

## **Master of Science in Biochemistry (Molecular Parasitology)**

Biochemistry is a subject in life sciences that encompasses Molecular aspects of organism's life. It is a multi-disciplinary subject that focuses on structure and function of Molecules as well as their interplay to create the phenomenon of life. At advanced level, relevant areas of this subject are selected in an effort to provide information appropriate to attainment of capacity directed towards providing local and regional solutions to problems of health.

Varied aspects of Biochemistry and Molecular Parasitology are covered adequately in this programme to impart knowledge and skills amongst the trainees who at the end of this course, qualify to join teaching and research institutions as well as other centres mandated to find solutions to challenges related to health. The molecular basis of interaction between higher animals and their parasites is also covered to facilitate better understanding of disease development. It is envisaged that research arising from this effort will lead to pertinent proposals on better diagnostic, prognostic and therapeutic approaches focused towards reducing health related problems. This is in line with the vision which is endeavor to be a world class centre of excellence in training, research and innovation and mission which is commitment to offering quality training and research on recent advances in Biochemistry and Biotechnology to both graduates and undergraduates focused towards meeting the needs of the ever changing world.

### **PROGRAMME OVERVIEW**

The degree programme will be carried out in the Department of Biochemistry. Expertise in teaching and research will be resourced from biomedical research institutions. Topics will include: mechanisms of host cell invasion, host innate and adaptative immune response, parasite genome structure and expression, antigenic variability, immune evasion, vector-parasite interactions. The course covers four study areas in order to enhance subject coverage while allowing maximum utilization of human and physical resources in the department. The four study areas include include Immunology of Parasitic Infections, Vector Biology and Control, Molecular Biology of Parasites and Advanced Parasitology.

The units covered will provide basic understanding of the mammalian immune system, its control and how it is involved in protection against parasitic infections, an insight into immune

mechanisms operating within vertebrate and invertebrate vectors of parasitic diseases. These will also present detailed information on immunity to specific nematode, cestode, trematode and protozoan parasites. In summary the course will cover a variety of parasites such as Protozoan (*Plasmodium*, *Leishmania*, *Trypanosoma*, *Toxoplasma*, and *Entamoeba*), Metazoan (*Oncocherca*, *Schistosoma*, *Trichinella*) and other pathogens which cause diseases in humans and animals.

### **COURSE OBJECTIVES**

1. Equip students with advanced knowledge in areas of Molecular Parasitology.
2. Impart skills in the relevant areas of Biochemistry and Molecular Parasitology.
3. Empower students with skills to utilize recent advances in areas of Molecular Parasitology for research.

### **COURSE JUSTIFICATION**

Kenya and other developing countries in Africa need to develop an adequate scientific foundation able to support effective and regionally relevant solutions to problems of Health and Life sciences research. There are current endemic and emerging tropical diseases which result in high rates of morbidity and mortality. This has an economic impact on the individuals involved as well as the country as a whole. The areas in Molecular Parasitology are fundamental for the management of emerging and re-emerging tropical diseases.

## **Course Distribution**

### **First Semester**

#### **Core Units**

HBB 3100 Research Methodology  
HBB 3104 Biochemistry of Nucleic Acids  
HBB 3163 Immunology of Parasitic Infections I  
HBB 3164 Parasitic Protozoology

HBB 3102 Bioinformatics  
HBB 3161 Parasitology of Metazoa  
HBB 3111 Principles of Molecular Epidemiology  
HBB 3169 Human Pathogens