

**(A) Hands-on Workshops – 4 Quality Education**

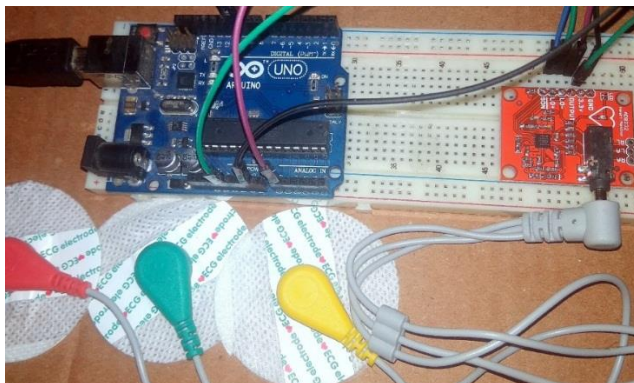
**Demonstration & Exhibition**

<p><b>Activity/Experiment title:</b></p>	<p>Heart Rate Monitor          ECG          Incubator          3D printed Prosthetic Hand          Hand Grip Test          Foot Pressure Map          Handwheel, Rehabilitation Tool</p>
<p><b>Activity owner:</b>          (Name of School/          Institution/University/Organization)</p>	<p>Department of Mechatronics and Biomedical Engineering,          Universiti Tunku Abdul Rahman Sungai Long Campus</p>
<p><b>Description of activity/experiment:</b>          (objective, content, etc)</p>	<p>Introduction of this activity:</p> <ol style="list-style-type: none"> <li><b>1. Heart Rate Monitor</b>              DIY Heart Rate Monitor together with pulse oximeter detects both the heart rate and the oxygen level in the human by clipping on to the fingers.</li> <li><b>2. ECG (Electrocardiogram)</b>              A DIY ECG device to read and display the graph of voltage versus time to understand the function of human heart. Integrating both the ECG sensor and algorithm to analyse the heart beat of human through different leads attached on specific region body.</li> <li><b>3. Incubator</b>              A device simulating avian incubation of various microorganisms in the correct temperature and humidity to hatch them. Build from reused refrigerator as casing, thermostat, thermoelectric and different sensors</li> <li><b>4. 3D printed Prosthetic Hand</b>              Measuring muscle activation via electric potential, referred to as electromyography (EMG) , with the advent of ever shrinking yet more powerful microcontrollers and integrated circuits, EMG circuits and sensors have found their way into prosthetics. Yet, EMG systems remain expensive so through this activity, participants able to gain the knowledge about EMG and prosthetic hand.</li> <li><b>5. Hand Grip Test</b>              The purpose of this test is to measure the maximum isometric strength of the hand and forearm muscles. Handgrip strength is important for any sport in which the hands are used for catching, throwing or lifting. Also, as a general rule people with strong hands tend to be strong elsewhere, so this test is often used as a general test of strength.</li> </ol>

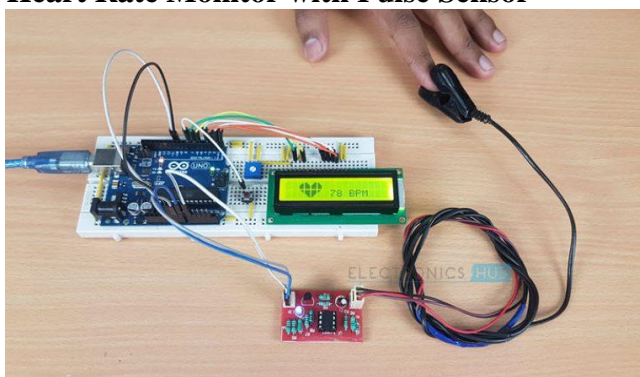
	<p><b>6. Foot Pressure Map</b> A analysis systems provide insights to help: -Identify asymmetries between the left and right foot -Monitor the effectiveness of treatments -Easily compare pre and post treatments with automated reporting -Educate patients about their pathologies with visual biofeedback -Identify plantar pressure profile discrepancies between left and right feet</p> <p><b>7. Handwheel, Rehabilitation Tool</b> A cycling training tool for improving motor function and accelerating the recovery of functional limb movements. In a rehabilitation setting, it is used for a variety of conditions, including stroke.</p> <p>Objectives: 1. To introduce and promote Biomedical Engineering 2. To foster new knowledge in biomedical engineering research project, the development of novel technologies and innovative applications, for example prosthetic hand. 3. To develop a quantitative understanding of the human body, for example anatomy and physiology of hand, and the neuromusculoskeletal system.</p>
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**Photo of activity sample:**

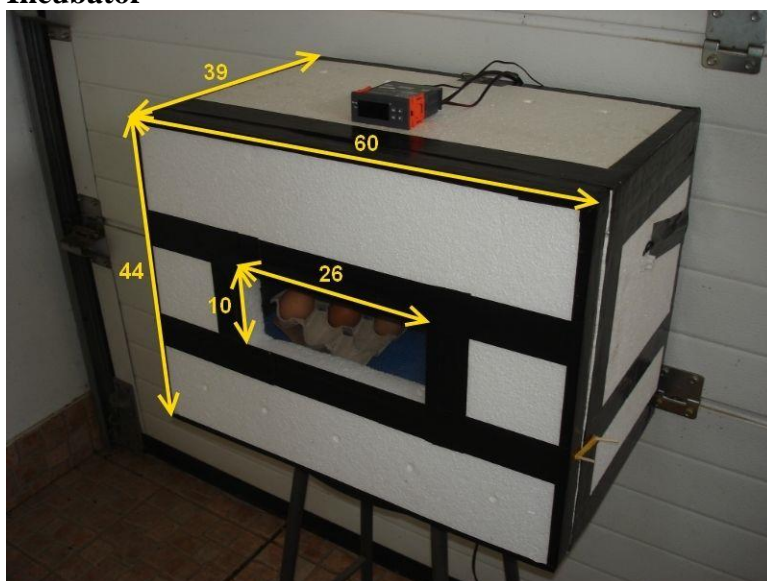
**1. ECG**



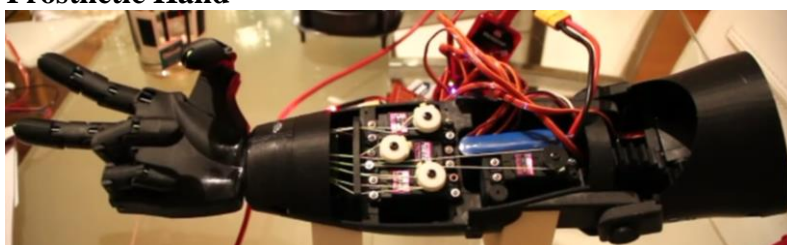
**2. Heart Rate Monitor with Pulse Sensor**



**3. Incubator**



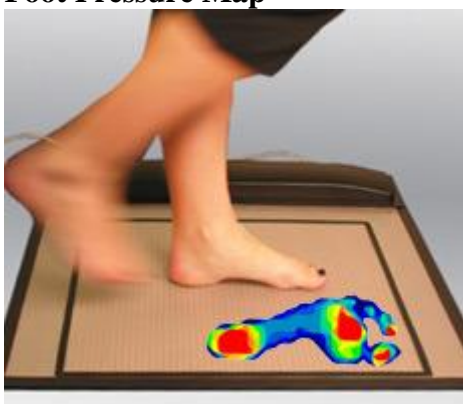
**4. Prosthetic Hand**



**5. Grip Force Test**



**6. Foot Pressure Map**



**7. Handwheel Rehabilitation Tool during KLESF 2018**

