What is Electronic Music, and why should UPEI care?

I am not an expert in the field of Electronic Music, but I could be—if I had been exposed to it sooner. I am grateful for the educational experiences I have had so far in my life; however, my recent fascination with the possibilities of electronic music has opened my mind to how the University of Prince Edward Island could easily provide better educational experiences for future students. It is easy to find specialized programs geared toward specific fields within Electronic Music; such as recording, mastering, and composing. However, it is difficult to find many generalized programs that cover the basics of Electronic Music without requiring a portfolio that would necessitate some independent learning. (See currently existent but non-included Appendix A) Although the existing generalized programs look good, they are not accessible to students who do not know where to start on their own. If the UPEI can create or update a program that incorporates the personal benefits of Music (reference this thing I found on April 6th: https://www.rcmusic.com/sites/default/files/files/RCM_MusicEducationBenefits.pdf) and opens doors to accessible job markets by providing foundational skills and knowledge in Electronic Music, they could appeal to a large number of potential students and provide a learning experience that is not offered at any nearby universities.

Technology is changing the potential careers so fast that a program created for one narrow career stream would render itself obsolete. Given the lack of beginner programs to enter into the broad field of Electronic Music, I had to reflect on what I meant when I thought of electronic music as a broad field of study; then I had to break that field down to basics myself. By looking at my own small experience and large goals in Electronic Music[1] alongside existing programs and careers, I noticed three general skillsets that affect any career or further study in the field: **synthesizing sound, modifying sound, and precisely articulating concepts about sound**. (See **Figure 1**) All three skillsets are not exclusive to Electronic Music; the field is interdisciplinary by nature, and many possible careers require the addition of other skillsets like those associated with Business, Computer Science, or Engineering. All three skillsets are not equally present in all focuses within electronic music: modifying sound would be more important than synthesizing sound for anyone looking to pursue mixing and mastering. However, all three skillsets combine to create a solid foundation that can lead to a variety of more detailed pursuits, given the interests of each student. The goal is to create a program that acts as an entry point into the field, so the program needs to start small, like a seed, with the potential to grow.

Blue: essential
Yellow: useful

Careers as they relate to three foundational skillsets

Careers	**Synthesizing sound**	**Modifying sound**	**Precisely articulating concepts about sound**
Studio Musician/Synthesist			
DJ/Remixer			
Producer			
Product Representative			
Computer Music Researcher			

[1] I have almost completed a Bachelor of Music and a Bachelor of Science Major in Computer Science, and I have started to combine these interests in the past year by diving into electronic music. I completed a Directed Studies course in Electroacoustic Composition, and I have taken every opportunity to use other courses to deepen my knowledge and experience in electronic music.

Sound Technician			
Acoustic Consultant			
Performer			
Sound Designer			

Figure 1 shows a table to demonstrate what careers exist in the field, and how they relate to three foundational skillsets. (careers from https://www.berklee.edu/careers-music-production-and-engineering and https://www.berklee.edu/careers-electronic-production-and-design)

The study of sound synthesis would include how sound is created in general, not just electronically. This would incorporate the basic physics of soundwaves to really understand the concept of overtones and undertones and how they determine the timbre—or colour—of sounds. One cannot study sound synthesis in the field of Electronic Music without covering a variety of synthesis methods, inclusive of subtractive synthesis, frequency modulation synthesis, and granular synthesis among others. Students can learn the basic physics of soundwaves through practical applications of a variety of synthesis methods while using an oscilloscope to observe changes in sounds. Students could also cover a more theoretical and mathematical approach to understanding the basics of synthesis. Whether through hands-on learning or a theoretical approach, an essential element to include in sound synthesis is ear training with a focus on hearing timbres as well as intervals. (reference the description of a Studio Synthesist) Within synthesis, it is useful to find some way to coax students to realize that electronic sounds should not be seen as a way to replicate acoustic instruments, but rather as an entirely separate and independent kind of musicking. Electronic and acoustic instruments should not be seen as one being better than the other, but as different approaches that each have their own values when it comes to making music.

Learning to modify existing sounds to realize some creative end goal is closely linked with synthesis. Sound modification is like sound synthesis on a larger scale: synthesis is the creation of each sound, and modification can be anything from tweaking and balancing multiple sounds to polish a project unobtrusively—like mixing and mastering a recording or working a soundboard for a live show—to remixing existing sounds to create something new. Even recording fits into sound modification because the recorded version of any acoustic sound is a modified version that is affected by the mic choice, the environment, and the mic placement. Sound modification also requires extensive ear training beyond what is necessary for synthesis since modification often involves working with many simultaneous sounds. Comparing the ear training necessary for synthesis with the ear training necessary for modification is much like comparing melodic ear training with harmonic ear training: one is focused on sequential sounds, while the other is focused on simultaneous sounds.

The ability to describe sounds with precision is necessary for eliminating the necessity for metaphors. Describing a sound as “warm” or “bright” can be helpful when speaking in general terms and using instruments that are extraordinarily intuitive in their timbral variances; however, when working with software that provides many ways to create and change sounds, it is important to be able to achieve the desired outcome efficiently. Producers, researchers, and educators are three types of people whose primary skillset would be communication—otherwise, how could they work with people or convey their research? Communicating ideas about sound obviously overlaps with the other two skillsets listed, but it is possible to be good at synthesis and modification without discussing precisely what is being done.

Communication skills are important, especially for working with others, so it is good to be able to take the metaphors and translate them into something that is a bit more scientific. Creating and modifying sound electronically is generally not as intuitive as acoustic instruments, meaning anyone who deals with sound electronically needs a more detailed idea of what needs to be done. It is through communication that we can continue a cycle of education—formal or informal—and expand this field.

While it is useful to establish some foundational skillsets to shape the educational approach to Electronic Music, it is important to work on narrowing down the abstract ideas to more actionable steps. Based on my recent Directed Studies course in Electronic Music, I have determined five core aspects of Electronic Music: **ear training, knowledge of MIDI structures, creative problem solving, comparing digital and analogue, knowledge of music and culture**. (See **Figure 2**) The core aspects are connected to all three foundational skillsets, and they are one layer closer to detailed actionable plans. The five aspects that form the core of Electronic Music can each be taught in a way that reinforces the three foundational skillsets from various angles.

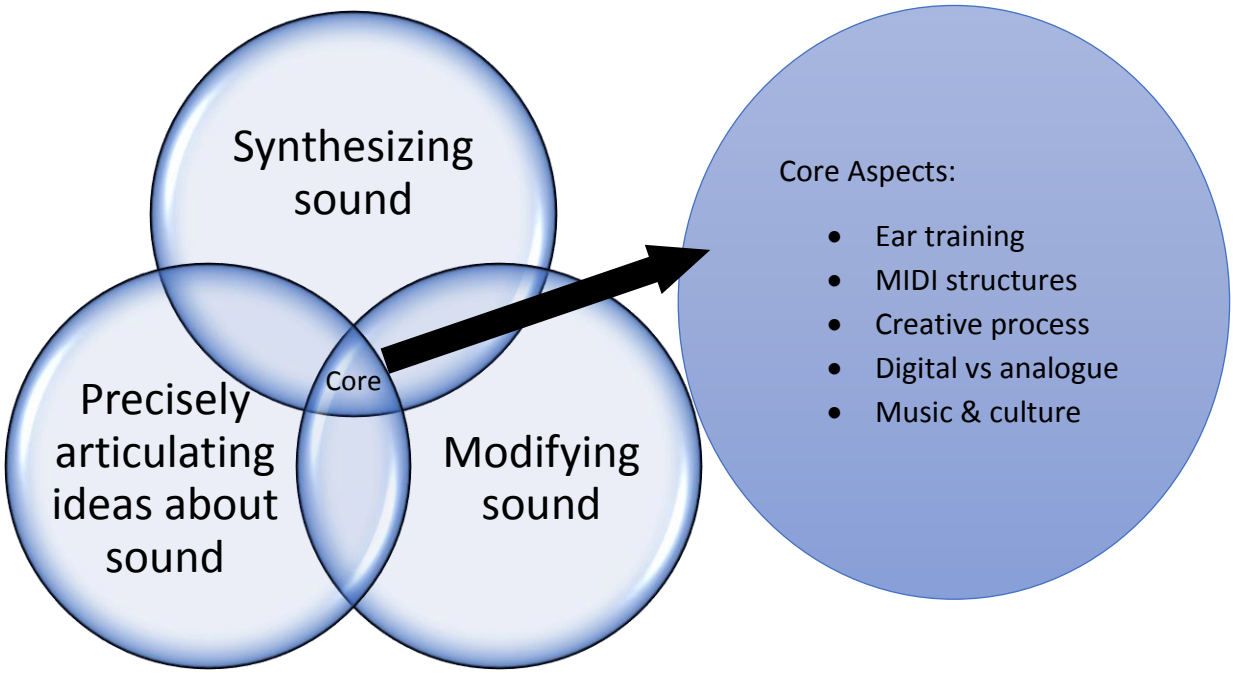

Figure 2 shows a Venn diagram to demonstrate the core aspects of Electronic Music that lie at the intersection of the three basic skillsets.

Ear training could include the replication of a sound as well as precise descriptions of a variety of sounds—much like how Music students learn to analyze existing compositions in order to compose their own music. One way to incorporate ear training in a hands-on way is to get students to replicate an existing sound; much like toy problems given in Computer Science are a way to learn certain problem-solving strategies, and learning scales and other technical exercises in Music trains the ears and the muscles, replication helps to teach the ear to distinguish between two sounds and find the details of how they differ so the brain can learn various problem-solving skills to shape the synthesized sound more precisely. When it comes to designing a sound with any given timbre, there are a variety of synthesis methods to choose from, and each software tends to come with a few samples of its own that can be modified as needed. With so many possibilities of what to make and how to make it, students

need to acquire a basic vocabulary and understanding of sounds beyond metaphors like “bright sounds”, “dark sounds”, “light sounds”, and “bouncy sounds”; they need to understand how overtones affect the sounds we hear, and how they can be manipulated to modify the timbre of sounds. When we understand exactly how to explain the sounds we want, it’s easier to find out how to make those sounds.

Musical Instrument Digital Interface—commonly referred to as MIDI—is so much more than the terrible play-back from the limited sound banks that come with most composition software. It is essential to understand the usefulness of MIDI in using and creating music software and hardware. With MIDI, we can make things like wearable controllers for a more organic electronic performance experience. “[MIDI] makes it possible to record music in a form that allows for easy note editing, flexible orchestration, and song arrangement.” (reference http://www.indiana.edu/~emusic/361/midi.htm) Given that MIDI has been a core element of electronic music for over 30 years, it is worth learning about its strengths and weaknesses while also looking into some technological responses to those weaknesses and how we can be innovative without losing backwards compatibility. (reference https://www.musicradar.com/news/tech/30-years-of-midi-a-brief-history-568009)

Without some kind of creative process, it’s very easy to get side-tracked by all the possibilities in electronic music, whether composing, learning to hear timbre, trying to create one sound, or learning pretty much anything. If students do not have some process to keep them on track before diving in, it is too fun and easy to get distracted. Given that technology is changing so fast, one essential skill in electronic music, as with almost any field, is self-teaching, which includes the creative problem solving involved in figuring out personal learning strategies, and how to stay on track while learning something new. It is often beneficial to take time to just dive in and experiment for the fun of it, but when one has a goal in mind, one needs a way to plan to reach that goal efficiently.

“Digital vs analogue” is a part of the electronic music community that is important to acknowledge. There are benefits to both digital and analogue synthesis, but there are people who are very opinionated on one being superior. Students should be knowledgeable of both digital and analogue, so they can make informed decisions on what method to use in any situation. (reference https://www.digitalpianoreviewguide.com/analog-synthesizer-vs-digital-synthesizer-which-is-better/ and https://www.moogmusic.com/legacy/conversation-bob-moog-analog-vs-digital-sound-generation) For someone just starting in Electronic Music without any desire to invest much money in it, it would be easiest to go purely digital to take advantage of free software. For someone looking to give a live show with full, rich sounds, it would make sense to invest in good analogue gear.

It is important not to take for granted the technological advancements that have shaped our culture and our music. Students must also recognize that, given how new the technology is, many people who are very experienced in this field are self-taught by necessity, and their skills are a valid qualification that should be respected. Along with appreciating the dedication necessary for being self-taught, we also need to recognize the benefits of formal education for efficiently acquiring knowledge and skills—when formal education is implemented well. Teaching oneself takes a lot of time, but if an instructor has already planned a course with a good flow of topics that build on each other in easy-to-follow chunks, students can learn much faster, meaning they can learn even more, and push this field of study further over time. (reference https://www.scotthyoung.com/blog/2010/02/24/self-education-failings/)

The three foundational skillsets defined above provide a useful frame to guide the details of designing an Electronic Music program. Narrowing the skillsets down to some elements that relate to all three skillsets results in one possible solution comprised of the core aspects listed above. The core aspects that I outlined are designed to be an entry point, whereas other topics would be useful in building a more in-depth program. (See **Figure 3**) Along with the cohesive core, there are other courses that should be included in an Electronic Music program given the independent nature of many careers in the field: music business, music law, and directed studies courses that allow students the flexibility to explore areas of interest with guidance and supervision.

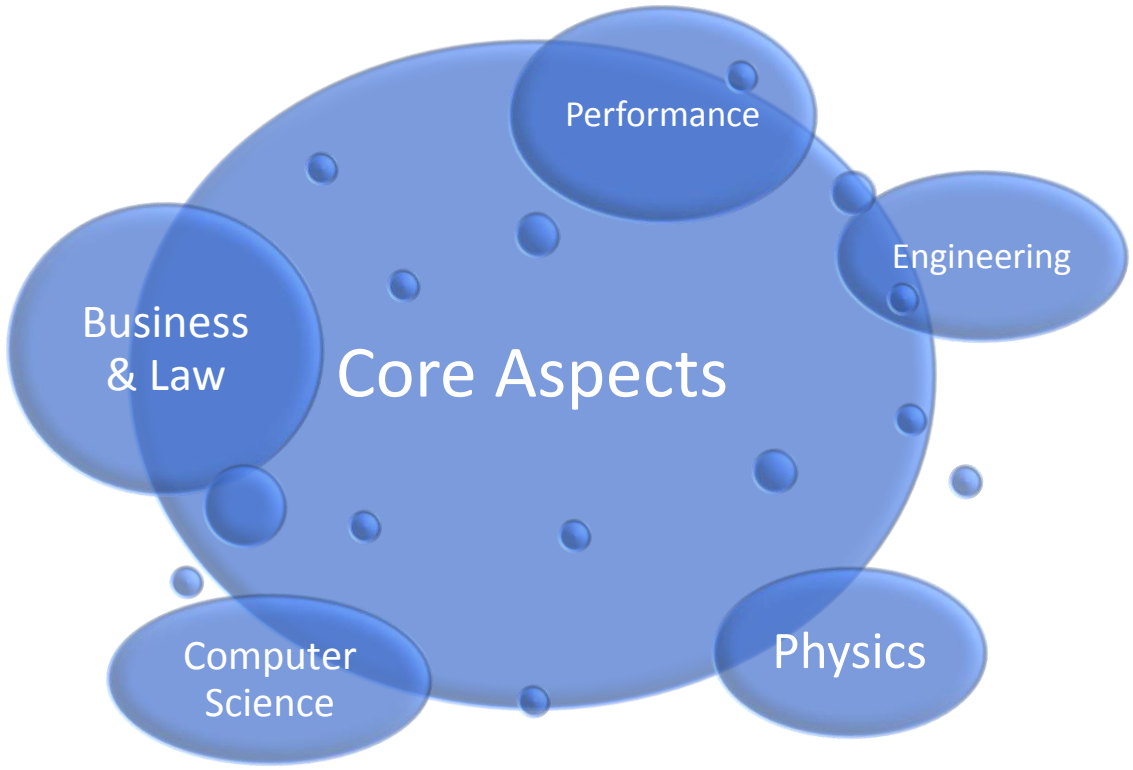

Figure 3 shows examples of some topics that can be added to the core aspects to build a more comprehensive Electronic Music program.

How can UPEI take action?

With any big project it is important to start small, but lofty end goals are a useful guide for exploring possibilities. I will present my lofty goals first; then I will peal back a few layers to reach something more tangible that could provide the groundwork for whoever may decide to pursue the next step of this project by developing a more detailed and immediate plan of action.

BIG Dreams

Intro to explain this section [This section will have stuff about an ideal program without thinking of the limitations of UPEI. General core and electives.] and lead into an explanation of a core with electives.

A paragraph about the general core based on the above section.

A paragraph on electives based on expansion topics.

A closing paragraph suggesting the numerous possibilities and directions that can be taken.

Ambitious Ideas

[This section will have stuff about something achievable for UPEI if everyone were to put the work in. Include a diagram about how electronic music can be a program that has parts that fall into various existing degrees, so it would have various entry points. Common core like MCS to make it easier to potentially expand the program to have a variety of Majors, with crosslisted courses like DSJS and a general Major to start. Mention using the CS lab 104 for Electronic Music labs with provided MIDI controllers and software like how CS provides circuit boards for Digital Systems labs.]

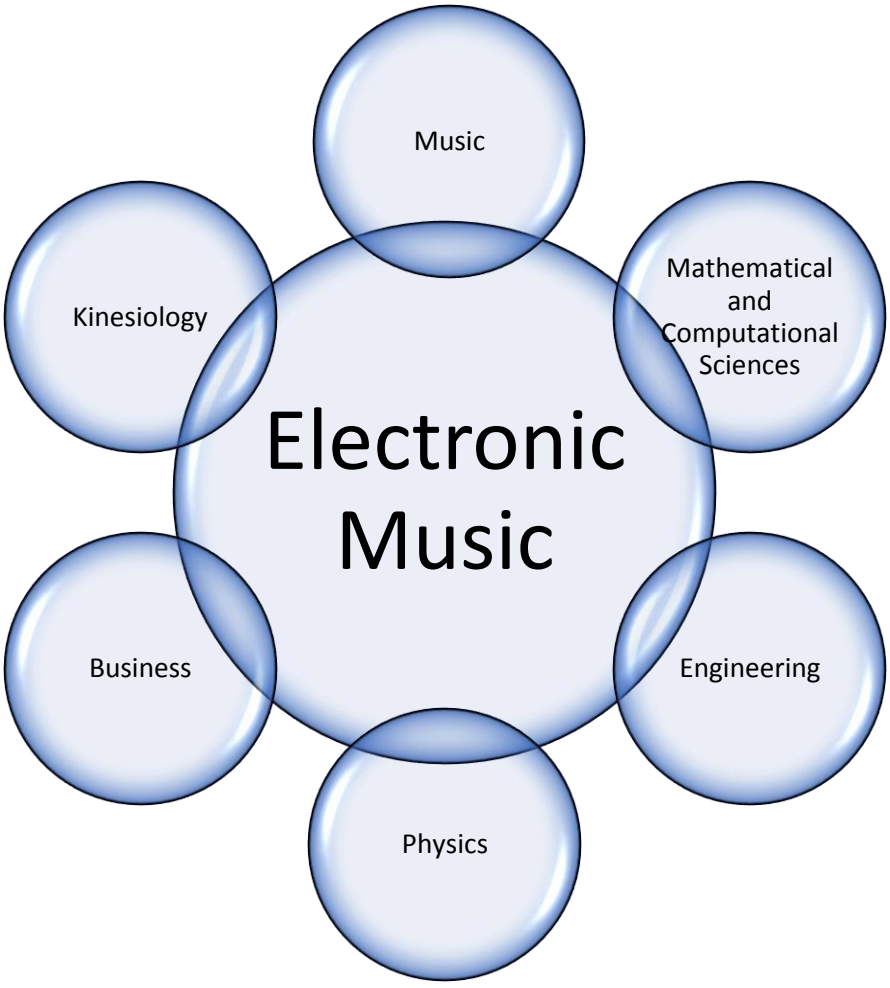

Figure 4 shows a variety of existing programs at UPEI that could have some crosslisted courses as entry points to expose students to an Electronic Music program.

Baby steps

[This section will have stuff about realistic steps that could be taken to adjust some current courses at UPEI with minimal effort. Courses that could be adjusted: Aural Skills, Composition, the Arduino course in CS, Music & culture, that recording course that's offered sometimes.]

[Insert the following somewhere in this section]

> Incorporating small elements of electronic music in existing courses could easily add value to both the Bachelor of Music and Bachelor of Music Education at UPEI. It would be very beneficial to at least include education in areas that music teachers will definitely encounter in schools: recording their ensembles and using basic sound reinforcement equipment. “Both of these outcomes can be achieved with little capital expense and will be of ongoing value to teachers in the field.” (Williams)

Closing thoughts

If administrators at UPEI dare to dream big enough and invest their resources, then they could make UPEI stand out by offering a program that does not exist in the Atlantic provinces. They could make a program that stands out even among similar programs simply because this new program would be more accessible to students who have lots of interest and no idea where to start to make a portfolio.