**POH 113: BIOTECHNOLOGY, BIOSAFETY, BIOSECURITY AND PANDEMICS**

**Module Overview**

Definitions of the terms Biosafety, Biosecurity, Bio-economy and Biotechnology concerning genetic Engineering and biotechnology, Evolution in using synthetic genomics, and Synthetic genomes. Overview of synthetic biology and its application, technological developments in life science, development and application, Application of Bio-Economy-Agriculture, Health, Industrial and Environmental sector. East African Community bio-economy strategy and policies, Packaging and Shipping/Sample handling/Labelling of infectious materials; (the transport chain, Road regulations, Air transport, Railway transport, Transport by Sea, Transport by Post, Air Mail, Public Transport),

Potential Risks for Synthetic Genomics/Dual Use issues in Biotechnology, Biological weapons and Bioterrorism, International regimes related to dual-use aspects (CBRN, WMD, UN Security Council Resolution 1540, Biological Weapons Convection 1970), Cartagena Protocol on GMOs and Global Health Security Agenda.

How biotech can be used to develop new products, methods and organisms for human, animal and plant health for preparing and responding to pandemics

Measures to prevent the introduction of pathogens and reduce their spread to humans, animals, plants and the environment in order to prepare and respond to pandemics

Protection of the community, workers and the environment from accidental exposure or unintentional release of infectious agents, toxins and other biological hazards.

**Mode of Delivery**

This includes lectures: problem-based learning using interactive tutorials, small group discussions and written assignments, plenary presentations; case studies, experiential learning through independent/reflective study and field visits and placements; and online peer discussions using video clips and conferencing, case study and case series, table top exercises, field work

**Instructional Materials and/or Equipment**

Materials: Lecture notes and slides, video clips, handouts, case studies, reference materials (textbooks, journals, policy document-guidelines), institutional placements and field visits

Equipment: LCD projectors, laptops, white board, markers and flipcharts, LCD, printers, internet access for e-resources, PDAs, mobile phones. We shall also engage international experts in the fields of synthetic biology, biosafety and biosecurity, bioterrorism, UN Security Council Resolution 1540 and the Biological Weapons Convention.

The assessment will be pre and post-test, group assignments, participation in the discussion forum and individual assignments.

**Core References Materials**

1. World Health Organization. (‎2006) ‎. Biorisk management: laboratory biosecurity guidance. World Health Organization. <https://apps.who.int/iris/handle/10665/69390>
2. World Health Organization. (‎2004) ‎. Laboratory biosafety manual, 3rd ed. World Health Organization. <https://apps.who.int/iris/handle/10665/42981>
3. World Health Organization. (‎2020) ‎. Laboratory biosafety manual, 4th ed. World Health Organization. <https://www.who.int/publications/i/item/9789240011311>
4. International Organization for Standardization of Medical Service. (2019).<https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100343.pdf>
5. Ministry of Public Health and Sanitation. *Laboratory Biosafety and Biosecurity Policy Guidelines*.<https://internationalbiosafety.org/wp-content/uploads/2019/08/Kenya-Biosafety-Guidelines.pdf>

**Recommended Reference Materials**

1. Astuto-Gribble, L. M., & Caskey, S. A. (2014). *Laboratory Biosafety and Biosecurity Risk Assessment Technical Guidance Document* (No. SAND2014-15939R). Sandia National Lab.(SNL-NM), Albuquerque, NM (United States).
2. Centers for Disease Control and Prevention. and the association of Public Health Laboratories (2011) *Guidelines for Biosafety Laboratory Competency.*<https://www.cdc.gov/mmwr/pdf/other/su6002.pdf>
3. Association of Public Health Laboratories. (2017). Enhancing biosafety and biosecurity in the nation’s public health laboratories: a report of the APHL 2016 Biosafety and Biosecurity Survey.