

Suggested Workshop Themes

Theme	Brief comments and inspirational material	Student Mini-project	Physic area related
Ventilators for emergency cases	<p>COVID-19 have demonstrated in many countries the insufficiency of the Health System infrastructure for coping with a massive demand of basic and critical sanitary equipment. For example ventilators. In critical situations, homemade technology could save lives while waiting for the professional healthcare service. Especially in areas of difficult access. Is it possible to design for emergency situations homemade ventilators? Could the mindset of jugaad innovation be of help?</p> <p>Jugaad Innovation: https://en.wikipedia.org/wiki/Jugaad</p> <p>Homemade ventilator: https://www.youtube.com/watch?v=gxPLtEtz1-k https://www.youtube.com/watch?v=qTUPFAnx0OE https://www.youtube.com/watch?v=fWy6XYfOCoc</p>	Design an operating homemade ventilator with low-tech materials (e.g. the ones you may have in your garage).	Basic principles of mechanics, airflow and functioning of simple machines.
Monitoring pandemics	<p>COVID-19 have demonstrated in many countries the need of closely monitoring the spread and growth rate of pandemics. This is critical for implementing all kinds of emergency measures such as citizen confinement. Our GSM devices could act as data gathering devices if we input in a suitable and reliable app the number of infected people that we know about, their location etc. This data could be sent for further analysis to the central healthcare services in a country and the bodies delivering statistics for healthcare professionals and policymakers.</p> <p>https://www.researchgate.net/publication/224123165_mHealth_for_Influenza_Pandemic_Surveillance_in_Developing_Countries</p> <p>https://www.businessinsider.com/countries-tracking-citizens-phones-coronavirus-2020-3?r=US&IR=T</p>	Design a simple to use GSM app that can help citizens to deliver reliable data to health authorities	Basic principles of disease modeling; data analysis.

<p>Delivering basic goods to the elderly</p>	<p>COVID-19 have demonstrated in many countries the need to take special care for the elderly. In particular, the need of attending their basic needs while confining them at home since they a population under high contagion risk. But in many cases little or no coordination exists to figure out where are those elderly citizens located, the best way to attend them and what are their needs. Especially for those one living alone. Help in collecting these data by family and friends is essential. Again, GSMs could help in collecting data and alerting for example supermarkets to make an optimum route of delivery and goods. Optimization of routes will also help delivery professionals on exposing themselves less to contagion.</p> <p>https://en.wikipedia.org/wiki/Vehicle_routing_problem</p>	<p>Design a simple to use app for families to gather critical data for helping attention to elderly and supermarkets for optimizing delivery routes.</p>	<p>Optimization algorithms.</p>
<p>Homeschooling for everyone</p>	<p>COVID-19 have forced hundreds of children of all ages adopting homeschooling. In some cases, high social class children and schools are able to cope with the need thanks to digital technologies. Unfortunately, this represents a minority. Many schools and families do not count even with internet connections and not only in developing countries. There is a clear need for elaborating physical and attractive home schooling materials in an efficient way as well as motivating of parents and children of the importance of adopting and following proper disciplines. It is as well critical to deliver these materials where needed in an optimum manner. As in the previous example, GSMs could help in locating and establishing optimum routes for delivering.</p> <p>https://www.homeschoolglobal.com/index.html</p>	<p>Prepare a basic and engaging physical kit for homeschooling for children and parents and an optimal way of delivering where needed.</p>	<p>Optimization algorithms.</p> <p>This is a great opportunity for a collaboration between physics students and humanity students.</p>