

REGULATIONS AND SYLLABUS FOR THE MASTER OF SCIENCE IN TROPICAL AND INFECTIOUS DISEASES (MSc. TID)

1.0 INTRODUCTION

Infectious pathogens which include bacteria, viruses, parasites and fungi are the most frequent and life threatening health problems occurring in tropical countries. Of these, the human immunodeficiency virus (HIV), malaria and pulmonary tuberculosis cause the highest morbidity and mortality in populations living in the tropics. Many others considered neglected and/or emerging are endemic and frequently cause epidemics further complicating the already worsened situations in resource-limited countries. Bacterial and viral meningitis, yellow fever, rift valley fever and other viral haemorrhagic infections (Ebola and Marburg), are among diseases increasingly becoming common causes of epidemics in sub Saharan Africa.

Lack of adequate personnel well equipped with innovative approaches in dealing with such major communicable and emerging disease problems together with inadequate supply of the relevant equipment and materials to fight epidemics is a major impediment in the control of infectious diseases. The Masters course in Tropical and Infectious Diseases is designed to address one aspect in the control process by training personnel who will form core infectious disease control teams consisting of physicians, dentists, pharmacists, nurses, epidemiologists and biologists capable of predicting disease outbreak, carrying out disease surveillance and controlling disease epidemics. The established core teams will be expected to work closely with the relevant government ministries to combat and control diseases. They will also be expected to work with non-governmental organizations (NGOs) and other international agencies such as the World Health Organization (WHO), Food and Agriculture Organization (FAO) and others.

Trainees of the programme will do coursework in the first year of their study following which they will be offered an intensive practical attachment in their areas of interest based on their professional background. During the attachment, trainees will be required to carry out a project related to their areas of professional interest.

The objectives of this programme are to:

- (a) Equip trainees with specialized skills to recognize suspected disease outbreaks in order to institute appropriate management and control measures.

- (b) Equip the trainees with the necessary knowledge and skills to conduct research in tropical and infectious diseases.
- (c) Build capacity for the prevention of outbreaks of epidemics and carry out surveillance of infectious diseases in the tropics.

2.0 ENTRY REQUIREMENTS

- 2.1 The common regulations for the Masters degree in the University of Nairobi shall apply.
- 2.2 Candidates eligible for admission into the Master of Science in Tropical and Infectious Diseases shall have any of the following minimum qualifications:
 - 2.2.1 Holders of Bachelor of Medicine and Bachelor of Surgery, Bachelor of Dental Surgery, Bachelor of Pharmacy, Bachelor of Nursing Sciences and Bachelor of Veterinary Medicine degrees from the University of Nairobi.
 - 2.2.2 Holders of Bachelor of Science upper second class degree or above in biomedical sciences from the University of Nairobi with at least three years working experience in medical research or in disease control programmes.
 - 2.2.3 Holders of Bachelor of Science lower second class degree in biomedical sciences from the University of Nairobi with at least five years working experience in medical research or in disease control programmes.
 - 2.2.4 Any other equivalent qualifications to the above from institutions recognised by the Senate of the University of Nairobi.

3.0 TRANSFER OF CREDITS

- 3.1 A candidate may be allowed to transfer up to a maximum of one third of the taught units provided that these are from institutions recognized by the Senate.
- 3.2 Applicants seeking transfer of credits shall:
 - 3.2.1 Send a formal application to the Director, Board of Postgraduate Studies through the Director, Institute of Tropical and Infectious Diseases seeking transfer of credit, justifying the request and attach evidence of credentials which would support such a request;
 - 3.2.2 Apply for transfer of credit, which shall be processed only after payment of the prescribed fees;

3.3 Applicants will only be allowed to transfer a unit, which is equivalent and/or at the same level with what is offered by the University of Nairobi.

3.4 No transfer of credits will be allowed in the clinical subjects.

4.0 COURSE DURATION AND STRUCTURE

4.1 The Master of Science degree course in Tropical and Infectious Diseases shall cover a minimum of four (4) semesters and a maximum of ten (10) semesters of fifteen (15) weeks each.

4.2 A candidate shall be required to take a minimum of three (3) course units and a maximum of five (5) course units in a semester.

4.3 The course shall consist of fifteen (15) units of sixty (60) hours each, a practicum and project.

4.4 The course shall be conducted through lectures, seminars, tutorials, laboratory and practicals.

4.5 The first year of study shall be by course work, tutorial, seminars, continuous assessment and end of year examinations. A candidate shall only proceed to the second year of study after successful completion of the first year examination.

4.6 In the second year of study, candidates shall take up an attachment /practicum in a discipline of their interest. They shall develop a research proposal so as to conduct original research, write a dissertation and sit for the final year examinations.

5.0 COURSE OUTLINE

YEAR I SEMESTER I

CODE	TITLE
WID 601	Medical Parasitology
90	
WID 603	Vector Biology
90	
WID 605	Immunology
90	
WID 607	Molecular Biology
90	
WID 609	Virology and Prion infections
90	

YEAR I SEMESTER II

CODE	TITLE	HOURS
WID 602	Medical Microbiology	150
WID 604	Pharmacology and Therapeutics	90
WID 606	Non-infectious Tropical Conditions	90
WID 703	Social Science and Health	60
WID 707	Health Systems Management	60

YEAR II SEMESTER I

CODE	TITLE	HOURS
WID 608	Research Methods	120
WID 705	Epidemiology and Biostatistics	120
WID 701	Tropical Paediatrics and Maternal Health	90
WID 709	Tropical and Travel Medicine	90
WID 710	Practicum I	120

(Students attachment to their areas of interest)

YEAR II SEMESTER II

CODE	TITLE	HOURS
WID 710	Practicum II	200
WID 750	Research project	320

6.0 EXAMINATION REGULATIONS

6.1 Written Examinations

- 6.1.1 The common regulations governing examinations for the Master's Degree in the University of Nairobi shall apply.
- 6.1.2 Examination for each taught Unit shall be held at the end of the semester.
- 6.1.3 Each Unit shall be examined by continuous assessment tests and end of semester examination.

- 6.1.4 Each examination shall be graded out of a 100% with a pass mark of 50%.
- 6.1.5 The final examinations in each course Unit shall constitute 70%. It shall be based on written papers, practicals and *viva voce* [where applicable]
- 6.1.6 The continuous assessment tests shall be based on written examinations, seminars, tutorials and practicals [where applicable]. It shall constitute 30% of the total final mark.
- 6.1.7 A candidate who fails to obtain a pass mark of 50% and above may, on the approval of the Senate, be allowed to sit for supplementary examination within three (3) months.
- 6.1.8 A candidate who fails the supplementary examination will be allowed to repeat the unit (s) in which he/she has failed.
- 6.1.9 A candidate who fails to sit or for good reasons fails to complete an end of semester examination shall be allowed to sit for special examinations.
- 6.1.10 A candidate who fails in supplementary examinations or fails to complete the course within the prescribed time shall on the recommendation of the Board of Examiners and approval by the Senate be discontinued.

6.2 Project Examination

- 6.2.1 The research project shall be examined according to the requirements of the University of Nairobi.
- 6.2.2 Candidates shall be required to submit a written dissertation report to the Board of Examiners for examination four (4) weeks before the end of the second semester of the second year.
- 6.2.3 The project shall be graded independently out of 100 marks with a pass mark of 50%. The distribution of the marks shall be as follows:
 - (a) Written report 70%
 - (b) Oral presentation 30%
- 6.2.4 A candidate who fails to obtain the pass mark in the dissertation shall on the recommendation of the Board of Examiners of the Institute and on approval by the Senate be allowed to resubmit the project up to a maximum of two (2) times within a period of six months.
- 6.2.5 A pass obtained for re-submission of the dissertation will be recorded as 50%.
- 6.2.6 A candidate who fails to obtain a pass in a dissertation at the second re-submission or fails to complete the course within the prescribed period shall on the recommendation of the Board of Examiners and approval of the Senate be discontinued.
- 6.2.7 The Course Units shall be graded as follows:

(a) Distinction	75%– 100%
(b) Credit	65% – 74%
(c) Pass	50% – 64%
(d) Fail	49% and below.

6.3 Examinations Schedule

The final examinations shall be as outlined in the following schedule:

6.3.1 FIRST YEAR

SEMESTER I

WID 601 Medical Parasitology

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	
Practical Paper	1x 2hrs	
<i>Viva voce</i>		1x 0.5hrs

WID 603 Vector Biology

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	
Practical Paper	1x 2 hrs	
<i>Viva voce</i>		1x ½ hrs

WID 605 Immunology

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	
<i>Viva voce</i>		1x ½ hrs

WID 607 Molecular Biology

Written Paper	1 x 3hrs	
Structured Questions	1 x 2 hrs	
Practical Paper	1x 2hrs	
<i>Viva voce</i>		1x ½ hrs

WID 609 Virology and Prion Infections

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	
<i>Viva voce</i>		1x ½ hrs

SEMESTER II

WID 602 Medical Microbiology

Written Paper	1 x 3 hrs	
Structured Questions	1 x 3 hrs	
Practical Paper	1x 3 hrs	
<i>Viva voce</i>		1x ½ hrs

WID 604 Pharmacology and Therapeutics

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	
<i>Viva voce</i>		1x ½ hrs

WID 606 Non-Infectious Tropical Conditions

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	
<i>Viva Voce</i>		1x ½ hrs

WID 608 Research Methods

Written Paper	1 x 3 hrs	
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6.3.2 SECOND YEAR

SEMESTER I

WID 701 Tropical Paediatrics and Maternal Health

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	

WID 703 Social Science and Health

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	

WID 705 Epidemiology and Biostatistics

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	

WID 707 Health Systems Management

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	

WID 709 Tropical and Travel Medicine

Written Paper	1 x 3 hrs	
Structured Questions	1 x 2 hrs	

SEMESTER II

WID 750 Research Project

Oral Defense

1 x 1 hr

7.0 DEGREE AWARD

A candidate who passes both the taught courses and the Research Project shall be awarded the degree of Master of Science in Tropical and Infectious Diseases (MSc.TID) of the University of Nairobi.

8.0 COURSE DESCRIPTION

WID 601 Medical Parasitology

Biology, life cycle, pathogenesis and diagnosis of parasitic infections in humans; laboratory identification of parasites; protozoa infections: intestinal protozoa- amoebae; balantidium, giardia, cryptosporidium, isospora; genital protozoa-trichomonas; blood and tissue protozoa-plasmodium, leishmania, trypanosomes, toxoplasma, babesia, sarcocystis, mycospora; helminthic infections: nematodes: intestinal-ascaris, hookworm, enterobius, strongyloides, trichuris, tissue nematodes – filaria, trichinella, dracunculus; trematodes: schistosomes, lung flukes, liver flukes; intestinal flukes; cestodes: taenia species; diphylobothrium; echinococcus; hymenolepis; special parasitic conditions: emerging and re-emerging parasitic infections; parasites and immunosuppression.

WID 602 Medical Microbiology

Introduction: classification and taxonomy, bacterial physiology and anatomy, pathogenicity, virulence and infection, bacterial toxins and enzymes, antimicrobial drugs and mechanisms of action, antimicrobial sensitivity testing and assays, resistance to antimicrobial drugs. Disinfectants, modes of action and testing efficacy, sterilization methods and testing of efficacy of sterilization. Systematic bacteriology: aerobic and anaerobic pyogenic cocci, aerobic and anaerobic bacilli; mycobacterium; tuberculosis, bovis, atypical mycobacterium, leprae, ulcerans; vibrio; campylobacter; rickettsia; chlamydia; mycoplasma; filamentous bacteria. Public health bacteriology: water; sewage; food poisoning. Clinical bacteriology: collection of specimens and processing; urine, stool, sputum, blood, cerebral spinal fluid, exudates, wound swabs, genito-urinary swabs; serological diagnostic tests; specific infections; tropical, upper respiratory, ocular, dermal and musculo-skeletal, abdominal, gastrointestinal, neurological, bacterial sexually transmitted; fungal infections: classification of fungi of medical importance; dermatophytes and agents of superficial mycoses; subcutaneous mycoses; systematic

mycoses; yeast infections; opportunistic fungal infections; processing of pathological fungal specimens; culture and sensitivity.

WID 603 Vector Biology

Medical Entomology: Biology and physiology of arthropods of medical importance, Classification of arthropods; Diptera–mosquitoes (anopheles, culex, aedes and other mosquitoes), - flies (glossina, phlebotomus, simulium, culicoides, chrysops and other tabanidae, musca and myiasis causing flies; Anoplura – pediculus, phthirus; Siphonaptera – fleas; Hemiptera – cimex; Arachnida – ticks and mites; Injurious non-parasitic arthropods; Medical Malacology; Biomphalaria, Bulinus, Onchomelania, Lymnea; For each of the groups methods of identification, life cycle, mechanisms of disease transmission and control.

WID 604 Pharmacology and Therapeutics

Chemotherapy of microbial diseases: principles of chemotherapy; pharmacokinetics; pharmacodynamics; signal transduction mechanisms; [Drug disposition in disease states](#); pharmacogenetics and Gene-based therapy; drug interactions; rational drug use; therapeutic drug monitoring; identification and development of compounds for treatment of infectious diseases; rational drug design: analysis of drug activity and mechanisms of drug resistance; immunopharmacology; principles of toxicology and poisoning.

WID 605 Immunology

Immunological concepts: Functional organization of the immune system – innate, humoral and cellular, immunocompetent cell ontogenesis, immunoglobulin structure and function, antigen recognition, antibody-antigen interactions, antigen processing and presentation; Effector mechanisms of the immune system: Cytokine actions and interactions as regulators of the immune responses to infections, cellular collaboration, complement systems, cell mediated effector responses, hypersensitivity reactions; Immune systems and pathogens: Immune responses to viral, fungal, and protozoa diseases, immune regulation and immunotherapy, immunodeficiency conditions and opportunistic infections, Immunodiagnosics including recombinant technology, HLA and human diseases, vaccination.

WID 606 Non-Infectious Tropical Conditions

Nutritional disorders: physiology and biochemistry of nutrients; micronutrients; malnutrition in the tropics; avitaminosis; interactions of nutrition and infection; Food economics in tropics: nutritional surveys; national, regional; prevention of malnutrition; special feeding programmes and health care, food toxicants, malabsorption; eating disorders; special conditions: anaemias; skin diseases, bites and stings, heat disorders; heat stroke, sunburn, eye diseases in the tropics, surgery in the tropics, anaesthesiology, mental health in the tropics, medicine and socio-cultural practises.

WID 607 Molecular Biology

Bacterial genetics: deoxyribonucleic acid (DNA); structure of DNA, replication of DNA, recombination at the molecular level, mutability and repair of DNA, DNA extraction; ribonucleic acid (RNA); structures, replication, mutability, RNA extraction, regulation of gene function in bacterial cells, regulation of protein synthesis and function in bacteria, replication of bacteriophage viruses; plasmid analysis; molecular epidemiology; DNA amplification; general concepts and methods, conventional Polymerase Chain Reaction (PCR), real time polymerase chain reaction, multiplex polymerase chain reaction; protein structures and synthesis; molecular diagnostic tools in virology; deoxyribonucleic Acid viruses, ribonucleic acid viruses; ligase chain reaction (LCR) techniques: PCR methods for study of bacterial diseases, viral fungal and parasitic diseases, Human Immunodeficiency Virus (HIV), hepatitis C virus, human Papilloma viruses; molecular approaches for the detection and identification of drug resistance; molecular biology of parasitic diseases; malaria, trypanosomiasis, leishmaniasis, pneumocystis; impact of molecular methods on clinical bacteriology and virology; DNA vaccines; viruses and bacteria as vectors for vaccine technology.

WID 608 Research Methods

Introduction to research methodology; qualitative and quantitative, development of research project proposal: prioritization of health problems, problem statement, research questions, hypothesis, justification/rationale, objectives; literature review and critical appraisal; sampling and sample size; instrumentation; validation of instruments, principles of ethics; preparation for field work: budgeting and logistics, data collection and management; modeling and simulation use of computer software; report writing and dissemination; research grant writing.

WID 609 Virology and Prion Infections

General properties of viruses; The biology of virus replication; Laboratory diagnosis of viral infections; Epidemiology of viral infections; deoxyribonucleic acid viruses: poxviruses; variola, molluscum contagiosum, animal poxviruses; herpes viruses; herpes simplex virus, epstein Barr virus, varicella zoster virus and cytomegalovirus; adenoviruses; papova viruses; Human Papilloma viruses, polyoma and vacuolating virus including simian virus 40; parvoviruses; ribonucleic acid viruses: picorna viruses: rhinoviruses; enteroviruses: polio, echo and coxsackie viruses; rotavirus, norwalk virus, astrovirus, calcivirus, coronavirus, small round viruses, orthomyxo- and paramyxoviruses, influenza virus, parainfluenza virus, respiratory syncytial virus, mumps virus, measles virus and rubella virus; rhabdoviruses ;rabies; togaviruses ;alphaviruses and flaviviruses, Marburg and Ebola viruses; arenaviruses; lymphocytic choriomeningitis, lassa virus; retroviruses; human immunodeficiency viruses (HIV), simian immunodeficiency viruses (SIV), human T-lymphocytic viruses (HTLV); emerging and re-emerging viral infections; prions, haemorrhagic fevers, severe acute respiratory syndrome (SARS).

WID 701 Tropical Paediatrics and Maternal Health

Morbidity and mortality in childhood: care of neonates, low-birth-weight babies, neonatal infections, breast-feeding and infant nutrition, protein calorie malnutrition; underweight, kwashiakor, marasmus, vitamin deficiency syndromes, gastro-enteritis and dehydration; immunisable infectious diseases of childhood – measles, meningitis, polio, diphtheria, tuberculosis, neonatal tetanus, rotavirus; anaemia – nutritional anaemia, Haemoglobinopathies, infection induced anaemia; non-infectious diseases; Burkitt's lymphoma, rheumatic disorders, accidents and poisoning; Maternal Health and morbidity: causes, indices, prevention; Infectious diseases in pregnancy; HIV, TB, malaria, and Syphilis.

WID 703 Social Science and Health

Socio-cultural approaches: contextualization; emic and etic approaches; conceptual framework; culture and health; classification of theories of illness causation; illness and health as cultural phenomenon; explanatory models; biomedical versus cultural; human behaviour and disease; Illness behaviour: the sick role; decision making and health seeking behaviour: determinants; pattern of resort; provider/client interaction; perception of quality of care; health systems: health system as part of culture system; ethno

medicine; medical pluralism; food, health and culture: definition of food; food preferences; genetically modified food; avoidance and taboos; changing food and dietary pattern; social change and health: development and modernization; acculturation; diseases of development; population mobility/dynamics: migration health; gender and health; community participation in health care; the impact of natural disasters and conflicts on health.

WID 705 Epidemiology and Biostatistics

Introduction to epidemiology, causes and natural history of diseases, methods of disease control, clinical epidemiology, measures of disease occurrence and effect, morbidity and mortality rates, standardization; types of epidemiological studies: observational studies; descriptive and analytic studies, intervention studies; randomized control studies; ecological studies; public health and epidemiology: principles of public health and epidemiology, public health significance of infectious diseases, public health services; surveillance, monitoring and evaluation of disease control strategies, early warning systems, geographical information systems (GIS); use of appropriate GIS software in health studies; data collection tools and design, measures of spread and presentation, data processing and reduction, choice of appropriate analytical techniques, hypothesis testing and tests of significance, diagnostic tests; sensitivity, specificity, predictive values; binomial/normal distribution; odds ratios relative risk; sampling distribution; sample size calculation, calculation of confidence intervals, probit and logit; kappa and other tests, analysis and presentation of data from epidemiological studies, epidemiological models, field trip.

WID 707 Health Systems Management

Analysis of the various stages of policy making; health economics and financing; basic approaches to financing health care systems; principles of health economics; general taxation, insurance and out-of-pocket payments for health care: financial management; accounting and control; costing and pricing of health services; budgeting and budgetary control; financial and business planning: essentials of health systems promotion; health care delivery; core epidemiology; core concepts in social sciences; organization management; behaviour, motivation, roles, interaction, leadership, power, influence, groups, culture; staff development; politics; design and change in organizations. History of management theory: Human resource; Health care intervention; Outbreak and disaster management; Health systems and policies and analysis of the various stages of policy making. Health care evaluation: quality; effectiveness; equity.

WID 709 Tropical and Travel Medicine

Ecology of tropical diseases; gastrointestinal infections: amoebiasis, cryptosporidiosis, typhoid, cholera, shigellosis, giardiasis and malabsorption; systemic infections: parasitic; malaria, trypanosomiasis, leishmaniasis, schistosomiasis and filariasis; bacterial; tuberculosis, leprosy, tetanus, meningitis, plague, septicaemias, rickettsial diseases; viral; HIV/AIDS, hepatitis, rabies, other viral diseases in the tropics, fungal; deep and superficial mycosis. Diseases related to travel in the tropics; international health regulations: preventive and control measures, port health, immunization and public health law; special diagnostic procedures; microscopy, cultures, serological diagnosis, histopathology/tissue diagnosis; practical procedures: molecular diagnostic techniques, tissues biopsies; rectal snips, liver biopsy, splenic aspirations, fine needle aspirate, aspirations of abscesses, skin biopsy and smear; radiological diagnosis: plain x-ray, sonography, contrast studies, computerized tomography, magnetic resonance imaging, intervention radiology

WID 710 Practicum

Candidates shall be attached to a discipline of their choice which is related to one of the major areas of study within the master's programme. Clinical based students will participate in the management of infectious disease patients under the supervision of an instructor. Laboratory based students will take their rotation in laboratory based disciplines such as Medical Parasitology, Molecular Biology, Medical Microbiology, Immunology etc. While others will be attached to other areas identified for rotation. They will spend their time in all sections of the discipline learning and carrying out all procedures under the supervision of an instructor within the discipline. They shall finalize their proposals and submit for ethical approval.

WID 750 Research Project

Candidates shall carry out a project in the selected area of specialization under supervision as approved by the Institute. The written project shall be submitted for evaluation four weeks before the end of the semester in which it is being examined.