

# Getting Started With Electronic Music: An Open Course in Music Technology

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## Abstract

The curriculum for a music technology course is presented in four areas: digital audio sound manipulation, MIDI arranging and sequencing, online notation, and music videos. The course material is online and open to students and the public.

The class is activity-based and taught in a flipped classroom with minimal lecturing. Students study the material and come to class prepared to work through the tutorials during supervised lab sessions. The course content is available in an open online environment that anyone can access and is divided into modules so that parts of the course can be accessed and adapted individually. Instead of turning in assignments to the teacher, students build online portfolios that can be reviewed by their colleagues and explored by the general public.

## Background

The curriculum that is presented here was developed for an introduction to computer music class taught in the freshman year that is required in two different tracks in our program: music production and composition. The course prepares music production students to use the recording studio as a compositional tool, while at the same time providing compositional opportunities for composition majors who do not yet have a strong theoretical background in music theory. Since there are no prerequisites and because it approaches the subject broadly, any music student can take the class and explore the four content areas.

The National Association of Schools of Music (NASM) expects graduates with degrees in music to have developed a number of basic skills. One of these is in the area of composition and improvisation, as described in their Competencies Summary (emphasis added):

“These [composition/improvisation competencies] may include but are not limited to the **creation of original compositions** or improvisations, variations or improvisations on existing materials, **experimentation with various sound sources**, the imitation of musical styles, and **manipulating the common elements in non-traditional ways**. Institutional requirements should **help students gain a basic understanding of how to work freely and cogently with musical materials in various composition-based activities**, particularly those most associated with the major field.” (NASM, 2020)

It is not easy to find a place in music degree programs to develop these skills along with the many required general education and music courses, nor to have release enough faculty to teach an additional class for student. One way to develop this competency by each student could be to have them work through some or all of the material presented here independently and then submitting a portfolio to be checked off before graduation.

The decision to share course materials was inspired by the Creative Commons, an organization and network which provides licenses that make it easy to share works, and in the process makes educational material available to the public. This, I feel, is my responsibility as an employee at a state institution: to enable independent learners, create value for society, and save

other teachers from having to reinvent the wheel. I have also found many personal rewards in the process of being generous and giving things away, and, by doing this, have made friends and built trust with people that later led to collaborations on projects that have been rewarding financially and for advancement as a professor. Not a lot of additional effort is required to share materials in digital form, and after they have been electronically published, it is easier to repurpose them when courses are repeated or change format. In my case, this has been advantage when our university moved to larger classes under a new incentivized budget model, and to cope with moving classes online as a response to the COVID-19 situation.

Since the launch of the World Wide Web, I have always been interested in creating and sharing resources online, and my publications are designed to help people do things. Projects include a teacher's guide for a [music industry class](#), an overview of a [music retail products class](#), [a book on music production](#) with multitrack sessions shared by 11 collaborators, and [73 instructional videos](#) including resources for [a history of rock and roll class](#), [interviews](#), [music productions](#), assistance for [ukulele singalongs](#), apps for playing internet radio, and websites for Conlon Nancarrow and [Scott Joplin](#).

## **Class Setup**

The introductory computer music class is activity-based and taught in a flipped classroom with minimal lecturing. Everything is posted on Canvas so students don't have to take as many notes and can see what we did in class if they are absent. There is no punishment for an absence other than missing an opportunity to get assistance while working on the material. Students seem to enjoy the experience, and there has not been a significant drop in participation since changing the attendance policy.

In the classroom, there are ten desktop computer stations and some students bring their own laptops. Students are encouraged to work in pairs so that one can follow the tutorial while the other operates the computer. They switch roles halfway through the session. With this arrangement it is possible to have at least twenty students in the class working at their own pace.

I look for opportunities to have students teach each other since explaining a topic is a great way for them to consolidate the material they are learning. Sometimes a student who has asked a question is later directed to help another student who asks the same question. Students who finish the tutorial quickly are directed to assist their colleagues.

Most of the software used is free and cross-platform, so students may choose to come in after class hours to work on assignments in the lab or use their own machines at home. We use Audacity to study digital audio and editing, Noteflight for notation, and Shotcut for video editing projects. Formerly, I used free versions of Pro Tools and Studio One but decided to take advantage of the lab's Logic Pro licenses to teach a program not taught in the music production curriculum; Pro Tools is the DAW used in recording techniques and Studio One is used in the live sound and mixing and mastering classes.

Students come to class prepared to work through the tutorials during supervised lab sessions. Instead of turning in assignments to the teacher, they build online [portfolios](#) that can be reviewed by faculty and peers, encouraging them to do their best work since it is on public display.

## Overview of Class Materials

Course topics and shared materials (i.e., projects) include:

- Module I (5 weeks) **Digital audio sound manipulation**: acoustics, digital audio, sampling, pioneers of electroacoustic music, improvisation, and Audacity software. Project: Musique Concrète Étude in which student records a source sound and then manipulates it by changing the pitch or speed, reversing, looping, filtering, and/or spatializing using Audacity.
- Module II (5 weeks) **MIDI arranging and sequencing**: MIDI controllers, GM (General MIDI), expression, automation, orchestration, drum parts, pioneers of synthesizer performance, and Logic software. Project: MIDI Arrangement with melody, chords, bass, and drums of a favorite or original song using a sequencing program of their choice.
- Module III (3 weeks) **Music notation**: arranging, lead sheet notation, MIDI files, interoperability, and Noteflight software. Project: Notated Score of an original piece using Noteflight or MuseScore.
- Module IV (3 weeks) **Music video**: music for video, video for music, framing shots by choosing angles and distances, soundtracks, video editing, and iMovie/Shotcut software. Project: Music Video of one of their first three projects or a different song they have produced using iMovie or Shotcut.

## Results

Figures 1 through 4 below show examples of work from [Tyler Kuntz's portfolio](#)

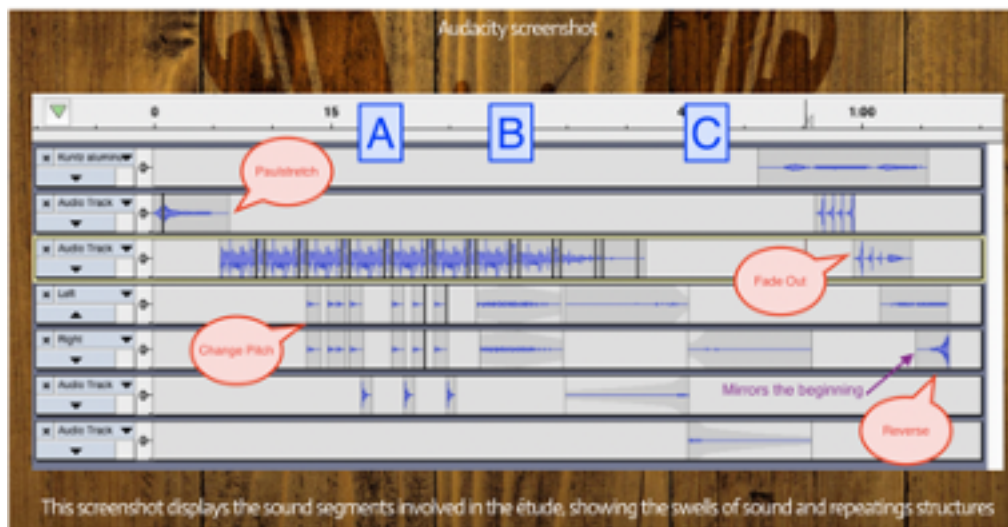


Figure 1: Overview of a musique concrète étude in Audacity. The labelling indicates where the various processing techniques were applied. Audio: "[The Journey Through Life](#)"



Figure 2: Overview of MIDI arrangement in Pro Tools showing the combination of synthesizer and audio tracks. Audio: [“Close”](#)

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### Psalm 22

NIV v. 1-4 Tyler Kuntz

David *♩ = 50*

Women  
My God, my God, why have you for - so - ken me?

Piano

Derived from Psalm 22, this song is a duet between a soloist and a pianist; what I believe to be the simplest, yet most elegant, musical pairing. A basic accompaniment spanning the treble and bass defs of the piano allows the voice to be featured and preserves the tranquility of the lyrics.

Figure 3: Notation in Noteflight of composition for women’s voices and piano. Audio: [“Psalm 22”](#)



Figure 4: Overview of music video in iMovie showing editing and overlays.

Video: "[Graduation Rewrite](#)"

## Concert

As a side project, the students organized and promoted a concert of electronic music that was presented in the campus' planetarium. The venue for the concert provided a setting for a novel performance, as one graduate student in the physics department created astronomical projections to complement the music. Becoming involved with the organization and promotion of a concert is good experience for composers who in the future will need to create opportunities to present work and network with others. In the process of choosing the pieces, students got to know upper division students in the advanced computer music classes at our university and faculty from other programs in the United States and Brazil. The students made paper programs, titles to be projected on the dome, and an online program with links to the music for those who were not able to attend.

## Conclusion

The curriculum outlined in this presentation and made available online to the public introduces the basics of acoustics, digital audio, sound manipulation, mixing, computer-based instruments, and music video production. Having this class and its resources online and open makes them easy to reuse for future classes and to share with anyone else that may be interested.

If you have any problems accessing the items linked individually in this paper, you may also find links to them and additional material, including a Canvas archive of the course, at <http://rkwilley.com/atmi2019>.

## References

Software used (\* featured programs)

- [Ableton Live](#) – live performance and production
- \* [Audacity](#) – recording, editing, and processing sounds
- \* [Canvas](#) – learning management environment
- [GarageBand](#) – music sequencing for Apple computers
- [iMovie](#) – movie editing for Apple computers
- [Logic](#) – full-featured music recording and sequencing for Apple computers
- [Mixcraft](#) – music sequencing for Windows computers
- [MuseScore](#) – score editing
- \* [Noteflight](#) – score editing
- [Pro Tools](#) – audio recording and sequencing
- \* [Shotcut](#) – video editing

NASM (2020). National Association of Schools of Music *Handbook 2019-20*, VIII.B.3, p. 102.  
Reston, VA.