

For A Healthy Life

PROGRAM OUTLINE



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For A Healthy Life

Public Health is defined as “the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society” (Acheson, 1988; WHO).

Reviewing the grand challenges of Egypt, health status is worth your attention since bad health status is considered as multi-problematic factor that affects all life aspects. Bad health status is what makes Egypt a highly-ranked country in many diseases' incidence statistics. Then come the consequences with more money spent on the health sector, reduced number of laborers, decreased productivity, and decreased quality of life. Now, you are the man who we have been waiting for; let's take the scientists' coat. Let's research and contribute to solve at least one problem of public health issues.



Generally, knowledge, personal development and engineering skills are the main drives behind this program's outline and practices. As scientific knowledge is the base for inventing, this program is designed to expose you to different fields of sciences. By the end of phase one, you should be able to describe what ecology is; studying ecology will make you able to relate between human and all other living creatures within the same ecosystem. You should also be familiar with the basics of anatomy, and physiology to know how a normal healthy man is. Also one of the most interesting topics will be covered here: microbiology. Studying microbiology will introduce you to the world of microbial diseases, don't be afraid, you will beat all pathogens. Then you will be introduced to pathology, epidemiology, and biostatistics to know how the diseases affect our bodies and what their prevalence are. To keep up with the new approaches, you will be introduced to how digital diagnosis works. In addition, the program is dedicated to improving your personal skills. As you are approaching the end of phase one, you will collect

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several data about the previous solutions that tried to address this problem. At the end of the first phase, preparation phase, you will design your solution.



In the second phase, you will determine the problem you are addressing and the design requirements that you must achieve. Now you will use the knowledge you acquired to design your solution. Therefore, the engineering design process (EDP) is an essential part of this phase. You will make several studies using the rules and information you have learnt, and simulate your product using different stimulation programs. Also you might be using Android Studio or the various services and tools on the Egyptian Knowledge Bank (EKB). Here comes the most interesting part when you transform your innovation into reality and begin to test. Seeing your first prototype is a very proudful moment. However, all errors come here. As problem-solving is an iterative process, you are expected to re-design and re-implement your product. Don't worry about complexity. Your instructors are here to help you. Be prepared for the challenge to begin!



Program Skills structure

The main goal of this program is to train minds to think; we aim to allow young leaders to move freely in science to come up with a brilliant solution to our grand challenges – we believe they will. Mainly the program concerns about developing skills rather than memorizing and that is the main base for the project-based learning. The journey here involves acquiring knowledge, understanding how nature works as this would be the main target of the program. Then follows teamwork skills. We cannot do significant something alone. Teamwork is a guarantee for maximum efficiency. You will involve with your team members discussing the solution and implementation. As disputes are inevitable at the beginning, by time, you will acquire the skills to discuss efficiently. Then comes the practical application for which the team is constructed for. You and your team begin to describe resources, find a solution for the problem and make and design. However, in your design, you must consider cost and efficiency which is part of designing and practical work skills. It's a wonderful experience.

Scientific and knowledge skills

Science and knowledge are guiding our revolution in the twenty-first century. Their existence is of great importance for efficient design. Without knowledge, we are not expected to apply it, which is what problem-solvers do. Here, students will study the scientific topics from their basics and at the same time will enjoy the beauty of it by making fun experiments.

Engineering and Hands-on skills

Different form experiments, here, you are using knowledge to make a prototype with a specific function that helps humans in somehow. You will work according to the engineering design process where you are considering the problem, find the solution and test your prototype. Nothing is more existing than creating your model from scratch, and watching it works.

Personal and Teamwork Skills

For large projects, humans are required to work in groups to increase efficiency and productivity. Acquiring such skills is essential and thus, the program is concerned about improving your teamwork skills. You will be experience opposition from members and hard times, but above all you will learn how to discuss your points and shows your weaknesses and strengths. By time, your communication skills will be developed until you're able to persuade. From this point, it's the way to business and management skills. You're expected to make a business plan for your project in which you market your project.

Program progress phases

Program Structure:

The program is designed to enhance students' personal skills and development, academic skills, and engineering and practical skills. The program consists three phases; each phase will last one weeks with 3 sessions per week:

1. Preparation Phase – 1 week, 3 sessions.
2. Designing Phase – 1 week, 3 sessions.
3. Implementation Phase – 1 week, 3 sessions.

Phase 1 – Preparation

In this phase you will be introduced to some scientific basics: anatomy, physiology, pathology, microbiology, ecology. You will also be introduced to the different traditional solutions to public health related problems as well as new alternative environment-friendly approaches. The objective skills set for this phase are:

1.S: Scientific and knowledge content

You will be introduced to the common pathogens: bacteriology, virology, and different common disease-causing agents. You will be introduced to general pathology, physiology, and anatomy. Through this phase, antibiotic resistance also will be studied. Thus, you will be able to build up a good vision about diseases and how badly they affect us. After this journey you will be ready to witness the future and afford your efforts aiming to save your ecosystem from all harms followed bad health status.

1.E: Engineering Practices

Case studies for selected topics and techniques along with review articles of disease epidemiology and etiology. You will also inspect real life medical application of the topics studied in the scientific sections that include bacterial cultivation and microscopic examinations. In this part, students will appreciate the role that science plays in their real life.

1.H: Hands on Activities and checkpoint assignment

Here comes the part where we start playing around and building our own small-scale prototypes. Student will cultivate, stain and examine bacteria. They also will isolate to different kind of bacteria. They will see some videos of cytopathic effect of disease causing agent. Hands-on activities will run in parallel with the scientific content and the engineering practices so that students can apply what they study. They will have a checkpoint assignment in which they define general terms of ecology, pathology and microbiology.

Phase 2 – Design

In this phase you will be introduced to pathology, epidemiology, biostatistics and digital techniques of diagnosis. Android Studio, various tools on EKB, design structure, mechanisms, microcontrollers, sensors, simulations Apps, etc.

2.S: Scientific and knowledge content

Pathology, epidemiology, and biostatistics. Students will study design mechanisms and principal components of an efficient design. Student will study different cytopathic effects of some diseases. Students will be introduced to immunity and treatment strategies. Python and Android Studio will be covered. Electronics and sensors will be discussed to help those who will work medical engineering.

2.E: Engineering Practices

Diagnosis techniques, how immunity works (activity), android Studio, various tools on EKB, design structure, mechanisms, microcontrollers, sensors, simulations Apps, Solid works and Arduino, etc.

2.H: Hands on Activities and checkpoint assignment

Students will be asked to gather statistics on some diseases in Egypt. Simulation test of the chosen solution/project with all features (diagnosis, prophylaxis, treatment etc.). Specify what exactly your project will achieve and how this can be authentically measured.

Phase 3 – Implementation

In this phase, all your dreams shall come true. It will completely dedicated to building your project from scratch. Enough about theories and formulas or equations, it's time to put all the designs and simulations into a real thing. You will not succeed from your first attempt. But don't worry we got your back. Together we shall redesign, and modify the project and this is the fun part. Debugging and modification is the last step before you see your work doing what it is supposed to do.

3.E: Engineering Practices

Android Studio, real time components testing, re-Design and re-Implement and retesting.

3.H: Hands on Activities and checkpoint assignment

Project construction, and testing. This is the part of pride and appreciation. In this part, you will watch your project doing what it is supposed to do. You will witness the effort that you have put into this project turning to success.