio perception.

Instructional Objectives: *Such concepts will enable us to explore different techniques in audio recording, mixing, synthesis and design with an emphasis on contemporary digital modes of production. Towards the latter half of the course, we will develop these techniques further in combination with the fundamentals of programming (for example, logic, loops, functions, objects, etc.) in order to examine how advances in computational thinking have enhanced our respective abilities as artists, scientists and engineers to use audio both to produce and to interpret information about the world around us. In this part of the course, students will work with and even design new audio tools for a wide array of digital production environments, including Web-based media, soundscapes, art installations and videography. The final modules of the course will examine the relatively recent field of sonification or the use of audio technology to process and represent data. By studying this highly experimental range of audio technology theories and practices, students will see more precisely how computers continue to transform some of our most basic ideas of what sound actually is and the many ways it contributes to almost every field of knowledge.*

> *Over the term, Students will not only study different historical and theoretical lineages informing the production and distribution of sound as a media technology over the last century, but also learn, assess and apply hands-on techniques to produce creative sound works of their own.*

Course Assessment: Exercises and Tasks with Grading Schema

Class Work

Attendance with Participation:	10 marks
Short Exercises (5 x 2 marks each)	10 marks
Course Portfolio	5 marks

Academic Writing and Research

Report on Sound as an Object	10 marks
Report on Sound as Technology	10 marks

Sound Composition Projects

- Sound Environments 10 marks
- Sound Arrangements 10 marks
- Sound Discoveries 10 marks

Major Project

Sonification (Visual + Audio)	25 marks

Detailed Description of Course Assignments

This course is designed and organised primarily as a workshop for the production and critical study of sound as both an art form and media modality using contemporary audio technologies.

Punctuality, Attendance and Participation:

Each class will offer students the opportunity to engage simultaneously in both a workshop and seminar environment. The workshop portions of these classes allow students to actively engage with and use sound production technologies. My pedagogy emphasizes a learner active approach to in-class assignments, where I hope *learners* lead discussions as often as *me*, the instructor. Learners are encouraged to introduce material and ideas they believe are relevant to the topic at hand. Learners are expected to attend every class.

Absences due to illness must be confirmed a minimum of **4 hours** before class by email to avoid penalty. In-class activities and general participation will account for **10 marks** and will be based on both the frequency, relevance, and general quality of the learner's comments, questions and observations. More than **6 unexcused absences (6 weeks of the curriculum)** will result in automatic failure of the course; excessive unexcused lateness of **15 minutes** or more throughout the course will be considered as one absence. Learners who expect to miss classes or exams because of religious observance or athletic events must submit to their instructors a written list of dates that will be missed by the end of the second week of classes. Learners are expected to make up missed work.

Remote Learning in a Pandemic Era

Remote synchronous and asynchronous learning presents a unique set of additional challenges to all learners enrolled in an undergraduate course. Regardless of one's skill level or access to technology, remote learning requires learners to self-manage both their time and resources more independently than classes attended in-person. To make matters even more complicated, learners are also being asked to cope with many additional emotional, psychological, and economic difficulties brought on by the current situation. Experience shows that up to a third of the class will very likely be unable to complete the course by the final week. Others will find it challenging to complete individual assignments by prescribed due dates or will feel obligated to submit substandard work in order to meet all deadlines. For these reasons, the importance of open, timely, and consistent communication cannot be overstated. As your instructor, I bear strict accountability for ensuring your access to the assignments, specific utilities, and all related material necessary for completing this course successfully. If, for whatever reason, this access seems compromised at any time, it is vital that you contact me personally through email or in-class as soon as possible. The following communication guidelines have been set up to help you avoid unnecessary penalties for missed or late assignments.

- **If a class cannot be attended for any reason other than physical illness, I must be notified a minimum of one day before the class is scheduled to enable me to prepare alternative access to the same material.**
- **Extra time to complete individual assignments must be petitioned a minimum of one week (7 days) before the assignment is due.**
- **Assignment drafts or requests for assignment specific advice must arrive a minimum of 9 days before the assignment's due date if extra help is to be delivered in a timely fashion.**

Alternative submission access for late assignments and extra course material will be provided for each graded task; however, late assignments and missed classes that occur outside these guidelines will be penalized. Late assignments will be deducted 10 percent of the task's course value up to 1 week after the submission date. Late assignments will be deducted 20 percent of the task's course value from 8 days to 2 weeks after the submission date. Late assignments will be deducted 50 percent of the task's course value from 15 days to 4 weeks after the submission date. Assignments missing for more than 4 weeks will not be accepted. No late assignment will receive commentary supplementary to its graded evaluation.

Proper and accepted communication guidelines serve to minimize the risk of penalty in terms of grading as well as critical commentary. Compromising your access to resources, including the time you may need to complete each assignment, can be seriously incapacitating, preventing you from learning the actual skills and approaches required to understand the course material. This will remain a very serious risk throughout the term. Providing information as early as possible concerning any challenges you are facing this term will enable me to work with you more effectively and conceivably prevent the assigned work from overtaking your abilities. Losing access to the course material and my assistance strongly risks a withdrawal or a grade of F by the end of the term.

Learner success in this course demands consistent access and proper use of these electronic resources is the student's responsibility, as it is assumed that their general availability is constant, 24/7. If technical problems with the software or any specific interface occur during the course, it is up to the student to contact either the professor or one of the IT/Help resources associated with the website as quickly as possible.

Online Short Exercises and Learner Course Portfolio

Short Exercises
Due to the experimental and, at times, complex nature of much of the assigned composition work, various short writing exercises will be distributed at strategic points in the course to help students taking the course at a general level organise and formulate relevant questions regarding their larger compositions and writing projects. These exercises will take the form of five summary analyses (300-500 words) to be completed online usually in response to specific course readings or pre-selected topics of discussion. The exercises are designed to prompt critical reflection concerning their work, while also providing core content and material resources to be used in the actual composition process. Students taking the course an honours level will substitute these summary analyses with a single research paper on current philosophies of listening and/or the aesthetics of noise.

Learner Portfolio
Copies of the sound compositions and all major writing assignments will be saved and uploaded to electronic portfolios designed and distributed by each student early in the course. Students are also required to save all written assignments and drafts of their work for inclusion in this portfolio. The portfolio software we will be using is the Google Sites Platform access to which is gained through either Google or a direct link via Moodle. At the end of the semester, the student and the instructor should meet to discuss the portfolio, taking note of the progress that has been achieved and the challenges that remain as the student moves forward to the next Humanities course. Each portfolio will be given a holistic score out of 5 based on the following criteria:

- Evidence of analytical and critical thinking.
- Evidence of university level skill in academic writing, including advanced revision and editing techniques.
- Evidence of creativity, innovation and technical competency in the use of sound-based multimedia tools
- A familiarity and introductory competency with the fundamentals of coding and procedural thinking.
- A familiarity and overall fluency with electronic, multimodal writing environments (including social media/portfolio tools).

It's common for the Communication and Media program to schedule an additional review of a selected sample of students' portfolios. The portfolios may be reviewed and commented upon by other instructors in the department. Such assessments will be considered formative and will not be included in any student's course or assignment grade.

Academic Writing

Field Reports
Two formal reports will be assigned early on in the course to give students the opportunity to observe, collect information first hand and then reflect on how sound media can be interpreted anew in terms of cultural discourses and audio reproduction technologies. Upon exploring sound itself as an inherently mutable, ever evolving material artefact, students will be able to situate it within a wide assortment of multiple social environments, inclusive of their own personal experiences and open speculations. The first report will focus primarily on different cultural contexts, encouraging students to compare and discuss sound in relation to such variables as spatial orientation, visual structure, language and even historical events if they so choose. The second report will discuss sound and its development as a media format relative to broader technological advances, including automation and digitization, and other industry-oriented movements. Each report will be multimodal in format, integrating any number of genres, designs and media elements warranted by the topic under investigation. A short, separate, original audio composition will also accompany the report in order to exemplify some of the themes and issues being considered.

Sound Composition Projects
Over the course of the term, students will be required to compose and submit three original sound works using contemporary digital audio workshop tools.

Digital Audio Projects (DAP)
Learners will be given the opportunity to produce three sound compositions in the form of "digital audio projects" or DAPs. Each project will centre upon a distinct theme or point of interrogation, while introducing the learner to different composition skills and techniques used in digital audio production.

- **DAP 1** will investigate issues and ideas associated with sound as an experiential, spatial environment or "soundscape," asking students to build and/or reference a distinct physical location as an audio arrangement. Mobile recording equipment like a phone or digital recorder will used to acquire content evocative of a specific locus. The material will then be edited and augmented using simple digital studio tools.
- **DAP 2** will introduce learners to basic techniques in digital audio production using Ableton Live 10 software. For this assignment, learners will continue working with various field recordings archived for DAP 1 and explore different ways to arrange them with supplementary samples, mixing tools, and audio effects to produce original compositions.
- **DAP 3** will take many of the basic skills learned in the previous project a few steps further by applying more current MIDI recording technologies and sound sampling. MIDI allows learners to use increasingly granular, sophisticated digitization techniques based in the complete synthesis of sound as digital information. At the same time, learners will be presented with contemporary issues exploring how computation and programming continue to shape sound composition in the 21st century. Experiments in digital modulation, filtering, programming, and soundwave construction will provide an array of new devices for building new and original sound pieces.

Students will be given two to three weeks to complete these assignments using resources listed here on the outline. All compositions will be stored on the course Canvas site and also on SoundCloud. SoundCloud offers a free public digital archive and Internet-based distribution service for audio works.

Final Project on Sonification
Students will complete the course by submitting individual major projects designed to explore the emerging field and practice of study in sound technology known as "sonification". Consistent with this field, each project will be multimedia in format, including numerous aural as well as visual elements. As the course has sought to demonstrate, a variety of visual and audio representation technologies now available in our digital era have allowed both science and culture to explore entirely new realms of human experience in remarkably rich and detailed manners. GPS technologies operating over wireless frequencies enable geo-spatial mapping to occur at unprecedented personal levels, while audio streaming allows for a seemingly endless archive of sound files to be instantly accessible at high quality. Together, these information tools provide a visually and aurally robust mode of interacting with and learning about our environments. This final assignment will ask students to compose an original sonic-information work from data they will collect both visually and sonically via digital representation technologies. The information subsequently presented will demonstrate a specific exploratory thesis on a topic or issue of the student's choice.

Students will begin their respective projects shortly after spring break and be given **four** weeks to complete the assignment. Project workshops will be provided during class between **weeks 12 and 14** of the course. Finished projects will be showcased during the last two weeks of class.

Students are expected to abide fully by the NJIT Honor Code, available on the NJIT site at **http://www.njit.edu/academics/honorcode.php**).

Required Texts/Technologies:

Selected Essays published on Canvas
Don DeLillo, *The Silence*. New York: Scribner, 2020 (eBook or Hardcover)
Ableton Live Version 10 (education version)

Student Outcomes

Upon successful completion of these activities, students will be able to:

- Engage in critical thinking and reflection pertaining to the cultural history of sound, sonification and aural/sound-based media technologies.
- Gain a practice-based introduction to digital sound production and distribution tools.
- Gain a practice-based introduction to various associated methods for composing sound projects in digital or electronic media.
- Understand the fundamentals of several common web and script-based programming codes, while gaining an introductory competency in their use to produce digital sound media.
- Refine their working knowledge of traditional as well as more recently developed techniques and tools for planning, organising, and drafting academic arguments in multimodal formats.
- Refine techniques for working collectively in groups on planning, drafting, reviewing and revising multiple versions of a single media project.

Course Rubric

A = 90-100	**B+** = 87-89	**B** = 80-86	**C+** = 77-79	**C** = 70-76	**D** = 60-69	**F** = 0 – 59

Course Syllabus

Date	Topics/Readings	Tasks/Assignments
Week 1 **21 January**	**Sound Cultures: Introduction** • **Class Introduction** • **Canvas/course technologies** • **Discussion: An Introduction to Sound and How we Experience it** **The Cultural Experience of Sound: Acoustics and Acousmatics,** **Online Readings – Available on Canvas Site** Pierre Schaeffer, "Acousmatics." Jonathan Sterne, on Sound Machines and Sound Reproduction from *The Audible Past* Francesco Lòpez, "Profound Listening and Environmental Sound Matter." R. Murray Schafer, "Glossary of Soundscape Terms."	**No Assignment**
Week 2 **28/2 Jan-February**		**Report 1: On Sound Objects (10 marks) Due 16 February** **Short Exercise 1: Sound as an Aural Experience – 2 marks Due next week**
Week 3 **4/9 February**	**Introductory History of Recording and Sound Technologies** **Signals and Transmissions** **Roundtable Discussions: New Audio Recording Technologies** • Physical Modelling and Sound Synthesis • Aesthetics and Sound Technology I: Recording and Broadcasting	**Digital Audio Project #1: Exploring Sound Environments (10 marks) Due 23 February**
Week 4 **11/16 February**	**Roundtable Discussions: New Industries and Markets of Sound** • From Radioactivity to Radios • Marketing Sound: Sheet Music, Broadway, and Broadcasts **Online Readings – Available on Canvas site** Jonathan Sterne, "Audile Technique and Media," from *The Audible Past* Luigi Russolo, "The Art of Noises: Futurist Manifesto" Morton Feldman, "Sound, Noise, Varèse, Boulez" Don DeLillo, *The Silence* (Part 1)	**Short Exercise 2: Moments in Recording History – 2 marks Due next week** **Report 1 Due** **Digital Audio Project #1 Workshop**
Week 5 **18/23 February**	**Noise, Signals, and Silence: Constructing a Philosophy of Listening** **Roundtable Discussions: Modes of Listening** • Noise and Ambiguity: Aesthetics of Sound/Sound Art • Silence as Media	**Report 2: On Sound Technologies (10 marks) Due 9 March** **Digital Audio Project #1 Due**
Week 6 **25/2 Feb/March**	**Roundtable Discussions: Measuring Sound as Experience** • Computation and Sound • Aesthetics, Hip Hop, the Break and DJing	**Exercise 3: Listening vs. Hearing – 2 marks Due next week**
Week 7 **4/9 March**	**Digital Audio Workshop: Introduction to Software** • Mixing Tracks with Ableton Live **Online Readings – Available on Canvas site** Salomé Voegelin, Selected Readings from *Listening to Noise and Silence* (Continuum, 2010) Brandon LaBelle, "4'33": Sound and Points of Origin," from *Background Noise: Perspectives on Sound Art* Roland Barthes, "Listening," from *Responsibility of Forms* Michel Chion, "The Three Listening Modes," from *Audio-Vision: Sound on Screen*	**Report 2 Due** **Digital Audio Project #2: Building Sound Arrangements (10 marks) Due 25 March**
Week 8 **11/23 March**	**Computational Sound: Designing and Composing for Digital Culture** **Sound and Synthesis: Audio Recording in the Digital Age** **Roundtable Discussion: Working with MIDI** • Short History of MIDI (Specifications, Structures, Limitations) **Digital Audio Workstations and Production Techniques**	**DAP Workshop for Project #2**

	• Synthesis and transformation of sound by computer **Digital Audio Workshop: Introduction to MIDI Software** • Mixing MIDI and Audio on Ableton Live **Online Readings – Available on Moodle site** Dominic Pettman, "The Cybernetic Voice," from *Sonic Intimacy: Voice, Species, Technics* John Mowitt, "The Sound of Music in the Era of its Electronic Reproducibility" from *The Sonic Studies Reader* Don DeLillo, *The Silence* (Part 2)	
14-20 March	**Spring Recess 2021**	
Week 10 **25/30 March**	**Computational Sound: Designing and Composing for Digital Culture II** **Computation and Composition** **Roundtable Discussion: Algorithmic Compositions** • Stochastic Composition and Randomness • Tools for Machine Musicianship • The Art of Feedback **Online Readings – Available on Canvas Site** Kim Cascone, "The Aesthetics of Failure: Post-Digital Tendencies in Contemporary Computer Music" David Toop, "The Generation Game"	**Exercise 4: Are Humans Really Necessary? – 2 marks Due next week** **Digital Audio Project #2 Due**
Week 11 **1/6 April**	**Sonification: Sound as Information** **Analysis, Synthesis and Signal Processing** **Roundtable Discussion: Sound and Perception** • Sound and Perception • Auditory Display: Histories and Methodologies	**Digital Audio Project #3: Making Sound Discoveries (10 marks) Due 20 April**
Week 12 **8/13 April**	**Digital Audio Workshop: Sonification Technologies/Software** • Georgia Institute of Technology: Sonification Sandbox • Coding Music and Sounds for Live Performance • Live Coding and DAW: Ableton Live **Roundtable Discussion: Towards an Aesthetics of Sonification** • Design and Sensuous Perception **Digital Audio Workshop: Sonification Projects** • Project Planning • Producing a "Sound" Thesis	**Major Project: Sonification Compositions (25 marks) Due 6 May** **DAP Workshop** **Exercise 5: Sound Knowledge: How Does Science Change with Sound? – 2 marks Due next week**
Week 13 **15/20 April**	**Roundtable Discussion: Sonic Expressionism** • Creative Coding **Online Readings – Available on Canvas Site** S. Helmreich, "Gravity's Reverb: Listening to Space-Time, or Articulating the Sounds of Gravitational-Wave Detection." T. Hermann and H. Ritter, "Sound and Meaning in Auditory Data Display"	**Sonification Workshop** **Digital Audio Project #3 Due**
Week 14 **22/27 April**		**Sonification Workshop**
Week 15 **29 April**	**Future Directions: New Interfaces for Sonic Expression**	**Sonification Showcases**

	Review and Final Showcase **Roundtable Discussion: Class Assessment of Sonification Projects**	**Showcases Conclude** **Sonification Projects Due 6 May – 25 marks**

FIN