

Toronto Metropolitan University

Engineering Competition 2024

Bio-Engineering Rulebook

**Background**

In recent times, global attention has increasingly focused on the challenges within the healthcare sector. Numerous regions have grappled with a surge in patient numbers, complicating the process of securing appointments with general practitioners or finding available hospital beds. In Canada, pre-existing issues with overburdened health services have been exacerbated, significantly increasing the workload for clinical staff and physicians. Particularly, it has been difficult to access the minimal healthcare services, such as routine checkups that provide vital patient information. The current strain on the medical sector may render it ill-equipped to handle future demands, underscoring the critical importance of sustainable healthcare for societal well-being.

When examining underserved communities with limited access to medical facilities, the problem of accessibility is further compounded by lengthy waiting lists and instances of care denial. Doctors, too, face the repercussions as their working hours are extended, or they are reassigned. Whether seen from the viewpoint of the healthcare provider or the patient, there are evident shortcomings in the healthcare delivery system. Given the advancements in the tech industry, innovative developments in wearable technology offer a potential solution to issues related to healthcare accessibility.

Your team's objective is to address the gaps in absent healthcare systems in various locations. Utilizing technology and data analytics, your goal is to develop a wearable device capable of diagnosing health problems. This device aims to promote healthy living by providing a portable and personalized healthcare system accessible to each individual.

**Challenge**

Create and develop a wearable device that substitutes the need for routine checkups in socio-economically deprived populations in high-income countries. The device should conform to the user's personal physical and health related needs through user inputted data alongside data submitted from the medical database. The device should perform basic health monitoring of vital signs while actively referring to the person's medical records to alert about early indicators of illness. It should act as an aid for healthcare systems to integrate into their diagnosis during patients visits to hospitals.

**Deliverables**

As engineers, you need to complete:

One (1) report with a maximum of ten (10) pages for the provided case. This report must be emailed to the provided email address by the end of the design phase.

The report must consider the following:

* Biomedical, Environmental and Economically related factors
* Technical feasibility and potential for innovation
* Real-world applicability
* A 15 minute presentation which you will present in front of a panel of judges. At the end of your presentation, there will also be a maximum 10-minute question period where the panel will ask you any questions they may have.

**Judging Matrix**

| **Solution** | * Deliverable Compliance with Expectations * Environmental, Biomedical and Economic Consideration * Technical Feasibility/Innovation * Real-world Applicability | /60 |
| --- | --- | --- |
| **Report** | * Clarity * Writing Style * Professionalism * Design Justification | /15 |
| **Presentation** | * Voice * Articulation and Timing * Visual Aids * Response to Questions | /25 |
| **Penalties** | * Plagiarism * Insufficient Citation * Documents Received After Deadline * Absent Team Member * Verbal Disclosure of School During Presentation * Disclosure of School in Presentation Files/Documents * Disclosure of School by Supporting Audience Members | -50  -50  -50  -25  -10  -10  -10 |
| **Total** |  | /100 |