THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

HEALTH LABORATORY PRACTITIONERS' COUNCIL (HLPC)

GUIDELINE FOR THE ESTABLISHMENT OF THE HEALTH LABORATORY TRAINING PROGRAM

February, 2024

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FOREWORD

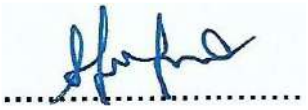
The Health Laboratory Practitioner's Council (HLPC) is mandated prescribe standards and conditions for establishing a training institution for also to advise and regulate the implementation of the curricula for the training of health laboratory assistant, health laboratory technologist and health laboratory scientists. The provision of health services in acceptable quality and standards which is assured by availability of capable human resource of adequate number and is an integral component of Universal Health Coverage.

In this training component, for example, the Ministry in collaboration with the private sector run a number of health and social welfare institutions; government owned, privately owned, and through public-private partnership.

The uncoordinated and inadequately streamlined procedures for granting approval to institution intended to establish Medical laboratory training program due to unavailability set of rules and procedures to adhere to meet minimum requirement.

In order address the above challenge, the HLPC has developed this standard for the establishment of medical laboratory training program. This guideline provides for the basic minimum requirements to be fulfilled for the medical laboratory sciences in the acquisition of the preliminary approval.

It is the expectation of the HLPC that all stakeholders will use this standard as a guiding tool for the provision of quality medical laboratory sciences training program in Tanzania.



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Chief Medical Officer

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Also, I would like to thank the following for their valuable and pivotal role in the development of this guideline: Dr. Balthazar M. Nyombi (from KCMUCo); Mr. Adam Mwakyoma (from KCMC); Mr. BetrandMsemwa(from CUHAS); Dr. Fulgence Matimbo (from TCU); Mr. Emmanuel Njuu (from Tanga COHAS); Mr. Judethadeus Munishi (from MNH); Dr. George Mugusi (from DECOHAS); Mr. Isaac G. Paul (from Diagnostic Services Unit - MoH); Ms. Zubeda M. Salum (from HLPC); Mr. A medeus L. Mushi (from HLPC); and Joseph N. Nkinga (from HLPC).

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Mary Faustin Mtui
Registrar - HLPC

Abbreviations

ALAT	Alanine Amino Transferase
ALP	Alkaline Phosphatase
ARC	Academic Research and Consultancy
ASAT	Aspartate Amino Transferase
BSc	Bachelor of Science
CHMT	Council Health Management Team
CK	Creatinine Kinase
Cm	Centimeter
M	Meter
M^2	Meter Squared
CPK	Creatinine Phosphokinase
CUM	Curriculum Master Plan
DMO	District Medical Officer
DP – ARC	Deputy Principal – Academic, Research and Consultancy
DP – PFA	Deputy Principal – Planning, Finance and Administration
G6PD	Glucose 6 Phosphate Dehydrogenase
GGT	Gamma GlutamylTransferase
GPA	Grade Point Average
HDL	High Density Lipoprotein
HIV	Human Immunodeficiency Virus
HLPC	Health Laboratory Practitioners' Council
HLTI	Health Laboratory Training Institute
HLTP	Health Laboratory Training Program
HTI	Health Training Institute (also referred to as Medical Laboratory Training Institution)
ICT	Information Communication Technology
LDH	Lactate dehydrogenase
MoH	Ministry of Health
MoU	Memorandum of Understanding
mRDT	Malaria Rapid Diagnosis Test
NACTVET	National Council for Technical and Vocational Education Training
NTA	National Technical Award
OSHA	Occupational Safety and Health Authority
PFA	Planning, Finance and Administration
PSA	Prostate Specific Antigen
PVC	Polyvinyl Chloride
RPR	Rapid Plasma Reagin
SOPs	Standard Operating Procedures
T_3	Triiodothyroninehomone
T_4	Thyroxinehomone

TCBS	Thiosulfate Citrate Bile Salt
TCU	Tanzania Commission for Universities
TG	Triglycerides
TSH	Thyroid Stimulating Hormone
TV	Television
TVET	Technical and Vocational Education and Training
VLDL	Very Low Density Lipoprotein
XLD	Xylose Lysine Deoxycholate

Definition of terms

"**Academic Staff**" means a professional member of an institution such as a teacher, tutor, instructor who supports a trainee to achieve his/her training objectives.

"**Accreditation**" means an approval by Training Regulatory Authorities (Tanzania Commission for Universities (TCU) and National Council for Technical and Vocational Education and Training(NACTIVET)), granted to an institution on account of having programmes and quality assurance system that ensures the provision of set qualifications and educational standards.

"**Curriculum**," means a curriculum that has been officially accepted by the responsible Councils under the provisions of these guidelines, as meeting the satisfactory set of standards for training a particular programme leading to the acquisition of a qualifying award.

"**Institution**" means an institution or part of an institution approved by the responsible Councils under the provisions of these guidelines, to provide a programme leading to the acquisition of a qualifying award.

"Health Laboratory Training" Offer knowledge and skills of the following but not limited; Hematology, Blood transfusion, Medical Microbiology, Clinical chemistry, Medical Parasitology and Entomology, Histology and Cytology, Anatomy and Physiology.

"**Health Laboratory Training Institution**" means an institution or part of an institution approved by NACTVET or TCU to provide a medical laboratory program leading to the acquisition of a qualifying award.

"**Classroom**" means a specialized room in a training institution, constructed under specified requirements, where training and learning processes are taking place.

"**Medical Laboratory Instructor**" means a trained professional who guides and supervises students to acquire practical skills during clinical rotations in health laboratory facilities.

"**Field Practical Instructor**" means a trained professional who guides and supervises students to acquire practical skills during field visits in medical settings.

"**Institutional Governance**" means mechanisms used by a training institution to ensure that its constituents follow its established processes and policies.

"**Local Government Authority**" means administrative body for a City, Municipal, Township or District.

"**Module**" means an independent package of learning related to an academic programme studied by a student for a fixed number of hours during a semester that can be credited towards the final award at any given level.

"**National Technical Award**" is an academic award in the National Council for Technical and Vocational Education and Training (NACTVET) Qualification Framework awarded to students upon successful completion of the programme requirements.

“**Practicum Site**” means a place in a specialized field of study, that is designed to give students an opportunity for a supervised practical application of a previously or concurrently studied theory.

“**Professional Regulatory Bodies**” means a Body empowered by legislation to oversee and control the performance of related professionals after completing a course of studies.

“**Programme**” means an academic level of training offered by an institution in recognized field of study that culminate in identified student competencies leading to the defined award.

“**Skills Laboratory**” means a specialized room that is mainly used for training and learning practical skills of the respective programme of study prior to students’ exposure to medical laboratory practice.

“Teaching Clinical laboratory” means Medical Laboratory which can be autonomous or attached in Hospital which offer services to patients/clients whereby the LaboratoryTraining Institution has Memorandum of Understanding (MoU) for students attend for routinely practice.

Scope:

This Standard for establishment of Health Laboratory Training Institution identifies the minimum benchmarks for Medical Laboratory programs.

The Standard will assist the stakeholders to align with minimum requirements for establishing Health Laboratory Training Institution. Institutions are encouraged to go beyond these minimum Standards as they seek for a competitive quality and excellence of their respectively programmes

Table of Contents

CHAPTER ONE: Introduction

1.1 Background

The Health Laboratory Practitioners' Council (HLPC) is a corporate body established under Health Laboratory Practitioners Act No. 22 of 2007 for the purpose of regulating medical laboratory profession. The Act provides a legal framework to coordinate the registration and regulation of health laboratory practitioners to provide directives on the related matters as per prescribed professional requirement.

Among the mandates of the Council are to prescribe standards and conditions for establishing the Health Laboratory Training Institution (HLTI), advice and regulate the implementation of the curricula for the training of health laboratory professionals. The purpose is to ensure that the intended competences at each level of program completion are acquired before the council registers the graduates as medical laboratory practitioners.

Regarding the mentioned mandates, the Council has been implementing various measures aiming at advancing the quality of training provided in accordance with the demand and changing in science and technology to obtain competent medical laboratory practitioners. In establishment of Health Laboratory Training institution, the role of the Council is to guarantee the medical laboratory institution has all necessary requirements prior to accreditation by respective authorities such as Tanzania Commission for Universities (TCU) and National Council for Technical and Vocational Education and Training (NACTIVET),

The HLPC has an obligation to assess the compliance to standards and conditions for establishing medical laboratory institutions. However, the Council lacks a guideline that can assist to carry out the assignment of assessing the training institution objectively. This has led to subjectivity in the assessment exercises and inconsistent feedback to stakeholders. The HLPC has developed this guideline with minimum requirements to guide stakeholders intending to establish Health Laboratory Training Institutions, and assist the HLPC office to provide unbiased assessment feedback to stakeholders for improvement of their facilities.

1.2 Mandate and Responsibilities of the Council

In discharging its mandate, the Council has been charged with the responsibilities, among others, to:

(a) Advise and regulate the implementation of the curricula for the training of health laboratory assistant, health laboratory technologist and health laboratory scientists;

(b) Prescribe ethics and code of conduct for health laboratory practitioners;

(c) Regulated the standard and practice of the profession of health laboratory;

Evaluating and approve applications from qualified health laboratory practitioners and person intending to be licensed;

Advise the Government on the matters relating to delivery of Health laboratories services and performance of functions of health laboratory practitioners; and

Conduct examination for the health laboratory practitioner prior to registration or enrolment, if necessary.

1.3 Vision

A model and autonomous excellence driven body corporate for quality health laboratory practice

1.4 Mission

Regulation of Health Laboratory practice of high standard, safe and ethical through appropriate training, registration and licensing of Health Laboratory Practitioners

CHAPTER TWO

PROCEDURE FOR APPROVAL

The proposed HLTI shall invite the HLPC to assess the fulfillment of requirements prior to submission of application to the registration and accreditation authorities (NACTVET/TCU).

2.1 Submission of Application

An entity intending to establish a HLTI shall submit a formal application including the following:

a) Application letter;

b) Self- assessment filled checklist form (appendix V);

c) Filled application form (F 08); and

d) Evidence of payment of non-refundable application fee.

2.2 Assessment of the application

After receiving the application documents for the proposed HLTI, the HLPC shall:

a) Acknowledge the receipt of application documents to the applicant.

b) Assess the application documents package if they satisfy for the proposed HLTI. The HLTI deserves to be visited for the assessment and verification.

c) Appoint the assessment team when the proposed HLTI has scored 60% of overall requirements. However, the following categories shall score not below 60% in the self-assessment:

- Academic staff;
- Laboratory (equipment and instrument, Chemicals /reagents);
- Infrastructure;
- Furniture;
- Library; and
- Practical Teaching Facility.

d) Communicate with the HLTI on the proposed date for a HLPC team visit to the site for the assessment.

2.3 Recommendation on Approval

The Council Education Committee shall review the report provided by Appointed Assessment Team and give its recommendation to the Council for making the approval decision.

The Registrar will provide the report with a covering letter to the applicant and the accrediting authority on the decision made by the Council.

2.4 Reassessment application

The proposed HLTI if scored below the acceptable score, the applicant shall apply for the reassessment after addressing identified deficiencies.

Note: If it is found that, there is any false/fraud information provided by the applying HLTI such as documents of ownership of buildings, equipment, invalid (forged/false) documents of staff, infrastructures, or any other document required during the assessment; the assessment procedure shall be denied.

2.5 Student Enrolment Benchmarking

2.5.1 Enrolment of students

The HLTI shall comply with NACTVET or TCU standard to ensure quality enrolled students.

2.5.2 Institution Capacity

HLTI shall prove to have recommended resources such as physical infrastructures, practicum site, qualified tutors, and accepted student: tutor ratio, teaching and learning materials in compliance with NACTVET or TCU standard.

CHAPTER THREE

REQUIREMENTS FOR ESTABLISHMENT OF A HEALTH LABORATORY TRAINING INSTITUTE

3.1 Physical Environment

3.1.1. Land size

The area should be sufficient to accommodate all buildings for students' accommodation (when applicable), classrooms, teaching laboratories, dinning, recreation, computer laboratory, library, and administration offices depending on the enrolment capacity of the programs.

3.1.2 Location

i) The HLTI shall be located in an area easily accessible throughout the year.

ii) This location shall be conducive (away from workshops, highway, market, bus stand, garage, water logged and casino) for teaching and learning environment for both theory and practical components.

iii) The area shall be planned to enable access to all buildings in case of emergency services.

iv) It shall have a well-defined physical address (Location with GPS codes).

3.1.3 Land Ownership

There shall be clearly defined ownership of the land where the training institution is located; with deemed rights observed one of the following is required:

(i) Title deed.

(ii) Renting for a period of not less than five (5) years, whereby certified copy of the legal lease agreement should be available to the respective institution.

3.1.4 Safety and Security

(i) The institution shall have well defined land boundaries.

(ii) The institution shall have a sufficient safe emergency assembly area to accommodate number of enrolment capacity.

(iii) The institution shall comply with fire safety, chemical and electrical safety requirements.

(iv) The applying institution shall have environmental impact assessment and Occupational Safety and Health Authority (OSHA) compliance certificate.

3.1.5 Facilities for Extra-Curricular Activities

Training institution shall possess the following or having MoU for facilitating extra-curricular activities:

a) Playgrounds for physical fitness; and

b) Recreation hall/area.

3.1.6 Transport

Training institution shall have a reliable means of transport.

3.2 Governance and Management

The HLTI shall have a well-defined management team with an organogram for enforcing efficiency in running the institution.

3.2.1 Technical training institution

The HLTI shall have a well-defined system of governance and administration including but not limited to:

(i) Principal;

(ii) Deputy Principals (Academic Research and Consultancy & Planning, Finance and Administration);

(iii) Quality Assurance Officer;

(iv) Examination Officer;

(v) Admission Officer;

(vi) Head of Department;

(vii) Academic Staff;

(viii) Supporting Staff; and

(ix) Students' organization/union structure.

3.2.1.1 Principal

Principal of the HLTI shall have the following qualifications:

(i) Be a holder of a degree and above in the medical field. Have a minimum of 3 years teaching experience in Health Training Institutions;

(ii) Shall be registered by the respective professional Council; and

(iii) Shall have a letter of appointment to the post of Principal.

Deputy Principal of the HLTI shall have the following qualifications:

(i) Be a holder of a degree and above in the medical field. Have a minimum of 3 years teaching experience in Health Training Institutions;

(ii) Shall be registered by the respective professional Council; and

(iii) Shall have a letter of appointment to the post of Deputy Principal.

3.1.1.2 Quality Assurance Officer

The HLTI shall have a Quality Assurance Officer who shall oversee quality matters of academics and shall have the following qualifications;

(i) Be a holder of a degree and above in medical field;

(ii) Shall be registered by the respective professional Council;

(iii) Shall have a letter of appointment of the post of Quality Assurance Officer; and has

(iv) Attended a quality assurance Training course is an added advantage.

3.2.1.3 Examination Officer

The Examination Officer is responsible to manage matters pertaining to examinations. The Examination Officer shall have the following qualifications:

(i) Be a holder of degree or above;

(ii) Must possess computer knowledge and skills in Microsoft Office;

(iii) Must be registered by professional council if applicable;

(iv) Have letter of appointment from head of institution; and

(v) Have a minimum of 1 year working experience in health training institutions.

3.2.1.4 Admission Officer

The HTI shall have Admission Officer who ensures admitted students meet the minimum entry requirements, also ensures student is registered and enrolled in respective academic year intakes. The Admission Officer shall have the following qualifications:

(i) Be a holder of degree or above;

(ii) Must possess computer knowledge and skills in Microsoft Office;

(iii) Have letter of appointment from head of institution;

(iv) Ensures admitted students meet the minimum entry requirements; and

(v) Ensures students are registered and enrolled in respective academic year intakes and based on institution capacity.

3.2.1.5 Head of Department

The Head of Department shall meet the following:

(i) Shall be a holder of a degree or above in Health Laboratory Sciences;

(ii) Shall have attended teaching methodology at recognized institution where applicable;

(iii) Shall be registered by the HLPC; and

(iv) Shall have a letter of appointment for the Head of Department post.

3.2.1.6 Academic Staff

(a) Full time

(i) The academic staff shall comprise of a minimum permanent staffing level for establishing Technical training (Tutor: Student Ratio = 1:50) for single module.

(ii) One academic staff shall not facilitate more than two teaching modules in the whole program.

(iii) The academic staff shall have a degree and above.

(iv) Instructor for practical demonstrations shall have a minimum of Ordinary Diploma in Medical Laboratory Sciences.

(b) **Part Time:** may include volunteers, emeritus, and honorary.

3.2.2 University level

A University/University College shall have a well-defined system of governance and administration including but not limited to:

(i) Vice Chancellor;

(ii) Deputy Vice Chancellor Academic;

(iii) Deputy Vice Chancellor Administration;

(iv) Principal/Dean of College/School;

(v) Director of Quality Assurance;

(vi) Deputy Principal of College/School-Academic;

(vii) Deputy Principal of College/School- Administration;

(viii) Directors/Heads of Departments;

(ix) Deputy Director/ Heads of Departments;

(x) Academic Staff; and

(xi) Supporting Staff.

3.2.2.1 University Organogram

(i) The details of the qualification, roles and responsibilities of each title in the university organogram shall align with the TCU's University Act. 2005.

(ii) The academic staff in establishment of Bachelor of Medical Laboratory Sciences (BMLS) shall be of at least one higher level of education (holder of master degree) directly related to the health laboratory sciences.

(iii) Ratio of academic staff to students (1:25).

(iv) Each specialty (Haematology and Blood transfusion, Clinical Chemistry, Microbiology and Immunology, Medical Parasitology and Entomology, Histology and Cytology, Anatomy, Physiology and Biochemistry) shall have at least one full time academic staff supported by part time academic staff who should not be more than 30% of full time academic staff.

3.2.2.2 Non-Teaching Staff

The following supporting staff are required as non-academic staff, but not limited to:

(i) Computer System Administrator;

(ii) Human Resource Officer (Human Resources Manager);

(iii) Office Attendants;

(iv) Cleaners (could be out-sourced);

(v) Security Guards (could be out-sourced);

(vi) Librarian for BMLS/Assistant Librarian for technical training program;

(vii) Procurement Officer;

(viii) Bursar/Accountant;

(ix) Warden/ Counsellor (if applicable);

(x) Driver;

(xi) Chefs/Cook if applicable;

(xii) Estate Manager;

(xiii) Bioengineer/Technician;

(xiv) Student Loan Board officer (for BMLS); and

(xv) Other supporting staff.

3.3 Teaching and Learning Facilities

3.3.1 Buildings

The buildings layout plans shall comprise of the following:

(i) Construction shall be done with either a concrete frame of cement or any other permanent approved material.

(ii) The wall shall be smooth coated with an attractive washable color.

(iii) Roofing with hardwood treated timber or iron rods with corrugated galvanized iron or aluminum roofing sheets or burned clayed tiles or a cement slab.

(iv) Strong double doors, large windows must open toward outside to allow ventilation.

3.3.2 Classrooms

The HLTI shall have classrooms with the following specifications:

(i) The minimum space of 2 square meters per student with maximum capacity of 50 students per classroom.

(ii) There shall be at least one classroom per NTA level.

(iii) There shall be audio visual facilities per teaching room.

(iv) There shall be appropriate chairs and tables with a ratio of 1:1 in a classroom.

(v) There shall be adequate light and ventilation in a classroom.

3.3.3 Teaching Laboratory

There shall be adequate light and ventilation teaching laboratory with the following:

(i) Minimum space of 2 square meters per student with maximum capacity of 50 students per laboratory.

(ii) Audio visual facilities per laboratory.

(iii) Flat firm marble/formaica top benches preferably of white colour with locked cabinets.

(iv) Chemical resistant Laboratory sinks with elbow water-tape.

(v) Chemical resistant and washable floor.

(vi) Emergency shower and eyewash station.

(vii) Laboratory stool (wooden with water resistant washable material top or PVC) which comply with height of the benches.

(viii) The laboratory building shall have provision for infrastructure for electricity, gas and water supply.

(ix) Firefighting equipment *(fire extinguishers, sand bucket, smoke* detectors, fire blanket).

(x) Standby electric generator for backup power supply.

(xi) General Laboratory store room with adequate shelves for reagents and consumables.

(xii)Laboratory reagents preparation room.

(xiii) Laboratory office(s).

(xiv) Two large doors opening outside (Size 120cm wide).

(xv)Two toilets at least within 50 meters (for gentlemen, ladies and disabled).

(xvi) Adequate lighting and ventilation or air conditioning.

(xvii) Fume chamber/ biosafety cabinet.

(xviii) Teaching aids for different modules (charts, atlases, pictures).

(xix) Lockers for student belongings.

(xx) Reagents and equipment, glassware *(see the Appendix 1 - III).* All equipment shall be permanent labeled with institution unique identifier on it.

3.3.3.1 Computer Laboratory and ICT Infrastructures

Computer Laboratory:

Computer room shall have enough space to accommodate 25 students and shall comprise the following:

(i) Maximum ratio of one students per computer during training sessions;

(ii) Reliable electric supply;

(iii) Equipped with desktop or laptop computers;

(iv) Adequate lighting and ventilation;

(v) Air condition;

(vi) Storage room;

(vii) Teaching aids (boards, projector etc);

(viii) Reliable internet connections; and

(ix) Adequate chairs and tables.

3.3.4 Library

The library shall meet the following conditions:

a) Minimum space of 1 square meter per student with minimum capacity of 50 students per room;

b) Large enough to hold available text books and other relevant materials. Have adequate and up to date textbooks, journals and periodicals for the Health Laboratory Sciences programme as prescribed by the curricular and indicated but not limited to the list in appendix IV and must have the following:

(i) Have office for the Librarian / working room

(ii) Have reliable internet connection

c) Have at least four (4) computers connected to the internet to cater for e-Library

d) Have toilet facility for both students and tutors nearby (max. 50 meter away)

(i) Have adequate lighting and ventilation or air condition

(ii) Have a room/area for special reserve books

(iii) Have a reception space with area for keeping users' items

3.3.5 Offices

The administrative block shall comprise the following minimum number of offices:

(i) Principal's office

(ii) Deputy Principal- Academic, Research and Consultancy;

(iii) Deputy Principal- Planning, Finance and administration;

(iv) Quality Assurance Office;

(v) Head of Department Office;

(vi) Secretary's Office;

(vii) Academic staff office(s); and

(viii) Non-academic members' staff offices.

Other required offices include:

(i) Strong room, examination office, record office, admission office, boardroom or equivalent.

(ii) Offices should be furnished with office chairs, tables, cabinets, computers with internet connection, dust bins, etc.

3.3.6 Infrastructures to Support Physical Disabilities

The HLTI buildings should favor people with disability.

3.3.7 Dining Hall

Each HLTI should have dining hall/canteen/ cafeteria:

(i) A dining hall shall have sufficient area and accessible; and

(ii) Running water and dish washing sinks.

3.3.8 Recreation Facilities

The institution should have at least one recreation hall which also could be used for multipurpose activities.

3.3.9 Student Residential Area (if applicable)

Where applicable Dormitories/Hostel should have the following specifications:

(i) A room intending to be occupied with two people (two beds) with enough ventilation.

(ii) Toilets: Water closets or pit latrine stances can be used in a ratio of 1:10. At least one toilet should be accessible for females with disabilities and one for males with disabilities.

(iii) Fire extinguishers: The building should be equipped with the necessary fire extinguisher.

3.3.10 Sanitary and Disposal Places (Sanitation Facilities)

There should be availability of the following:

(i) Water closets;

(ii) Urinals; and

(iii) Laundry facilities.

3.3.11 Fire and Safety

A HLTI shall comply with fire safety requirements by providing a fire certificate. The building should be equipped with the necessary items as follows:

(i) Fire extinguisher/Fire hose reel/Sand buckets/Fire blankets;

(ii) Assembly point;

(iii) Siren;

(iv) Exit direction;

(v) Fire detectors;

(vi) Emergency exits;

(vii) First aid and Evacuation facilities;

(viii) Fire hydrants; and

(ix) Water reservoir.

3.3.12 Teaching Clinical Laboratory

a) There shall be a MoU between established health training Institution and registered clinical laboratory. Clinical laboratory can be autonomous or attached Medical Laboratory.

b) All Teaching Health Laboratories shall have the following:

(i) Qualified registered health laboratory personnel (Ratio Expert 1:5 students), shall not exceed 30 students at once in particular laboratory.

(ii) Available MoU between two parties.

(iii) One teaching clinical laboratory shall not be used by more than thity students per once.

(iv) The teaching clinical laboratory shall be easily accessible within 15km from the HLTI.

(v) All basic laboratory sections (Hematology, Blood Transfusion, Parasitology, Clinical Chemistry, Microbiology and Immunology). The sections such as Histopathology/Cytopathology and Molecular Biology can be scheduled to visit facilities where these sections are available (MoU is required).

(vi) Shall be implementing quality management system.

c) The roles of teaching clinical laboratory facility shall include but not limited to:

(i) Sign agreed MoU between the two parties.

(ii) Establishment of mutual relationship between clinical laboratory staff and students.

(iii) Identify focal person among its staff for clinical placement coordination.

(iv) Provide opportunity for students to practice their skills (hands on activities).

(v) Supervise and monitor clinical/practical teaching.

(vi) Allow HLTI academic staff to participate in patient care.

3.3.13 Teaching and Learning Materials

The established HLTI shall have teaching and learning materials that include but not limited to the following:

(i) Books/ Students ratio 1:5 (1 relevant book for each module: Appendix IV). Books can be hard copy or soft copy (e-library).

(ii) There shall be one (1) practical logbook/procedure book per student.

(iii) Multimedia LCD projector – one (1) per classroom.

(iv) There shall be one laptop per classroom.

3.4 Students' Welfare

(i) A HLTI shall provide adequate and appropriate resources to support student learning and the general welfare.

(ii) The HLTI shall make provision for adequate catering and food services to be available for students and staff. This should be planned during the establishment of the institution.

(iii) In addition, a dedicated room for medical emergencies should be available.

3.4.1 Health Insurance

The HLTI shall ensure that all enrolled students have health insurance from a recognized insurer as per the National Health Insurance Fund (NHIF) or other national regulation.

CHAPTER FOUR

4.1. APPENDICES

4.1.1. Appendix I: Medical Laboratory equipment list

	ITEM	IDEAL (item : Student)
1.	Microscopes with micrometer for students	1:4
2.	Colorimeter or Spectrophotometer	1:8
3.	Electrical centrifuge minimum 12 tubes capacity. Adjustable speed to maximum of 5000rpm	1:10
4.	Water baths 20Lt capacity	1:25
5.	Electrical Autoclaves not less than 60lt capacity	1:50
6.	Digital analytical weighing scales (0.01g – 1500g)	1:25
7.	Water Distiller (Minimum 25 Lt/Hour)	1:100
8.	pH meter	1:25
9.	Digital Timer	1:2
10	Hot air oven	1:25
11	Incubator (Minimum 200lt capacity)	1:25
12	Hot plate	1:25
13	Laboratory Refrigerator with transparent door (100lts minimum	1:50
14	Deep-freezer -20^{O}C (Capacity 100 Lt)	1:100
15	Bunsen burner and/or Spirit lamp	1:5
16	Haematocrit/ Micro centrifuge	1:10
17	Vortex /Micro mixer	1:10
18	Inoculating wire loops/disposable loops	1:2
19	Nichrome straight wire	1:2

20	Forceps	1:5
21	Test tube holders	1:5
22	Racks for test tubes	1:1
23	Micro – pipettes 10-100µl 5 – 200 µl	1:5
24	Micro – pipettes 20-200µl	1:5
25	Micro – pipettes 100-1000µl	1:5
26	Micro – pipettes multichannel	1:25
27	Differential cell counter	1:5
28	Tally counter	1:5
29	Urinometer/ Hydrometer	1:10
30	Cuvettes	1:1

4.1.2.Appendix II: Medical laboratory glassware /instruments list

	ITEM	IDEAL (item:student)
1.	Graduated measuring cylinder (10, 25, 50, 100, 250, 500, 1000ml) each	1:5
2.	Conical flask (50, 100, 250, 500, 1000ml) each	1:5
3.	Round-bottom volumetric flask (50, 100, 250, 500, 1000ml) each	1:5
4.	Flat-bottom volumetric flask (50, 100, 250, 500, 1000ml) each	1:5
5.	Beakers(50, 100, 200, 250, 500, 1000Mls) each	1:5
6.	Funnel (65, 100,160mm diameter) each	1:10
7.	Coupling jars	1:5
8.	Disposable Pasteur pipettes	1:1
9.	Neubaur counting chamber	1:4
10.	Westergren tube	1:1
11.	Westergren stand rack	1:5
12.	Rubber teats/pipette filler	1:2
13.	Brown Reagent bottles (50 ml, 100 ml, 250 ml, 500 ml, 1 L, 5 L) each	1:5
14.	Colourless Reagent bottles (50 ml, 100 ml, 250 ml, 500 ml, 1 L, 5 L) each	1:5
15.	Dropper bottles	1:10
16.	Staining racks	1:10
17.	Draining racks	1:10
18.	Wash bottles	1:10
19.	Centrifuge tubes	1:1
20.	Glass slides P/50 with frosted end	1:10
21.	Lead pencil	1:1

22.	Cover slips P/100	1:10
23.	Cover glass P/100	1:10
24.	What man filter paper P/100	1:20
25.	Petri dishes (60,75, 90 mm diameter)	1:1
26.	Histological container	1:1
27.	Stool container	1:1
28.	Urine container	1:1
29.	Tissue cassettes	1:25
30.	Microtome blade	1:25
31.	Magnifying hand lens	1:5
32.		

4.1.3. Appendix III: Chemicals and reagents/consumables list

	item	**Available or not available**	
1.	Syringes with needles (2, 5, 10cc) P/100 each	1:10	
2.	Vacutainer needle P/100	1:10	
3.	Vacutainer needle handle Each	1:1	
4.	Vacutainer tube (Red, purple, light blue, green, gray, P/100) each	1:10	
5.	Microscope lens cleaning paper P/50	1:5	
6.	Immersion oil B/100ml (refractive index 1.5)	1:10	
7.	Commercial kits for urine chemistry P/100	1:10	
8.	Absolute Methanol P/5lt	1:25	
9.	Absolute Ethanol P/5lt	1:25	
10.	Giemsa powder B/25gm	1:50	

11.	Glycerol B/2.5lt	1:25	
12.	Sodium chloride B/500gm	1:50	
13.	Formalin (40% formaldehyde) B5lt	1:25	
14.	Anaesthetic Ether B/500ml	1:25	
15.	37% Sodium hypochlorite 1lt	1:25	
16.	Iodine solution B/100ml	1:25	
17.	Potassium iodide B/25gm	1:25	
18.	Hydrochloric acid B/5lt	1:25	
19.	Potassium dichromate crystals P/500gm	1:25	
20.	Sulphuric acid B/5lt	1:25	
21.	Potassium hydroxide B/500gm	1:25	
22.	Acetone B/5lts	1:25	
23.	Buffer tablets (pH 6.8 & 7.2) B/50 tabs	1:25	
24.	Glacial acetic acid B/5lt	1:25	
25.	Ammonium Oxalate P/500gm	1:25	
26.	Ammonium sulphate P/500gm	1:25	
27.	Phenol crystals B/500gm	1: 50	
28.	Copper sulfate B/500gm	1:25	
29.	Sulphosalicylic acid B/25gm	1:25	
30.	Brilliant cresyl blue powder B/25gm	1:25	
31.	Methylene blue B/25gm	1:25	
32.	Carbolfuchsin B/25gm	1:25	
33.	Sodium Metabisulphite B/250gm	1:25	
34.	Leishman stain powder B/25gm	1:25	

35.	Crystal violet B/25gm	1:25	
36.	Neutral red B/25gm	1:25	
37.	India ink B/100ml	1:10	
38.	Safranin powder B/25gm	1:25	
39.	Nigrosin B/25gm	1:25	
40.	Haematoxylin B/25gm	1:25	
41.	Eosin B/25	1:25	
	Liver function test kits		
42.	ALAT	1:10	
43.	ASAT	1:10	
44.	Bilirubin T,	1:10	
45.	Bilirubin D	1:10	
46.	ALP	1:10	
47.	GGT	1:10	
	Renal function test kits		
48.	Urea	1:10	
49.	Creatinine	1:10	
50.	Uric acid	1:10	
51.	Picric Acid B/500gm	1:25	
52.	Sodium Nitrate B/25gm	1:25	
53.	Sodium Nitroprusside B/25gm	1:25	
54.	Sodium Azide B/25gm	1:25	
55.	Sulfur powder B/25gm	1:25	
56.	**Lipid profile (each kit)**		
57.	Total Cholesterol	1:10	

58.	High density lipoprotein (HDL)	1:10	
59.	Low density lipoprotein (LDL)	1:10	
60.	Very low density lipoprotein (VLDL)	1:10	
61.	Triacylglycerol (TG))	1:10	
62.	**Cardiac Markers (each kit)**		
63.	Troponin I	1:10	
64.	Myoglobin	1:10	
65.	Creatine phosphokinase (CPK)	1:10	
66.	Creatine kinase (CK)	1:10	
67.	Lactate dehydrogenase (LDH)	1:10	
68.	G6PD reagent powder B/250g	1:25	
69.	Biuret reagent for total protein B/250mls	1:10	
70.	Glucose oxidase peroxidase kit	1:25	
71.	Syphilis reagent (RPR, Rapid test,) p/20	1:5	
72.	Widal test strips P/25	1:5	
73.	H. Pylori test kit (Ag &Ab) p/20	1:5	
74.	Rheumatoid factor reagent	1:10	
75.	Salmonella grouping Antisera	1:10	
76.	Shigella grouping Antisera	1:10	
77.	Hepatitis B, (Ag) (p/250)	1:5	
78.	Hepatitis C Ab (p/25)	1:5	
79.	Blood agar base B/500gm	1:50	
80.	MacConkey agar base B/500gm	1:50	
81.	Peptone water B/100gm	1:25	

82.	Transport media B/250gm	1:50	
83.	Mueller Hinton agar B/500gm	1:50	
84.	Selenite F 50mls	1:25	
85.	Xylose Lysine deoxycholate (XLD) B/500gm	1:50	
86.	Thiosulphate citrate bile sucrose (TCBS) B/500gm	1:50	
87.	Kligler iron agar B/500gm	1:50	
88.	Sulfur Indole Motility agar B/500gm	1:50	
89.	Citrate(Simmon's Citrate) agar B/500gm	1:50	
90.	Urease agar B/500gm	1:50	
	Biochemical tests for identification of microorganisms		
91.	Oxidase reagent	2 strips :1 student	
92.	Catalase	2mls : 1 student	
93.	Kovacs reagent	2mls :1 student	
94.	Coagulase	2mls : 1 student	
95.	Bacitracin Optochin	1:10 1:10	
	Susceptibility test discs for Gram negative bacteria any four		
96.	Ceftazidime	2 discs :1 student	
97.	Ceftriaxone	2 discs :1 student	
98.	Ampicillin	2 discs :1 student	
99.	Amoxyclavulanic acid	2 discs :1 student	
100.	Trimethoprim sulfur-methoxazole	2 discs :1 student	
	Susceptibility test discs for Gram positive any four		
101.	Cefoxitin	2 discs :1 student	
102.	Erythromycin	2 discs :1 student	

103.	Clindamycin	2 discs :1 student	
104.	Ciprofloxacin	2 discs :1 student	
105.	Cefotaxime	2 discs :1 student	
106.	Gentamicin	2 discs :1 student	
107.	Amikacin	2 discs :1 student	
108.	Autoclave quality indicators (e. G autoclave tapes)	1:50	
109.	ABO and Rh blood grouping antisera kits	1:15	
110.	Anti Human Globulin Sera	1:25	
111.	McFarland tube	1:10	
112.	Mounting media B/250ml	1:100	
113.	Xylene B/500ml	1:100	
114.	Kato Katz Kit	1:5	
115.	Urine filtration kit	1:5	
116.	Anatomical Model of complete human with removable internal organs (Not limited to: heart, brain, Kidney, Liver, pancreas, Lung)	1	
117.	Model of human skeleton	1	
118.	Model of human gastrointestinal tract	1	
119.	Model of cross-section of the human kidney	1	
120.	Artificial human upper limb	1	
121.	Model of reproductive system male and female	1	
122.	Model of human lungs	1	
123.	Positive sample and slides	Adequate for respective subject	
124.	Plasmodium species of malaria	4 slides for each species	
125.	Microfilaria	4 slides	

126.	Borrelia	4 slides	
127.	Trypanosomes	4 slides	
128.	AFB	4 slides	
129.	Stool	2 formalin fixed stool samples	
130.	Urine for Schistosomahaematobium	2 formalin preserved urine samples	
131.	Bacteria	4 slides for gram positive and negative(bacilli &cocci)	
132.	Fungal elements (Yeast cells)	4 slides	
	Positive control sera/plasma/Whole blood for serological tests for		
133.	Syphilis	5 mls of serum sample	
134.	HIV	5 mls of serum sample	
135.	Hepatitis B, C	5 mls of serum sample	
136.	Typhoid	5 mls of serum sample	
137.	mRDT	5 mls of serum sample	
138.	H. Pylori	5 mls of serum sample	

4.1.4. Appendix IV: List of reference books

4.1.4.1. LEVEL 4

1. Drake R .L, Vogl W, Mitchell A W M (2007). *Gray's Anatomy for Students,* United Kingdom:Churchill Livingstone Elservier

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3. Seeley R. R, Stephens T. D, Tate P. (2003) *Anatomy and Physiology*.New York: McGraw-Hill

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5. Standring S.(2008). *Grays's Anatomy The anatomical basis of clinical practice.* United Kingdom: Churchill Livingstone Elservier.

6. Thibodeau G. A. Patton K. T. (1999). *Anatomy & Physiology.* Saint Louis:Mosby, Von Hoffman Press, Inc

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9. Jayasinghe, M. (2001), Counselling in Careers Guidance, 1st Edition, Oxford University Press

10. Behavior Change Communication Training Toolkit, International Training & Education Center on HIV, 2006

11. Ministry of Health & Social Welfare, 2005; National Guidelines for Voluntary Counselling & Testing, National AIDS Control Programme, United Republic of Tanzania

12. Ministry of Health & Social Welfare, 2007; National Guidelines for Provider Initiated Testing & Counselling, National AIDS Control Programme, United Republic of Tanzania

13. Ministry of Health & Social Welfare, 2007; Manuals for In-service Training on Collaborative TB and HIV activities, National AIDS Control Programme and National TB & Leprosy Control Programme, United Republic of Tanzania;

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16. Bott, E. and Siechert, C. (2001). Microsoft Windows XP Inside Out.

17. Cook, L.R. (2001). 1st Edition, Computer Fundamentals –Understanding How they Work. Ventage Press.

18. Herniter, M.E. (2000). Personal Computer Fundamentals for Students, Hardware Windows 2000 Application (2nd Ed). Prentice Hall.

19. Morris M & Charles, M. (2003). Logol Computer Designer Fundamentals. Prentice Hall

20. WHO (2003) Manual of basic techniques for a health laboratory.

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1. Denise M. Harmening; (2007) Laboratory Management 'Principles and Processes', 2nd Edition, D.H Publishing and Consulting.INC. St Petersburg Florida 33711,

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3. Battersby A. (2003), A Guide to Stock Control, 2nd ed. Pitman Publishing

4. Hugo et al (2004b) Supply chain management: logistics in perspective. Pretoria: Van Schaik. Publishers

5. Kagashe, et al. (2012) medicine stock out and inventory management problems in public hospitals in Tanzania, Research Article, Muhimbili University of Health Science

6. Morrison. A. (2001) Storage and Control of Stocks for Public Undertakings 2nd ed. London: Pitman Publishing limited.

7. Mpwanya M.F. (2005) Inventory management as the determinant of improving customer service, dissertation, University of Pretoria

8. Mwansele H.A. et al (2011) Determination of Inventory Control Policies, Business and Economics Journal, Volume 2011, University of Dar-es-Salaam.

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11. Temeng V.A. (2010) Application of Inventory Management Principles to Explosive

12. Marshall W.J., Bangert S.K., Clinical Chemistry, Mosby, 5th Edition, 2004

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1. MOH (2000): District Health Management Training Modules -1, 3 and 4 2nd Version;

2. Kanani S. Maneno J. &Schluter P. (1984): Health Service Management for Health Workers; and

3. Laboratory management (Principles and processes) second edition by Denise M. Harmening. Copyright 2007 by D.H. Publishing and consulting, Inc.

4. MOH (2000): District Health Management Training Modules -1, 3 and 4 2nd Version;

5. Jayasinghe, M., (2001): Counselling in Careers Guidance, 1st Edition, Oxford University Press;

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7. Ministry of Health & Social Welfare, (2007): National Guidelines for Provider Initiated Testing & Counselling, National AIDS Control Programme, United Republic of Tanzania;

8. Ministry of Health & Social Welfare, (2007): Manuals for In-service Training on Collaborative TB and HIV activities, National AIDS Control Programme and National TB & Leprosy Control Programme, United Republic of Tanzania.

9. Kothari C.R. (2004): Research Methodology and Techniques 2nd Ed. New Age International Ltd;

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21. David Greenwood, Richard CB Slack, John F. Peutheren (2002): Medical Microbiology (A Guide to Microbial Infections: Pathogenesis, Immunity, Laboratory Diagnosis and Control 6th Edition Churchill Livingstone;

22. Monica Cheesbrough (1981): Medical Laboratory Manual for Tropical Countries Volume I, 2nd Edition Butterworth & Co. (Publishers) Ltd; and

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25. Carl A. Burtis (2001): Fundamentals of Clinical Chemistry, 15th Edit W.B. Saunders Company;

26. Wendy Anerson (2007): Clinical Chemistry; A Laboratory Perspective F.E. Davis Company; and

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29. J.B. Bancroft (2008): Theory and Practice of Histological Techniques 6th Edit, Elsevier Limited;

30. Lydyard P. Lackhan S. (2000): Pathology Integrated an A–Z of Disease and its Pathology 2nd Ed. Oxford University.

31. Dacie and Lewis (2001): Practical Haematology, 9th Edition (SM Lewis, B.J. Bain, I Bates, Churchill Livingstone Inc.;

4.1.5. Appendix V: Checklist of Practicum site (Laboratory) Assessment

	Availability	**Required but not limited to**	Number
1	Laboratory Staff	Laboratory Scientist	3
		Laboratory technologist	7
2	Functioning Haematologyanalyser (3 or 5 parts)	1	
3	Functioning Chemistry analyser (Semi automated/full automated)	1	
4	Functioning Hormonal analyser (Semi automated/Automated)	1	
5	Functioning GeneXpert Machine	1	
6	Functioning Biosafety Cabinet/fume hood chamber	1	
7	Functioning Centrifuge machine	2	
7	Blood transfusion services	Blood donation	
		Blood transfusion	
		Immunohematological tests	
8	Microbiology culture services	Blood culture	
		Stool culture	
		Urine culture	
		Body fluid culture (CSF, Pleural fluid, ascitic fluid, discharge)	
		Swab (wound, HVS)	
10	Functioning Autoclave	1	
11	Functioning Freezer	1	
12	Functioning Micropipette (5ul,10ul,20ul,50ul,100ul,200ul,500ul, 1000ul)	2 each	
13	Functioning Incubator	2	
14	Standard operating procedures	All available tests	

15	implementing Quality management system	Enrolled to SLIPTA or Accredited

4.1.6. Appendix VI: Management Requirements

S/N	Requirements	Remark
1	Documented proceedings of Council/Governing/Board Meetings available	
2	Organization structure with names and qualifications of individuals holding each position available	
3	Rector/ Principal with relevant qualifications and appropriate leadership experience in the field of technical education and training available	
4	Accessibility of the institution/center	
5	Availability of reliable transport	
6	Certificate of Conformity with Fire Regulations available	
7	OSHA certificate	
8	Security facilities and services (fence, security guards) available	
9	Location of the institution/center away from distractions of teaching and learning	
10	Premises with Certificate of Occupancy or Legally Binding Lease Agreement of at least three (5) years available	
11	Offices for Principal/Rectors and Deputies available	
12	Offices for Departmental academic staff available	
13	Offices for Support Staff available	
14	Examinations Office available	
15	Admission Office available	
16	Strong room with safe cabinet for examinations available	
17	At least three classrooms available with capacity of 50 students each	
18	Library room available minimum 50 students	
19	Teaching Laboratory available	
20	Computer room available	

	Teaching computer (1 computer: 2 students)	
21	Toilet facilities for staff available, considering disabled	
22	Toilet facilities for students available 1:10, two for disabled	
23	Cafeteria/dining room available	
	Classroom Furniture - with tables available Ratio 1:1	
24	Classroom Furniture - with chairs available Ratio 1:1	
25	Laboratory benches, stool 1:1	
26	Electricity + adequate electric sockets	
27	Availability of running water	
28	Computers table with chairs available Ratio 1:1	
29	Audiovisual tools available in classrooms and teaching laboratory	
30		
31	Elbow operated water taps in teaching laboratory	
32	Textbooks for Parasitology (1 book:10 Students)	
33	Textbooks for Microbiology (1 book:10 Students)	
34	Textbooks for Clinical chemistry (1 book:10 Students)	
35	Textbooks for Hematology (1 book:10 Students)	
36	eLibrary available	
37	Legal employment contracts available for each staff	
39	Curriculum vitae (CV) available for each staff	
40	At least six(6) full time health laboratory professional tutors with relevant qualifications to deliver the curriculum available	
41	Ratio of tutor to student 1:50 for each module	
42	Ratio of full time to part time teaching staff7:3	
43	Librarian available	
44	practical instructor available 1:25	
45	Sports and recreational facilities available	

46	Electricity and power backup system available	
47	Piped water supply system available	
48	Incinerator/Solid waste disposal mechanism available	
49	Waste water disposal available	
50	Availability of social services (Cash points, Spiritual services)	
51	Health services available	
52	Infrastructural facilities to support people with special needs available	
54	Permanent Lebed equipment's with unique identifier	
54		

4.1.7. Appendix VII: Essential Textbooks

4.1.7.1. PARASITOLOGY AND ENTOMOLOGY

1. Textbook of Medical Parasitology 4th edition by S. C. Parija
2. F.J. Baker, R.E. Silverton (2001): Introduction to Medical Laboratory Technology, 7th Edition, Oxford University Press.
3. Monica Cheesbrough (2002): District Laboratory Practice in Tropical Countries Part 1 & 2 Cambridge University Press.
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7. The pathogenesis of severe falciparum malaria. In “Bailliere’s Clinical Infectious Diseases - Malaria”. Ed. G Pasvol. Builli_reTindall, London. 249-270.

8. Entomology for students of medicine 5th edition by R.M Gordon

4.1.7.2. BIOCHEMISTRY

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4. William J. Marshall (1995): Clinical Chemistry 3rd Edit. Times Mirror International Publishers limited.

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4.1.7.3. HEMATOLOGY

1. Sir John V. Dacie and S.M. Lewis, Practical Haematology, seventh edition

2. S.M. Lewis B.J. Bain Ibates, Practical Haematology, Tenth Edition

3. Americal Clinical Pathology Atlas of Blood Cell

4. East Africa Ministries of Health, Standard operating procedures published by AMREF 2008.

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4.1.7.4. HISTOPATHOLOGY

1. V. Kumar, A. K. Abbas, N. Fausto, R. Mitchell, Robin’s Basic Pathology,8th Edition, (2007) Saunders Elsevier Inc.

2. F.I. Carson, Histotechnology, A Self Instructional Text, 3rd edition (2009) ASCP Press

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4.1.7.5. MICROBIOLOGY AND IMMUNOLOGY

1. David Greenwood, Richard C.B. Slack, John F. Peutheren (2002): Medical Microbiology (A Guide to Microbial Infections: Pathogenesis, Immunity, Laboratory Diagnosis and Control 6th Edition Churchill Livingstone; and

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10. Monica Cheesbrough (2002): *District Laboratory Practice in Tropical Countries Part 1 & 2,* Cambridge University Press; Cambridge, England.

11. SOP manual

4.1.8. General Textbooks:

1. Anatomy and physiology 12th edition by Ross and Wilson
2. Anatomy and physiology 7th edition by Patton and Thibodean
3. Medical physiology 14th edition by Guyton and Hall
4. Grey's anatomy by Henry Carter
5. Entrepreneurship – the practice and mindset 2nd edition by Heid, Christopher and Emmanuel
6. Leadership and management by Ross Fardon
7. Basic computer knowledge by John Mony
8. Basic knowledge of computer by Dharmendra B. Kadia
9. Leadership for a better world by Susan R Komives
10. Total quality management 3rd edition by R. SNaagarazan

HLPC F08

4.1.8. Appendix VIII: Application for the approval of Health Laboratory training program form

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH
HEALTH LABORATORY PRACTITIONERS COUNCIL

Section 1: Particulars of the Institution

1.1 Name of the Institution: ……

1.2 Student Enrollment Capacity:……

1.3 Level Applying for: NTA Level 4,5 & 6 ☐ Bachelor Degree ☐

1.4 Location: Region: …… District:……
Ward: …….. Village/Street: ……

Plot No: ……. Block No: ……. Post-Code: ……

1.5 Address: ……
1.6 Phone Numbers: Landline No……..Mob. No: ……
1.7 E-mail Address:……website ……
1.8 Contact Person Name:……Phone……
1.9 Ownership: Government ☐ FBO ☐ Private ☐
……

Section 2: Declaration

1.10 Submitted documents: Application letter ☐ Self-assessment checklist ☐

Evidence of payments ☐

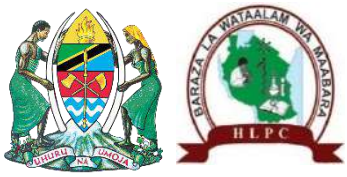
Declaration

I ……, on behalf of the …… (Name of the institution) hereby declare that, the submitted documents are correct to the best of my knowledge and hereby invite the council to visit this institution for physical verification.

Applicant's Name Signature and Stamp Date

…… …… ……

4.1.9. Appendix IX: Assessment Checklist for Medical Laboratory Training Program



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH
HEALTH LABORATORY PRACTITIONERS COUNCIL
ASSESSMENT CHECKLIST FOR
MEDICAL LABORATORY TRAINING PROGRAM

1 PARTICULARS OF THE TRAINING INSTITUTION

1.1 Name of the Institution: ……..

1.2 Date of visit……..

1.3 Name of the Head of Institution.....Signature.....

1.4 Name of Head of Laboratory Department…….. Signature……..

1.5 Registration number.....

1.6 Registration body: NACTVET ☐ TCU ☐ OTHERS (Specify)……..

1.7 Is the institution accredited by regulatory body: Yes ☐ No ☐

1.8 If yes, is the accreditation: Full ☐ or Provisional ☐

1.9 Ownership: Government ☐ Private ☐ FBO ☐ NGO ☐ Others ☐ ☐

(Specify) .....

1.10 Physical Address:

Plot Number……Street……

District/Municipal .... Region: ……

Postal Address……Post Code……..

Phone Number: .....

2 PROGRAMME OFFERED

2.1 National Technical Award (NTA) Levels (For Institutions registered by NACTVET)

Self-Assessment ☐ **Initial Assessment** ☐ **Follow Up Assessment** ☐

Programme	**Gender**		**Total**
	Male	**Female**	
Basic Technician Certificate in MLS (NTA Level 4)			
Technician Certificate in MLS (NTA Level 5)			
Ordinary Diploma in MLS (NTA Level 6)			
Higher Diploma in MLS (NTA Level 7)			
Graduate in MLS (NTA Level 8 and above)			
Total			

2.2 Non- NTA levels (For Institutions registered by TCU or Other)

Initial Assessment ☐ **llow Up Assessment** ☐

Programme	Year	Gender		Total
		Male	**Female**	
Certificate	**1**			
	2			
Ordinary Diploma	**1**			
	2			
	3			
Higher/Advanced Diploma	**1**			
	2			
Bachelor	**1**			
	2			
	3			
	4			
Masters of Science	**1**			
	2			
PhD				
Total				

3 NUMBER OF TEACHING STAFF **

Full time Teaching Staff:

These are graduates in Advanced Diploma, BSc, MSc and above in Medical Laboratory Sciences from the teaching hospital/or another training institution who are permanently employed by the teaching institution. The teaching staff should have undergone teaching methodology and have at least one level higher.

Part time Teaching Staff:

These are graduates in Advanced Diploma, BSc, MSc and above in Medical Laboratory Sciences from the teaching hospital/or another training institution who may be employed on part time bases. In addition,

clinicians and any other professionals who are capable of teaching Human Anatomy, Medical Physiology, Computer skills, and Communication skills, Procurement of laboratory supplies, Entrepreneurship and Health promotion may also be qualified to teach.

3.1 Certificate in Medical Laboratory Sciences

Teaching Staff: Student Ratio (Full and part time qualified Teaching Staff i.e. those with Diploma and above in the subject they teach).

Provide list of Teaching staff

1	Name of Academic staff	Qualification	HLPC Reg Number	Teaching Module/subject	Score
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Total score (25)					

At least 5 Medical laboratory Academic staff who meet registered and retain the registration, each score 5 mark

SN	**SPECIALITY**	**No. of Permanent Teaching Staff**	**No. of Part Time Teaching Staff**	**No. of Total Teaching Staff**	**Number of students taught**	**Ratio**	**Score**
NTA LEVEL 4 SEMESTER 1							
MLT04101	Laboratory Instrumentation						
MLT04102	General Human Anatomy and						

	Physiology						
MLT04103	Laboratory Safety and Waste Management						
MLT04104	Communication and Life skills						
MLT04105	Laboratory Ethics and Code of Conduct						
MLT04106	Prevention and Control of Communicable and Non-communicable Diseases						
NTA LEVEL 4 SEMESTER 2							
MLT04207	Routine Laboratory Investigations						
MLT04208	Laboratory Specimen Management						
MLT04209	Computer Application						
MLT04210	Systemic Human Anatomy and Physiology						
MLT04211	Laboratory Reagents and Solutions						
NTA LEVEL 5 SEMESTER 1							
MLT05101	Laboratory Logistic Management						
MLT05102	Maintenance and Calibration of Laboratory Instruments and Equipment						
MLT05103	Principles of Entrepreneurship						
MLT05104	Laboratory Quality Assurance						
MLT05105	Health Records Management						
MLT05106	General Pathology						
NTA LEVEL 5 SEMESTER 2							
MLT05207	Hematology and Blood Transfusion						
MLT05208	Medical Microbiology and Immunology						

MLT05209	Clinical Chemistry						
MLT05210	Medical Parasitology						
MLT05211	Cytology and Histology						
Total Score							

KEY:

	Score
1:1 - 1:25	5
1:26 - 1:50	4
1:51 - 1:75	3
1:76 - 1:100	2
>100	1
No teaching staff	0

3.2 Ordinary Diploma in MLS

SN	SPECIALITY	No. of Permanent Teaching Staff	No. of Part Time Teaching Staff	No. of Total Teaching Staff	Number of students taught	Ratio	Score
NTA LEVEL 6 SEMESTER 1							
MLT06101	Laboratory Quality Management						
MLT06102	Operational Research						
MLT06103	Principles of Epidemiology and Biostatistics						
MLT06104	Leadership and Management						
MLT06105	Introduction to Diagnostic Molecular Biology						
NTA LEVEL 6 SEMESTER 2							

MLT06206	Diagnostic Parasitology and Medical Entomology						
MLT06207	Diagnostic Microbiology and Immunology						
MLT06208	Diagnostic Clinical Chemistry						
MLT06209	Diagnostic Histology and Cytology						
MLT06210	Diagnostic Hematology and Blood Transfusion						
Total scored (100)							

KEY:

	Score
1:1 - 1:25	5
1:26 - 1:50	4
1:51 - 1:75	3
1:76 - 1:100	2
>100	1
No teaching staff	0

3.3 Bachelor In Medical Laboratory Sciences

Teaching Staff: Student Ratio (Full and part time qualified Teaching Staff i.e. those with Masters and above in the subject they teach).

S/N	**SPECIALITY**	**No. of Permanent Teaching Staff**	**No. of Part Time Teaching Staff**	**No. of Total Teaching Staff**	**Number of students taught**	**Registration Number**	**Ratio**	**Score**
Basic Sciences								
1	Human Anatomy and Histology							

2	Human Physiology							
3	Biochemistry							
4	Molecular Biology							
5	Developmental Studies							
6	Communication Skills							
7	Epidemiology and Biostatistics							
8	Research Methodology							
Laboratory Management								
9	Quality Management System							
10	Biosafety and Biosecurity							
11	Procurement of Laboratory Supplies							
12	Laboratory Instrumentation							
13	Ethics and Professional Codes of Conduct							
14	Customer Care and Entrepreneurship							
Core Subjects								
15	Clinical Microbiology and Immunology							
16	Medical Parasitology and Entomology							
17	Clinical Chemistry							
18	Haematology							
19	Blood Transfusion							
20	Histotechnology and Cytotechnology							
TOTAL(100)								

KEY:

	Score
1:1 - 1:25	5
1:26 - 1:50	4
1:51 - 1:75	3
1:76 - 1:100	2
>100	1
No teaching staff	0

3.4 Supporting Staff

SN	**CATEGORY**	**Available** Yes/No	**Number of Staff**	**SCORE**	**REMARKS**
1	Patron/Matron				
2	Secretary				
3	Library Assistant or above				
4	Accounts Assistant or above				
5	Laboratory Clinical instructor				
6	Security Guard(s)				
7	Driver(s)				
	TOTAL (7)				

Key: 1= Available 0= Not available

4 LABORATORY EQUIPMENT, INSTRUMENTS AND CONSUMABLES**

4.1LABORATORY EQUIPMENT (Check for adequacy of equipment for health laboratory training; assumption is a class has approximately 50 students)

SN	ITEM	Number Available	Number Recommended	Item : Student Ratio	Score	Remarks
1	Binocular electric microscopes for student		10	1:5		
2	Teaching microscopes		1	1:50		
3	Electrical centrifuge (≥8cups)		2	1:25		
4	Water baths		2	1:25		
5	Autoclaves/pressure cooker		1	1:50		
6	Digital weighing scales		5	1:10		
7	pH meter		2	1:25		
8	Hot air oven		1	1:50		
9	Incubator		1	1:50		
10	Hot plate		2	1:25		
11	Laboratory Refrigerator		2	1:25		
12	Freezer -20^{O}C		1	1:50		
13	Heating Systems		1	1:50		
14	Calorimeter / Spectrophotometer		5	1:10		
15	Racks for test tubes		50	1:1		
16	Micro – pipettes 5-200μl		10	1:5		
17	Micro – pipettes 200-1000μl		10	1:5		
18	Pipette Aid (Rubber teat/Bulb/Electric)		25	1:2		
19	Glucometer with Strips		10	1:5		
20	Haemoglobinometer with cuvettes		10	1:5		
21	Syringes and needles/ Vacutainers system (Needle, Holder, Tube)		10 boxes	1:5		
22	Tally counter		10	1:5		
23	Differential cell counter		10	1:5		

24	Neubaur counting chamber		10	1:5		
25	Westergren rack		10	1:5		
26	Westergren tube		50	1:1		
27	Reagent bottles 100 mls		10	1:5		
28	Reagent bottles 250 mls		10	1:5		
29	Reagent bottles 500 mls		10	1:5		
30	Reagent bottles 1000 mls		10	1:5		
31	Reagent bottles 2000 mls		10	1:5		
32	Dropper bottles		10	1:5		
33	Staining racks		10	1:5		
34	Draining racks		10	1:5		
35	Wash bottles		10	1:5		
36	Cover glass (P/100)		10	1:5		
37	Inoculating wire loops (Nichrome or platinum or disposable)		10	1:5		
38	Straight wire for deep cultures (Nichrome or platinum or disposable)		10	1:5		
39	Forceps		10	1:5		
40	Centrifuge tubes		50	1:1		
41	Glass slides (p/72 or p/50		10	1:5		
42	Coverslips (p/100)		10	1:5		
43	Whatman filter paper (Box/50)		10	1:5		
44	Petri dishes (Pair)		50	1:1		
45	Examination gloves Box/50		50	1:1		
46	Mask (box/50)		1	1:50		
47	Apron		1	1:50		
48	Googles		1	1:50		
49	Safety Boots		1	1:50		

General Medical Laboratory Wares						
50	Graduated cylinder 10 – 50 ml..... 100 – 250 ml..... 500 – 1000 ml.....		10@	1:5		
51	Conical flask 10 – 50 ml..... 100 – 250 ml..... 500 – 1000 ml.....		10@	1:5		
52	Round-bottom volumetric flask 10 – 50 ml..... 100 – 250 ml..... 500 – 1000 ml.....		10@	1:5		
53	Graduated pipettes 1 ml..... 5ml..... 10 ml.....		10@	1:5		
54	Beakers 10 – 50 ml..... 100 – 250 ml..... 500 – 1000 ml.....		10@	1:5		
55	Funnel 65 mm..... 100 mm..... 160 mm.....		10@	1:5		
56	Couplin jars		10@	1:5		
57	Test tubes		10@	1:5		

TOTAL (171)						Pass mark ≥60% Scored %=_____
Key;3= Available and adequate 1 = Available but inadequate 0= Not available						
4.2 CHEMICALS AND REAGENTS						
HAEMATOLOGY						
1	Immersion oil Vials		5	1:10		
2	Methanol Alcohol* (LTRS)		5	1:10		
3	Ethanol* LTRS		5	1:10		
4	Sodium hypochlorite* Working Solution (LTRS)		5	1:10		
5	Lysol *(LTRS)		5	1:10		
6	Hydrochloric acid* (LTRS)		5	1:10		
7	Sulphuric acid* (LTRS)		5	1:10		
8	Potassium hydroxide (2.5 kg)		1	1:50		
9	Acetone* (LTRS)		5	1:10		
10	Buffer tablets (pH 6.8 & 7.2) P/100		1	1:50		
11	Glycerol* (LTRS)		1	1:10		
12	Glacial acetic acid * (LTRS)		5	1:10		
13	Brilliant cresyl blue (Powder in 50g)		1	1:50		
14	Sodium Metabisulphite (Powder in 500g)		1	1:50		
15	Leishman stain (Powder in 500g)		1	1:50		
HISTOPATHOLOGY						
16	Crystal violet (Powder in 50g)		1	1:50		
17	Basic fuchsin		1	1:50		

18	Neutral red/ Safranin		1	1:50		
19	India ink / Nigrosin		1	1:50		
20	Wright Stain		1	1:50		
21	Calcium Oxalate		1	1:50		
22	Sodium Citrate		1	1:50		
23	Paraffin Wax (0.5 Kg)		1	1:50		
24	Haematoxylin (Powder in 50g)		1	1:50		
25	Eosin (Powder in 50g)		1	1:50		
26	Xylene (LTRS)		1	1:50		
27	Mountant (100 mls)		1	1:50		
28	Formaldehyde (LTRS)		5	1:10		
BLOOD TRANSFUSION						
29	ABO and Rh blood grouping antisera (kits)		5	1:10		
30	Anti-Human Globulin Sera (kits)		5	1:10		
31	Incomplete Anti D (kits)		5	1:10		
32	Opal Tiles		10	1:5		
PARASITOLOGY						
33	Urine dip sticks (p/100)		10	1:5		
34	Giemsa (Powder 25g)		1	1:50		
35	Field Stain A (Powder 25g)		1	1:50		
36	Field Stain B (Powder 25g)		1	1:50		
37	Ether (LTRS)		5	1:10		
38	Iodine solution LTRS)		1	1:50		
CLINICAL CHEMISTRY						
39	Renal function Test (Urea, Creatinine)		5	1:10		

40	Liver Function Test (ALAT, ASAT, ALP, BILI. Total Protein, Albumin, GGT)		5	1:10		
41	Thyroid Function Test (T3, T4 TSH)		5	1:10		
42	Lipid Profile (Cholesterol, TRIG, HDL, LDL, VLDL)		5	1:10		
43	Cardiac Markers (CK, Troponin, LDH, CKMB)		5	1:10		
44	Glucose Oxidase/Peroxidase		5	1:10		
45	Uric Acid		5	1:10		
46	Pandy's Reagent (2.5 LTRS)		1	1:50		
47	Benedict's Solution (LTRS)		5	1:10		
48	Sulphosalicylic Acid (LRTS)		5	1:10		
MICROBIOLOGY						
49	Rapid Test for Syphilis (kits)		5	1:10		
50	Widal Test Kit (kits)		5	1:10		
51	Rapid Test Hepatitis B or C (kits)		5	1:10		
52	Blood agar base (500g)		1	1:50		
53	MacConkey agar base (500g)		1	1:50		
54	Peptone water (500g)		1	1:50		
55	Transport media (500g)		1	1:50		
56	Mueller Hinton agar (500g)		1	1:50		
57	Selenite F (500g)		1	1:50		
58	Kligler iron agar (500g)		1	1:50		
59	Biochemical tests for identification of microorganisms: (Oxidase, Catalase, Urease, SIM, Kovacs)		1@	1:50		
60	Susceptibility discs (Erythromycin, penicillin, Cloxacilin, Clindamycin (G+ Org) Ampicillin, TCL, Chloramphenicol, Cotrinmoxazole (G- bacteria)		1@	1:50		
61	Autoclave quality indicators (e.g autoclave tapes)		1	1:50		

62	Lactophenol Blue		1	1:50		
TOTAL (124)						

Key; 2= Available 1= Available but not Adequate 0= Not available or expired

5: INFRASTRUCTURE/ BUILDINGS**

SN	**ITEM**	**Number Available**	**Number Recommended**	**Item : Student Ratio**	**Score**	**REMARKS**
Administration Block						
1	Head of Institution		1			
2	Office for Head - Lab School		1	1:150		
	Academic Office		1	1:150		
3	Staff offices		Adequate for relevant staff			
4	Staff washroom		Adequate for relevant staff			
Classrooms						
5	Classes		3	1:50		
6	Adequate space, desk and chairs for 50 students		50	1:1		
7	Projector		2	1:25		
8	Black/White board/ Flip chart stand		3	1:50		
9	Students washroom for Male and Female		2	1:25		

	Teaching Laboratory					
10	Practical room		1	1:50		
11	Office		1	1:50		
12	Store		1	1:50		
13	Sluice		1	1:50		
14	Preparation room		1	1:50		
15	Black/White board		1	1:50		
16	Colour coded Waste containers (set)		2@	1:25		
17	Running water supply and sinks with elbow - taps around the benches		5	1:10		
18	Emergency Shower and/or eye wash station		1	1:50		
19	Electric power fittings		25	1:2		
20	Lockers for belongings		Adequate For 50 Students	1:50		
21	Lab chairs/stools enough for 50 students (Diameter x height; 14”x 25.5”)		50	1:1		
22	A demonstration bench and a chair		1	1:50		
23	Fire extinguishers		2	1:50		
24	Wide entrances and Exit		2	1:25		
25	Laboratory Safety Signage		Adequate			
	Computer Laboratory					

26	Number of well-functioning Computers		25	1:2		
27	Chairs and Tables		50	1:1		
28	Internet Connectivity		YES/NO			
	Library					
29	Shelves		Adequate			
30	Number of chairs and Tables		50			
31	Adequate Lightening		5			
	Assembly Hall					
32	Assembly hall for adequate for 150 students with wide entrances and Exit		1	1:150		
33	TV		1	1:150		
	Canteen					
34	Adequate number of chair and table		Adequate			
35	Available sink		Adequate			
TOTAL (70)						

Key: **2=** Available and adequate 1= Available but not adequate 0= Not available

6: FURNITURE

SN	**ITEM**	**Number Available**	**Number Recommended**	**Score**	**REMARKS**
	Head of Laboratory Department				

1	Chairs		5		
2	Tables		2		
3	Cupboards		1		
4	File Cabinets		1		
	Staff Office				
5	Chairs		Adequate		
6	Tables		Adequate		
7	Cupboards		Adequate		
8	File Cabinets		Adequate		
TOTAL (16)					

Key: **2=** Available and adequate 1= Available but not adequate 0= Not available

7: TEACHING AIDS**

SN	**ITEM**	**Number Available**	**Number Recommended**	**Item : Student Ratio**	**Score**	**REMARKS**
1	Memorandum with Teaching Hospitals		1	1:50		
2	Approved curriculum available and in use		1 per programme	1:50		
3	Atlases		At least each subject	1:10		
TOTAL (15)						

Key: 5 = Available and adequate 2 = Available but not adequate 0 = Not available

8: TEACHING MATERIALS (Text books, reference books, journals teaching sample with known organisms etc)**

SN	ITEM	Number Available	Number Recommended	Item : Student Ratio	Score	REMARKS
1	Current text books: (See attached List)		Book: Student ration at least for each discipline	**1:10**		
TOTAL (44)						
Key: 2= Available (≥3 books per discipline, 1= Available (1-2 books per discipline) 0= Not available						
2	Control Samples (Positive and Negative) e.g. Malaria Parasite, AFB, Gram Stain, Intestinal Parasites.		For respective subject	**1:5**		
TOTAL (5)						

Key: 5 = Available and adequate 2 = Available but not adequate 0= Not available

9: PRACTICAL TEACHING AND TRAINING FACILITY**

ITEM	SCORE	REMARKS

The hospital laboratory has appropriate facilities for practical training (including mortuary) and allocates acceptable proportions of time for knowledge (theory) and skills (practical and/or fieldwork)		
The hospital laboratory has appropriate facilities for practical training (including mortuary) but does not allocate acceptable proportions of time for knowledge (theory) and skills (practical and/or fieldwork)		
The hospital laboratory has no appropriate facilities for practical training (including mortuary) but allocates acceptable proportions of time for knowledge and skills		
There is no evidence of the training facility having a hospital laboratory for practical training		
TOTAL (10)		

KEY;

10 = Adequate equipment, supervisors and time allocate for clinical rotation

5 = Adequate equipment and supervisors but inadequate time allocated for clinical rotation

1 = Inadequate equipment and supervisors but adequate time allocated for clinical rotation

0 = No evidence of training facility for clinical rotation

10: SUPPORTIVE SERVICES

Adequacy of support services for Medical Laboratory training

SN	ITEM	Availability	Adequacy	Score	Remarks
1	Piped Water Supply	Yes ☐ No ☐	Adequate ☐ Not Adequate ☐		
2	Waste water disposal	Yes ☐ No ☐	Adequate ☐ Not Adequate ☐		
3	Solid waste disposal	Yes ☐ No ☐	Adequate ☐ Not Adequate ☐		
4	Waste collection containers around the school one in each building	Yes ☐ No ☐	Adequate ☐ Not Adequate ☐		

5	Cleanness of building and environment	Yes ☐ ☐ No N	Adequate ☐ Not Adequate ☐		
6	Electricity	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
7	Functional Standby Backup Generator	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
8	Telephone	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
9	Health services (staff and students)	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
10	Recreational (sports)	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
11	Safety (PPE)	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
12	Security (fence, grills, etc)	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
13	Transport	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
14	Fire Fighting Equipment	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
15	First Aid Kit Large size kit (1for 25 people)	Yes ☐ ☐ No N	Adequate ☐ Not Adequate ☐		
16	Assembly Point/Area	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
17	Accommodation	Yes ☐ ☐ No	Adequate ☐ Not Adequate ☐		
TOTAL (34)					

Key: 2= Available and adequate 1= Available but not adequate 0= Not available

11: OTHERS

Does the institution has the following

ITEM	**SCORE**	**REMARKS**
Land-use plan		
Certificate of Occupancy/title deed		
Certificate of Conformity with fire regulations		
TOTAL(3)		

Key: 1= Available 0= Not available

**** Major Items for the existence and well-functioning Medical laboratory training institution**

12. SUMMARY OF SCORES (shall change according to above revisit)

S/N	**Section**	**Obtained score**	**Recommended Score NACTVET**	**Recommended Score TCU**	**Remarks**
3.1	Certificate in Medical Laboratory Science		100	**NA**	
3.2	Ordinary Diploma in Medical Laboratory Science		50	**NA**	
3.3	Bachelor in Medical Laboratory Sciences		NA	**100**	
3.4	Supporting staff		7	**7**	
4.1	Laboratory equipment and instrument		114	**114**	
4.2	Chemicals /reagents		124	**124**	
5	Infrastructure		70	**70**	
6	Furniture		16	**16**	
7	Teaching aids		15	**15**	

8	Teaching material		44	**49**	
9	Practical Teaching Facility		10	**10**	
10	Support Services		34	**34**	
11	Others		3	**3**	
Total Score of the Institution			**587**	**542**	

NB: % Score = x/maximum score for the institution x 100%

Grading:

A= 80 –100 Excellent (Encourage to maintain standards and work on any identified gaps)

B+= 70-79% Very Good (Encourage to address the minor deficiencies in 6/12

B = 60 - 69% Good (To address the gaps/deficiencies in 3/12)

C = 50 - 59% Average but (To address the major deficiencies in 1/12 and minor in 3/12) no permission granted until gaps addressed

D = 40 - 49% Unsatisfactory (recommend to NACTVET/TCU or regulatory body to suspend the training until all gaps are addressed)

E = 0 - 39% Poor (Recommend to NACTVET/TCU to de-register the training immediately)

Institution Score: ----------Grade----------

Recommendation of the team on theSuitability of institution for the purpose of health laboratory training if any.

……
……
……

……

13. Inspection Team (with qualification)

SN	Name	Profession/Title	Mobile No.	Signature	Date
1					
2					
3					
4					
5					