

A person with dark curly hair is seen from the side, working at a desk. In the background, a large computer monitor displays a graph with a blue curve and a horizontal line. On the desk, there is a keyboard, a mouse, and a tablet. The tablet shows a circuit diagram with various components and labels. A small electronic circuit board with wires is also visible on the desk. The overall scene is dimly lit, with the primary light source being the computer monitor.

Hello, I am Curtis Eck

Born in Belize, aspiring to become an innovative engineer. I strive to solve real world problems. Problems that will affect our very future, such as green energy, more efficient systems and a long-lasting future. My passion to design solutions to everyday problems, is me drive to be an engineer. This also leads me to pick up many strong qualities fitting of an engineer.

About Me

Throughout my engineering student years, I have acquired many hands-on applicable skills. I was placed through many hardships and challenges, which resulted in my strong variety of engineering hands-on skills:

- PCB Design
- Analog Filter Design/Applications
- Complex Signal Analysis
- Microcontroller program/implementation

Some of my greatest challenges were group projects with those who had complex schedules. From this, I had learned how to organize and cooperate with those who had a challenging time. Along with my greatest successes, the ability to design/implement hardware circuits. All while being linked to software.



Circuits II- Filter Design and Implementation

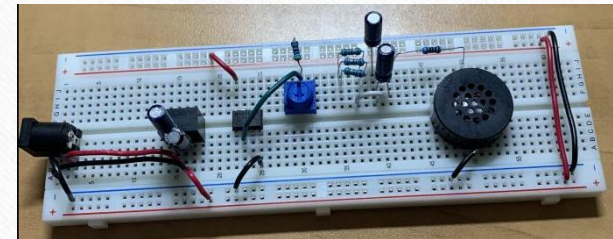
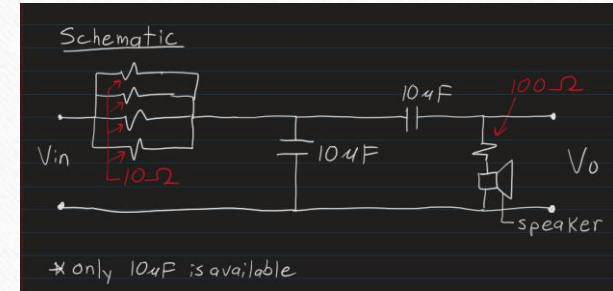
Situation: Design a Low-Pass Filter cascaded with a High-Pass Filter with an 8-resistor speaker load. Measure the Bode plot of the speaker.

Task: Design the cascaded system, implement it on a circuit board and measure the plots

Action: I first designed the circuit schematic for the cascaded systems of filters. I then proceeded to calculate the respective values to allow only the desired frequencies within the filters (200Hz-8kHz). After, I placed the desired circuit on the board as seen on the right. I placed a potentiometer to alter the magnitude of sound of the speaker. My last step was to examine the Bode Plot with a scan function on my ADALM2000, to see the relations of the decibels.

Result: This lab had resulted in me attaining a properly designed band-pass filter, with the ability to alter audio and signal magnitude. I was also able to attain a bode plot and recognize the decibel relationship of the system.

I took away the values and experience of filters, and how they are to be applied in real life. It was surprising to see the resulting Bode plot, as it directly resulted in the frequency response of the system. I experienced the inner designs of audio systems, and what type of systems are used. I ended up applying this process in a future project, to produce a device designed to play music.



Instrumentation, Sensors, and Interfacing- PCB Design

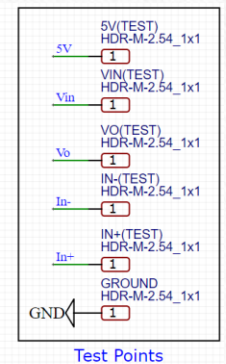
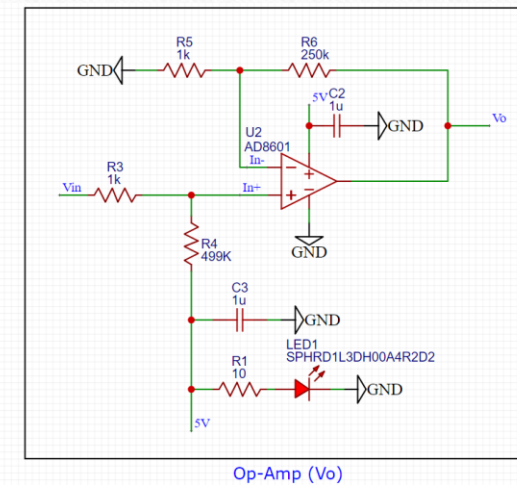
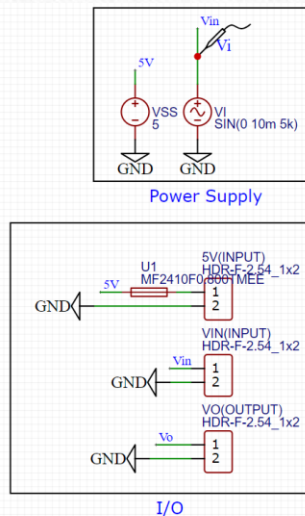
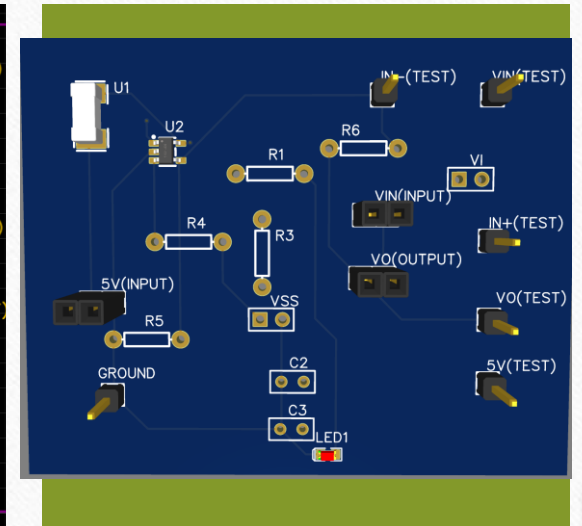
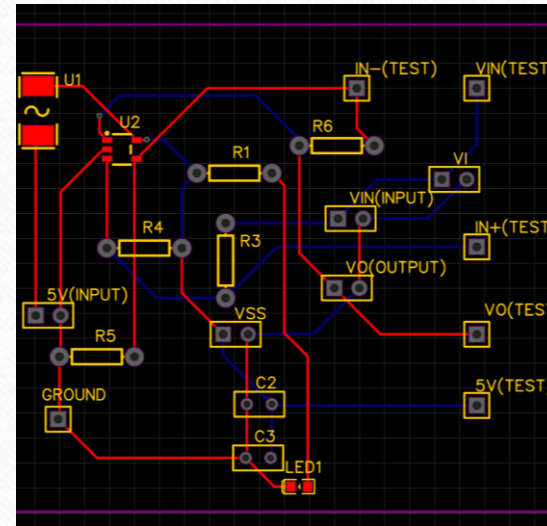
Situation: Design a PCB with specific conditions, adding desired components to the Circuit and to use 2 layers. The PCB should have valid components and fit a specific design rule.

Task: I was given the role of designing both the circuit and the PCB.

Action: My first step was to design the circuit (bottom image.) to fit project requirements, then I designed the PCB so that each component was well placed so that the wires could connect easily, and components would work. Last was to check the design rule to see that everything fit the desired requirements.

Result: A PCB that received full marks on every aspect except capacitor placement. The PCB was valid in all spectrums and was able to be printed.

This course and lab made me learn the innerworkings of modern electronic systems. From this, I learned how to efficiently design circuits. I used the skills from this course to design circuits in other labs. To briefly describe this course, it teaches and allows hands on experience of fundamentals of electronic applications.



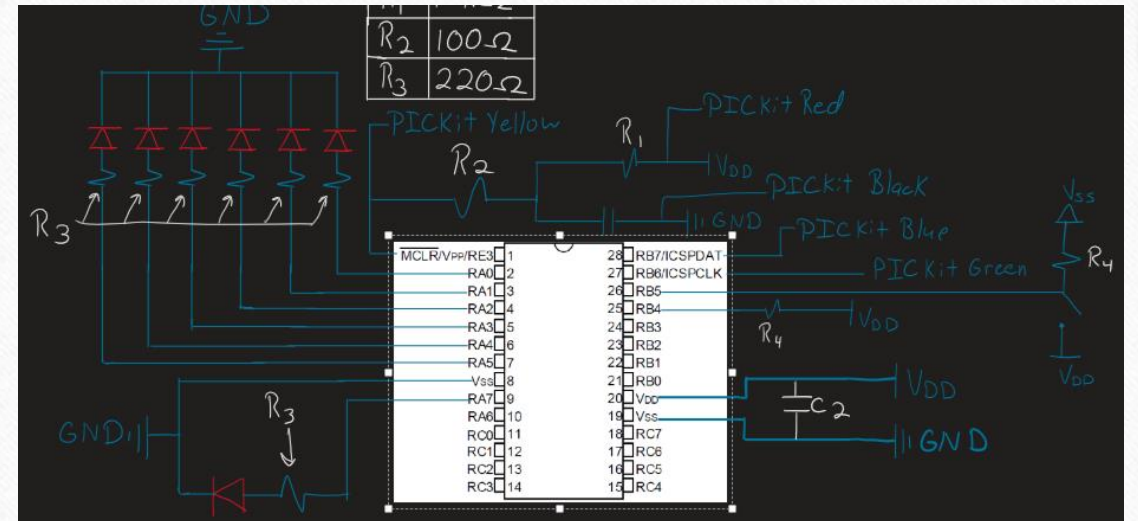
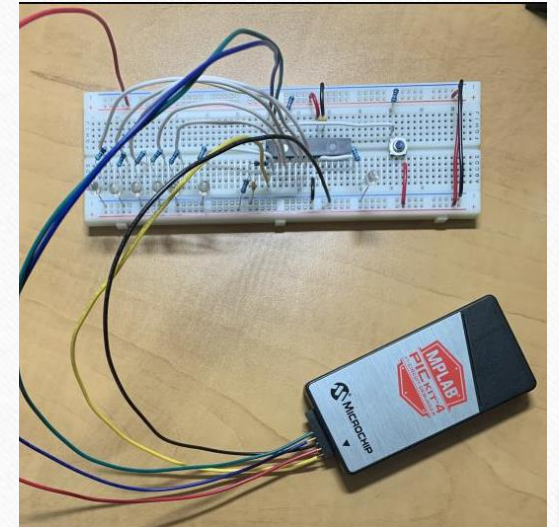
Computer Organization

Situation: Design and program a circuit that makes the microcontroller produce a song.

Approach – Initially, I calculated the proper components for the microcontroller to drive a sin-wave load into a speaker, and then implemented the circuit. I then programmed using interrupts and sin-wave generation to simulate the song onto the speaker.

Outcome – The result of this was a speaker that played the basic song “Twinkle Twinkle Little Star”

From this lab I learned how to program and get sound to play out of a speaker. How to combine software and hardware, to generate songs, and basic rhythms. I applied the experience from this experiment in my end of year project to produce beginner songs.



Learning the Design Process

The process of designing a project is a critical aspect of the **engineering profession**. One process is the “**Agile & Scrum**” method. Using this method, I put forth deliverables within an efficient manner. This was a skill I took and applied to my other projects, which yielded in efficient production. Applying this method was rewarding, as I saw my projects completed quickly, demonstrating the practical implications of what I learned.

There were many benefits to this design:

- Iterative
- ‘Waterfall’ – allowing room for change
- Efficient
- Fast



Entrepreneurship

In my engineering classes, I learned many quality aspects of engineering. One of which, was **Entrepreneurship Skills**. I learned and applied valuable concepts of entrepreneurship:

- Supply Chains
- Customer benefits
- Customer/Investments Pitches
- Business model/canvases

For my project, I researched and pitched values towards potential customers. It was rewarding to see the successes in my pitch, as my groups project proposition was greeted by many interested individuals.



Electrical and Computer Engineering Professional Skills

Teamwork is an important aspect of an engineer's career. It shows that they can work with others, broaden ideas and create solutions. During my winter 2021 year, I was given many tasks towards my project. My **greatest takeaway** was how to work with teammates in a **cohesive manner**. Learning how to cooperate, diffuse arguments and clear up confusions.

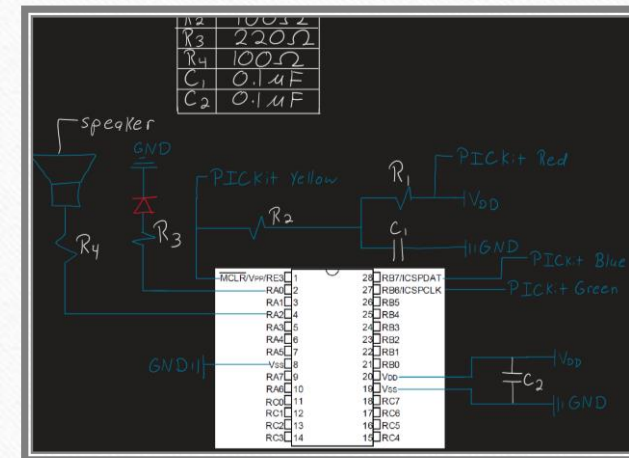
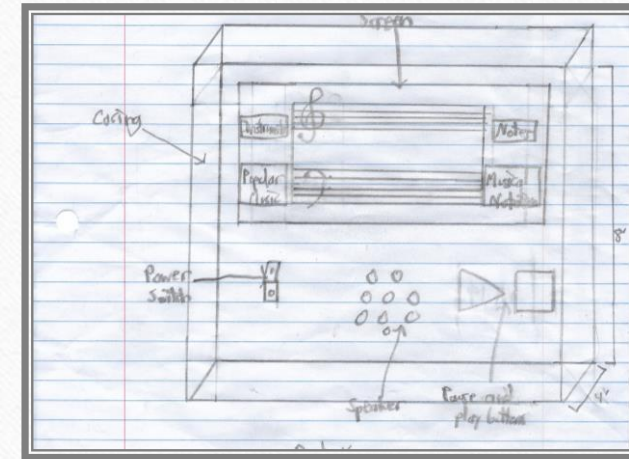
My biggest struggle was to fix conflict amongst group mates, since each person had their own mindset and goal. Despite this, I overcame this issue through reaching out to my teammates and organizing the best times for us.



Petite Bois à Musique

My group and I designed an intuitive, interactive music box, that helps musicians learn music quickly. The initial design consisted of a complex box that required manual input. It was then toned down to consist of just basic hardware and software on a breadboard connected to a speaker.

The most difficult concern was to organize hardware development due to COVID-19. However, with perseverance and proper planning, I managed to create **basic alpha prototype** of our design. From this project, I learned to organize, and persevere through challenges: such as hardware design, software implementation, and group organization.



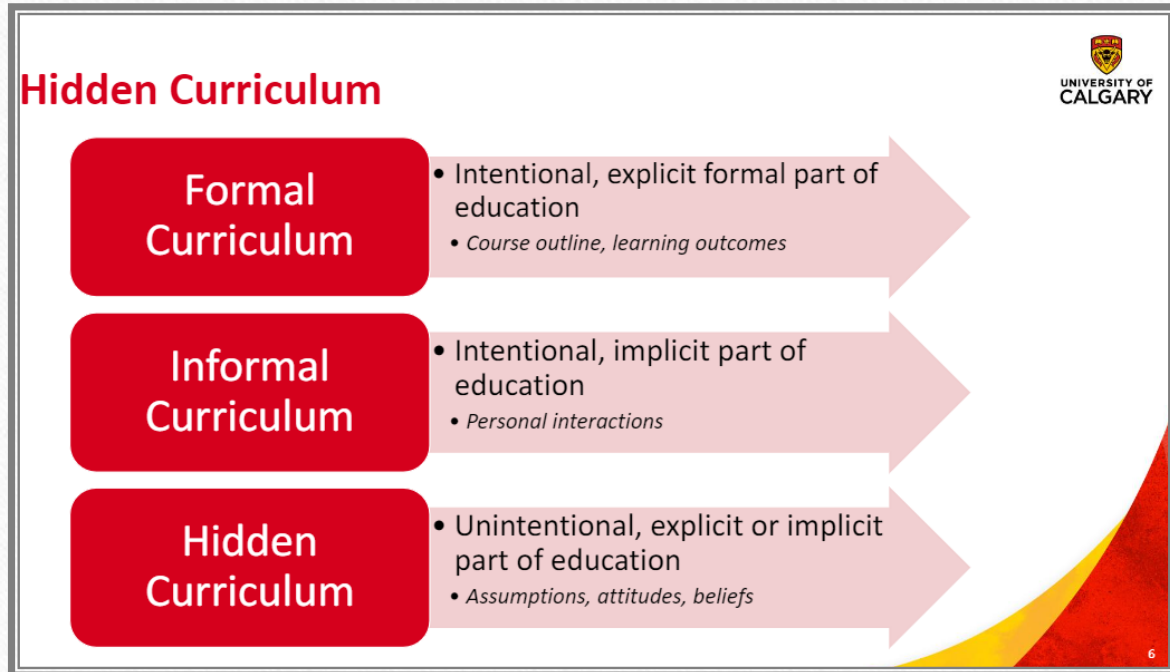
The Hidden Curriculum

During my engineering semesters, I expected to learn many mathematical formulas such as math equations, electronic concepts and hands-on engineering experience. However, I had also learned other valuable skills that weren't directly taught:

- Organization
- Resiliency
- Efficiency

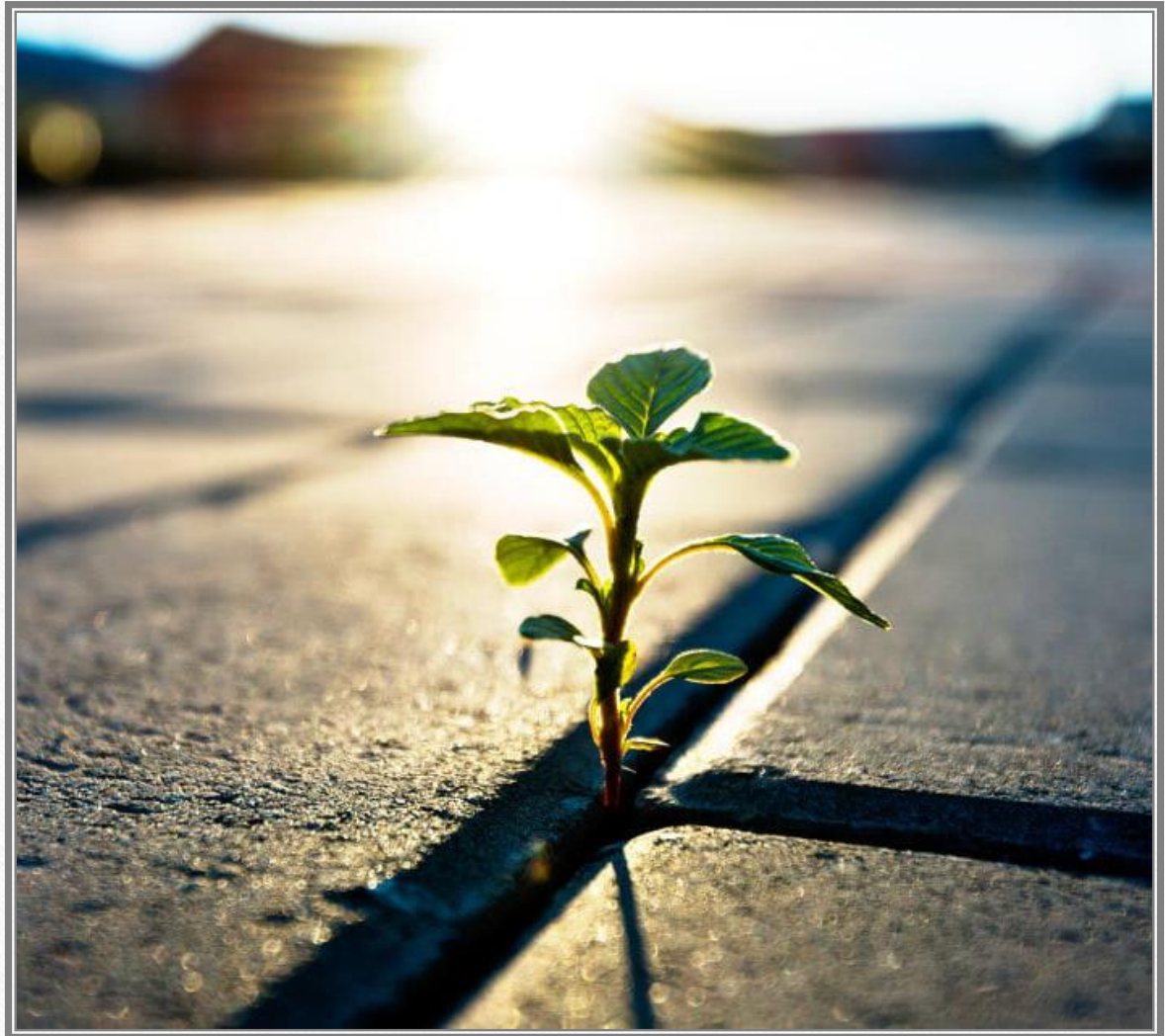
I learned that many skills can be acquired, even if they aren't directly taught. Even in my engineering profession, I will pick up on other skills like communication, ethics and the social aspects of work.

Hidden Curriculum



Resiliency

Resiliency is a **quality** I acquired that helps me overcome **challenges** within engineering. Throughout my engineering semester, it was difficult to balance school life, work and extracurricular all while maintaining good grades. Through resiliency and proper planning, I was able to persist through the semester and maintain my **scholarships**. I know this quality will benefit me in the engineering world, as it will allow me to overcome inevitable problems that come my way.



My Personal Interests

Since age 12 I have been interested in music. I participated in many band competitions, I was the lead trombonist in my high school jazz band for 3 years, and even started my own quartet outside of school. Learning music and different instruments takes up a lot of time, effort and dedication.

From an individual aspect, I had to learn many different concepts, individual playing skill, and music theories. From a teamwork perspective. I had to learn how to play with the band, harmonize with others, and synchronize my solos.

Like **engineering**, this hobby applies the ideas of proper teamwork and possessing individual skills. And just like engineering, it takes passion, dedication and effort; skills I have that will transfer over to the industrial world.

