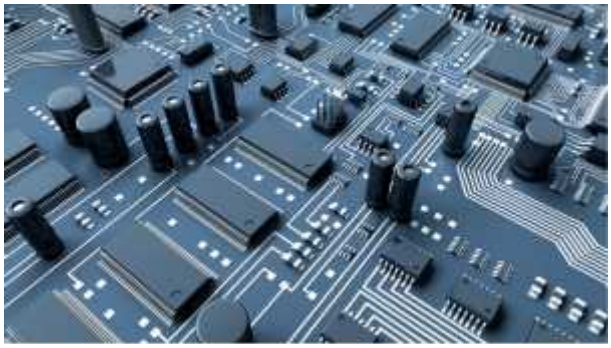
Electronic program

Program Introduction



Have you Ever wondered how every electric device works? What is that wired green chip with strange components on the top of it. We are now living in the age of electronics. Electronics are tied into so many different aspects of our life. Electronics is now approaching every single device in our live whether it is in our home, street or work. from the clock that wake you up in the morning, the coffee machine, traffic lights and the printer. Even cars manufacturers now replacing every mechanical system in the car with electric ones.

The approach of this program will be different as it will focus on widening your scope about what electronics is and how important it is to understand how it works. This approach will be delivered to you by giving you some insights, deep dives and experience in many inter-disciplinary concepts, as well as, engineering and personal skills.

The goal of this program is to understand the scientific background of electronics, components, and circuits, in order to submit a project, in the end of the program, which is a printed circuit board of you design, for example, a small circuit that contain a control a car (DIY motor driver). This program will give you an exposure to principles of design with Kicad program, using simulation software and statistical tools (Fritzing) and not to mention an exciting FabLab experience where you will see your designs come to life using CNC or etching. Then learn how to solder all the components into the pcb and watch it works.

Program Skills Structure

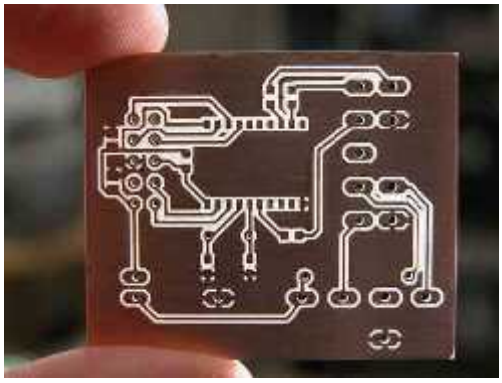
The set of skills in this program is dependent on three gears, knowledge, practice, and teamwork, so when one of them is triggered, the other two are triggered too. Yet after some time of exposure to this simple gear mechanism, you will be able to create a more complicated mechanism that fits you the most.

Knowledge gear will be the first to be triggered as it is the most important one and without it no other gear will be triggered. Knowledge is what drives us all, the true and the very meaningful value we need you to acquire. Then here comes the next gear, Practice, where you will do science and knowledge and try to practice your knowledge and connect it to real life problems. However, teamwork gear is very essential aspect of our programs. Thus, you and your team will be required to do some tasks through the program in which you will learn time management and collaboration to achieve success. Moreover, the program will expose you to economic and business management skills that are crucial to achieve success and to prepare you for a challenging tomorrow's world experience.

- **Scientific and knowledge skills**

As the main core of the program is to make a project but you must have to know the essence of what and how your project works according to the science and knowledge perspectives. You don't have to stress out, we will get you through the required scientific base you need.

- **Engineering and Hands-on skills**



After acquiring the knowledge, it's time to connect it to real world and practice it. Using different machines, instruments, equipment, and tools. You and your teammates will experience the joy and excitement of creating something from scratch and watch it come to life. Something that resembles everything you learnt and directed to environment and recycling.

- **Personal and Teamwork Skills**

No one can achieve success only by himself. Yet we have different and diverse personal and social backgrounds, but we have to learn how to work as a team, as one, to achieve our goals whether it was the assigned tasks or anything else. For sure, you and your mates may get into opposite opinions, frustrated with different decisions, or even passing through hard times, but all of these things are what leads you to the best solution and ensures the best outcome. It is not only about getting a project done, it is an experience and a skill that you will carry with you for the rest of your life and it will prepare you to face tomorrow's world with flexibility and strong character.

Program Progress Phases

Phase 1 - Preparation

In this phase you will be introduced to what is electronics and how its components work.

- **1.S: Scientific and knowledge content**

  Physics of circuits, Ohm's law, Resistors, capacitors, micro controllers, relays, transistors, and mosfets.

- **1.E: Engineering Practices**

  Analyzing some circuits design like motor drivers, remote controllers and understand how it works.

- **1.H: Hands on Activities and checkpoint assignment**

  Making some simple pcbs and test them on a bread board.

Phase 2 - Design

In this phase you will be through something exciting, learning whatever it takes to start designing your project. KiCAD Software and simulation software (fritzing).

- **2.S: Scientific and knowledge content**

  Understand some circuits principles, then deep dive designing real pcbs schematic, and routing using kicad.

- **2.E: Engineering Practices**

  CAD design (KiCAD), Simulation and Test parameters (fritzing)

- **2.H: Hands on Activities and checkpoint assignment**

  Complete a PCB full design which is ready to manufacture and Simulation test of it on fritzing to make sure it is working well

Phase 3 - Implementation

In this phase, all your dreams shall come true. It will be completely dedicated to the prototype of your project and watching it come to life. You shall re-design and re-build your project, if any error were found in the prototype.

3.E: Engineering Practices

Fab Lab, CNC, etching, soldering, Real time testing, Re-Design and Re-Implement.

3.H: Hands on Activities and checkpoint assignment

Project Construction and Real operation.