TERM PAPER PRESENTATION

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CHEMICAL ENGINEERING

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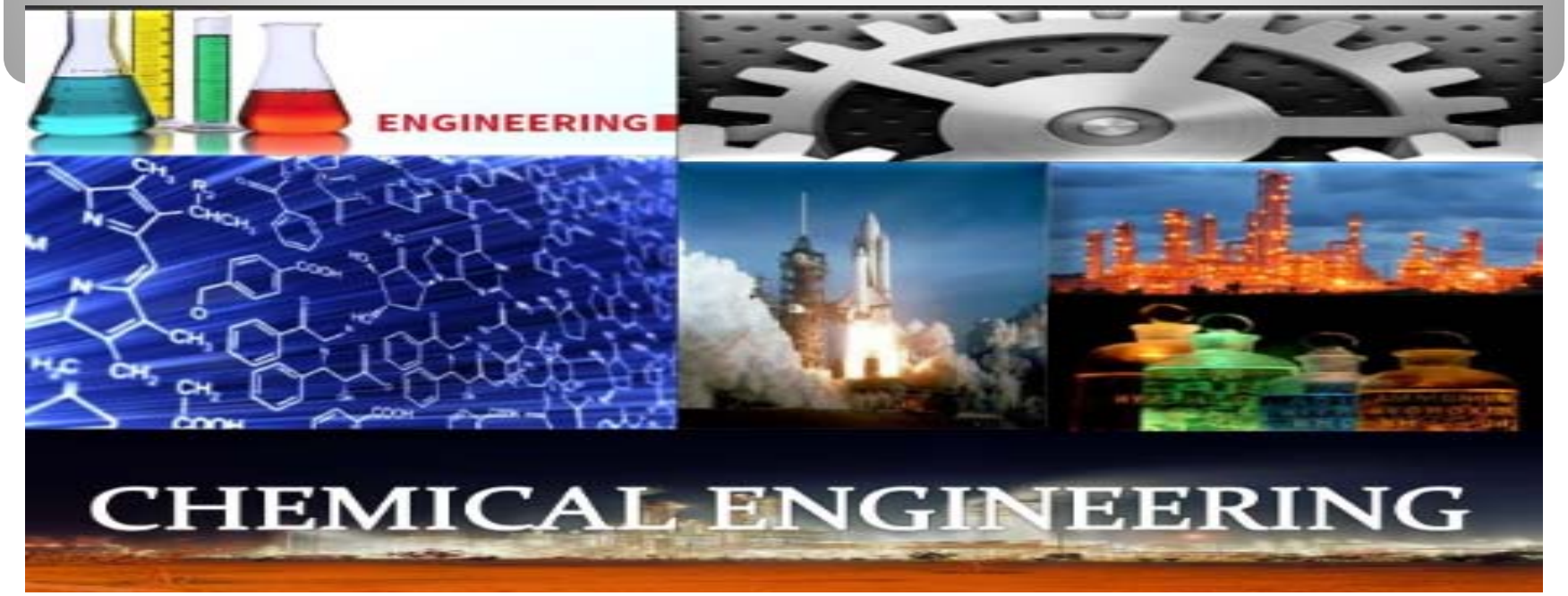
ENGINEERING STRATEGIES FOR HANDLING COVID-19 FOR ENVIRONMENTAL HEALTH AND ECONOMIC SUSTAINABILITY



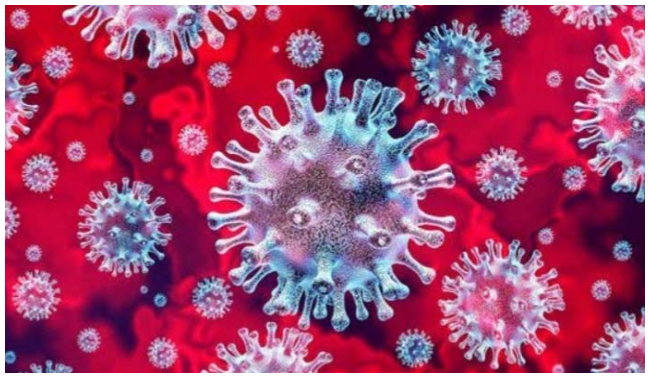
What is chemical engineering?

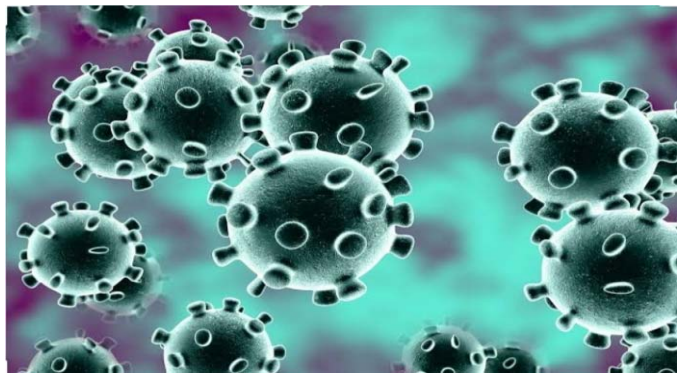
Chemical engineering is a branch of engineering that uses principles of chemistry, physics, mathematics, biology, and economics to efficiently use, produce, transform, and transport chemicals, materials, and energy. A chemical engineer designs large-scale processes that convert chemicals, raw materials, living cells, microorganisms, and energy into useful forms and products.

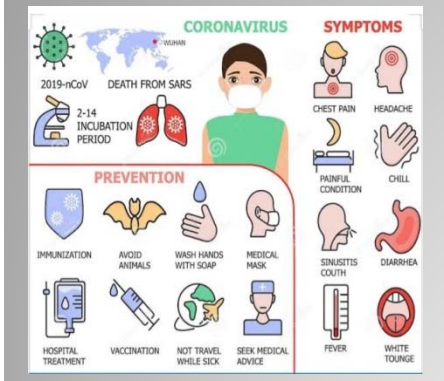
Covid-19 Pandemic

Coronavirus are a large family of viruses that are known to cause illness ranging from common cold to more severe diseases such as Middle east respiratory syndrome (MERS) and Severe acute respiratory syndrome (SARS).

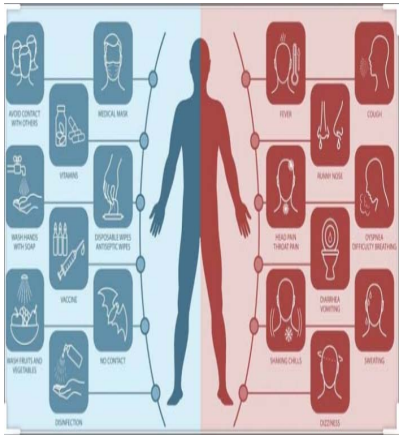
The disease caused by the novel coronavirus first identified in Wuhan, China, has been named coronavirus disease 2019 (COVID-19) – 'CO' stands for corona, 'VI' for virus, and 'D' for disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.'







The virus is transmitted through direct contact with respiratory droplets of an infected person (generated through coughing and sneezing), and touching surfaces contaminated with the virus. The COVID-19 virus may survive on surfaces for a few hours to several days, but simple disinfectants can kill it. Studies to date suggest that the virus that causes COVID-19 is mainly transmitted through contact with respiratory droplets, rather than through the air.



Symptoms can include fever, cough and shortness of breath. In more severe cases, infection can cause pneumonia or breathing difficulties. More rarely, the disease can be fatal.

These symptoms are similar to the flu (influenza) or the common cold, which are a lot more common than COVID-19. This is why testing is required to confirm if someone has COVID-19.

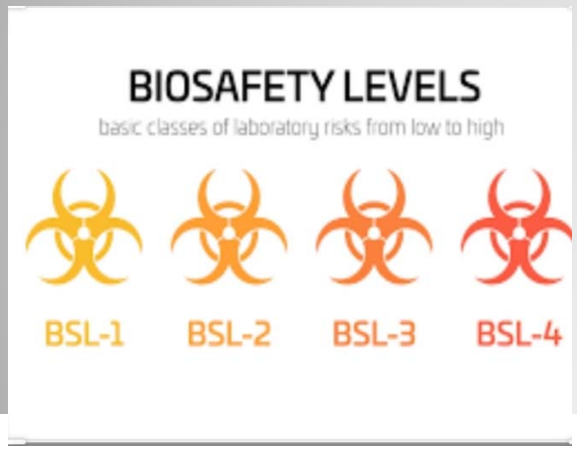
How do Engineers lend a helping hand in the prevention and cure of Covid-19?

1) Process engineers can help with that integration of equipment supply. We will then have cheaper capital cost of facilities, cheaper operational costs, and less supplier interfaces.

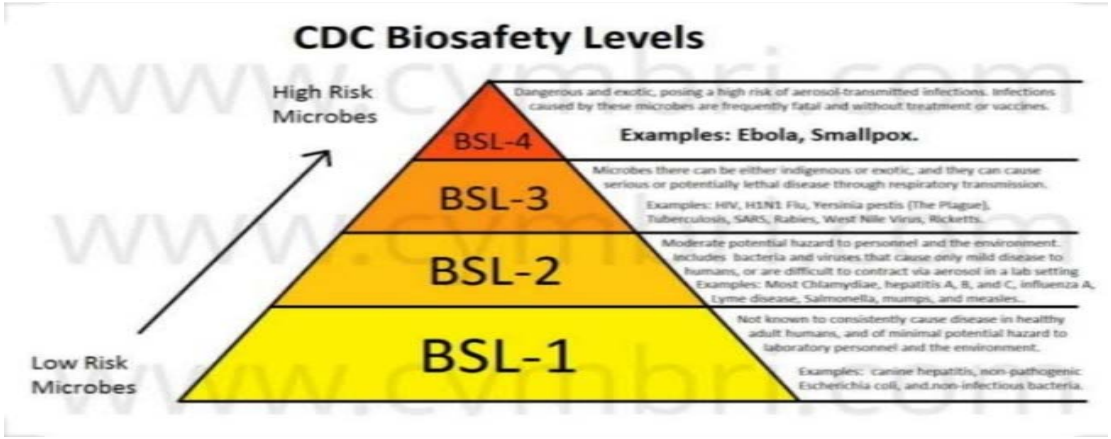
2) Other cutting-edge engineering could help lower infection rates. Cleaning solutions and material development with inbuilt anti-bacterial properties being developed into our design solutions would be positive.

3) Engineers should carry out a full assessment of medical equipment that might be required in similar situations, to ensure that designs can be open-sourced and shared with manufacturers when needed etc.

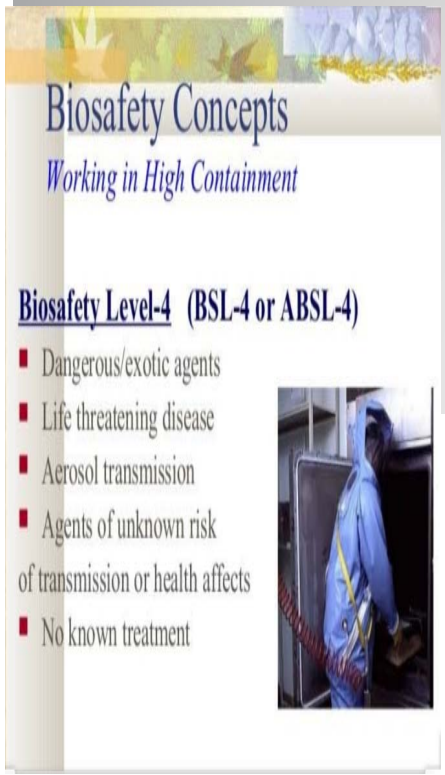
Biosafety Hazards Levels (BSL)



A biosafety level (BSL) is a set of bio-containment precautions required to isolate dangerous biological agents in an enclosed laboratory facility. At the lowest level of biosafety, precautions may consist of regular hand-washing and minimal protective equipment. At higher biosafety levels, precautions may include airflow systems, multiple containment rooms, sealed containers, positive pressure personnel suits, established protocols for all procedures, extensive personnel training, and high levels of security to control access to the facility.



Biosafety Level-4



BSL-4 labs are rare. However some do exist in a small number of places in the US and around the world. As the highest level of biological safety, a BSL-4 lab consists of work with highly dangerous and exotic microbes. Infections caused by these types of microbes are frequently fatal, and come without treatment or vaccines. Two examples of such microbes include Ebola and Marburg viruses.

In addition to BSL-3 considerations, BSL-4 laboratories have the following containment requirements:

1) Personnel are required to change clothing before entering, shower upon exiting

2) Decontamination of all materials before exiting

3) Personnel must wear appropriate personal protective equipment from prior BSL levels, as well as a full body, air-supplied, positive pressure suit etc.

In Conclusion……Engineers also play a big/major role in the prevention and cure of covid-19

In Summary, A very specialized research laboratory that deals with infectious agents is the biosafety lab. Whether performing research or production activities, when working with infectious materials, organisms or perhaps even laboratory animals, the proper degree of protection is of utmost importance. Engineers should carry out a full assessment of medical equipment that might be required in similar situations, to ensure that designs can be open-sourced and shared with manufacturers when needed.

In Recommendation……

1)People should also have a vast knowledge on Bio-safety levels, their importance and their use.

2) The public should be enlightened on the danger of the virus, how it affects our environment and ways in which we can prevent it.


THANK YOU
FOR
LISTENING