THE UNITED REPUBLIC OF TANZANIA

Ministry of Health

Practicum Guide

For Students

NTA level 4 Medical Laboratory Sciences

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List of Abbreviations

ADL	Activities of Daily Living
AIDS	Acquired Immune Deficiency Syndrome
AIHA	American International Health Agency
AMOTC	Assistant Medical Officer Training Centre
BCC	Behaviour Change Communication
BP	Blood Pressure
CA	Clinical Assistant
CATC	Clinical Assistant Training Centre
CDC	Centers for Disease Control and Prevention
CMT	Clinical Medicine Technician
CO	Clinical Officer
COTC	Clinical Officer Training Centre
CTC	Care and Treatment Clinic
ENT	Ear, Nose and Throat
EPI	Expanded Programme on Immunization
FH	Family History
GAP	Global AIDS Program
HEU	Health Education Unit
HIV	Human Immuno-deficiency Virus
HMIS	Health Management Information System
HPI	History of Present Illness
HRSA	Health Resources and Services Administration
I.V	Intra -Venous
IFM	Institute of Finance Management

IMAI	Integrated Management of Adolescents and Adults Illnesses
IPC	Infection Prevention and Control
IT	Information Technology
I-TECH	International Training and Education Center on Health
KCMC	Kilimanjaro Christian Medical Centre
MAM	Moderate Acute Malnutrition
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopaedic Institute
MTUHA	Mfumo wa Taarifa za Usimamizi wa Huduma za Afya
MUHAS	Muhimbili University of Health and Allied Sciences
NACP	National AIDS Control Programme
NGT	Nasogastric Tube
NMCP	National Malaria Control Programme
NTA	National Technical Award
OPD	Out-Patient Department
PEPFAR	President's Emergency Plan for AIDS Relief
PERRLA	Pupils Equal, Round, Reactive to Light, and Accommodation
PHCI	Primary Health Care Institute
PHNS	Public Health Nursing School
PLHIV	People Living with HIV
PMH	Past medical History
PPE	Personal Protective Equipment

RCH	Reproductive and Child Health
RN	Registered Nurse
ROS	Review of Other Systems
RVTC	Regional Vocational Training Centre
SAM	Severe Acute Malnutrition
SEHS	School of Environmental Health Sciences
SH	Social History
TB	Tuberculosis
TFNC	Tanzania Food and Nutrition Centre
TTCIH	Tanzania Training Centre for International Health
UDSM	University of Dar es salaam
VCT	Voluntary Counselling and Testing
VCTC	Vector Control Training Centre
WHO	World health Organization
WW	Writers' Workshop

Background and Acknowledgement

This practicum guide has been developed following present medical laboratory sciences curricula to accommodate societal needs and new technological advancement in the diagnosis of diseases. The development process also addressed the challenges that have been encountered during the implementation of the former curricula so as to ensure smooth running of Education and training in Health Training Institutions.

The development of this practicum guide for the Technician Certificate (NTA level 4) in Medical Laboratory Sciences is an outcome of collaborative efforts of the Ministry of Health (MoH), National Council for Technical and Vocational Education and Training (NACTVET) and tutors from various Health Training Institutions

I would like to appreciate in particular, the hard work of Mr. Innocent Chinguile and Dr. Joseph Mwabusila (the training coordinators of MoH) for their collaboration in thought and process to organize, coordinate and guide the review of this practical procedure book.

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Dr. Fadhil Mussa Lyimo

Assistant Director of Human Resources Development

Introduction to NTA Level 4 Practicum Guide

Overall Aim of the Practicum Guide

The practicum guide has been developed to guide students to effectively learn in laboratory practical areas to transfer the theoretical knowledge into practice. It provides an opportunity for students to practice newly learned skills under the supervision and support of tutors and practical instructors. This practicum guide provides guidance on required areas for rotation, specific skills to be learnt and tasks to be completed. This guide also attempts to promote standardization of the training in the laboratory settings; to ensure that students in all medical laboratory training institutions have same competences to be acquired for graduation.

Layout and Organization of the Practicum Guide

The practicum is organized into six major sections as follows:

Section I: Overview of the practicum which covers the overall aim of the practicum and definition of terms such as 'practicum', 'practical rotation'. The overview section also describes the structure, practicum areas, prerequisite, advance preparation, monitoring and evaluation.

Section II: This section describes the practical teaching team which includes tutors, instructors and students. The section also covers roles and responsibilities of the team and addresses the patient/client as an important resource who plays a key role in the laboratory practical learning of students.

Section III: This section explains practical competences according to NTA level 4, summary of practical competencies, aims, practical learning objectives, practical opportunities and prerequisites.

Section IV: This section contains a summary of all the practicum modules and their allocated time per week including specific guidance for NTA Level 4 Semester I practicum modules. Included in each module are the overall aim, practical learning objectives, competencies, practicum resources, prerequisites, practical placement, specific activities/assignments, end of practicum assignment, monitoring and evaluation, and checklists specific to each practicum module.

Section V: This section contains a summary of all the practicum modules and their allocated time per week including specific guidance for NTA Level 4 Semester II practicum modules. Included in each module are the overall aim, practical learning objectives, competencies, practicum resources, prerequisites, practical placement, specific activities/assignments, end of practicum

assignment, monitoring and evaluation, and checklists specific to each practicum module.

Who is the Practicum Guide For?

This practicum guide is intended primarily for use by all students to learn in the practical setting.

How Should the Practicum Guide be used?

The practicum guide is intended to be used as a tool by students to learn the appropriate skills as stipulated in the curriculum.

Practical Procedure Books

- Students shall be provided with Practical Procedure Books at the beginning of the academic year. The Practicum Guide has been harmonised with the Practical Procedure Book as a guide for performing most of the procedures listed in the Practical Procedure Book. Students should be encouraged to practice skills at all the times in laboratory settings and use both the Practical Procedure Book and Practicum Guide for the acquisition of skills.
- The tutor or practical instructor assigned for signing the student Practical Procedure Book should only do so after being satisfied that he/she has coached, supported and observed the student performing a task.

Section I: Overview of the Practicum

Overall Aim of Laboratory Practical Training

The aim of the training is to expose students to the entire range of activities in the health facility while rotating through the different laboratory departments, students will acquire relevant skills to enable them to provide or participate in the delivery of services at their respective levels. The practical training will be given over the entire instructional period of each semester.

Purpose of the Practicum

The practicum is a practical attachment intended to give students opportunities for supervised practical hands-on application of theoretical concepts studied in class during the current or past semester. The practicum may be a brief activity or could last longer.

Laboratory rotation/placement

This is a form of practicum where students are attached to health facility laboratory (dispensary, health centre and hospital) area for a specified period of time in order to learn the intended skills. At the site they have more interaction with patients and staff and have some responsibilities. During the laboratory placement, responsibility for teaching relies on both practical instructors and tutors. The practical time has to be utilized appropriately through organization of classroom and

practical hours for students to have enough time for effective acquisition of skills.

Structure of Practicum Areas

During NTA Level 4 Semester I, students will spend 7 hours a week in the laboratory setting. During NTA Level 4 Semester II, students will spend 13.5 hours a week in the laboratory setting.
In order to have successfully completed the practical training, students should demonstrate competences in Laboratory instrumentation, Routine laboratory investigation, Computer application and Laboratory reagents and solutions.

Practicum Modules per Semester

- The following are NTA Level 4 Semester I practicum modules:
    - MLT04101 Laboratory instrumentation (60 Practical hours)
    - MLT04102 General Human Anatomy and Physiology (40 Practical hours)
    - MLT04103 Laboratory Safety and Waste Management (40 Practical hours)
    - MLT04104 Communication and life skills (20 Practical hours)

- The following are NTA Level 4 Semester II practicum modules:
    - MLT04207 Routine laboratory investigation (60 Practical hours)
    - MLT04208 Laboratory Specimen Management (40 Practical hours)
    - MLT04209 Computer application (70 practical hours)
    - MLT04210 Systemic Human Anatomy and Physiology (20 Practical hours)
    - MLT04211 Laboratory reagents and solution (80 Practical hours)

Prerequisites

For NTA Level 4, students should have completed the required theoretical preparation. These prerequisites are discussed in each respective section for each area of practice.

Practicum Resources

- Laboratory rotation plan
- Practicum Guide
- Practical Procedure Book

Advance Preparation

For all practical procedures, students should be introduced to the skills in class/skills laboratory through demonstrations, simulations and role plays.

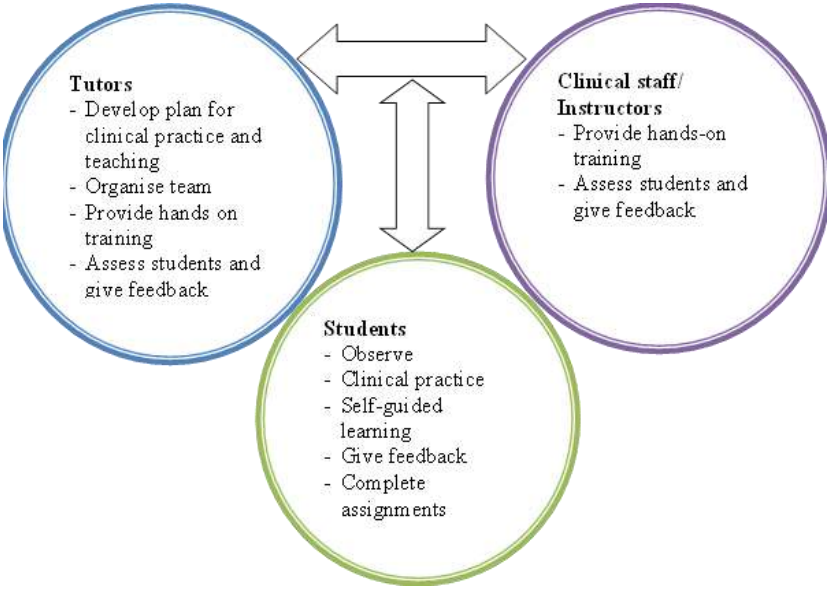
Practical Teaching

Tutors and Practical Instructor have the responsibility to supervise, guide and teach students in the laboratory setting. They also have responsibility of documenting student progress by making appropriate entries or endorsing procedures completed in the students' Practical Procedure Books and relevant checklists. The roles and responsibilities of different staff in student learning are highlighted in section II of this practicum guide.

Section II: The Practical Teaching Team and Their Roles

Implementation of practical training requires the collaborative efforts of tutors, practical instructors and students. Each of these groups has different roles in the teaching and learning process. The relationship between members of the practical teaching team and students is important. Tutors, practical instructor and students must communicate clearly with each other during the learning process. Students will gain the most from their experiences when feedback is given constructively in the spirit of promoting learning. Students are not expected to know how to do everything perfectly at once, but rather, they are in the process of learning to improve upon their current skills and learn new ones. The practical instructor or tutor will work with each student or a group of students during the process of practical learning and teaching. The tutor and practical instructor will be responsible to monitor, evaluate, and give constructive feedback on students' learning. The students will have the opportunity to seek guidance from and provide feedback to the tutors and practical instructors.

Figure 1: Roles and Responsibilities of Tutors, Practical instructorand Students



Roles and Responsibilities of the Student in Practical Setting

Students are expected to show diligence in practical areas and behave in a way that is consistent with ethical practice. Students will have the following roles:

- Learn the laboratory setting leadership, policies, routine and procedures
- Learn practical skills according to practical learning objectives

- Present performed practical summaries, challenges encountered and other assignments to practical instructors and tutors as relevant
- Perform other duties as assigned by Practical Staff/Instructors at the relevant site
- Complete assignments and submit them to the relevant practical instructor or tutor as appropriate
- Maintain laboratory records correctly
- Support fellow students in the practical areas for effective learning
- Share practical learning experiences in classroom and laboratory.
- Receive feedback from tutors and practical instructors on progress and discuss/ask questions
- Provide feedback to tutors and practical instructors on practical teaching and learning process

NOTE: Other specific roles will depend on the specific area in which the student will be placed.

Patient/Client as a Resource

Patient/Client is a very important resource and plays a key role in the practical learning of students. He/she is a constant resource for students as source of laboratory specimens. However, the patient/client has rights which tutor, medical laboratory staff/instructor and student have to observe as they interact with the patient/client. These rights include:

- Being treated with compassion, love and respect.
- Getting correct information about his/her tests requested and procedures.
- Complaining and appealing in accordance with established procedures.
- The right to privacy and confidentiality.
- Refusing services if they do not meet the required needs and standards.
- Accessing health services, facilities and information according to their needs.
- The right for informed consent, self-expression and choice of care.
- Knowing health facility rules and regulations that apply to his/her conduct as a patient.

Section III. Practical Competences According to NTA Level 4

Introduction

NTA Level 4 students (Basic Laboratory Technicians) are expected to apply professional ethics and code of conduct in performing routine medical laboratory duties including collecting and analyzing routine specimens, preparing basic reagents, operating laboratory equipment, keeping records and documents in health service facilities.

Table 1: Summary of practical Competences According to NTA Level 4

<table>
<tr><td>Principal Outcomes</td><td colspan="3">By the end of the NTA Level 4 rotation students will be able to:
Apply principles of customer care to provide health laboratory services
Apply safety principles to manage laboratory operations
Employ principles of computer in record keeping to handle laboratory information
Apply standard procedures to prepare laboratory reagents and solutions for performing laboratory investigations
Apply standard procedures to diagnose diseases
Apply principles of laboratory instrumentation to facilitate disease diagnosis</td></tr>
<tr><td rowspan="2">NTA Level 4</td><td colspan="2">Semester Subject Areas</td><td rowspan="2">Training Sites</td></tr>
<tr><td>Tasks for Semester I</td><td>Tasks for Semester II</td></tr>
<tr><td>Apply preventive measures correctly in handling laboratory equipment</td><td>Application of aseptic procedures in specimen collection</td><td>Autonomous laboratory (level C)</td></tr>
</table>

	• Operate laboratory equipment/instruments properly • Troubleshoot common problems in basic laboratory instruments / equipment • Apply procedures for caring of basic laboratory instruments/equipment • Maintain equipment inventory properly in the laboratory • Prepare official letter, curriculum vitae, meeting minutes, memo and notice • Apply fingerspell alphabet in sign to special group in providing laboratory services. • Apply negotiation skills. • Locate organs involved in blood formation and lymphatic system. • Locate muscles of the upper limb and lower limbs where blood vessels for blood sample collection lie	• Able to select specimen containers correctly • Collecting specimens according to Standards (SOPs) • Preparation of basic laboratory reagents and solutions • Perform routine investigations correctly in the laboratory • Practice computer skills effectively in the laboratory. • Locate sites and blood vessels of the lower limb, upper limb and other special sites for blood collection (heel, big toe, dorsal pedis femoral, finger, ventral side of the hand and cubital area, ear lobe and temporal site)	• Dispensary and health centre laboratory • Skills laboratory • Hospital laboratory • Computer laboratory

Aim

The overall aim of the NTA Level 4 practicum is to enable a trainees to acquire the necessary skills in laboratory instrumentation, routine laboratory investigations, reagent preparation and solution and computer to confidently solve day-to-day problems in health care settings.

Specifically, students will be prepared to continue on to NTA Levels 5. To this end, the following outcomes have been established for students:

- Apply computer skills in performing laboratory investigation (LIS).
- Utilize skills for preparing reagents and solutions for routine laboratory investigations.
- Utilize skills for infection, prevention and control (IPC) to prevent and control infectious diseases
- Perform routine laboratory diagnostic methods to detect diseases
- Apply procedures for operating and caring laboratory instruments/equipments
- Troubleshoot common problems in basic laboratory instruments / equipment.
- Prepare official letter, curriculum vitae, meeting minutes, memo and notice in improving communication at the working environment.
- Apply fingerspell alphabet signs to special group when providing laboratory services

Practical Learning Outcomes

By the end of NTA level 4 practicum students are expected to be able to:

- Apply principles of customer care to provide health laboratory services
- Apply safety principles to manage laboratory operations
- Employ principles of computer in record keeping to handle laboratory information
- Apply standard procedures to prepare laboratory reagents and solutions for performing laboratory investigations
- Apply standard procedures to diagnose diseases

Practical Competencies/Skills

- Practical competencies/skills are specified in each module below

Practical Opportunities

During NTA level 4 at medical laboratory schools, students will be oriented to specific practical areas and will:

- Be trained for a professional world (Practical skills).Where they will practise thinking and acting like professional Medical Laboratory Technologists by experiencing the equipment, protocols and working environment of a real medical laboratory which fits their needs.

- Gain Intellectual skills through producing data from practical acquire, processes, analyse and interpret. Achieving this; requires application, analysis and evaluation, higher order thinking skills which add value to their profession.
- Gain Personal / transferable skills due to working together with medical laboratory staffs and enhance their effective communication and organization.

Prerequisites

Before starting the practicum, students should have had theoretical preparation. However for this level, students will go to practical areas at the same time as they are receiving educational training. These exposures are brief and related to the particular area covered during class sessions.

Section IV: Semester I Practicum Modules

Students will be placed in practical settings for acquisition of skills during the training of the following three (3) practicum modules (see table below).

Table 2: Semester I Practicum Modules

Module Code and Title	Scheme of Study (Hours per week)	
	Practical	**Practicum Activity**
MLT04101 Laboratory Instrumentation	3	Caring, operating and troubleshooting instruments/equipments
MLT04102 General Human Anatomy and Physiology	2	Locate lymphatic system and muscles of the upper limb and lower limbs for sample collection.
MLT04103 Laboratory Safety and Waste Management	2	Applying IPC measures
MLT04104 Communication and life skills	1	Prepare official letter, CV, meeting minutes, memo and note
Total hours	**8**	

Practicum Module: MLT04101 Laboratory Instrumentation

Total Practical Time: 60 hours in 20 weeks of a semester

Aim: The aim of practical session is for students to acquire skills of operating, caring and troubleshooting instruments/equipment in the laboratory setting.

Practical Learning Outcomes:

By the end of practicum, students are expected to be able to:

- Use basic instruments and equipment to conduct laboratory tests.
- Apply procedures for caring of basic laboratory instruments/equipment
- Troubleshoot common problems in basic laboratory instruments / equipment
- Report non-conformances of basic laboratory instruments/equipment

Competences/Skills

- Operate instrument and equipment according to manufacturer manuals and or SOPs
- Use performance monitoring tools (the temperature chart, maintenance log)
- Perform care of basic laboratory instruments/equipment
- Assemble materials for care of basic equipment and instruments
- Report non-conformances of laboratory instruments and equipment
- Fill corrective action log sheet for basic laboratory equipment/instruments

Practicum Resources

- Practicum checklists
- Practical assignment sheets
- Equipment/ instruments
- Practical Procedure Books (PPB)

Prerequisite modules

- None

Practical Placement and Assignments

During placement in the hospital laboratory department, students will get the opportunity to perform practical activities, assignments and demonstrations. In each area students will have an opportunity to observe, perform and acquire different skills and to see how those skills are applied in different settings.

Activity1: Operating instruments and equipment.

In the Clinical chemistry section, Haematology section, Parasitology section, Microbiology section, Sterilization room and other relevant areas, students will be assigned to the activities of laboratory instrumentation as follows:

- Operate Microscope, centrifuges, weighing balances, incubators, refrigerators and colorimeter

Assignment 1

Each student shall be assigned to operate Microscope, Centrifuges, Weighing balances, Incubators, Refrigerators, Water bath, Distiller, Hot air oven and Colorimeter. Write and submit to the practical instructor a report showing how he/she operated those equipments while dealing with patient samples.

Activity 2: Using performance monitoring tools of the equipment/ instruments

In the Clinical chemistry section, Haematology section, Parasitology section, Microbiology section, Sterilization room and other relevant areas, students will be assigned to the activities of laboratory instrumentation as follows:

- Use the temperature chart and maintenance log for monitoring refrigerator, microscopes, centrifuges, autoclave and hot air oven.

Assignment

Each student shall be assigned to use the temperature chart and maintenance log for monitoring refrigerator, microscopes, centrifuges, autoclave and hot air oven. Write and submit filled tools to the practical instructor

Activity 3: Reporting non-conformances of laboratory instruments and equipment

In the Clinical chemistry section, Haematology section, Parasitology section, Microbiology section, Sterilization room and other relevant areas, students will be assigned to the activities of laboratory instrumentation as follows:

- Report non-conformances and fill corrective action log sheet for distiller, autoclave, micropipette and microscope

Assignment

Students shall document the non-conformances and troubleshoot all common problems of the distiller, autoclave, micropipette and microscope. Write and submit report to the practical instructor.

Activity 4: Performing care of basic laboratory instruments/equipment

In the Clinical chemistry section, Haematology section, Parasitology section, Microbiology section, Sterilization room and other relevant areas, students shall be divided into small manageable groups of 4 to 6 students per group to rotate into the identified areas above; and be assigned to the following activity:

- Perform care of Microscope, centrifuges, weighing balances, incubators, refrigerators, colorimeter, autoclave, hot air oven and distiller

Assignment 1

Each student shall be assigned to perform care of Microscope, Centrifuges, Weighing balances, Incubators, Refrigerators, Colorimeter, Autoclave, Hot air oven and Distiller. Instruct students to write report and submit to the practical instructor

Activity 5: Filling corrective action log sheet for basic laboratory equipment/instruments

In the Clinical chemistry section, Haematology section, Parasitology section, Microbiology section, Sterilization room and other relevant areas, students shall be divided into small manageable groups of 4 to 6 students per group to rotate into the identified areas above; and assigned to the following activity:

- Fill corrective action log sheet for basic laboratory equipment/instruments

Assignment

Each student shall fill corrective action log following the identification of non-conformances of Microscope, Centrifuges, Weighing balances, Incubators, Refrigerators, Colorimeter, Autoclave, Hot air oven and Distiller. Students shall write report and submit to the practical instructor

Checklist 1: Operating of Light Microscope

Skills	
Standard	**Criteria**
1.1 Procedure of operating microscope	1.1.1 Connects the light microscope to a power source.
	1.1.2 Turn the revolving nosepiece putting the lowest objective lens in position.
	1.1.3 Mount slides with specimen onto the stage.
	1.1.4 Keep the slide with specimen in place with the metal clips
	1.1.5 Look into the eyepiece and focus into specimen.
	1.1.6 Adjust the condenser for the maximum amount of light depending on objective lens and nature of specimen (wet or dry stained smear).
	1.1.7 Visualize the field with x10 objective lens

Skills	
Standard	**Criteria**
	1.1.8 Visualize the field with x40 objective lens
	1.1.9 Visualize the field with x100 objective lens using oil immersion.
	1.1.10 Rotate the fine adjustment knob to obtain a clearer image.
	1.1.11 Examine the specimen.
	1.1.12 Remove the slide from the stage
	1.1.13 Wipe oil from x100 objective and microscope stage using lens paper
	1.1.14 Switche off the microscope and disconnects from the power source

Checklist 2: Care and Safety Precautions when Operating Microscope

Skills	
Standard	**Criteria**
2.1 Safety Precautions when Operating Microscope	2.1.1 Clean lenses with lens paper
	2.1.2 Wipe the stage and disinfects the eyepiece with an alcohol-based wipe.
	2.1.3 Turn off the light source when the microscope is not in use.
	2.1.4 Carrie the microscope using two hands
	2.1.5 Store the microscope properly by lowering the nosepiece, and placing the objective lenses on the lowest setting.
	2.1.6 Cover the microscope after use

Checklist 3: Troubleshooting Laboratory Equipment/Instruments

Skills	
Standard	**Criteria**
3.1 Procedure of troubleshooting laboratory equipment	3.1.1 Read the operating manual.
	3.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	3.1.3 Report major breakdown of equipment

Checklist 4: Operating Centrifuge

Skills	
Standard	**Criteria**
4.1 Procedure of operating centrifuge	4.1.1 Connect the centrifuge to the proper power supply
	4.1.2 Place the sample into the centrifuge symmetrically
	4.1.3 Seal tightly all tubes and safety cups.
	4.1.4 Close the lid of the centrifuge
	4.1.5 Set speed and time.
	4.1.6 Start the centrifuges
	4.1.7 Open the centrifuge lid and Removes the sample
	4.1.8 Switch off the centrifuge
	4.1.9 Disconnect the equipment from the power source at the end of the day work

Checklist 5: Care and Safety Measures when Operating Centrifuge

Skills	
Standard	**Criteria**
5.1 Safety Measures when Operating Centrifuge	5.1.1 Clean and disinfects after use.
	5.1.2 Lubricate O-rings and rotor threads.
	5.1.3 Balance the centrifuge rotor
	5.1.4 Inspect the rotor and tube cavities for signs of damage
	If using a swinging bucket rotor, follow these additional workplace practice controls:
	5.1.5 Put metal buckets in place.
	5.1.6 Load samples symmetrically to axis of rotation.
	If using a fixed angle rotor, follow these additional workplace practice controls:
	5.1.7 Tighten rotor lid correctly.
	5.1.8 Install and attach rotor to spindle.
	5.1.9 Pull up on the rotor to confirm rotor is attached.

Checklist 6: Troubleshooting of Centrifuge

Skills	
Standard	**Criteria**
6.1 Procedure of troubleshooting centrifuge	6.1.1 Read the operating manual.
	6.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	6.1.3 Report major breakdown of equipment

Checklist 7: Operating Weighing Balance

Skills	
Standard	**Criteria**
7.1 Procedure of operating weighing balance	7.1.1 Level the weighing balance
	7.1.2 Place a piece of filter paper on the pan
	7.1.3 Zero the weighing balance
	7.1.4 Place the chemical on a filter paper using spatula.
	7.1.5 Add the chemical slowly until the desired weight
	7.1.6 Remove the chemical from the weighing balance
	7.1.7 Turn of the weighing balance

Checklist 8: Care and Safety Measures when Operating Weighing Balance

Skills	
Standard	**Criteria**
8.1 Care and Safety Measures when Operating weighing balance	8.1.1 Clean the weighing balance with a damp cloth
	8.1.2 Clean any spilt chemical with dry gauze
	8.1.3 Turn off the weighing balance after use

Checklist 9: Troubleshooting of Weighing Balance

Skills	
Standard	**Criteria**
9.1 Procedure of troubleshooting Weighing balance	9.1.1 Read the operating manual.
	9.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	9.1.3 Report major breakdown of equipment

Checklist 10: Operating Autoclave

Skills	
Standard	**Criteria**
10.1Procedure of Operating Autoclave	10.1.1 Loosen the caps of the containers to be sterilized
	10.1.2 Pour distilled water or rain water into the autoclave
	10.1.3 Place the basket in the autoclave
	10.1.4 Close the lid and screws down the lid clamps
	10.1.5 Open the air outlet valve
	10.1.6 Turn on the heat source
	10.1.7 Close the air outlet valve when the air has expelled and temperature gauge reads 104^0C
	10.1.8 Wait until the gauge reads 121^0C
	10.1.9 Reduce the heat after 15 minutes when the gauge reads 121^0C
	10.1.10Turn off the autoclave and waits until gauge reads 0^0C
	10.1.11 Open the outlet
	10.1.12 Open the lid

Checklist 11: Care and Safety Precautions when Operating Autoclave

Skills	
Standards	**Criteria**
11.1Care and Safety Precautions when Operating Autoclave	11.1.1 Use only distilled water or rainwater in an autoclave to avoid salt deposits
	11.1.2 Check water level if sufficient for one cycle
	11.1.3 Pack materials to be sterilized as per autoclave bucket capacity
	11.1.4 Open the lid after the pressure gauge reaches zero
	11.1.5 Clean the inside of the autoclave with a cloth dampened in distilled water after use
	11.1.6 Clean the pressure and safety valves using a swab moistened with distilled water.
	11.1.7 Lubricate the autoclave clamps using high melting point grease
	11.1.8 Lubricate the sealing face of the gasket with high melting point grease to prevent permanent wear and failure of the gasket.

Checklist 12: Troubleshooting an Autoclave

Skills	
Standard	**Criteria**
12.1 Procedure of troubleshooting of Autoclave	12.1.1 Read the operating manual.
	12.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	12.1.3 Report major breakdown of equipment

Checklist 13: Operating Colorimeter

Skills	
Standard	**Criteria**
13.1Procedure of Operating Colorimeter	13.1.1 Connect the unit to the power supply and switch on.
	13.1.2 Wait for 5 minutes for colorimeter to warm-up
	13.1.3 Select the correct wavelength for the compound to be tested
	13.1.4 Select absorbance by using the mode switch
	13.1.5 Arrange blank, standard and test solutions in test tube rack
	13.1.6 Clean a cuvette using soft tissue to avoid scratches
	13.1.7 Transfer the blank solution into the cuvette
	13.1.8 Place the cuvette in the sample compartment with the clear sides of the cuvette facing the light path.
	13.1.9 Close the chamber and zero the calorimeter
	13.1.10 Remove the cuvette from the compartment
	13.1.11Pour the standard solution into the cuvette and reads the absorbance
	13.1.12Pour the test solution into the cuvette and reads the absorbance
	13.1.13Switch off the instrument
	13.1.14Disconnect from power supply after use

Checklist 14: Care and Safety Precautions when Operating Colorimeter

Skills	
Standard	**Criteria**
14.1 Care and Safety Precautions when Operating Colorimeter	14.1.1 Keep the cuvette chamber closed when not in use.
	14.1.2 Clean filters with a soft cloth or cotton gauze when required (for non-inbuilt filters).
	14.1.3 Switch off the equipment after use
	14.1.4 Disconnect from power source after use.

Checklist 15: Troubleshooting of Colorimeter

Skills	
Standard	**Criteria**
15.1 Procedure of troubleshooting Colorimeter	15.1.1 Read the operating manual.
	15.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	15.1.3 Report major breakdown of equipment

Checklist 16: Operating Refrigerator

Skills	
Standard	**Criteria**
16.1 Procedure of operating Refrigerator	16.1.1 Plug in the refrigerator onto the power source
	16.1.2 Switch on the power source
	16.1.3 Set the correct temperature (2-8℃) for the refrigerator
	16.1.2 Open and closes the door gently to avoid disturbing the contents

Checklist 17: Care and Safety Precautions when Operating Refrigerator

Skills	
Standard	**Criteria**
17.1 Care and Safety Precautions when Operating Refrigerator	17.1.1 Clean the refrigerator
	17.1.2 Defrost and cleans the freezer compartment
	17.1.3 Dry the freezer compartment with a clean cloth
	17.1.4 Wipe with glycerine or 70% methanol onto the walls to make it easier to defrost next time
	17.1.5 Wash the rubber lining on the door with soap and water.
	17.1.6 Remove dirt and dust from the coils and condenser using a soft brush.
	17.1.7 Place the refrigerator away from the wall
	17.1.8 Close the door to prevent warm air entering the cooling chamber.

Checklist 18: Troubleshooting of Refrigerator

Skills	
Standard	**Criteria**
18.1Procedure of troubleshooting of Refrigerator	18.1.1 Read the operating manual.
	18.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	18.1.3Report major breakdown of equipment

Checklist 19: Operating Water Bath

Skills	
Standard	**Criteria**
19.1Procedure of Operating Water Bath	19.1.1 Put water in the water bath
	19.1.2 Connect the unit to the main power supply.
	19.1.3 Set the temperature control to the desired temperature.
	19.1.4 Switch on the main switch
	19.1.5 Incubate vials or test tubes of samples in the water bath
	19.1.6 Remove vials or test tubes of samples after incubation
	19.1.7 Close the lid of the water bath after use and when not in use.

Checklist 20: Care and Safety Precautions when Operating Water Bath

Skills	
Standard	**Criteria**
19.2Care and Safety Precautions when Operating Water Bath	19.2.1 Clean the water bath trough using distilled water and disinfectant
	19.2.2 Check container for water leaks during cleaning of the trough
	19.2.3 Use distilled water or rainwater in the water bath
	19.2.4 Change distilled water in the water bath trough when needed
	19.2.5 Clean the water bath trough using distilled water and disinfectant
	19.2.6 Check container for water leaks during cleaning of the trough
	19.2.7 Use distilled water or rainwater in the water bath

Checklist 21: Troubleshooting of Water bath

Skills	
Standard	**Criteria**
21.1Procedure of troubleshooting Water bath	21.1.1 Read the operating manual.
	21.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	21.1.3 Report major breakdown of equipment

Checklist 22: Operating Incubator

Skills	
Standard	**Criteria**
22.1 Procedure of Operating Incubator	22.1.1 Switch on the instrument
	22.1.2 Set the desired temperature
	22.1.3 Arrange articles to be incubated
	22.1.4 Close the door

Checklist 23: Care and Safety Precautions when Operating Incubator

Skills	
Standard	**Criteria**
23.1 Care and Safety Precautions when Operating Incubator	23.1.1 Close the door fully when in use
	23.1.2 Clean the incubator using non-corrosive disinfectant
	23.1.3 Wipe with a damp cloth soaked in soapy water.
	23.1.4 Lubricate the mechanical parts of the door lock
	23.1.5 Protect the incubator from power surges using a voltage stabiliser

Checklist 24: Troubleshooting of Incubator

Skills	
Standard	**Criteria**
24.1Procedure of troubleshooting Incubator	24.1.1 Read the operating manual.
	24.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	24.1.3 Report major breakdown of equipment

Checklist 25: Operating Water Distiller

Skills	
Standard	**Criteria**
25.1 Procedure of Operating Water Distiller	25.1.1 Connect the distiller to the main power supply
	25.1.2 Switche on the main power supply
	25.1.3 Connect the pressure hose to the water tap and turn on the water supply
	25.1.4 Switche on the distiller
	25.1.5 Check the drained water flows freely and does not 'back-up' into the level control.
	25.1.6 Switche off the distiller when the reservoir is full
	25.1.7 Turn off water supply
	25.1.8 Disconnect from the mains power supply after use

Checklist 27: Care and Safety Precautions when Operating Water Distiller

Skills	
Standard	**Criteria**
27.1 Care and Safety Precautions when Operating Water Distiller	27.1.1 Tur on the electricity supply when the heating element is completely immersed in water
	27.1.2 Puts in sufficient cool running water to feed the condenser
	27.1.3 Clean the distiller
	27.1.4 Switche off the distiller after use

Checklist 28: Troubleshooting of Distiller

Skills	
Standard	**Criteria**
28.1 Procedure of troubleshooting Distiller	28.1.1 Read the operating manual.
	28.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	28.1.3 Report major breakdown of equipment

Checklist 29: Using Micropipette

Skills	
Standard	**Criteria**
29.1 Procedure of using Micropipette	29.1.1 Set the desired volume
	29.1.2 Select the correct size of tips to be used
	29.1.3 Attach the tip firmly to the micropipette
	29.1.4 Presse the push-button of the pipette with a thumb to the first stop of the micropipette
	29.1.5 Immerse the pipette tip vertically into the solution
	29.1.6 Release the button to move up to the top stop position by releasing the thumb slowly and smoothly
	29.1.7 Place the pipette tip at 45^0 angle against inside the wall of the receiving container

Skills	
Standard	**Criteria**
	29.1.8 Empty the tip by slowly pressing the push-button down to the first stop
	29.1.9 Empty completely by presses down the push-button to the final stop
	29.1.10 Release the push-button to return to the top stop position.
	29.1.11 Discard the tip
	29.1.12 Place the pipette back into respective stands after use.

Checklist 31: Care and Safety Precautions when Operating Micropipette

Skills	
Standard	**Criteria**
31.1 Care and Safety Precautions when Operating Micropipette	31.1.1 Decontaminate and cleans outside of the micropipette with 70% methanol or ethanol
	31.1.2 Place the micropipette in the respective rack after use

Checklist 32: Troubleshooting of Micropipette

Skills	
Standard	**Criteria**
32.1Procedure of troubleshooting Micropipette	32.1.1 Read the operating manual
	32.1.2 Report major malfunctions of equipment

Checklist 33: Operating pH Meter

Skills	
Standard	**Criteria**
33.1Procedures for Operating pH Meter	33.1.1 Place the equipment on clean and flat surface
	33.1.2 Connect the equipment to the main power supply and switches on
	33.1.3 Rinse the electrodes with deionized water
	33.1.4 Dip the electrodes in sample solution
	33.1.5 Read the pH results
	33.1.6 Clean the equipment after pH reading
	33.1.7 Report the reading

Checklist 34: Care and Safety Precautions when Operating pH Meter

Skills	
Standard	**Criteria**
34.1 Care and Safety Precautions when Operating pH Meter	34.1.1 Wash the electrodes in deionized water
	34.1.2 Store the electrodes in storage medium of solution
	34.1.3 Wipe the glass electrode bulb with tissue paper
	34.1.4 Disconnect the instrument from power supply after use

Checklist 35: Troubleshooting of pH Meter

Skills	
Standard	**Criteria**
35.1 Procedure of troubleshooting pH Meter	35.1.1 Read the operating manual
	35.1.2 Check the electric socket outlet, plug and fuse, if the equipment/instrument fails to switch on
	35.1.3 Report major breakdown of equipment

Practicum Module: MLT04102 General Human Anatomy and Physiology

Total Practical Time: 40 hours in 20 weeks of a semester

Aim: The aim of this practicum is for students to acquire skills of human anatomy and physiology in providing health care services.

Practical Learning Outcomes:

By the end of practicum the students will be able to:

- Locate organs involved in blood formation
- Locate organs involved in lymphatic system
- Locate muscles of upper limb were blood vessels (medial cubital vein, cephalic vein and basilic vein) lie
- Locate muscles of lower limbs were femoral vein lie

Competencies/Skills

- Show and name organs involved in blood formation
- Show and name organs involved in lymphatic system

- Show and name muscles of upper limb were blood vessels lie
- Show and name muscles of lower limbs were femoral vein lie

Practicum Resources

- Practicum learning Outcomes
- Manikins
- Charts
- Models

Prerequisite modules

- None

Areas of Practice and Assignment

Students will have an opportunity while on placement in the Skill laboratory to familiarise with organs for blood formation and areas used for blood collections. Tutors and skills laboratory instructors and other staff should ensure that students learn the following:

Activity 1: At the Skill laboratory

At the end of theory session which contain practical component(s) the students shall be divided in small manageable groups (4-6 students) and assigned to identify and familiarise with organs for blood formation, lymphatic system, muscles of upper and lower limbs and areas used for blood collections.

Practicum Module: MLT04103 Laboratory Safety and Waste Management

Total Practical Time:40 hours in 20 weeks of a semester

Aim: The aim of this practicum is for students to acquire and apply safety skills and aseptic methods in managing laboratory operations.

Practical Learning Outcomes:

By the end of practicum, the students will be able to:

- Use 6S laboratory principles in improving working area
- Use protective gears in laboratory practices to maintain safety
- Use fire fighting techniques in laboratory accidents
- Use different methods of laboratory waste disposal to maintain safety in working environment
- Use personal protective equipment to maintain safety in laboratory premises
- Apply IPC guidelines to manage personal protective equipment in health facilities

Competences/Skills

- Clean blood collection sites using antiseptic as per SOP
- Disinfect working bench and floor using appropriate disinfectant
- Wash hands as needed during laboratory practices as per SOP
- Decontaminate laboratory wares as per SOP
- Sterilize laboratory wares as per SOP (dry heat, moist heat and chemical)
- Put on and take off protective gears during laboratory practices as per SOP (*gloves, lab coats, goggles, masks, eye wears, gumboot, apron*)
- Apply 6S in the laboratory practices (Sort/Select, Set, Shine, Standardize, Sustain, Safety)
- Sterilize laboratory materials as per SOP
- Use and monitor laboratory safety tools (first aid kit, spill kit, emergence shower, eye wash, biosafety cabinet and safety hood)
- Extinguish fire using available firefighting equipment in the laboratory (fire extinguisher, sand basket, water horse)
- Segregate and dispose wastes according to nature of wastes
- Decontaminate bins and other laboratory materials by using appropriate disinfectant

Practicum Resources

- Practicum learning Outcomes

- Checklists
- PPE
- IPC guidelines

Prerequisite modules

- None

Practical Placement and Assignments

- During placement in the hospital laboratory department, students will get the opportunity to perform practical activities, assignments and demonstrations. In each area students will have an opportunity to observe, perform and acquire different skills and to see how those skills are applied in different settings.

Activity 1: in the Laboratory

Students shall perform the following activities:

- Clean blood collection sites using antiseptic as per SOP
- Disinfect working bench and floor using appropriate disinfectant
- Wash hands as needed during laboratory practices as per SOP

- Put on and take off protective gears during laboratory practices as per SOP
- Decontaminate laboratory wares as per SOP
- Sterilize laboratory wares as per SOP (dry heat, moist heat and chemical)
- Apply 6S in the laboratory practices (Sort/Select, Set, Shine, Standardize, Sustain, Safety)
- Sterilize laboratory materials as per SOP
- Use and monitor laboratory safety tools (first aid kit, spill kit, emergence shower, eye wash, biosafety cabinet and safety hood)
- Extinguish fire using available firefighting equipment in the laboratory (fire extinguisher, sand basket, water horse)
- Segregate and dispose wastes according to nature of wastes
- Decontaminate bins and other laboratory materials by using appropriate disinfectant

Assignment

Each student shall write a report and submit to the tutor for assessment and feedback.

Checklist 36: Cleaning blood collection sites using antiseptic

Skills	
Standard	**Criteria**
36.1 Procedure for Cleaning blood collection sites using antiseptic	36.1.1 Wash hands
	36.1.2 Wear appropriate personal protection equipment (PPE)
	36.1.3 Clean site with alcohol swabs in a circular motion
	36.1.4 Wait for the alcohol to dry

Checklist 37: Disinfection of working bench and floor

Skills	
Standard	**Criteria**
37.1 Procedure for Disinfection of working bench and floor	37.1.1 Dispose absorbent materials
	37.1.2 Minimize clutter and other unnecessary items on countertops and desks/tables
	37.1.3 Clean dirty surfaces
	37.1.4 Apply disinfectant
	37.1.5 Wipe the surface to dry and/or remove residual disinfectant
	37.1.6 Store disinfectants in accordance to manufacturer labels
	37.1.7 Dispose cleaning materials in trash containers

Checklist 3: Hand washing

Skills	
Standard	**Criteria**
3.1 Procedure for Hand washing	3.1.1 Wet hands with running water
	3.1.2 Apply soap
	3.1.3 Rub all areas of hands: palms, fingers, fingernails and between fingers
	3.1.4 Rinse hands with clean running water
	3.1.5 Use a paper towel when turning off tap if is not elbow controlled or automatic shut off
	3.1.6 Dry hands with a paper towel

Checklist 38: Donning and doffing gloves

Skills	
Standard	**Criteria**
38.1 Procedure for donning and doffing gloves	**Donning gloves**
	38.1.1 Take out a glove from the box
	38.1.2 Hold the glove by the top edge of the cuff only as you slip your fingers into it
	38.1.3 Don the first glove by pulling it on, holding it by the top edge of the cuff
	38.1.4 Take a second glove from the box
	38.1.5 Transfer the glove to the gloved hand by the edge of the cuff
	38.1.6 Insert bare fingers into the glove
	38.1.7 Turn the external surface of the glove to be donned
	38.1.8 Pull the second glove up

Skills	
Standard	**Criteria**
	Doffing gloves
	38.1.9 Pinch one glove at the wrist level to remove it
	38.1.10 Peel the glove downward and away from hand
	38.1.11 Hold the removed glove on the gloved hand
	38.1.12 Slide the fingers of the un-gloved hand inside between the glove and the wrist
	38.1.13 Remove the second glove by rolling it down the hand and over the top of the first glove
	38.1.14 Discard the removed gloves in an appropriate waste container

Skills	
Standard	**Criteria**
	38.1.15Clean hands with soap and water or alcohol-based hand sanitizer

Checklist 39: Waste segregation

Skills	
Standard	**Criteria**
39.1 Procedure for Waste Segregation	39.1.1 Dispose sharp materials in sharp box
	39.1.2 Dispose highly infectious materials in red bin
	39.1.3 Dispose infectious materials in yellow bin
	39.1.4 Dispose all non-infectious materials in black or green bin

Practicum Module: MLT04104 Communication and Life skills

Total Practical Time: 20 hours in 20 weeks of a semester

Aim: The aim of practical session is for students to acquire and apply communication and life skills in the laboratory setting.

Practical Learning Outcomes:

By the end of practicum, students are expected to be able to:

- Apply communication skills in customer care to provide laboratory services
- Apply writing skills in improving communication at working environment.
- Apply sign language to communicate with special group to provide laboratory services

Competencies/Skills

- Demonstrate effective communication skill when attending clients
- Prepare official letter
- Prepare curriculum vitae
- Prepare meeting minutes
- Prepare memo and notice

Practicum Resources

- Practicum checklists
- Practical assignment sheets

Prerequisites modules:

- None

Practical Placement and Assignments

During placement in Phlebotomy section, Laboratory reception, Skills laboratory and other relevant departments, students will get the opportunity to gain communication and life skills through activities, assignments and demonstrations. In each area students will have an opportunity to observe and acquire different skills and to see how those skills are applied in different settings

Activity1: Phlebotomy section, Laboratory reception and Other relevant areas

In the above mentioned areas, instruct students to perform the following activity

- Communicate with clients during provision of service

Assignment 1

Each student shall write a report and submit to the tutor for assessment and feedback

Assignment 2

Instruct each student to prepare curriculum vitae indicating personal particular, education background, field/working experience (if applicable), hobbies and two referees.

Assignment 3
Instruct each student to prepare one official letter indicating writers address, recipient organization/ person address, date, reference number, title, main message, signature of the writer.

Assignment 4
Instruct each student to write an internal memo indicating date, addressor, addressee, heading, contents and signature.

Assignment 5
Instruct each student to write meeting minutes indicating date, heading, participants, agenda, content and closure.

All assignment reports shall be submitted to the tutor for assessment and grading

Monitoring and Evaluation

- Practical teaching team will make daily observations of students, provide support and document progress using checklists provided
- The Practical teaching team will give timely feedback for student's improvement
- Tutors/practical instructors will find opportunities for students to learn a maximum number of tasks stipulated in the NTA Level 4 Practicum Guide
- The students' reports shall be assessed and graded for assessment and evaluation purposes and then an immediate feedback shall be given to the student

Checklist 40: Communication Skills and Customer care

Skills	
Standard	**Criteria**
40.1 Creating rapport with the patient/client	40.1.1 Welcome the patient/client to a seat
	40.1.2 Greet the patient/client
	40.1.3 Introduce him/herself to the patient/client
40.2 Utilizing communication skills	40.2.1 Maintain eye contact throughout the discussion
	40.2.2 Talk to the patient/client in simple, clear language and audible voice.
	40.2.3 Show patience by not rushing the patient/client
	40.2.4 Does not interrupt the patient/client
	40.2.5 Act non-judgemental by trying to understand and not rushing to conclusions
	40.2.6 Do not get distracted by other things
	40.2.7 Use encouragers (e.g ‘mhmh’, nodding, ‘yes, yes’)
	40.2.8 Check for understanding by paraphrasing or reflecting to what the patient/client is saying
	40.2.9 Call patient/client by their first name

Skills	
Standard	**Criteria**
	40.2.10 Show concern for the patient/client by acknowledging their emotions and feelings
	40.2.11 Use appropriate body gestures and postures
	40.2.12Observe patient/clients body gestures(language) and interprets correctly
40.3Collecting information	40.3.1 Follow a logical sequence
	40.3.2 Respond to leads from the patient/client
	40.3.3 Allow the patient/client to express his/her concerns
	40.3.4 Listen actively and attentively to the patient/client concerns
	40.3.5 Use both open and closed ended questions
	40.3.6 Summarise information and allows the patient/client to correct errors
	40.3.7 Provide Feedback appropriately
	40.3.8 Record all information correctly in the appropriate patient/client's record

Practicum Module: MLT04207 Routine Laboratory Investigation

Total Practical Time: 60 hours in 20 weeks of a semester

Aim: The goal of practicum is for students to acquire and apply basic laboratory skills in processing and examining specimens to provide test results at the health facility.

Practical Learning Outcome:
By the end of practicum, students are expected to be able to:

- Apply skills of performing routine laboratory investigations
- Apply turnaround time (TAT) in providing health laboratory services
- Apply principles of quality assurance in performing routine laboratory investigations

Competencies/Skills:

- Develop turnaround time worksheet for routine laboratory investigations (Locate time, evaluate time and develop TAT)
- Perform routine Parasitological tests (BS, MRDT, urinalysis, stool analysis)
- Perform routine Hematological tests (haemoglobin estimation using Haemoglobinometers)
- Perform routine Microbiological tests (Ziehl Nelsen Hot, rapid syphilis test, urine pregnancy test, rapid Hepatitis B and C test and rapid HIV test)

- Perform routine Clinical Chemistry test (routine urine biochemical tests using Multistix and blood glucose test using Glucometer)
- Perform daily quality control testing, prepare positive and negative controls for routine tests.

Practicum Resources:

- Practical rotation plan
- Practical assignment sheets
- Checklists
- All necessary working tools/supplies

Pre-requisite modules

- Laboratory instrumentation
- Laboratory Safety and Waste Management
- Laboratory ethics and code of conduct

Practical Attachment

During the practical attachment in hospital laboratory, students will get opportunities to learn skills in Laboratory reception, haematology, blood transfusion, parasitology, microbiology and other related area. Students will have an opportunity to observe, practice, and acquire different skills under supervision in the above mentioned areas.

Activity 1: Reception, Phlebotomy, Haematology, Microbiology, Parasitology, clinical chemistry sections and other relevant areas

Divide students into small manageable groups that will rotate in Reception, Phlebotomy, Haematology, Microbiology, Parasitology, clinical chemistry sections and other relevant areas to observe and practice the following:

- Examine blood for malaria parasites (BS and MRDT), Haemoglobin, Hepatitis B and C, HIV and syphilis
- Examine urine for pregnancy, parasites and biochemical analytes

- Examine sputum using Ziehl Nelsen Hot
- Examine stool for parasites

Assignment 1

Assign each student to examine urine for UPT and biochemical analytes, sputum for ZN hot, blood for BS, MRDT, Haemoglobin, hepatitis B and C, HIV and syphilis, stool for parasites. Instruct each student to write report and submit to the practical instructor

Assignment 2

Assign each student to document patient data and test results into the register books. Instruct each student to write report and submit to the practical instructor/tutor

Activity 2: At the Microbiology and Parasitology sections

Instruct each students to perform the following;

- Prepare positive and negative controls for routine tests
- Perform daily quality control testing

Assignment

Instruct each student to write report and submit to the practical instructor/tutor

Monitoring and Evaluation

- Practical teaching team will make daily observations of students, provide support and document progress using checklists provided
- The Practical teaching team will give timely feedback for student's improvement
- Tutors/practical instructors will find opportunities for students to learn a maximum number of tasks stipulated in the NTA Level 4 Practicum Guide
- The students' reports shall be assessed and graded for assessment and evaluation purposes and then an immediate feedback shall be given to the student

Checklist 41: Performing Malaria Rapid Diagnostic Test (MRDT)

Skills	
Standard	**Criteria**
41.1 Procedure of performing Malaria Rapid Diagnostic Test	41.1.1 Assemble important equipment, materials and supplies: • Paper towels • Gloves • blood collection device(capillary tube, inverted cup and pipette) • Disposal bucket • Marker pen/pen or pencil • Safety box • Standard diagnostic MRDT kit • Sterile lancet • Cotton

Skills	
Standard	**Criteria**
	• Alcohol swab
	41.1.2 Wash hands with soap and water and dry with dry paper towel
	41.1.3 Put on gloves
	41.1.4 Remove the test device from the foil and place it on flat surface
	41.1.5 Write the patient's identification number on the device
	41.1.6 Disinfect the fingertip site with alcohol swab
	41.1.7 Prick the fingertip with a sterile lancet
	41.1.8 Apply gentle pressure to the finger until the finger express the first blood drop
	41.1.9 Wipe the first drop of blood away with a dry cotton wool

Skills	
Standard	**Criteria**
	41.1.10 Apply gentle pressure until a new blood drop appears
	41.1.11 Collect blood by using blood collection device(capillary tube, inverted cup and pipette)
	41.1.12 Touch the blood collecting device into the sample well and allow the blood to be drawn into the device
	41.1.13 Place the appropriate number of drops of buffer solution into the buffer well
	41.1.14 Leave it on bench at room temperature for 10 minutes
	41.1.15 Report the findings in the investigation form and appropriate register
	41.1.16 Wash hand with soap and water after the procedure

Checklist 42 : Staining of Blood Smear by Giemsa and Field Stain

Skill	
Standard	**Criteria**
42.1Procedure of Staining blood smear by Giemsa stain	42.1.1 Assemble the important equipment, materials and supplies: • 10% Giemsa staining reagent • Gloves • Glass slide • Jars • Slide rack • Waste disposal containers
	42.1.2 Wash hands with soap and water
	42.1.3 Dry hands with paper towel
	42.1.4 Put on gloves
	42.1.5 Place the slide smear on the staining rack

Skill	
Standard	**Criteria**
	42.1.6 Flood the smear with the 10% Giemsa solution
	42.1.7 Wash off the stain with running tap water
	42.1.8 Air dry the smear on the rack
	42.1.9 Discard wastes in the appropriate containers
	42.1.10 Put off gloves and washes hands with soap and water
	42.1.11 Dry hands with paper towel
42.2 Procedure of Staining blood smear by Field st**ain**	42.2.1 Assemble the important equipments, materials and supplies: • Gloves • Slide • Jars (with field stain) • Slide rack
	42.2.2 Wash hands with soap and water before handling the sample
	42.2.3 Dry hands with paper towel

Skill	
Standard	**Criteria**
	42.2.4 Put on gloves
	42.2.5 Stain by dipping the slide, keeping it steady, into the jars
	42.2.6 Dip in fields stain A
	42.2.7 Clean the slide with water
	42.2.8 Dip in fields stain B
	42.2.9 Clean the slide with water
	42.2.10 Leave the slide to air dry on the slide rack
	42.2.11 Remove gloves
	42.2.12 Washes hand with soap and water

Checklist 43: Routine Urine Examination (Macroscopy and Microscopy)

Skill	
Standard	**Criteria**
43.1Procedure of routine urine examination	43.1.1 Assemble the following equipment materials and supplies: • Paper towels • Gloves • Centrifuge • Microscope • Transfer pipette • Slides • Safety box • Waste disposal container
	43.1.2 Washe hands with soap and water
	43.1.3 Dry hands with paper towel
	43.1.4 Put on gloves

Skill	
Standard	**Criteria**
Macroscopic examination	43.1.5 Inspect the urine for colour, turbidity and presence of blood
	43.1.6 Report macroscopic findings
Microscopic Examination	43.1.7 Pour urine from the container into a tube
	43.1.8 Place a tube with urine into centrifuge rotors
	43.1.9 Centrifuge the urine at 3000rpm for 5 minutes
	43.1.10 Remove the tube with sample from the centrifuge rotor using forceps
	43.1.11 Discard the supernatant into the sink with running water
	43.1.12 Collect 1drop of urine sediment on a clean slide using transfer pipette
	43.1.13 Cover the preparation by using cover slip
	43.1.14 Place the slide on the microscope stage
	43.1.15 Visualize the field with x10 objective lens

Skill	
Standard	**Criteria**
	43.1.16Examine the preparation under x40 objective for detailed examination
	43.1.17Discard cover slips and glass slides
	2.1.7 Report microscopic findings
	2.1.8 Wash hands with soap and water
	2.1.9 Dry hands with paper towel

Checklist 44: Biochemical (Analytes) Urine Examination

Skill	
Standard	**Criteria**
44.1Procedure of urine examination for analytes(Biochemical) using multistix (blood, glucose, ketones, biliribin, urobilinogen,Ph, protein, nitrite, leucocyte, specific gravity)	44.1.1 Assemble the following equipment, materials and supplies: • Soap • Paper towels • Gloves • Waste disposal container • Container with Multistix
	44.1.2 Wash hands with soap and water
	44.1.3 Dry hands with paper towel
	44.1.4 Put on gloves
	44.1.5 Take one strip from bottle and replaces a cap
	44.1.6 Dip the test area of strip in urine and removes immediately

Skill	
Standard	**Criteria**
	44.1.7 Tap edge of strip against blotting paper to remove excess urine
	44.1.8 Leave it for 1 minutes to allow the reaction to take place
	44.1.9 Compare test area with colour chart on the container of strips
	44.1.10 Report the reading
	44.1.11 Discard the used materials
	44.1.12 Remove gloves
	44.1.13 Wash hands with soap and water

Checklist 45: Routine Stool Examination

Skill	
Standard	**Criteria**
45.1Procedure for routine stool examination	45.1.1 Assemble equipment, reagent and materials: • Slides • Cover slips • Marker pen/pencil • Sample (stool sample) • Gloves • Normal saline • Applicator stick • Microscope • Cotton balls/swabs
	45.1.2 Label the slide with patient laboratory number using a grease pencil or lead pencil

Skill	
Standard	**Criteria**
	45.1.3 Wash hands with soap and water
	45.1.4 Dry hands with paper towel
	45.1.5 Put on gloves
Macroscopic Examination	45.1.6 Inspect the stool for colour, consistency, mucus ,blood and visible parasite with naked eyes
	45.1.7 Report the macroscopic findings
Microscopic examination of stool	45.1.8 Place a drop of physiological saline on a clean labelled slide
	45.1.9 Select a portion of stool specimen that appears abnormal
	45.1.10 Take a small stool sample with wooden applicator stick
	45.1.11 Emulsify with the saline on the Microscope slide
	45.1.12 Cover the emulsified stool sample with cover slip
	45.1.13 Disposes applicator stick and container in appropriates disposal bucket
	45.1.14 Place the slide on the microscope stage

Skill	
Standard	**Criteria**
	45.1.15Visualize the field with x10 objective lens
	45.1.16Examine the preparation under x40 objective for detailed examination
	45.1.17Discard cover slips and glass slides
	45.1.18Report microscopic findings
	45.1.19Switch off the microscope after use
	45.1.20Cleans the microscope using a dry peace of cotton gauze
	45.1.21Cover the microscope with appropriate cover
	45.1.22Wash hands with soap and water or antiseptic

Checklist 46: Estimating Blood Haemoglobin Level

Skills	
Standard	**Criteria**
46.1Procedures of Estimating hemoglobin level Using the Hemocue method	46.1.1 Assemble important equipment, materials and supplies: • Gloves • Pipettes 5 mls • Hemocue machine • QC solution • A test tube • A clean cuvette • Sterile lancet
	46.1.2 Start up the Hemocue machine
	46.1.3 Wash hands with soap and water
	46.1.4 Dry hands by using paper towel
	46.1.5 Put on gloves

Skills	
Standard	**Criteria**
	46.1.6 Clean patient's finger with antiseptic wipe
	46.1.7 Prick side of finger with sterile lancet
	46.1.8 Apply light pressure until the first blood drop appears
	46.1.9 Wipe away first blood drop
	46.1.10 Re-apply light pressure towards fingertip until another drop of blood appear
	46.1.11 Fill microcuvete in one continuous process
	46.1.12 Wipe off any excess blood outside of the microcuvette
	46.1.13 Check that no air bubbles are present in the microcuvette
	46.1.14 Place microcuvette in the cuvette holder
	46.1.15 Push cuvette holder to reading position
	46.1.16 Read the Hb results
	46.1.17 Report the Hb results
	46.1.18 Remove the cuvette

Skills	
Standard	**Criteria**
	46.1.19Dispose the cuvette in the waste bin
	46.1.20Turn off Haemocue Machine
	46.1.21Wash hands with soap and water after the procedure

Checklist 47: Ziehl-Neelsen Hot Technique

Skill	
Standard	**Criteria**
47.1Procedure for preparing smear for Ziehl-Neelsen Hot Technique	47.1.1 Assemble the following equipment, materials and supplies: • Sputum sample • Marker pen • Gloves • Waste disposal container • Applicator stick / wire loop • Spirit lamp • Glass slides • Grease / lead pencil • Phenol/ Jik
	47.1.2 Wash hands with soap and water
	47.1.3 Dry hands with paper towel

Skill	
Standard	**Criteria**
	47.1.4 Put on gloves
	47.1.5 Use new slides when preparing sputum smear
	47.1.6 Clean the slide with alcohol and wipes dry or passes briefly through flame
	47.1.7 Label the slide with the laboratory/ specimen number on the frosted end of slide using a lead pencil
	47.1.8 Open/ uncap the container carefully
	47.1.9 Pick out a portion of sputum which appears abnormal using wooden applicator stick or loop
	47.1.10 Spread the sputum on the middle of the slide in rotational movement
	47.1.11 Fix the smear by passing over a flame two to three times
	47.1.12 Place fixed sputum smear on a staining rack

Skill	
Standard	**Criteria**
	47.1.13Discard the cap and the container in a bucket containing phenol for disinfection
	47.1.14Take off gloves
	47.1.15Wash hands with soap and water
47.2Procedure for Performing a Ziehl - Neelsen Hot Technique staining	47.2.1 Assemble the following equipment, materials and supplies: • Sputum smear • Microscope • 25% sulphuric acid • 0.3% Methylene blue • Strong Carbolfuchsin • Gloves • Waste disposal container • Spirit lamp • Phenol/ Jik

Skill	
Standard	**Criteria**
	47.2.2 Washes hand with soap and water and dries it with paper towel
	47.2.3 Put on gloves
	47.2.4 Flood the smear with filtered strong Carbolfuchsin stain
	47.2.5 Heat underneath the smear using a burning cotton swab soaked in methanol until vapour just begins to rise
	47.2.6 Allow the heated stain to remain on the slide for 5 minutes
	47.2.7 Wash off the stain with clean water
	47.2.8 Decolourise with 25% sulphuric acid until the stain is no longer decolourizable
	47.2.9 Wash well with clean water
	47.2.10 Counter stains the smear by covering with 0.3% methylene blue or malachite green stain for 1 minute
	47.2.11Wash the smear in thin stream of clean water

Skill	
Standard	**Criteria**
	47.2.12Clean the back of the slide with cotton wool or gauze
	47.2.13Place it upright in a drying rack for the smear to air-dry at room temperature
	47.2.14Discard the used materials in appropriate waste disposal containers
	47.2.15Put off gloves
	47.2.16Wash hands with soap and water
	47.2.17Dry hands with paper towel
47.3Examining the smear under the microscope	47.3.1 Put on new gloves
	47.3.2 Mount the slide onto the microscope stage
	47.3.3 Visualize with x 10 objective
	47.3.4 Examine with x 100 oil immersion objective

Skill	
Standard	**Criteria**
	47.3.5 Discard the used materials in the appropriate waste disposal containers
	47.3.6 Put off gloves
	47.3.7 Report the findings in the laboratory investigation form and register
	47.3.8 Wash hands with soap and water

Checklist 48: Hepatitis and Syphilis Rapid Testing

Skills	
Standard	**Criteria**
48.1Procedure for rapid Hepatits B and C(HB and HCV) testing	48.1.1 Assemble important equipment, materials and supplies: • Paper towels • Gloves • Plastic transfer pipette • Absorbent pad • Disposal bucket • Marker pen • Safety box • Standard diagnostic HBV or HCV kit
	48.1.2 Wash hands with soap and water
	48.1.3 Dry hands with paper towel

Skills	
Standard	**Criteria**
	48.1.4 Put on gloves
	48.1.5 Remove the strip from the packet
	48.1.6 Place the strip on a flat surface
	48.1.7 Pipette required amount of plasma/ serum/whole blood into device well
	48.1.8 Put the specimen to the absorbent pad of the strip
	48.1.9 Add three drops of essay diluents to the whole blood specimen
	48.1.10 Read results after 10-20 minutes
	48.1.11 Discard all wastes in appropriate container
	48.1.12 Remove gloves
	48.1.13 Report results in the investigation form and register book
	48.1.14 Wash hands with soap and water

Skills	
Standard	**Criteria**
48.2Syphilis rapid testing by use of Syphilis kit	48.2.1 Assemble important equipment, materials and supplies: • Paper towels • Gloves • Disposable pipette • Syphilis kit • Marker pen • Safety box • Disposal container • Buffer reagent
	48.2.2 Wash hands with soap and water
	48.2.3 Dry hands with paper towel
	48.2.4 Put on gloves

Skills	
Standard	**Criteria**
	48.2.5 Remove device from package
	48.2.6 Place the device on a flat surface
	48.2.7 Label device with client identification number
	48.2.8 Collect specimen using the disposable pipette
	48.2.9 Add two drops of specimen to the sample port in the device
	48.2.10 Add two drops of the appropriate buffer reagent to sample port
	48.2.11 Read results after 10-20 minutes
	48.2.12 Discard all wastes in appropriate container

Skills	
Standard	**Criteria**
	48.2.13Remove gloves
	48.2.14Report results in the investigation form and register book
	48.2.15Wash hands with soap and water

Checklist 49: Rapid HIV Testing

Skill	
Standard	**Criteria**
49.1Procedure of HIV rapid testing by use of SD Bioline	49.1.1 Assemble important equipment, materials and supplies: • Gloves • Paper towels • Standard diagnostic Bioline kit • Marker pen • Safety box • Waste disposal container
	49.1.2 Wash hands with soap and water
	49.1.3 Dry hands with paper towel
	49.1.4 Put on gloves
	49.1.5 Remove the testing devise from a packet
	49.1.6 Place the device on a flat surface

Skill	
Standard	**Criteria**
	49.1.7 Label it with patient's identification number
	49.1.8 Pipette required amount of plasma/serum/whole blood into a device well
	49.1.9 Add three drops of essay diluent
	49.1.10 Read the results after 10 to 20 minutes
	49.1.11 Discard all wastes in appropriate container
	49.1.12 Remove gloves
	49.1.13 Report the results in investigation forms and appropriate register
	49.1.14 Wash hands with soap and water
49.2 HIV rapid testing by use of Unigold	49.2.1 Assembles important equipment, materials and supplies: • Paper towels • Gloves • Disposable pipette

Skill	
Standard	**Criteria**
	• Unigold kit • Marker pen • Safety box • Disposal container • Wash reagent
	49.2.2 Washes hands with soap and water
	49.2.3 Dries hands with paper towel
	49.2.4 Puts on gloves
	49.2.5 Removes device from package
	49.2.6 Places the device on a flat surface
	49.2.7 Labels device with client's identification number
	49.2.8 Collects specimen using the disposable pipette
	49.2.9 Adds two drops of specimen to the sample port in the device

Skill	
Standard	**Criteria**
	49.2.10 Adds two drops of the appropriate buffer reagent to sample port
	49.2.11 Reads the results after 10-20 minutes
	49.2.12 Discards all wastes in appropriate container
	49.2.13 Removes gloves
	49.2.14 Reports the results in the laboratory investigation form and in the laboratory register book
	49.2.15 Washes hand with hands soap and water

Checklist 50: Urine Pregnancy Test

Skills	
Standards	**Criteria**
50.1Procedure for Urine Pregnancy Test(UPT)	50.1.1 Assembles important equipment, materials and supplies: • Paper towels • Gloves • Disposal bucket • Standard diagnostic UPT kit • Pipette
	50.1.2 Washes hands with soap and water
	50.1.3 Puts on gloves
	50.1.4 Removes the pregnancy strip from the pouch
	50.1.5 Dips the strip in a urine container up to a mark labelled “max”
	50.1.6 Removes the strip from the urine container
	50.1.7 Places the strip on a flat surface

Skills	
Standards	**Criteria**
	50.1.8 Waits for the colored lines to appear
	50.1.9 Reads the results after 5 minutes
	50.1.10 Discards all wastes in appropriate container
	50.1.11 Removes gloves
	50.1.12 Reports the results in investigation forms and appropriate register
	50.1.13 Washes hands with soap and water

Checklist 51: Measuring Blood Glucose Level

Skill	
Standard Operating Procedure	**Criteria**
51.1Measuring blood glucose level using a glucometer	51.1.1 Assembles important equipment, materials and supplies: • Gloves • Glucose strips • Glucometer • Sterile lancet • Alcohol swab
	51.1.2 Washes hands with soap and water
	51.1.3 Dries hands with paper towel
	51.1.4 Puts on gloves
	51.1.5 Turns on the glucometer machine
	51.1.6 Disinfects the fingertip site with alcohol swab

Skill	
Standard Operating Procedure	**Criteria**
	51.1.7 Pricks the fingertip with a sterile lancet
	51.1.8 Applies gentle pressure to the finger until the finger express the first blood drop
	51.1.9 Wipes the first drop of blood away with a dry cotton wool
	51.1.10 Applies gentle pressure until a new blood drop appears
	51.1.11 Picks one strip from the bottle containing the glucose strip
	51.1.12 Touches the strip's slot with blood on the finger tip
	51.1.13 Inserts the strip into the glucometer
	51.1.14 Waits until the glucometer displays the results
	51.1.15 Reads the glucose results

Skill	
Standard Operating Procedure	**Criteria**
	51.1.16Removes the strip from the glucometer
	51.1.17Discards the used strip and other materials in appropriate disposal containers
	51.1.18Puts off the gloves
	51.1.19Reports the results on investigation form and appropriate register
	51.1.20Places the machine in its appropriate place
	51.1.21Washes hand with soap and water

Practicum Module: MLT04208 Laboratory Specimen Management

Total Practical Time: 40 hours in 20 weeks of a semester

Aim: The goal of practicum is to enable students to acquire and apply basic laboratory skills in accessioning and collecting specimens for routine laboratory investigations at the health facility.

Practical Learning Outcome:
By the end of practicum, students are expected to be able to:

- Apply procedures to collect specimens for routine laboratory investigations
- Apply procedures of accessioning specimens for laboratory investigations
- Apply Standards to maintain records of collected specimens in the laboratory
- Select containers for specimen in the laboratory

Competencies/Skills:

- Perform accessioning of specimen.
- Instructs client to collect urine, stool and sputum specimens.
- Collect capillary blood specimen by finger prick and heel prick methods.
- Collect venous blood by venipuncture method.

Practicum Resources:

- Practical learning outcomes
- Practical rotation plan
- Practical assignment sheets
- Checklists
- All necessary working tools/supplies

Prerequisite modules

- All NTA level 4 modules for semester 1

Practical Attachment

During the practical attachment in hospital laboratory, students will get opportunities to learn skills in Laboratory reception section, Phlebotomy section and other related area. Students will have an opportunity to observe, practice, and acquire different skills under supervision.

Activity 1: Laboratory reception Section and Phlebotomy section and other relevant areas

Students shall be divided into small manageable groups (4 to 6 students per group) that will rotate in the Laboratory reception section, Phlebotomy section and other relevant areas to observe and practice the following:

- Accession urine, stool, sputum and blood specimens
- Instructs client to collect urine, stool and sputum specimens
- Collect capillary blood by finger prick and heel prick
- Collect venous blood by venipuncture method

Assignment 1

Each student will be required to apply skills on how to collect urine, sputum and stool for routine laboratory investigations. Each student shall write report and submit to the practical instructor/tutor.

Assignment 2

Each student shall be required to apply skills of collecting blood for routine laboratory investigations. Each student shall write report and submit to the practical instructor/tutor.

Assignment 3

Each student shall be required to apply skills of accessioning laboratory specimen for routine laboratory investigations. Each student shall write report and submit to the practical instructor

Checklist 52: Venous Blood Collection

Standard	Skills
	Criteria
52.1Procedure for venous blood collection.	52.1.1 Washes hands with soap and water
	52.1.2 Dries hands with paper towel
	52.1.3 Puts on gloves
	52.1.4 Gathers the materials: • Needles 19 gauge, 21gauge and 23 gauge • Syringes 2.5mls ,5ml,10ml • Vacutainer needle • Vacutainer holder • Vacutainer tube/container

	• Tourniquet • 70% methanol or alcohol swabs • Cotton wool or gauze • Gloves • Paper towel • Sharps box or container • Disposal bucket
	52.1.5 Introduces themselves
	52.1.6 Verifies the client's name, date of birth, client's ID number, protocol number, and medical record number.
	52.1.7 Directs client to sit in a comfortable position
	52.1.8 Applies the tourniquet.
	52.1.9 Asks client to make a tight fist so that the veins become more prominent
	52.1.10 Uses the index finger to palpate for a suitable vein
	52.1.11 Cleans site with alcohol swabs in a circular motion
	52.1.12 Stabilizes the vein with non-dominant hand

	52.1.13 Punctures the skin at 30^0 angle using the vacutainer apparatus with dominant hand
	52.1.14 Obtains blood samples using appropriate blood collection tubes.
	52.1.15 Loosens the tourniquet if blood flows freely
	52.1.16 Removes the tourniquet just before the last blood sample has been obtained
	52.1.17 Applies a cotton wool over the puncture site
	52.1.18 Withdraws the needle
	52.1.19 Applies the needle safety device
	52.1.20 Discards the needle with the safety device in place into the sharps container
	52.1.21 Mixes the blood collection tubes with additives by inverting
	52.1.22 Applies pressure to the site for 2 to 3 minutes
	52.1.23 Tapes the gauze pad or Band-Aid to the punctured site
	52.1.24 Discards blood contaminated products into the biohazard trash.

	52.1.25Labels the blood collection tubes
	52.1.26Verifies name and medical record number on the label in the presence of the client before taking the sample to the laboratory
	52.1.27Thanks the client
	52.1.28Removes gloves
	52.1.29Washes hands with soap and water

Checklist 53: Finger prick blood collection

Skills	
Standard	**Criteria**
53.1Procedure for finger prick blood collection	53.1.1 Washes hands with soap and water
	53.1.2 Dries hands with paper towel
	53.1.3 Puts on gloves
	53.1.4 Gather the materials: • 70% methanol or alcohol swabs • Sterile lancet/pricker • Cotton wool or gauze • Gloves

Skills	
Standard	**Criteria**
	• Paper towel • Sharps box or container
	53.1.5 Introduces themselves
	53.1.6 Verifies the client's name, date of birth, client's ID number, protocol number, and medical record number.
	53.1.7 Directs client to sit in a comfortable position
	53.1.8 Positions patient's palm side up
	53.1.9 Chooses the ring finger or whichever is least calloused
	53.1.10 Cleans the fingertip with alcohol and allows the area to dry
	53.1.11 Applies intermittent pressure to the finger to help the blood to flow to the surface of the finger

Skills	
Standard	**Criteria**
	53.1.12 Holds the finger and places firmly a new sterile lancet off-centre on the fingertip
	53.1.13 Pricks the fingertip with a quick stabbing wrist motion
	53.1.14 Discards the used lancets in the safety box
	53.1.15 Wipes away the first drop from the finger tip of blood with a dry sterile gauze pad or cotton ball
	53.1.16 Uses the next few drops of blood for the required test
	53.1.17 Applies a gauze pad or cotton ball with a gentle pressure to the puncture site until the bleeding stops
	53.1.18 Thanks the patient
	53.1.19 Disposes waste materials in the appropriate container
	53.1.20 Decontaminates all reusable equipment and returns to their appropriate places

Skills	
Standard	**Criteria**
	53.1.21Removes gloves
	53.1.22Washes hands with soap and water

Checklist 54: Blood collection by heel prick

Skills	
Standard	**Criteria**
54.1procedure for heel prick blood collection	54.1.1 Washes hands with soap and water
	54.1.2 Dries hands with paper towel
	54.1.3 Puts on gloves
	54.1.4 Assembles important materials: • Gloves • Cotton wool • Alcohol swab • Pricker/lancet • Sharps box or container • Waste container

Skills	
Standard	**Criteria**
	54.1.5 Identifies the site of heel to puncture
	54.1.6 Cleans the site of puncture using alcohol swab.
	54.1.7 Punctures the site by using a lancet/pricker
	54.1.8 Wipes away the first drop of blood
	54.1.9 Eases thumb pressure and apply intermittent pressure. Avoid milking and scraping
	54.1.10 Uses the next few drops of blood for the required test
	54.1.11 Cleans area after blood collection is complete
	54.1.12 Applies a gauze pad or cotton ball with a gentle pressure to the puncture site until the bleeding stops
	54.1.13 Applies Band-Aid above the age of two
	54.1.14 Labels specimens immediately after the draw; never before
	54.1.15 Disposes waste materials in the appropriate container

Skills	
Standard	**Criteria**
	54.1.16Decontaminates all reusable equipment and returns to their appropriate places
	54.1.17Removes gloves
	54.1.18Wash hands with soap and water

Checklist 55: Sample accessioning

Skill	
Standard	**Criteria**
55.1 Procedure for sample accessioning	55.1.1 Washes hands with soap and water
	55.1.2 Dries hands with paper towel
	55.1.3 Puts on gloves
	55.1.4 Inspects specimen transport container to ensure custody seals are intact
	55.1.5 Opens the transport container
	55.1.6 Removes specimen and request form from transport container
	55.1.7 Inspects specimen containers for correct acceptance criteria
	55.1.8 Reads over the Request Form

Skill	
Standard	**Criteria**
	55.1.9 Writes mode of delivery on the request form in upper right hand corner
	55.1.10 Stamps the request form with the date received
	55.1.11 Arranges specimens together with their request form

Practicum Module: MLT04209 Computer Applications

Total Practical Time: 70 hours in 20 weeks of a semester

Aim: The aim of this practicum is for students to apply basic computer skills in managing health facility communication and patient information.

Practical Learning Outcomes:

By the end of practicum, students are expected to be able to:

- Apply Word Processing program in preparing documents
- Apply Spreadsheet program in data processing
- Apply presentation program in presenting laboratory information
- Apply internet searching skills in accessing web resources
- Apply internet, intranet and email skills in communication
- Apply skills of planned preventive maintenance on computer

Competencies/Skills

- Format text in a Microsoft Word document
- Create tables using Microsoft Word
- Work with images in Microsoft Word
- Prepare a word document for printing
- Create formulas in Microsoft Excel
- Manage Microsoft Excel worksheet
- Create charts using MS Excel
- Print Microsoft Excel Document
- Create Power Point presentation
- Format text of a PowerPoint presentation
- Add clip art and pictures in a PowerPoint presentation
- Add charts, diagrams and tables in a PowerPoint presentation
- Add auto shapes, word art and hyperlinks in a PowerPoint presentation
- Create animate slides of a PowerPoint presentation
- Add transition to a PowerPoint presentation
- Perform presentation using MS Power Point
- Print a Power Point presentation
- Search information by using Boolean operators (AND, OR, NOT, Quotation marks, Parenthesis)
- Create email address
- Compose email message and send
- Communicate using intranet
- Attach documents to email message

- Perform PPM procedures on protecting computer from extreme temperatures, dust and viruses
- Remove spyware/ adware and viruses
- Conduct defragmentation of the computer

Practical learning resources

- Computers and accessories
- Internet connection
- Assignment sheets
- Checklists

Prerequisites

- None

Activity: Department of Health facility laboratory with LIS/Institution Computer laboratory

Students will be divided into small manageable groups (4 to 6 students per group) to work with the ICT Officer/Medical laboratory practitioners of the hospital/training institution to perform the following:

- Enter data in the computer and generate a data report using word processors

- Enter data in a spreadsheet program and generate a data report
- Represent data in graphs using Excel
- Enter data in the computer and prepare presentations using Microsoft power point
- Do web searching for health related information using search engines such as Google, Yahoo and from databases such as HINARI, Pub med, and Research4life etc.
- Create an email account, sign in, write email text and send to the practical instructor/tutor

Assignment 1

Each student shall be assigned to apply skills of MS word, Ms Excel, MS power point to generate report, enter data and prepare presentation respectively on any health related information. Each student shall submit them to the Instructor

Assignment 2

Each student shall create an email account, sign in and send email to Instructor with attachment.

Assignment 3

Each student shall be assigned to do web searching for health related information using search engines and present them in writing to the Instructor.

Checklist 56: Microsoft word Processing in preparing documents

Skills	
Standard	**Criteria**
56.1Opening the Word program window	56.1.1 Clicks start menu
	56.1.2 Clicks All Program
	56.1.3 Clicks Microsoft Office
	56.1.4 Clicks Microsoft office word
56.2Insert text	56.2.1 Moves a mouse to the location where you want text to appear in the document
	56.2.2 Left-clicks the mouse, the insertion point appears
	56.2.3 Types the text you want to appear using keyboard
56.3Delete text	56.3.1 Places a cursor next to the text you want to delete

Skills	
Standard	**Criteria**
	56.3.2 Press the Backspace key on the keyboard to delete text to the left of the cursor
	56.3.3 Press the Delete key on the keyboard to delete text to the right of the cursor
56.4Select text	56.4.1 Places the insertion point next to the text you want to select
	56.4.2 Left-clicks your mouse while holding it down, drag the mouse over the text to select it
	56.4.3 Releases the mouse button. You have selected the text. A highlighted box will appear over the selected text
	56.4.4 Places the insertion point next to the text you want to select
	56.4.5 Left-clicks the mouse while holding it down, drag your mouse over the text to select it
	56.5.1 Selects the text you want to copy

Skills	
Standard	**Criteria**
56.5Copy and paste text	56.5.2 Clicks the Copy command on the Home tab
	56.5.3 Places the insertion point where you want text to appear
	56.5.4 Clicks the Paste command on the Home tab. The text will appear.
	56.5.5 Selects the text you want to copy.
56.6Drag and drop text	56.6.1 Selects the text you want to copy.
	56.6.2 Left-clicks your mouse, and drag the text to the location where you want it to appear.
	56.6.3 Releases the mouse button, and the text will appear.
56.7Use the Save As command	56.7.1 Clicks the Microsoft Office button/File.
	56.7.2 Selects Save As Word Document. The Save As dialog box appears
	56.7.3 Selects the location where you want to save the document
	56.7.4 Enters a name for the document

Skills	
Standard	**Criteria**
	56.7.5 Clicks the Save button
56.8 Use the Save command	56.8.1 Clicks the Microsoft Office button/File
	56.8.2 Selects Save from the menu
56.9 Use the spelling check feature	56.9.1 Right-clicks the underlined word
	56.9.2 Selects the correct spelling of the word from the listed suggestions
	56.9.3 Left-clicks your mouse on the word
	56.9.4 Chooses to ignore an underlined word, add it to the dictionary, or go to the Spelling dialog box
	56.9.5 Right-clicks the underlined word
56.10 Use the grammar check feature	56.10.1 Right-clicks the underlined word
	56.10.2 Selects the correct word from the listed suggestions
	56.10.3 Left-clicks your mouse on the word. It will appear in the document

Skills	
Standard	**Criteria**
56.11 Preview the document before printing	56.11.1Clicks the Microsoft Office button
	56.11.2Selects Print
	56.11.3Prints Preview. The document opens in Print Preview format
	56.11.4Closes Print Preview to exit the preview format and make changes to the document
56.12 Print	56.12.1Clicks the Microsoft Office button/File
	56.12.2Selects Print
	56.12.3Selects the pages you want to print—either all pages or a range of pages
	56.12.4Selects the number of copies
	56.12.5Checks the Collate box if you are printing multiple copies of a multi-page document
	56.12.6Selects a printer from the drop-down list

Skills	
Standard	**Criteria**
	56.12.7Clicks Print
56.13 Print via Quick Print	56.13.1Clicks the Microsoft Office button/File
	56.13.2Selects Print
	56.13.3Clicks Quick Print. The document automatically prints to the default printer.
56.14 Formatting font size	56.14.1Selects the text you want to modify.
	56.14.2Left-clicks the drop-down arrow next to the font size box on the Home tab. The font size drop-down menu appears
	56.14.3Moves a cursor over the various font sizes. A live preview of the font size will appear in the document
	56.14.4Left-clicks the font size you want to use. The font size will change in the document
	56.15.1Selects the text you want to modify

Skills	
Standard	**Criteria**
56.15 Formatting font style	56.15.2Left-clicks the drop-down arrow next to the font style box on the Home tab. The font style drop-down menu appears
	56.15.3Moves a cursor over the various font styles. A live preview of the font will appear in the document
	56.15.4Left-clicks the font style you want to use. The font style will change in the document
56.16 Formatting font color	56.16.1Selects the text you want to modify
	56.16.2Left-clicks the drop-down arrow next to the font color box on the Home tab. The font color menu appears
	56.16.3Moves a cursor over the various font colors. A live preview of the color will appear in the document
	56.16.4Left-clicks the font color you want to use. The font color will change in the document
	56.17.1Selects the text you want to modify

Skills	
Standard	**Criteria**
56.17 Use the bold, italic, and underline commands	56.17.2 Clicks the bold, italic, or underline command in the Font group on the Home tab
56.18 Change the text case	56.18.1Selects the text you want to modify
	56.18.2Clicks the Change Case command in the Font group on the Home tab
	56.18.3Selects one of the case options from the list
56.19 Change text alignment	56.19.1Selects the text you want to modify
	56.19.2Selects one of the four alignment options from the Paragraph group on the Home tab
	56.20.1Selects the text you want to format

Skills	
Standard	**Criteria**
56.20 Formatting line spacing	56.20.2Clicks the Line spacing command in the Paragraph group on the Home tab
	56.20.3Selects a spacing option OR
	56.20.4Selects Line Spacing Options. The Paragraph dialog box appears
	56.20.5Selects a spacing option from the Line spacing drop-down menu
	56.20.6Clicks "OK"
56.21 Change page orientation	56.21.1Selects the Page Layout tab
	56.21.2Clicks the Orientation command in the Page Setup group
	56.21.3Left-clicks either Portrait or Landscape to change the page orientation
	1.22.1 Selects the Page Layout tab

Skills	
Standard	**Criteria**
56.22Change the paper size	1.22.2 Left-clicks the Size command and a drop-down menu will appear. The current paper size is highlighted
	1.22.3 Left-clicks a size option to select it. The page size of the document changes
1.23 Formatting page margins	1.23.1 Selects the Page Layout tab
	1.23.2 Clicks the Margins command. A menu of options appears. Normal is selected by default
	1.23.3 Left-clicks the predefined margin size you want. OR
	1.23.4 Selects Custom Margins from the menu. The Page Setup dialog box appears
	1.23.5 Enters the desired margin size in the appropriate fields
	1.24.1 Selects the Insert tab
	1.24.2 Clicks the Header or Footer command

Skills	
Standard	**Criteria**
1.24 Insert Header and Footer	1.24.3 Selects the desired header or footer
1.25 Insert Page number	1.25.1 Selects the Insert tab
	1.25.2 Clicks Page Number.
	1.25.3 Clicks Top of Page, Bottom of Page, or Page Margins, depending on where you want page numbers to appear in your document.
	1.25.4 Chooses a page number design from the gallery of designs
1.26 Insert a break	1.26.1 Selects an insertion point
	1.26.2 Selects the Page Layout tab
	1.26.3 Clicks the Breaks command. A menu appears
	1.26.4 Left-clicks a break option to select it
	1.27.1 Selects an insertion point

Skills	
Standard	**Criteria**
1.27 Insert data in a table	1.27.2 Selects the Insert tab
	1.27.3 Clicks the Table command
	1.27.4 Selects the number of columns and rows in the table
	1.27.5 Left-clicks your mouse and the table appear in the document
	1.27.6 Enters text into the table
1.28 Insert picture	1.28.1 Selects an insertion point
	1.28.2 Selects Insert tab
	1.28.3 Clicks the Pictures Command
	1.28.4 Browses to the picture you want to insert, select it
	1.28.5 Clicks Insert
1.29 Insert symbols	1.29.1 Selects an insertion point
	1.29.2 Clicks insert on the menu bar
	1.29.3 Select symbols. the “symbol” dialog box appear
	1.29.4 Clicks the symbols tab

Skills	
Standard	**Criteria**
	1.29.5 Selects an insertion point
1.30 Create a word Art	1.30.1 Selects the Insert tab
	1.30.2 Selects the WordArt pull-down menu
	1.30.3 Clicks either Plain WordArt Styles or WordArt Transform Style galleries
	1.30.4 Types a text in the Edit Word Art Text box
	1.30.5 Selects the font, font size, and apply bold or italics
	1.30.6 Clicks “OK”

Checklist 2: Microsoft Excel in Data Processing

Skills	
Standard	**Criteria**
2.1 Opening the Excel program window	2.1.1 Clicks start menu
	2.1.2 Clicks All Programs
	2.1.3 Clicks Microsoft Office
	2.1.4 Clicks Microsoft office Excel
2.2 Insert text	2.2.1 Left-clicks a cell to select it
	2.2.2 Enters text into the cell using your keyboard
2.3 Edit or delete text	2.3.1 Selects the cell
	2.3.2 Press the Backspace key on your keyboard to delete text and make a correction
	2.3.3 Press the Delete key to delete the entire contents of a cell
2.4 Moving through a	2.4.1 Selects a cell
	2.4.2 Press the Tab key to move to the right of the selected cell

Skills	
Standard	**Criteria**
worksheet using the keyboard	2.4.3 Press the Shift key then the Tab key to move to the left of the selected cell
	2.4.4 Uses the Page Up and Page Down keys to navigate the worksheet
	2.4.5 Uses the arrow keys
2.5 Save the workbook:	2.5.1 Left-clicks the Microsoft Office button/file
	2.5.2 Selects Save or Save As
	2.5.3 Renames the file
	2.5.4 Chooses a location to save the spreadsheet
2.6 Modifying column width:	2.6.1 Positions the cursor over the column line in the column heading, and a double arrow will appear
	2.6.2 Left-clicks the mouse drag the cursor to the right to increase the column width or to the left to decrease the column width

Skills	
Standard	**Criteria**
	2.6.3 Releases the mouse button OR
	2.6.4 Left-clicks the column heading of a column you'd like to modify. The entire column will appear highlighted
	2.6.5 Clicks the Format command in the Cells group on the Home tab. A menu will appear
	2.6.6 Selects Column Width to enter a specific column measurement
	2.6.7 Selects AutoFit Column Width to adjust the column so all of the text will fit
2.7 Modifying the row height	2.7.1 Positions the cursor over the row line you want to modify, and a double arrow will appear
	2.7.2 Left-clicks the mouse, then drag the cursor upward to decrease the row height or downward to increase the row height

Skills	
Standard	**Criteria**
	2.7.3 Releases the mouse button OR
	2.7.4 Clicks the Format command in the Cells group on the Home tab. A menu will appear
	2.7.5 Selects Row Height to enter a specific row measurement
	2.7.6 Selects AutoFit Row Height to adjust the row so all of the text will fit
2.8 Insert rows:	2.8.1 Selects the row below where you want the new row to appear
	2.8.2 Clicks the Insert command in the Cells group on the Home tab. The row will appear
2.9 Insert columns	2.9.1 Selects the column to the right of where you want the column to appear

Skills	
Standard	**Criteria**
	2.9.2 Clicks the Insert command in the Cells group on the Home tab. The column will appear
2.10 Deleting rows and columns	2.10.1 Selects the row or column you'd like to delete
	2.10.2 Clicks the Delete command in the Cells group on the Home tab
2.11 Formatting text in bold or italics	2.11.1 Left-clicks a cell to select it, or drag your cursor over the text in the formula bar to select it
	2.11.2 Clicks the Bold or Italics command
2.12 Formatting text as underlined	2.12.1 Selects the cell or cells you want to format
	2.12.2 Clicks the drop-down arrow next to the Underline command
	2.12.3 Selects the Single Underline or Double Underline option
	2.13.1 Selects the cell or cells you want to format

Skills	
Standard	**Criteria**
2.13 Changing the font style	2.13.2 Left-clicks the drop-down arrow next to the Font Style box on the Home tab
	2.13.3 Selects a font style from the list
2.14 Changing the font size	2.14.1 Selects the cell or cells you want to format
	2.14.2 Left-clicks the drop-down arrow next to the Font Size box on the Home tab
	2.14.3 Selects a font size from the list
2.15 Changing the text color:	1.15.1 Left-clicks the drop-down arrow next to the Text Color commands. A color palette will appear
	1.15.2 Selects a color from the palette OR
	1.15.3 Selects More Colors. A dialog box will appear
	1.15.4 Selects a color
	1.15.5 Clicks OK

Skills	
Standard	**Criteria**
2.16 Adding a border	2.16.1 Selects the cell or cells you want to format
	2.16.2 Clicks the drop-down arrow next to the Borders command on the Home tab. A menu will appear with border options
	2.16.3 Left-clicks an option from the list to select it.
2.17 Adding a fill color	2.17.1 Selects the cell or cells you want to format
	2.17.2 Clicks the Fill command. A color palette will appear
	2.17.3 Selects a color OR
	2.17.4 Selects More Colors. A dialog box will appear
	2.17.5 Selects a color
2.18 Formatting numbers and dates	2.18.1 Selects the cell or cells you want to format
	2.18.2 Left-clicks the drop-down arrow next to the Number Format box
	2.18.3 Selects one of the options for formatting numbers
	2.19.1 Clicks Review On the menu bar

Skills	
Standard	**Criteria**
2.19 Protect Workbook	2.19.2 Selects Protect workbook
	2.19.3 Clicks protect structure and windows
	2.19.4 Selects the appropriate option(s)
	2.19.5 Enters password
	2.19.6 Re-Enters password
2.20 Protect Worksheet	2.20.1 Clicks Review On the menu bar
	2.20.2 Selects Protect Sheet, the dialog box will appear to enter password
	2.20.3 Enters password
	2.20.4 Re-Enters password
2.21 Creating a simple formula that	2.21.1 Clicks the cell where the formula will be defined (C5, for example)
	2.21.2 Types the equals sign (=) to let Excel know a formula is being defined

Skills	
Standard	**Criteria**
adds two numbers	2.21.3 Types the first number to be added (e.g., 1500)
	2.21.4 Types the addition sign (+) to let Excel know that an add operation is to be performed
	2.21.5 Types the second number to be added (e.g., 200)
	2.21.6 Clicks the Enter button on the Formula bar to complete the formula
2.22 Creating a simple formula that adds the contents of two cells	2.22.1 Clicks the cell where the answer will appear (C5, for example)
	2.22.2 Typesthe equals sign (=) to let Excel know a formula is being defined
	2.22.3 Types the cell number that contains the first number to be added (C3, for example)
	2.22.4 Types the addition sign (+) to let Excel know that an add operation is to be performed

Skills	
Standard	**Criteria**
	2.22.5 Types the cell address that contains the second number to be added (C4, for example)
	2.22.6 Press Enter, or clicks the Enter button on the Formula bar to complete the formula
2.23 Creating a simple formula using the point-and-click method	2.23.1 Clicks the cell where the answer will appear (C30, for example)
	2.23.2 Types the equals sign (=) to let Excel know a formula is being defined
	2.23.3 Clicks on the first cell to be included in the formula (C5, for example)
	2.23.4 Types the subtraction sign (-) to let Excel know that a subtraction operation is to be performed
	2.23.5 Clicks on the next cell in the formula (C29, for example)

Skills	
Standard	**Criteria**
	2.23.6 Press Enter, or clicks the Enter button on the Formula bar to complete the formula
2.24 Creating a simple formula that multiplies the contents of two cells	2.24.1 Selects the cell where the answer will appear (E32, for example)
	2.24.2 Types the equals sign (=) to let Excel know a formula is being defined
	2.24.3 Clicks on the first cell to be included in the formula (C9, for example), or type a number
	2.24.4 Types the multiplication symbol (*) by pressing the Shift key and then the number 8 key. The operator displays in the cell and Formula bar
	2.24.5 Clicks on the next cell in the formula or type a number (12, for example)

Skills	
Standard	**Criteria**
	2.24.6 Press Enter, or click the Enter button on the Formula bar to complete the formula.
2.25 Creating a simple formula that divides one cell by another	2.25.1 Clicks the cell where the answer will appear
	2.25.2 Types the equals sign (=) to let Excel know a formula is being defined
	2.25.3 Clicks on the first cell to be included in the formula
	2.25.4 Types a division symbol. The operator displays in the cell and Formula bar
	2.25.5 Clicks on the next cell in the formula
	2.25.6 Press Enter, or clicks the Enter button on the Formula bar to complete the formula
	2.26.1 Clicks the cell where you want the formula **result** to appear. In this example, H6

Skills	
Standard	**Criteria**
2.26 Writing a complex formula	2.26.2 Types the equals sign (=) to let Excel know a formula is being defined
	2.26.3 Types an open parenthesis, or (.
	2.26.4 Clicks on the **first cell** to be included in the formula (G6, for example)
	2.26.5 Types the **addition sign (+)** to let Excel know that an add operation is to be performed
	2.26.6 Clicks on the **second cell** in the formula (G7, for example)
	2.26.7 Types closed parentheses
	2.26.8 Types the next mathematical operator, or the **division symbol (/)**, to let Excel know a division operation is to be performed
	2.26.9 Types an open parenthesis, or (.

Skills	
Standard	**Criteria**
	2.26.10 Clicks on the **third cell** to be included in the formula (D6, for example
	2.26.11 Types the **addition sign (+)** to let Excel know that an add operation is to be performed
	2.26.12 Clicks on the **fourth cell** to be included in formula (D7, for example)
	2.26.13 Types closed parentheses)
	2.26.14 Press **Enter**, or clicks the **Enter button** on the Formula bar. This step ends the formula
2.27 Creating a chart	2.27.1 Selects the **worksheet** you want to work with. In this example, we use the **Summary** worksheet
	2.27.2 Selects the **cells** you want to chart, including the **column titles** and **row labels**
	2.27.3 Clicks the **Insert** tab

Skills	
Standard	**Criteria**
	2.27.4 Hover over each **Chart option** in the Charts group to learn more about it
	2.27.5 Selects one of the Chart options. In this example, we'll use the Columns command
2.28 Changing the chart type	2.28.1 Selects the Design tab
	2.28.2 Clicks the Change Chart Type command. A dialog box appears
	2.28.3 Selects another chart type
	2.28.4 Clicks OK
2.29 Changing chart layout	2.29.1 Selects the Design tab
	2.29.2 Locates the Chart Layouts group
	2.29.3 Clicks the More arrows to view all of your layout options
2.30 Changing chart style	2.30.1 Selects the Design tab
	2.30.2 Locates the Chart Style group

Skills	
Standard	**Criteria**
	2.30.3 Clicks the More arrow to view all of your style options
	2.30.4 Left-clicks a style to select it
2.31 Moving the chart to a different worksheet	2.31.1 Selects the Design tab
	2.31.2 Clicks the Move Chart command. A dialog box appears. The current location of the chart is selected
	2.31.3 Selects the desired locations for the chart (i.e., choose an existing worksheet, or select New Sheet and name it)

Checklist 3: Enter data in the computer using presentation programs and prepare presentations using Microsoft power point

Skills	
Standard	**Criteria**
3.1 Opening the PowerPoint program window	3.1.1 Clicks start menu
	3.1.2 Clicks All Programs
	3.1.3 Clicks Microsoft Office
	3.1.4 Clicks Microsoft office Powerpoint
3.2 Creating new presentation	3.2.1 Clicks the Microsoft Office button/File
	3.2.2 Chooses New from the menu. The New Presentation dialog box will appear
	3.2.3 Clicks Blank presentation
	3.2.4 Clicks Create, and a new presentation will open in the PowerPoint window

Skills	
Standard	**Criteria**
3.3 Inserting text into a placeholder	3.3.1 Clicks inside the placeholder. The placeholder text will disappear, and the insertion point will appear
	3.3.2 Types your text once the insertion point is visible
	3.3.3 Clicks outside the placeholder when you have entered all of your text into the placeholder
3.4 Inserting a new slide	3.4.1 Clicks the New Slide command in the Slides group on the Home tab. A menu will appear with your slide layout options
	3.4.2 Clicks the slide you want to insert. A new slide with the chosen layout will appear in the center of the PowerPoint window and in the pane on the left
3.5 Changing the layout of an existing slide	3.5.1 Selects the slide you want to change
	3.5.2 Clicks the Layout command in the Slides group on the Home tab. A menu appears with your options

Skills	
Standard	**Criteria**
	3.5.3 Clicks an option to select it. The slide will change in the presentation
3.6 Copy and paste a slide	3.6.1 Selects the slide you want to copy
	3.6.2 Clicks the Copy command on the Home tab
	3.6.3 Clicks inside the Slides tab on the left task pane. A horizontal insertion point will appear
	3.6.4 Moves the insertion point to the location where you want the copy of the slide to appear
	3.6.5 Clicks the Paste command on the Home tab. The copied slide will appear
3.7 Delete a slide	3.7.1 Selects the slide you want to delete.
	3.7.2 Clicks the Delete command in the Slides group on the Home tab

Skills	
Standard	**Criteria**
3.8 Move a slide	3.8.1 Selects the slide you want to move on the Slides tab in the left task pane
	3.8.2 Clicks and drag the slide to a new location. The insertion point will appear
	3.8.3 Releases the mouse button. The slide will appear in the new location
3.9 Use the Save As command	3.9.1 Clicks the Microsoft Office button/File
	3.9.2 Selects Save As. A menu will appear
	3.9.3 Selects the type of file you want to save the presentation as
	3.9.4 Types the file name
	3.9.5 Selects the location where you want to save the document using the drop-down menu
	3.9.6 Enters a name for the document
	3.9.7 Clicks the Save button

Skills	
Standard	**Criteria**
3.10 Use the Save command	3.10.1 Clicks the Microsoft Office button/File
	3.10.2 Selects Save from the menu
3.11 Insert text	3.11.1 Clicks the placeholder or text box where you want to insert text
	3.11.2 Types the text you want to appear
3.12 Delete text	3.12.1 Places your cursor next to the text you want to delete
	3.12.2 Presses the Backspace key on your keyboard to delete text to the left of the cursor
	3.12.3 Presses the Delete key on your keyboard to delete text to the right of the cursor
3.13 Select text	3.13.1 Places the insertion point next to the text you want to select
	3.13.2 Clicks and drag your mouse over the text to select it

Skills	
Standard	**Criteria**
	3.13.3 Releases the mouse button. You have selected the text. A highlighted box will appear over the selected text
3.14 Formatting font size	3.14.1 Selects the text you want to modify
	3.14.2 Clicks the drop-down arrow next to the font size box on the Home tab. The font size drop-down menu appears
	3.14.3 Moves your cursor over the various font sizes. A live preview of the font size will appear in the document
	3.14.4 Clicks the font size you want to use. The font size will change in the document
3.15 Formatting font style	3.15.1 Selects the text you want to modify
	3.15.2 Clicks the drop-down arrow next to the font style box on the Home tab. The font style drop-down menu appears

Skills	
Standard	**Criteria**
	3.15.3 Moves your cursor over the various font styles. A live preview of the font will appear in the document
	3.15.4 Clicks the font style you want to use. The font style will change in the document
3.16 Formatting font color	3.16.1 Selects the text you want to modify
	3.16.2 Clicks the drop-down arrow next to the font color box on the Home tab. The font color menu appears
	3.16.3 Moves your cursor over the various font colors. A live preview of the color will appear in the document
	3.16.4 Clicks the font color you want to use. The font color will change in the slide
3.17 Use the Bold, Italic, and	3.17.1 Selects the text you want to modify
	3.17.2 Clicks the Bold, Italic, or Underline command in the Font group on the Home tab

Skills		
Standard		**Criteria**
	Underline commands	3.17.3 Clicks the command again to remove the formatting
3.18	**Changing text alignment**	3.18.1 Selects the text you want to modify
		3.18.2 Selects one of the four alignment options from the Paragraph group on the Home tab
		3.18.3 Aligns Text Left, Center, Right or Justify
3.19	**Copy and paste text**	3.19.1 Selects the text you want to copy
		3.19.2 Clicks the Copy command on the Home tab
		3.19.3 Places your insertion point where you want the text to appear
		3.19.4 Clicks the Paste command on the Home tab. The text will appear
3.20	**Cut and paste text**	3.20.1 Selects the text you want to cut
		3.20.2 Clicks the Cut command on the Home tab
		3.20.3 Places your insertion point where you want the text to appear

Skills	
Standard	**Criteria**
	3.20.4 Clicks the Paste command on the Home tab. The text will appear
3.21 Drag and drop text	3.21.1 Selects the text you want to copy.
	3.21.2 Clicks your mouse and drag the text to the location where you want it to appear. The cursor will have a text box beneath it to indicate that you are moving text
	3.21.3 Releases the mouse button, and the text will appear
3.22 Insert a table using a placeholder command	3.22.1 Selects the slide to insert a table
	3.22.2 Clicks the Insert Table command in the placeholder. The Insert Table dialog box will appear
	3.22.3 Enters the number of table columns and rows in the dialog box
	3.22.4 Clicks OK. The table will appear on the slide, and the Design and Layout tabs will appear on the Ribbon

Skills	
Standard	**Criteria**
	3.22.5 Enters text into the table
3.23 Applying a table style	3.23.1 Selects the table.
	3.23.2 Selects the Design tab to access all Table Styles and Options
	3.23.3 Moves your cursor over a table style in the Table Styles group to see a live preview of the style on the slide
	3.23.4 Clicks the More drop-down arrow to see all available options
	3.23.5 Clicks a style to select it
3.24 Changing table shading	3.24.1 Selects the table
	3.24.2 Selects the Design tab
	3.24.3 Selects the rows or columns you want to modify
	3.24.4 Clicks the Shading command in the Table Styles group.
	3.24.5 Moves your cursor over a color option to see a live preview of the color on the slide

Skills	
Standard	**Criteria**
	3.24.6 Clicks a color to select it
3.25 Applying a border	3.25.1 Selects the table
	3.25.2 Selects the Design tab
	3.25.3 Selects the rows or columns you want to modify
	3.25.4 Clicks the Borders command in the Table Styles group
	3.25.5 Selects a borders option from the menu
3.26 Applying a table effect	3.26.1 Selects the table
	3.26.2 Selects the Design tab
	3.26.3 Selects the rows or columns you want to modify
	3.26.4 Clicks the Effects command. A menu will appear
	3.26.5 Selects a menu option. The options are: Cell Bevel, Shadow, and Reflection. This will display a submenu
	3.26.6 Selects an effect option from the submenu

Skills	
Standard	**Criteria**
3.27 Inserting a row	3.27.1 Selects the table
	3.27.2 Selects the Layout tab
	3.27.3 Places the insertion point in a row adjacent to where you want the new row to appear
	3.27.4 Clicks the Insert Below or Insert Above command
3.28 Delete a row	3.28.1 Selects the table
	3.28.2 Selects the Layout tab
	3.28.3 Place the insertion point in the row you want to delete
	3.28.4 Clicks the Delete command
3.29 Inserting a column	3.29.1 Selects the table
	3.29.2 Selects the Layout tab
	3.29.3 Places the insertion point in a column adjacent to the location where you want the new column to appear
	3.29.4 Clicks the Insert Right or Insert Left command

Skills	
Standard	**Criteria**
3.30 Delete a column	3.30.1 Selects the table
	3.30.2 Selects the Layout tab
	3.30.3 Places the insertion point in the column you want to delete
	3.30.4 Clicks the Delete command
	3.30.5 Selects Delete Column from the menu
3.31 Use another method to insert and delete rows and columns	3.31.1 Places the insertion point in the row or column you want to delete
	3.31.2 Right-clicks the table and a menu appear
	3.31.5 Selects one of the Insert/Delete menu options
3.32 Changing the text	3.32.1 Selects the table
	3.32.2 Selects the Layout tab

Skills	
Standard	**Criteria**
alignment in a table	3.32.3 Selects the cells you want to modify
	3.32.4 Clicks an alignment command to change the text alignment in the table. The alignment commands are:
	3.32.5 Aligns Text Left, Center, Right or Bottom
3.33 Inserting a table using Ribbon commands	3.33.1 Selects the slide where you want to insert the table
	3.33.2 Selects the Insert tab on the Ribbon
	3.33.3 Clicks the Table command. A menu will appear
	3.33.4 Selects the number of columns and rows in the table
	3.33.5 Clicks to insert the table on the slide
	3.33.6 Enters text into the table
3.34 Inserting a chart	3.34.1 Selects the Insert tab
	3.34.2 Clicks the Insert Chart command. The Insert Chart dialog box appears

Skills	
Standard	**Criteria**
	3.34.3 Clicks and drag the scroll bar to view the chart types, or click a label on the left of the dialog box to see a specific chart style
	3.34.4 Clicks a chart to select it
	3.34.5 Clicks OK
3.35 Entering chart data	3.35.1 Selects a cell in the Excel spreadsheet
	3.35.2 Enters your data in the cell
	3.35.3 Moves to another cell
	3.35.4 Repeats the above Criteria until all of your data is entered
	3.35.5 Clicks and drag the lower-right corner of the blue line to increase or decrease the data range for columns
	3.35.6 Clicks and drag the lower-right corner of the blue line to increase or decrease the data range for rows

Skills	
Standard	**Criteria**
	3.35.7 Selects any cells with placeholder data remaining. In the example, the column with Series 3 data was not needed
	3.35.8 Presses the Delete key to delete the remaining placeholder data
	3.35.9 Closes Excel. You do not need to save the spreadsheet. The new Excel source data appears in the PowerPoint chart
3.36 Using Print Preview	3.36.1 Clicks the Microsoft Office button/File
	3.36.2 Selects Print
	3.36.3 Selects Print Preview. The presentation opens in Print Preview format
	3.36.4 From here, you can view each slide in grayscale, make decisions about whether to print the slides individually or as handouts
	3.36.5 Chooses various other options

Skills	
Standard	**Criteria**
3.37 Printing	3.37.1 Clicks the Microsoft Office button
	3.37.2 Selects Print, The Print dialog box appears
	3.37.3 Selects the printer you want to use if you have more than 1 printer
	3.37.4 Clicks Properties. From here, you can make choices on paper size and whether to print on both sides. These options vary from printer to printer
	3.37.5 Enters a print range
	3.37.6 Leaves the default setting, All, selected, or clicks Slides
	3.37.7 Enters the slide numbers of the slides you want to print
	3.37.8 Decides what you want to print: slides, handouts, notes pages, or an outline
	3.37.9 Chooses horizontal or vertical slide layout, if given the option
	3.37.10 Chooses the number of copies to print

Skills	
Standard	**Criteria**
	3.37.11Clicks OK

Checklist 4: Create an email account, sign in and send email to supervisor with attachment

Skills	
Standard	**Criteria**
4.1 Creating an Email account	4.1.1 Opens a browser
	4.1.2 Enters website address
	4.1.3 Clicks on the mail button
	4.1.4 Creates a new account
	4.1.5 Enters all required particulars
	4.1.6 Clicks create account
4.2 Sending an email	4.2.1 Logs In, into your Email account
	4.2.2 Clicks the Compose button on the left side of your home page
	4.2.3 Types an email address
	4.2.4 Types the subject
	4.2.5 Enters the message

Skills	
Standard	**Criteria**
	4.2.6 Clicks Send icon
4.3 Adding an attachment	4.3.1 Composes a message
	4.3.2 Clicks Browse to a locate a file
	4.3.3 Selects a file
	4.3.4 Clicks Open icon
4.4 Adding a signature	4.4.1 Open the Settings menu
	4.4.2 Find the Signature section
	4.4.3 Type your signature
	4.4.4 Add links to your signature
4.5 Reading an email	4.5.1 From your inbox, click the email you want to read
	4.5.2 The email will open in the same window
4.6 Opening an attachment	4.6.1 Opens the email message that contains the attachment
	4.6.2 Clicks Download
	4.6.3 Clicks Open in the Download dialog box

Skills	
Standard	**Criteria**
4.7 Replying to an email message	4.7.1 Views a message
	4.7.2 Clicks Reply at the bottom of the message
	4.7.3 Type a message in the Body field
	4.7.4 Clicks Send
4.8 Forwarding an email message	4.8.1 Views a message
	4.8.2 Clicks Forward at the bottom of the message
	4.8.3 Types a recipient's email address
	4.8.4 Types a message in the Body field
	4.8.5 Clicks Send
	43.3.1. Writes a prompt or question
	43.3.2. Sets a variable or field data type
	43.3.3. Clicks "OK"
43.1. Enter data	**43.4.1.** Clinks "Enter data" command In the main page of Epi Info

Skills	
Standard	**Criteria**
	43.4.2. Selects a "File"
	43.4.3. Clicks on "Open"
	43.4.4. Selects the directory and choose the project file
	43.4.5. Selects a table
	43.4.6. clicks "OK"
43.2. Import data	**43.5.1.** Clicks "Analyze data" In the main page of Epi Info
	43.5.2. Clicks "Read (import)" in the panel at the left side of the screen
	43.5.3. Clicks “Change Project”
	43.5.4. Selects the project file from your directory ";
	43.5.5. Clicks "Open
	43.5.6. Selects the table within the project file you want to open;
	43.5.7. Clicks "OK"
43.3. Export data	**43.6.1.** Clicks on "Write (export)" in the panel on the left

Skills	
Standard	**Criteria**
	43.6.2. Selects the type of file in Output formats
	43.6.3. Clicks on the browse button to go to your directory
	43.6.4. Types a name for the file you are exporting
	43.6.5. Clicks "OK"
43.4. Analyse data	**43.7.1.** Clicks "Analyze data" In the main page of Epi Info
	43.7.2. Clicks on "Read (import)" in the panel at the left side of the screen
	43.7.3. Clicks “Change Project”
	43.7.4. Selects the project file from your directory
	43.7.5. Clicks "Open"
	43.7.6. Selects the table within the project file you want to open;
	43.7.7. Clicks “OK”
	43.7.8. Selects a type of analysis command in the Analysis Command Tree

Skills	
Standard	**Criteria**
43.5. Create a report	**43.8.1.** Clicks "Create reports" in the main page of Epi Info
	43.8.2. Selects a file button in the Epi Report window
	43.8.3. Clicks generate report

Practicum Module: MLT04210 Systemic Human Anatomy and Physiology

Total Practical Time: 20 hours in 20 weeks of a semester

Aim: The aim of this practicum is for students to acquire skills of human anatomy and physiology in providing health care services.

Practical Learning Outcomes:

By the end of practicum the students will be able to:

- Locate different sites and name blood vessels for blood collection
- Locate parts of respiratory system for collection of specimen
- Locate sites for collecting eye swab
- Locate sites for collecting ear swab
- Locate sites for collecting tongue scrapings
- Locate sites for collecting skin specimens

- Locate sites for collecting nasal swab
- Locate sites for collecting gastrointestinal specimens
- Locate sites for collecting specimens of the urinary system

Competencies/Skills

- Identify and name different sites for blood collection
- Identify and name different sites and name blood vessels for blood collection
- Identify and name parts of respiratory system for collection of specimen
- Identify and name sites for collecting eye swab
- Identify and name sites for collecting ear swab
- Identify and name sites for collecting tongue scrapings
- Identify and name sites for collecting skin specimens
- Identify and name sites for collecting nasal swab
- Identify and name sites for collecting gastrointestinal specimens
- Identify and name sites for collecting specimens of the urinary system

Practicum Resources

- Practicum learning Outcomes

- Manikins
- Charts
- Models

Prerequisite modules

- MLT04102 General Human Anatomy and Physiology

Areas of Practice and Assignment

Students will have an opportunity while on placement in the Skill laboratory to familiarise with different parts of the human body for specimen collection. Tutors and skills laboratory instructors shall ensure that students learn the following activities:

Activity 1: Skill laboratory

At the end of theory session which contain practical component(s) students shall be divided in small manageable groups (4-6 students) and assigned to identify and name specific sites in the human body used for collections of different specimen.

Practicum Module: MLT04211: Laboratory Reagents and Solution

Total Practical Time: 80 hours in 20weeks of a semester

Aim: The aim of the practicum is for students to prepare, store, verify and document reagents and solutions used for laboratory investigations.

Clinical Learning Outcomes

- Prepare clinical laboratory reagents and solutions according to SOPs Administer medications to patients
- Verify the quality of reagents and solutions to ensure reliable laboratory results.
- Store reagents and solutions in the laboratory as per guideline or SOP

Competencies/Skills

- Use standard unit conversions for preparation of different concentrations of reagents

- Prepare Giemsa stain solution
- Prepare Field Stain A and B solutions
- Prepare Auramine phenol staining reagent
- Prepare Turk's solution
- Prepare Gram staining solutions
- Prepare ZN staining solution
- Label prepared reagents and solutions
- Verify quality performance of reagents prepared
- Document stored reagents and solutions in the laboratory

Practicum Resources

- Practicum checklists
- Practical learning outcomes
- Practical rotation plan
- Practical assignment sheets
- All other necessary equipments and supplies

Prerequisite modules

- MLT 04101 Laboratory Instrumentation
- MLT 04103 Laboratory safety and waste management

Practical Placement

During placement in health facility laboratory departments and teaching laboratories, student will get the opportunity to observe and practice the preparation, storage and quality checks of different reagents and solutions used in laboratory investigations. Through assignments and demonstrations, students will acquire skills and see how those skills are applied in diverse settings.

Activity 1: Preparation of Reagents and Solutions

Students shall be divided into small manageable groups (4 to 6 students per group) that will rotate in the reagents preparation rooms to observe and practice the following:

- Prepare Giemsa stain solution
- Prepare Field stain A and B solutions
- Prepare Auramine staining reagent
- Prepare Turk's solution
- Prepare Gram staining solutions
- Prepare ZN staining solution

Assignment 1

Each student shall prepare Giemsa stain, Field stain A and B, Auramine stain, Turk solution, Gram stain and ZN stain; and submit those reagents to the practical instructor for assessment.

Assignment 2

From the prepared reagents and solution above:

- Students shall be provided with old prepared batch of reagents and be required to verify quality performance of prepared Giemsa stain, Field stain A and B, Auramine stain, Turk solution, Gram stain and ZN stain

Write the report and submit to the tutor for assessment and grading

Checklist 1: Preparation of Giemsa stock solution

Skill	
Standard	**Criteria**
1.1 Procedure for Preparation of Giemsa solution	1.1.1 Assembles important equipment, materials and supplies • *Measuring Graduated cylinder* • *Flasks (volumetric)* • *Pipettes* • *Weighing Balance* • *Spatula* • *Water bath* • *Brown bottle* • *Para film* • *Label or tape* • *Marker pen*

Skill	
Standard	**Criteria**
	• *Distilled Water or filtered Rain water* • *Absolute methanol* • *Glycerol* • *Giemsa powder*
	1.1.2 Weighs out 3.8 g of Giemsa powder
	1.1.3 Places in the flask
	1.1.4 Adds 250 mL methanol
	1.1.5 Mixes well
	1.1.6 Adds 250 ml glycerol
	1.1.7 Mixes well
	1.1.8 Heats to 60^{o}C for 90 minutes until powder is completely dissolved
	1.1.9 Allows the stain to cool down

Skill	
Standard	**Criteria**
	1.1.10 Labels Giemsa stain using tape and marker pen
	1.1.11 Stores the prepared Giemsa reagent in storage bottle (brown bottle)

Checklist 2: Preparation of Field Stain "A" and "B" solutions

Skill	
Standard	**Criteria**
2.1 Procedure for preparation field stain "A" and "B"	2.1.1 Assembles the important equipment, materials and supplies: • *Measuring Graduated cylinder* • *Flasks (volumetric)* • *Pipettes* • *Weighing Balance* • *Spatula* • *Water bath (above 1000C)* • *Parafilm* • *Label or tape* • *Marker pen* • *Distilled Water or filtered Rain water* • *Field stain A powder*

Skill	
Standard	**Criteria**
	• *Field stain B powder*
	2.1.2 Heats 600 ml distilled water to boiling
	2.1.3 Weighs out 6 g of Field stain A powder and add to 500 ml volumetric flask containing some hot water
	2.1.4 Mixes by swirling to dissolve
	2.1.5 Adds the remaining volume of distilled water to make 500 ml.
	2.1.6 Parafilms and mixes thoroughly
	2.1.7 Filters stain
	2.1.8 Stores stain in brown bottle
	2.1.9 Labels Field Stain A using tape and marker pen
	Field stain "B"
	2.1.10 Heats 600 ml in distilled water to boiling

Skill	
Standard	**Criteria**
	2.1.11 Weighs out 5 g of Field stain B powder and add to 500 ml volumetric flask containing some hot water
	2.1.12 Mixes by swirling to dissolve
	2.1.13 Adds the remaining volume of distilled water to make 500 ml
	2.1.14 Parafilms and mixes thoroughly
	2.1.15 Filters stain
	2.1.16 Stores stain in brown bottle
	2.1.17 Labels Field Stain B using tape and marker pen

Checklist 6: Preparation of Ziehl Neelsen staining solutions

Skill	
Standard	**Criteria**
6.1 Procedure for preparation of ZN solutions	Assembles important equipment, materials and supplies: • *Measuring Graduated cylinder* • *Flasks (volumetric)* • *Weighing Balance* • *Para film* • *Label or tape* • *Marker pen* • *Distilled Water or filtered Rain water* • *Basic Fuchsin* • *Absolute methanol* • *0.3% Methylene blue* • *Phenol crystals*

Skill	
Standard	**Criteria**
	Preparation of 20% sulphuric acid
	6.1.1 Measures 20 ml concentrated sulphuric acid and transfers to a leak-proof container
	6.1.2 Measures 80 ml of distilled water
	6.1.3 Transfers 20ml of sulphuric acid into the container with 80ml of distilled water
	6.1.4 Labels the bottle
	6.1.5 Stores at room temperature in a safe place. The reagent is stable indefinitely
	Preparation of 0.3% Methylene Blue
	6.1.6 Weighs out 0.3 g of methylene blue using a balance

Skill	
Standard	**Criteria**
	6.1.7 Adds 0.3 g methylene blue to a 100 mL volumetric flask containing some distilled water
	6.1.8 Mixes by swirling to dissolve
	6.1.9 Adds the remaining volume of distilled water
	6.1.10 Parafilms and mixes thoroughly
	6.1.11 Labels using tape and marker pen
	Preparation of Strong Carbol Fuchsin
	6.1.12 Dissolves 1g basic fuchsin in 10 mL absolute methanol in a flask
	6.1.13 Dissolves 4.5g phenol crystals in 90 mL distilled water in separate flask
	6.1.14 Mixes the 2 solutions in a 100 mL flask
	6.1.15 Filters stain into a brown bottle
	6.1.16 Labels using tape and marker pen

Checklist 4: Preparation of Turk's Reagent

Skill	
Standard	**Criteria**
4.1 Procedure for preparation of Turk's reagent	Assembles important equipment, materials and supplies: • *Glacial acetic acid* • *0.5% gentian violet solution* • *Measuring Graduated cylinder* • *Flasks (volumetric)* • *Label or tape* • *Marker pen* • *Distilled Water or filtered Rain water*
	4.1.1 Measures 980 ml distilled into a flask
	4.1.2 Adds 20 ml glacial acetic acid to the flask
	4.1.3 Adds 2-3 drops of 0.5% Gentian violet solution
	4.1.4 Transfers stain to a clean reagent bottle
	4.1.5 Labels using tape and marker pen

Checklist 5: Preparation of Gram Stain Solutions

Skill	
Standard	**Criteria**
5.1 Procedure for preparation of Gram stain solutions	Assembles important equipment, materials and supplies: • *Glacial acetic acid* • *0.5% gentian violet solution* • *Measuring Graduated cylinder* • *Flasks (volumetric)* • *Label or tape* • *Marker pen* • *Distilled Water or filtered Rain water*

5.2	**Preparation of Crystal Violet Solution**
	5.2.1 Dissolves 2.0 g of crystal violet into 20.0 ml of 95% ethyl alcohol
	5.2.2 Dissolves 0.8 g ammonium oxalate into 80.0 ml distilled water
	5.2.3 Mixes the two solutions together and allow them to stand overnight at room temperature
	5.2.4 Filter through coarse filter paper before use
	5.2.5 Stores at room temperature
	Preparation of Gram's iodine (lugol's iodine)
	5.2.6 Weighs 1.0g of iodine and 2.0g of potassium iodide
	5.2.7 Grinds 1.0 g iodine (crystalline) and 2.0 g potassium iodide in a mortar
	5.2.8 Adds to 300.0 ml distilled water
	5.2.9 Stores at room temperature in a foil-covered bottle (to protect solution from light)

	Preparation of 10% acetone in alcohol
	5.2.10 Measures 10 ml of acetone and 90ml of ethanol or methanol
	5.2.11 Adds acetone to alcohol and mix
	5.2.12 Label the bottle, and mark it **Highly Flammable**
	5.2.13 Store in a safe place at room temperature
	Preparation of Safranin-O
	5.2.14 Weighs 2.5g salfranin-O
	5.2.15 Measures 100mls of 95% ethyl alcohol
	5.2.16 Measures 90mls of distilled water
	5.2.17 Adds 2.5 g safranin-O to 100.0 ml 95% ethyl alcohol
	5.2.18 Adds a mixture of safranin-O and ethyl alcohol to 90.0 ml distilled water
	5.2.19 Labels using tape and marker pen
	5.2.20 Stores at room temperature
	Preparation of dilute carbol-fuchsin
	5.2.21 Weighs 0.3g of carbol-fuchsin
	5.2.22 Measures 10mls of 95% ethyl alcohol
	5.2.23 Measures 5 mls of melted phenol crystals

	5.2.24 Measures 95 mls of distilled water
	5.2.25 Dissolves 0.3 g basic fuchsin in 10.0 ml 95% ethyl alcohol
	5.2.26 Adds 5.0 ml melted phenol crystals to 95.0 ml distilled water
	5.2.27 Adds the 5% phenol solution to the fuchsin solution and let stand overnight
	5.2.28 Filters through coarse filter paper
	5.2.29 Labels using tape and marker pen
	5.2.30 Stores at room temperature in a foil-covered bottle

Checklist 3: Preparation of Auramine Phenol solution

Skill	
Standard	**Criteria**
3.1 Procedure for preparation of Auramine solution	3.1.1 Weighs 1.0 g of Auramine powder and 30 g of phenol crystals separately
	3.1.2 Measures 100 ml of alcohol and 870 ml of distilled water separately
	3.1.3 Combines alcohol and Auramine powder in a conical flask and stir until Auramine dissolved
	3.1.4 Adds phenol crystals to water and stir until dissolved
	3.1.5 Combines the two solutions
	3.1.6 Adds distilled water to fill to a total volume of 1L
	3.1.7 Performs Quality Control

Skill	
Standard	**Criteria**
	3.1.8 Labels using tape and marker pen
	3.1.9 Stores in room temperature