



CURRICULUM AND COURSE SPECIFICATION
FOR
NATIONAL DIPLOMA (ND)
MEDICAL LABORATORY TECHNOLOGY

AUGUST, 2024

FOREWORD

Medical science is advancing rapidly and the role of medical laboratory technicians has become increasingly vital. From the detection of infectious diseases to the monitoring of chronic conditions and the evaluation of genetic markers, the accuracy and reliability of laboratory results are crucial for effective medical interventions.

I believe that this curriculum and course specifications which are the minimum required to produce technicians with sound knowledge and skills in medical laboratory technology, if properly implemented with the required resources (qualified teaching staff and adequate equipment/consumables, physical training facilities, and teaching aids), also with qualified candidates admitted into the programme, will lead to the production of competent and skilled workforce required in the sector.

I wish to express my deep appreciation to those that made the development of the curriculum possible. The invaluable contributions of all the members of the Team and resource persons during the idea generation, pre-critique, and critique workshops are appreciated.

I hope that the curriculum will be properly implemented, to produce the required manpower for better service delivery in the health sector in Nigeria.

**Prof. Idris M. Bugaje,
EXECUTIVE SECRETARY,
NBTE KADUNA.**

NATIONAL BOARD FOR TECHNICAL EDUCATION

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GENERAL INFORMATION

1.0 PROGRAMME NOMENCLATURE

National Diploma (ND) Medical Laboratory Technology

2.0 PROGRAMME GOAL

The goal of this curriculum is to train competent medical laboratory technicians to meet present and projected service needs in primary and secondary health care services in Nigeria.

3.0 OBJECTIVES OF THE PROGRAMME

The objectives of the programme on completion are to:

- i. Perform routine Medical Microbiology, Histopathology and Cytology, Haematology and Blood Group Serology, Chemical Pathology, Medical Parasitology, Immunology and Virology tests under the supervision of a Medical Laboratory Scientist
- ii. Carry out first Aid Care in the Medical Laboratory.
- iii. Assist a Medical Laboratory Scientist in the management and organisation of a Medical Laboratory.
- iv. Collect, Collate, Process and enter accurately medical laboratory data using the Medical Laboratory Information Management system
- v. Prepare reagents and chemicals used for medical laboratory diagnosis.
- vi. Perform basic equipment maintenance in a medical laboratory.
- vii. Carry out and present research outcomes logically.
- viii. Collect and process samples for medical laboratory investigations.
- ix. Collect, process, manage, and dispose of medical laboratory waste.
- x. Identify basic Arthropods causing ill-health.
- xi. Recognize and adhere to safety policies and practices

4.0 ENTRY REQUIREMENTS

- i. At least a minimum score in the Unified Tertiary Matriculation Examination (UTME) as stipulated by JAMB
- ii. A minimum of five (5) credit passes at Senior Secondary School Certificate and other approved equivalent O-Level Certificates (NECO, NABTEB or WASC/GCE) in the following subjects: English, Mathematics, Chemistry, Biology and Physics at not more than two sittings.

5.0 STRUCTURE/DURATION OF THE PROGRAMME

The ND Medical Laboratory Technology programme is structured for two years of four (4) semesters of classroom work, laboratory posting and field work in accredited health facilities.

The duration also incorporates 3-4 months Supervised Industrial Field Experience (SUPFE) which shall take place at the end of the second semester of the first year for not less than 3-4 months.

Each semester shall be for 15-17 weeks, made up of as follows:

- 15 contact weeks of teaching (i.e. lectures and practical sessions etc.) and
- 2 weeks for registration, tests, quizzes and examinations

6.0 CURRICULUM

The Curriculum of the ND Medical Laboratory Technology programme consists of four (4) main components.

These are:

1. General Studies/General Education Courses components shall include courses in English Language and Communication, Literacy, Societal Knowledge or History, Citizenship Education, Computer Knowledge and Entrepreneurship which are mandatory, others include General Sciences. These are compulsory and constitute 15% of total contact hours.

2. **Foundation Courses** include courses in Mathematics, Pure sciences, and those introductory components courses that are offered in the core Department for the purposes of rudimentary knowledge or background, etc. These courses should constitute a maximum of 25% of the total contact hours for the programme
3. **Professional Courses** are courses, which give the student the theory and practical skills in Medical Laboratory Technology which he or she needs to practice. These should account for a maximum of 65% of the contact hours of the programme
4. **Supervised Field Experience (SIWES)** Supervised Industrial Work Experience Scheme (SIWES) shall be taken during the long vacation following the end of the second semester of the first year. See details on SIWES below.

7.0 ASSESSMENT CRITERIA

Aspect	Classwork/Practical and Laboratory Works	Semester Examination	Total
Theory	10	30	40
Practical	20	40	60
Total	30	70	100

8.0 CONDITIONS FOR THE AWARD OF NATIONAL DIPLOMA

For the programme to qualify for the award of National Diploma (ND), programme, it should have been accredited by the National Board for Technical Education, (NBTE) Kaduna

The conditions for the award of National Diploma for Medical Laboratory Technology Certificate include the following:

1. Satisfactory performance in all prescribed coursework/assignments, tests/quizzes, workshop practice, laboratory work, field trips etc.

2. Satisfactory completion of Supervised Field Experience (SIWES)
3. Satisfactory performance in all semester examinations
4. Satisfactory completion of written term papers and or final year diploma project works
5. The candidate should have completed a minimum of 103 and maximum of 110 total credit units.

Additionally, candidate must pass the professional certification examination administered by the Medical Laboratory Science Council of Nigeria (MLSCN) in the second semester of the second year of ND programme. This will enable the Council to induct the students for certification to practice as Medical Laboratory Technicians. The professional certification examination shall involve the following examination

- Oral examination
- Practical examination
- Theory examination

The National Diploma shall be awarded based on the following classification

Class of Diploma	CGPA
Distinction	3.50 - 4.00
Upper Credit	3.00 - 3.49
Lower Credit	2.50 - 2.99
Pass	2.00 - 2.49

9.0 ACCREDITATION OF THE PROGRAMME

The ND programme shall be accredited by the NBTE and the MLSCN before Diplomates can be awarded.

10.0 LOGBOOK

There shall be two types of logbooks:

- A personal logbook for each course to be taken is to be kept by the students. It shall contain all the recordings of the day-to-day, weekly and semester practical works/activities from day 1 to the end of the programme. This is to be checked, marked appropriately and endorsed by all lecturers concerned at the end of every week
- An end-of-school (post diploma) log book maintained by a Supervisee medical laboratory scientist for the entry of their daily/weekly Field Experience work in the Medical Laboratory Technology Department/Unit of Supervisee's posting. The log book shall be duly signed by the industry-based-Supervisor on monthly basis. At the end of the MLSCN - supervised 52-week long SUPFE, the Supervisee receives a certificate of SUPFE completion from MLSCN

11.0 FINAL YEAR PROJECTS

Final year students of the ND programme are expected to carry out a project work, which should be on individual or group basis. The project should as much as possible be something that is implementable or marketable. Project reports should be properly supervised and well presented. The Departments offering the programme should make its own arrangement of schedules for project work

12.0 GUIDANCE NOTES FOR TEACHERS TEACHING THE PROGRAMME

The new curriculum is drawn in course units. This is in keeping with the provisions of the National Policy on Education which stresses the need to introduce the semester credit units which will enable a student who so wishes to transfer the units already completed in an institution of similar standard from which he/she is transferring. In designing the units, the principle of the modular system by product has been adopted; thus making each of the professional modules, when completed provide the student with technical skills, which can be used for employment purposes.

As the success of the credit unit system depends on the articulation of the programme between the institution and industry, the curriculum content has been written in behavioural objectives, so that it is clear to all stakeholders what the diplomats of the programme have learnt. There is a slight departure in the presentation of the performance-based curriculum which requires the conditions under which the performance are expected to be carried out and the criteria for the acceptable levels of performance. It is a deliberate attempt to further involve the staff of the department teaching the programme to write their

own curriculum stating the conditions under which the performance can take place and to follow that with the criteria for determining an acceptable level of performance.

Departmental submission on the final curriculum should be approved by the Academic Board of the institution.

Our aim is to continue to see to it that a solid internal evaluation system exists in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the polytechnic system.

The teaching of the theory and practical work should, as much as possible, be integrated. Practical exercises, especially those in professional courses and laboratory work, should not be taught in isolation from the theory. For each course, there should be a balance of theory to practice in the ratio of at least 60:40.

Normally, continuous assessment should be 40% while semester examination should be 60% to make a total of 100%.

13.0 GUIDELINES ON SIWES PROGRAMME

For the smooth operation of the SIWES the following guidelines shall apply:

GRADING OF SIWES

To ensure uniformity of grading scales, the institution should ensure that the uniform grading of students' work, which has been agreed to by all Polytechnics and similar NE awarding Institutions, is adopted.

The Institution Based Supervisor

The institution-based supervisor should initial the log book during each visit. This will enable him to check and determine to what extent the objectives of the scheme are being met and to assist students having any problems regarding the specific assignments given to them by their industry-based supervisor.

Frequency of Visit

Institution should ensure that students placed on attachment are visited within one month of their placement. Other visits shall be arranged so that:

- i) There is another visit six weeks after the first visit; and
- ii) a final visit in the last month of the attachment.

Responsibility for Placement of Students

- a) Institution offering the ND programme shall arrange to place the students in industry. By the end of second semester the first academic session, six copies of the master list showing where each student has been placed shall be submitted to the Executive Secretary, NBTE who shall, in turn, authenticate the list and forward it to the Industrial Training Fund, Jos.
- b) The Placement Officer should discuss and agree with industry on the following:
 - i. a task inventory of what the students should be expected to experience during the period of attachment. It may be wise to adopt the one already approved for each field.
 - ii. the industry-based supervisor of the student during the period, likewise the institution-based supervisor.
 - iii. the final grading of the student during the period of attachment should be weighted more on the evaluation by his industry-based supervisor.

Evaluation of Students during the SIWES

In the evaluation of the student, cognizance should be taken of the following items: a) Punctuality

- b) Attendance
- c) General Attitude to Work

- d) Respect for Authority
- e) Interest in the field/technical area
- f) Technical competence as a potential technician in the field.

Stipend for Students in SIWES

The rate of stipend payable shall be determined from time to time by the Federal Government after due consultation with the Federal Ministry of Education, the Industrial Training Fund and NBTE.

SIWES as a Component of the Curriculum

The completion of SIWES is important in the final determination of whether the student is successful in the programme or not. Failure in the SIWES is an indication that the student has not shown sufficient interest in the field or has no potential to become a skilled technician in the field. The SIWES should be graded on a fail or pass basis. Where a student has satisfied all other requirements but failed SIWES, he or she may only be allowed to repeat another four months SIWES at his own expense.

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YEAR I SEMESTER I

COURSE CODE	COURSE TITTLE	L	P	CU	CH
MLT 111	Introduction to Medical Laboratory Science I	3	-	3	3
MLT 112	History and Philosophy of Science	2	-	2	2
MLT 113	General Mathematics I	2	-	2	2
GNS 214	General Physics I	2	1	3	3
GNS 229	General Chemistry I	2	1	3	3
GNS 230	General Biology I	2	1	3	3
EHT 111	Introduction to Environmental Health	2	1	3	3
GNS 111	Citizenship Education I	2	-	2	2
COM 111	Introduction to Computing	2	1	3	3
GNS 102	Communication in English I	2	-	2	2
TOTAL		21	5	26	26

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YEAR I SEMESTER II

COURSE CODE	COURSE TITLE	L	P	CU	CH
MLT 121	Introduction to Medical Laboratory Science II	2	-	2	2
MLT 122	First Aid and Primary Healthcare	2	-	2	2
MLT 123	Philosophy, Logic and Critical Reasoning	2	-	2	2
MLT 124	Introduction to Medical Laboratory Information Management System (MLIMS)	1	2	3	3
MLT 125	Medical Laboratory Techniques	2	1	3	3
MLT 126	Introduction to Medical Laboratory Management, Organization & Ethics I	2	-	2	2
MLT 127	General Mathematics II	2	-	2	2
GNS 324	General Chemistry II	2	1	3	3
GNS 314	General Physics II	2	1	3	3
GNS 325	General Biology II	2	1	3	3
GNS 202	Communication in English II	2	-	2	2
ENT 126	Introduction to Entrepreneurship I	2	-	2	2
MSQ	Mandatory Skills Qualification	-	-	-	2
MLT 128	Clinical Laboratory Posting (SIWES)	-	-	-	-
TOTAL		23	6	29	31

YEAR II SEMESTER I

COURSE CODE	COURSE TITLE	L	P	CU	CH
MLT 211	Medical Microbiology I	2	1	3	3
MLT 212	Histopathology and Cytology I	2	1	3	3
MLT 213	Haematology and Blood Group Serology I	2	1	3	3
MLT 214	Chemical Pathology I	2	1	3	3
MLT 215	Medical Parasitology and Entomology I	2	1	3	3
MLT 216	Introduction to Medical Laboratory Management, Organization & Ethics II	2	1	3	3
MLT 217	Research Methodology	2	-	2	2
BMS 211	Basic Anatomy and Physiology	1	1	2	2
BCH 222	Introduction to Biochemistry	1	1	2	2
ENT 216	Introduction to Entrepreneurship II	2	1	3	3
MSQ	Mandatory Skills Qualification	-	-	-	2
TOTAL		18	9	27	29

YEAR II SEMESTER II

COURSE CODE	COURSE	L	P	CU	CH
MLT 221	Medical Microbiology II	2	1	3	3
MLT 222	Histopathology and Cytology II	2	1	3	3
MLT 223	Haematology and Blood Group Serology II	2	1	3	3
MLT 224	Chemical Pathology II	2	1	3	3
MLT 225	Medical Parasitology and Entomology II	2	1	3	3
MLT 226	Introduction to Immunology and Virology	2	-	2	2
MLT 227	Project	-	-	4	4
TOTAL		11	6	21	21

YEAR I SEMESTER I

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY SCIENCE I	COURSE CODE: MLT IN1	CONTACT HOURS: 3
	CREDIT UNITS: 3	THEORETICAL: 3
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: NIL
GOAL: This course is designed to provide students with the basic knowledge in Medical Laboratory Science		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Know the concept of Medical Laboratory Science		
2.0 Know the history and development of Medical Laboratory Science		
3.0 Know hazard and universal precaution in Medical Laboratory Science		

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY SCIENCE			COURSE CODE: MLT 111	CONTACT HOURS: 3		
			CREDIT UNIT: 3	THEORETICAL: 3		
YEAR: I SEMESTER: I			PRE-REQUISITE:	PRACTICAL: NIL		
COURSE SPECIFICATION: THEORETICAL						
GOAL: This course is designed to provide students with the basic knowledge in Medical Laboratory Science						
GENERAL OBJECTIVE 1.0: Know the concept of Medical Laboratory Science						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-5	1.1 Define Medical Laboratory Science 1.2 List the branches of Medical Laboratory Science <ul style="list-style-type: none"> • Haematology • Blood Transfusion Science • Medical Microbiology • Parasitology 	Explain Medical Laboratory Science Explain the branches of Medical Laboratory Science <ul style="list-style-type: none"> • Haematology • Blood Transfusion Science • Medical Microbiology 	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	<ul style="list-style-type: none"> • Immunology • Clinical Chemistry • Forensic Science • Histopathology • Histochemistry • Virology • Mycology • Exfoliative Cytology • Laboratory Management <p>1.3 Explain the branches of Medical Laboratory Science in 1.2</p>	<ul style="list-style-type: none"> • Parasitology • Immunology • Clinical Chemistry • Forensic Science • Histopathology • Histochemistry • Virology • Mycology • Exfoliative Cytology • Laboratory Management <p>Explain the branches of Medical Laboratory Science in 1.2</p>				
GENERAL OBJECTIVE 2.0: Know the history and development of Medical Laboratory Science						
6-10	<p>2.1 Define history</p> <p>2.2 Explain history of Medical Laboratory Science</p>	<p>Explain history</p> <p>Explain history of Medical Laboratory Science</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p>			

	<p>2.3 Explain the development of Medical Laboratory Science:</p> <ul style="list-style-type: none"> • International • National <p>2.4 Explain the factors affecting the development of Medical Laboratory Science</p> <ul style="list-style-type: none"> • International • National 	<p>Explain the development of Medical Laboratory Science:</p> <ul style="list-style-type: none"> • International • National <p>Explain the factors affecting the development of Medical Laboratory Science</p> <ul style="list-style-type: none"> • International • National 	Journals			
GENERAL OBJECTIVE 3.0: Know Hazard and Universal precaution in Medical Laboratory Science						
11-15	<p>3.1 Define Hazard</p> <p>3.2 List types of hazards in Medical Laboratory Science</p> <p>3.3 Explain hazards in Medical Laboratory Science</p> <p>3.4 Define Universal precaution</p>	<p>Explain Hazard</p> <p>Explain types of hazards in Medical Laboratory Science</p> <p>Explain hazards in Medical Laboratory Science</p> <p>Explain Universal precaution</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p> <p>Microscopes</p> <p>Specimen containers</p>			

	3.5 Explain Universal Precaution in Medical Laboratory Science	Explain Universal Precaution in Medical Laboratory Science				
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EVALUATION: CA 30%
EXAMINATION 70%

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: HISTORY AND PHILOSOPHY OF SCIENCE	COURSE CODE: MLT 112	CONTACT HOURS: 2
YEAR: I SEMESTER: I	PREREQUISITE:	THEORETICAL: 2
	CREDIT UNIT: 2	PRACTICAL: NIL
GOAL: This course is designed to expose students to the Knowledge of Science and its development.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Know the history of Science		
2.0 Know the Philosophy of Science		
3.0 Know the history of Medicine		
4.0 Understand the laws of nature to everyday life		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: HISTORY AND PHILOSOPHY OF SCIENCE			COURSE CODE: MLT 112	CONTACT HOURS: 30 HRS		
YEAR: I SEMESTER: I			CREDIT UNIT: 2	THEORETICAL: 2 HRS		
			PRE-REQUISITE:	PRACTICAL: Nil		
GOAL: This course is designed to expose students to the Knowledge of Science and its development.						
GENERAL OBJECTIVE: 1.0 Know the Nature of Science						
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define Science 1.2 Explain the nature of Science 1.3 Explain the origin of Science	Explain Science Explain the nature of Science Explain the origin of Science	Textbooks Whiteboard Marker Multimedia Projector Laptops Lecture notes			
GENERAL OBJECTIVE 2.0: Know the Philosophy of Science						
4-8	2.1 Define Philosophy 2.2 Define Philosophy of Science 2.3 Explain Philosophy	Explain Philosophy Explain Philosophy of Science Explain Philosophy	Textbooks Whiteboard Marker Multimedia Projector Laptops			

	of Science 2.4 Explain the scope of Philosophy of Science 2.5 Explain the nature of man 2.6 Describe man and his origin	of Science Explain the scope of Philosophy of Science Explain man and his origin	Lecture notes			
GENERAL OBJECTIVE 3.0: Know the history of Medicine						
9- 12	3.1 Define Medicine 3.2 List the branches of Medicine 3.3 Explain History of Medicine 3.4 Explain the History of Medical Laboratory Science	Explain Medicine Explain History of Medicine and its branches Explain the History of Medical Laboratory Science	Textbooks Whiteboard Marker Multimedia Projector Laptops Lecture notes			
GENERAL OBJECTIVE 4.0: Understand the laws of nature to everyday life						
13-15	1.1 Define the laws of nature 1.2 Explain the laws of nature to everyday life	Explain the laws of nature Explain the laws of nature to everyday	Textbooks Whiteboard Marker Multimedia Projector			

		life	Laptops Lecture notes			
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EVALUATION: CA 30%
EXAMINATION 70%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY SCIENCE			
COURSE TITLE:	GENERAL	COURSE CODE: MLT 113	CONTACT HOURS: 2
MATHEMATICS		CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I	SEMESTER: I	PRE-REQUISITE:	PRACTICAL:
GOAL: This course is designed to provide students with the knowledge of General Mathematical and its Applicability in Medical Laboratory Science			
GENERAL OBJECTIVES: On completion of this course, the students should be able to:			
1.0 Know basic Algebra and Mathematical Essentials and their applications in Medical Laboratory Science			
2.0 Know Set Theory and Functions, and their Applications in Medical Laboratory Science			
3.0 Know Trigonometry and its Application in Medical Laboratory Science			

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: GENERAL MATHEMATICS I		COURSE CODE: MLT 113		CONTACT HOURS: 2		
		CREDIT UNIT: 2		THEORETICAL: 2		
YEAR: I SEMESTER: I		PRE-REQUISITE:		PRACTICAL:		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GENERAL OBJECTIVE 1.0: Know basic Algebra and Mathematical Essentials and their applications in Medical Laboratory Science						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
	1.1.Solve Indices and Logarithms 1.2.Solve Linear Equations 1.3.Solve Rational Equations 1.4.Solve Linear Inequalities; • Partial	Solve Indices and Logarithms Solve Linear Equations Solve Rational Equations 1.10. Solve Linear Inequalities; • Partial fractio	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	<p>fraction s. • Surds.</p> <p>1.5. Calculate Ratios and Proportions</p> <p>1.6. Solve Percent Problems</p> <p>1.7. Illustrate Properties of Exponents</p> <p>1.8. Illustrate Significant digits</p> <p>1.9. Illustrate Area vs. Volume and Units</p>	<p>ns. • Surds.</p> <p>Calculate Ratios and Proportions</p> <p>Solve Percent Problems</p> <p>Illustrate Properties of Exponents</p> <p>Illustrate Significant digits</p> <p>Illustrate Area vs. Volume and Units</p>				
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GENERAL OBJECTIVE 2.0: Know Set Theory and Functions, and their Applications in Medical Laboratory Science
Science

	<p>2.1. Illustrate</p> <ul style="list-style-type: none"> • Set theory. • Set union and intersection. • Types of Sets. • Sets and Venn-diagrams. <p>2.2. Solve Equation of linear circles and Ellipses.</p> <p>2.3. Illustrate Functions and relationships between the roots of a quadratic equation and the coefficients.</p>	<p>Illustrate</p> <ul style="list-style-type: none"> • Set theory. • Set union and intersection. • Types of Sets. • Sets and Venn-diagrams. <p>Solve Equation of linear circles and Ellipses.</p> <p>Illustrate Functions and relationships between the roots of a quadratic equation and the coefficients.</p> <p>Illustrate</p>	<p>Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals</p>			
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	2.4. Illustrate Remainder theorem	Remainder theorem				
GENERAL OBJECTIVE 3.0: Know Trigonometry and its Application in Medical Laboratory Science						
	3.1 Describe the mathematical concept of trigonometry.	Describe the mathematical concept of trigonometry.	Multimedia Projector Screen, Internet Textbooks			
	3.3. Illustrate Trigonometric exponential Function.	Illustrate Trigonometric exponential Function.	Computer Flip charts Journals			
	3.4. Illustrate Trigonometric logarithmic functions.	Illustrate Trigonometric logarithmic functions.				
	3.5. Illustrate maxima and minima in trigonometry	Illustrate maxima and minima in trigonometry				
	3.6 Illustrate tangential and normal in	Illustrate tangential and normal in				

	<p>normal in trigonometry.</p> <p>3.7. Illustrate Sine, cosine, and tangent.</p> <p>3.8. Illustrate circular measurements and small angles.</p>	<p>trigonometry.</p> <p>Illustrate Sine, cosine, and tangent.</p> <p>Illustrate circular measurements and small angles.</p>				
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EVALUATION: CA 30%
EXAMINATION 70%

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YEAR I SEMESTER II

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY SCIENCE II	COURSE CODE: MLT 121	CONTACT HOURS: 2
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE: MLT 111	PRACTICAL:
GOAL: This course is designed to provide students with the basic knowledge in Medical Laboratory Science		
GENERAL OBJECTIVES: On completion of this course, the students should be able to		
1.0 Understand the Concept of testing in Medical Laboratory Science		
2.0 Understand regulations in Medical Laboratory practice		
3.0 Know quality control in Medical Laboratory practice		

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY SCIENCE II		COURSE CODE: MLT 121		CONTACT HOURS: 30		
		CREDIT UNIT: 2		THEORETICAL: 2		
YEAR: I SEMESTER: II		PRE-REQUISITE: MLT 111		PRACTICAL:		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge in Medical Laboratory Science						
GENERAL OBJECTIVE 1.0: Understand the Concept of testing in Medical Laboratory Science						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-4	1.1 Define Medical Laboratory testing 1.2 Explain what is a Specimen 1.3 List the specimen in each branch of Medical Laboratory	Explain Medical Laboratory testing Explain what is a Specimen Explain the specimen in each branch of Medical Laboratory Science Explain specimen containers Explain collection of specimen in 1.3	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	<p>Science</p> <p>1.4 Explain specimen containers</p> <p>1.5 Explain collection of specimen in 1.3</p> <p>1.6 Explain transportation of specimen</p> <p>1.7 List methods of testing of specimen in Medical Laboratory</p> <p>1.8 Explain the importance</p>	<p>Explain transportation of specimen</p> <p>Explain methods of testing of specimen in Medical Laboratory</p> <p>Explain the importance of testing in Medical Laboratory</p> <p>Explain the role of Medical Laboratory personnel in Medical Testing</p> <p>Explain clients in Medical Laboratory Testing</p>				
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	<p>of testing in Medical Laboratory</p> <p>1.9 Explain the role of Medical Laboratory personnel in Medical Testing</p> <p>1.10 Explain clients in Medical Laboratory Testing</p>					
GENERAL OBJECTIVE 2.0: Understand regulations in Medical Laboratory practice						
5-10	<p>2.1 Define regulations</p> <p>2.2 Define regulations in Medical laboratory practice</p> <p>2.3 Explain the</p>	<p>Explain regulations</p> <p>Explain regulations in Medical laboratory practice</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p>			

	role of regulatory bodies in Medical Laboratory Training and Practice	Explain the role of regulatory bodies in Medical Laboratory Training and Practice				
GENERAL OBJECTIVE 3.0: Know quality control in Medical Laboratory practice						
11-15	3.1 Define quality control 3.2 Explain quality control in Medical Laboratory Practice 3.3 List types of quality controls in Medical Laboratory practice 3.4 Explain the importance of quality control in Medical Laboratory practice	Explain quality control in Medical Laboratory Practice Explain types of quality controls in Medical Laboratory practice Explain the importance of quality control in Medical Laboratory practice	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: FIRST AID AND PRIMARY HEALTHCARE	COURSE CODE: MLT 122	CONTACT HOURS: 30
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: –
GOAL: This course is designed to provide students with basic knowledge and skills of First Aid and Primary Health Care		
<p>GENERAL OBJECTIVES: On completion of this course, the students should be able to:</p> <ol style="list-style-type: none"> 1.0 Know Basic concepts of First Aid 2.0 Understand the Basic Concepts of Primary Health Care 3.0 Know the Elements of Primary Health Care 4.0 Understand the Concept of Public Health 5.0 Understand role of Medical Laboratory Science in Primary Health Care 6.0 Know Primary Health Care Related organisations and their functions 7.0 Know the Concept of Infection Prevention and Control 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: FIRST AID AND PRIMARY HEALTHCARE		COURSE CODE: MLT 122		CONTACT HOURS: 30		
		CREDIT UNITS: 2		THEORETICAL: 2		
YEAR: I SEMESTER: II		PRE-REQUISITE:		PRACTICAL: –		
COURSE SPECIFICATION: THEORETICAL						
GOAL: This course is designed to provide students with basic knowledge and skills of First Aid and Primary Health Care						
GENERAL OBJECTIVE 1.0: Know Basic Concepts of First Aid						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Define First Aid	Explain First Aid	Multimedia Projector			
	1.2 Explain the Aims of First Aid	Explain the Aims of First Aid	Internet			
	1.3 Explain the scope of First Aid	Explain the scope of First Aid	Textbooks Computer			
	1.4 List examples of First Aid	Explain examples of First Aid	Flip charts			
	1.5 Define Accident and Emergency	Explain Accident and Emergency	Journals			
	1.6 Explain First Aid in Accidents and	Explain First Aid in Accidents and				

	Emergency Care 1.7 Explain First Aid Care of accidents in the laboratory	Emergency Care Explain First Aid Care of accidents in the laboratory				
GENERAL OBJECTIVE 2.0: Understand the Basic concepts of Primary Health Care						
3-4	2.1 Define Primary Health Care 2.2 Explain the scope of Primary Health Care 2.3 Explain the aim of Primary Health Care in Healthcare delivery 2.4 Explain the importance of Primary Health Care in Healthcare delivery 2.5 Explain the Structure of Primary Health	Explain Primary Health Care Explain the scope of Primary Health Care Explain the aim of Primary Health Care in Healthcare delivery Explain the importance of Primary Health Care in Healthcare delivery Explain the Structure of Primary Health	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	Care 2.6 Explain the Functions of Primary Health Care 2.7 Explain role of Medical Laboratory in Primary Health Care	Care Explain the Functions of Primary Health Care Explain role of Medical Laboratory in Primary Health Care				
GENERAL OBJECTIVE 3.0: Know the Elements of Primary Health Care						
5-6	3.1 Explain the Elements of Primary Health Care 3.2 List the Elements of Primary Health Care 3.3 Explain the role of these elements in Primary Health	Explain the Elements of Primary Health Care Explain the Elements of Primary Health Care Explain the role of these elements in Primary Health Care	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	Care delivery	delivery				
GENERAL OBJECTIVE 4.0: Know the Concept of Public Health						
7-8	4.1 Define Public Health	Explain Public Health	Multimedia Projector Screen, Internet			
	4.2 Explain the scope of Public Health	Explain the scope of Public Health	Textbooks Computer Flip charts			
	4.3 Explain the Components of Public Health	Explain the Components of Public Health	Journals			
	4.4 Explain the role of Medical Laboratory Science in Public Health	Explain the role of Medical Laboratory Science in Public Health				
GENERAL OBJECTIVE 5.0: Understand the Role of Medical Laboratory Science in Primary Health Care						
9-10	5.1 Define Medical Laboratory Science	Explain Medical Laboratory Science	Multimedia Projector Screen, Internet			
	5.2 Explain the Role of Medical	Explain the Role of Medical Laboratory	Textbooks Computer Flip charts			

	Laboratory Science in Primary Health Care delivery	Science in Primary Health Care delivery	Journals			
GENERAL OBJECTIVE 6.0: Know Primary Health Care Related Organisations and their functions						
11-12	6.1 List Primary Health Care Related Organisations	Explain Primary Health Care Related Organisations	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			
	6.2 List the functions of Primary Health Care Related Organisations	Explain the functions of Primary Health Care Related Organisations				
	6.3 Explain the functions of Primary Health Care Related Organisations	Explain the functions of Primary Health Care Related Organisations				
GENERAL OBJECTIVE 7.0: Know the Concept of Infection Prevention and Control						
13-15	7.1 Define Infection	Explain Infection	Multimedia Projector Screen, Internet			
	7.2 Explain types of infections	Explain types of infections				

	7.3 Explain the nature of Infections	Explain the nature of Infections	Textbooks Computer Flip charts Journals			
	7.4 List the classifications of Infections	Explain the classifications of Infections				
	7.5 Explain the elements of Infection Prevention and Control	Explain the elements of Infection Prevention and Control				
	7.6 Explain the role of Medical Laboratory Science in Infection Prevention and Control	Explain the role of Medical Laboratory Science in Infection Prevention and Control				

EVALUATION: CA 30%
EXAMINATION 70%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: PHILOSOPHY, LOGIC AND CRITICAL REASONING	COURSE CODE: MLT 123	CONTACT HOURS: 30 HOUR
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL:
GOAL: This course is designed to provide students with the rudiments of philosophy, Logic and Critical Reasoning		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Know the history, concepts and application of Philosophy.		
2.0 Understand the concept and application of Logic		
3.0 Know the concept, techniques and application of Critical Reasoning.		

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: PHILOSOPHY, LOGIC AND CRITICAL REASONING			COURSE CODE: MLT 123		CONTACT HOURS: 30 HOURS	
			CREDIT UNIT: 2		THEORETICAL: 2	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL:	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the rudiments of philosophy, Logic and Critical Reasoning						
GENERAL OBJECTIVE 1.0: Know the history, concepts and application of Philosophy.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-4	1.1. Define Philosophy 1.2 Explain the scope of philosophy 1.3 Explain the history of philosophy: <ul style="list-style-type: none"> •Ancient philosophy: Socrates, Plato Aristotle •Medieval philosophy: 	Explain Philosophy Explain the scope of philosophy Explain the history of philosophy: <ul style="list-style-type: none"> •Ancient philosophy: Socrates, Plato Aristotle •Medieval philosophy: 	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	<p>Augustine and Aquinas</p> <ul style="list-style-type: none"> •Modern philosophy: Descartes, Hume, Kant <p>1.4 List the branches of philosophy:</p> <ul style="list-style-type: none"> • Metaphysic • Epistemology • Ethics • Aesthetics <p>1.5 Explain some basic concepts of philosophy:</p> <ul style="list-style-type: none"> •The mind-body problem. •Theories of consciousness •Personal identity and the self. 	<p>Augustine and Aquinas</p> <ul style="list-style-type: none"> •Modern philosophy: Descartes, Hume, Kant <p>Explain the branches of philosophy:</p> <ul style="list-style-type: none"> • Metaphysic • Epistemology • Ethics • Aesthetics <p>Explain some basic concepts of philosophy:</p> <ul style="list-style-type: none"> •The mind-body problem. •Theories of consciousness •Personal identity and the self. 				
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	1.6 Explain the application of Philosophy in real world Issues					
GENERAL OBJECTIVE 2.0: Understand the concept and application of Logic						
5-10	2.1. Define logic 2.2 Explain the scope of logic 2.3. List types of logic 2.4 Explain the following logical concept: <ul style="list-style-type: none"> • Propositions • Statements • Truth • Validity 2.5 Explain the role of logic in reasoning and argument 2.6 Explain Arguments and their components 2.7 Explain the application of Logic	Explain logic Explain the scope of logic Explain types of logic Explain the following logical concept: <ul style="list-style-type: none"> • Propositions • Statements • Truth • Validity Explain the role of logic in reasoning and argument Explain Arguments and their components	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	in real world Issues					
GENERAL OBJECTIVE 3.0: Know the concept, techniques and application of Critical Reasoning.						
11-15	<p>3.1 Define critical reasoning</p> <p>3.2 Explain the concept of Critical Reasoning</p> <p>3.3 Explain techniques of critical reasoning</p> <p>3.4 Explain the characteristics of Critical Reasoning</p> <p>3.5 Explain the characteristics of a Critical Thinker.</p> <p>3.6 List the barriers to Critical Reasoning</p> <p>3.7 Explain Critical Reasoning Techniques</p> <p>3.8 Explain the application of Critical Reasoning in real world Issues</p>	<p>Explain critical reasoning</p> <p>Explain the concept of Critical Reasoning</p> <p>Explain techniques of critical reasoning</p> <p>Explain the characteristics of Critical Reasoning</p> <p>Explain the characteristics of a Critical Thinker.</p> <p>Explain the barriers to Critical Reasoning</p> <p>Explain Critical Reasoning Techniques</p> <p>Explain the application of Critical</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p>			

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		Reasoning in real world Issues				
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EVALUATION: CA 30%
EXAMINATION 70%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY INFORMATION MANAGEMENT SYSTEM (MLIMS)	COURSE CODE: MLT 124	CONTACT HOURS: 45 HOUR
	CREDIT UNITS: 3	THEORETICAL: 1
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2
GOAL: This course is designed to enable students gain knowledge and skill of Medical Laboratory Information Management.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: <ul style="list-style-type: none"> 1.0 Understand the concept of data in Medical Laboratory Information Management 2.0 Understand Information Management in Medical Laboratory 3.0 Understand the Storage and Retrieval of Medical Laboratory Data 4.0 Understand Documentation and Records in Medical Laboratory 5.0 Understand Medical Laboratory Information Management 6.0 Know the internet of things (IoT) in Medical Laboratory Practice 7.0 Understand data protection in medical laboratory 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY INFORMATION MANAGEMENT SYSTEM			COURSE CODE: MLT 124		CONTACT HOURS: 60 HOURS	
			CREDIT UNIT: 2		THEORETICAL: 1	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to enable students gain knowledge and skill of Medical Laboratory Information Management.						
GENERAL OBJECTIVE 1.0: Understand the concept of data in Medical Laboratory Information Management						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Define data 1.2 Explain sources and types of Data 1.3 Explain Data in Medical Laboratory 1.4 Explain sources of data in Medical Laboratory.	Explain data Explain sources and types of Data Explain Data in Medical Laboratory Explain sources of data in Medical Laboratory.	Multimedia Projector Screen, Internet Textbooks Computer Journals	Identify Data in Medical Laboratory Identify sources of Data in Medical Laboratory Identify sources of Data in Medical Laboratory	Guide the students to: Identify Data in Medical Laboratory Identify sources of Data in Medical Laboratory	Record books Text books General register Computer Internet

	<p>1.5 Explain the scope and nature of data in Medical Laboratory</p> <ul style="list-style-type: none"> • Accessibility • Accuracy • Timeliness • Confidentiality • Privacy of patient information • Security of data; <p>1.6 Explain the importance of Information Management in Medical Laboratory Practice</p>	<p>Explain the scope and nature of data in Medical Laboratory</p> <ul style="list-style-type: none"> • Accessibility • Accuracy • Timeliness • Confidentiality • Privacy of patient information • Security of data; <p>Explain the importance of Information Management in Medical Laboratory Practice</p>				
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GENERAL OBJECTIVE 2.0: Understand Information Management in Medical Laboratory						
3-4	2.1 Define Information Management	Explain Information Management	Multimedia Projector Screen, Internet	Identify Medical Laboratory registers	Guide the students to:	Sample Registers
	2.2 Define Information Management in Medical Laboratory	Explain Information Management in Medical Laboratory	Textbooks Computer Journals	Make entry into the Medical Laboratory Registers	Identify Medical Laboratory registers	
	2.3 Explain Medical Laboratory Registers	Explain Medical Laboratory Registers			Make entry into the Medical Laboratory Registers	
	2.4 Explain the structure of Medical Laboratory Registers.	Explain the structure of Medical Laboratory Registers.				
GENERAL OBJECTIVE 3.0: Understand the Storage and Retrieval of Medical Laboratory Data						
5-6	3.1 Define Data Storage	Explain Data Storage	Multimedia Projector Screen, Internet	Identify data storage methods	Guide the students to:	Register Computers Internet
	3.2 Define Data retrieval	Explain Data retrieval	Textbooks	Identify Data retrieval Methods	Identify data storage methods	Wooden shelves

	<p>3.3 List types of Data storage methods</p> <p>3.4 List types of data retrieval methods</p> <p>3.5 Explain types of data storage and data retrieval methods.</p> <p>3.6 Define Archive in Information Management.</p> <p>3.7 Explain archiving of Data in Medical Laboratory</p> <p>3.8 Explain the Challenges in storage and</p>	<p>Explain types of Data storage methods</p> <p>Explain types of data retrieval methods</p> <p>Explain types of data storage and data retrieval methods.</p> <p>Explain Archive in Information Management.</p> <p>Explain archiving of Data in Medical Laboratory</p> <p>Explain the Challenges in storage and</p>	<p>Computers Journals</p>	<p>Store Data</p> <p>Retrieve Data</p> <p>Archive Data</p>	<p>Identify Data retrieval Methods</p> <p>Store Data</p> <p>Retrieve Data</p> <p>Archive Data</p>	<p>Cabinets</p> <p>Fire proof cabinets</p> <p>Flash drives</p> <p>Hard Drive</p> <p>Memory Card</p> <p>CD ROM</p> <p>Cloud</p> <p>Google Drive</p>
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	retrieval of Data in Medical Laboratory.	retrieval of Data in Medical Laboratory.				
GENERAL OBJECTIVE 4.0: Understand Documentation and Records in Medical Laboratory						
7-8	4.1 Define Documents 4.2 Define Records 4.3 Explain Documents and Records in Medical Laboratory 4.4 Explain types of Documentation and Records in Medical Laboratory. 4.5 Explain classification of Documents and Records in	Explain Documents Explain Records Explain Documents and Records in Medical Laboratory Explain types of Documentation and Records in Medical Laboratory. Explain classification of Documents and Records in	Multimedia Projector Screen, Internet Textbooks Computer Journals	Identify Document and Records in Medical Laboratory Classify Medical Laboratory Documents Classify Medical Laboratory Records Fill Documents Manage Records	Guide the students to: Identify Document and Records in Medical Laboratory Classify Medical Laboratory Documents Classify Medical Laboratory Records Fill Documents Manage Records	Registers Internet Sample Document Sample record

	Medical Laboratory	Medical Laboratory				
	4.6 Explain the importance of Documentation and Records in Medical Laboratory	Explain the importance of Documentatio n and Records in Medical Laboratory				
	4.7 Explain Documents and Records control in Medical Laboratory	Explain Documents and Records control in Medical Laboratory				
	4.8 Explain the challenges in Documentation and Records in Medical Laboratory	Explain the challenges in Documentation and Records in Medical Laboratory				
GENERAL OBJECTIVE 5.0: Understand Medical Laboratory Information Management						
9-10	5.1 Explain the Medical Laboratory Information	Explain the Medical Laboratory Information	Multimedia Projector Screen, Internet			

	Management.	Management.	Textbooks Computer Journals		
	5.2 Explain the development of Medical Laboratory Information Management System (MLIMS)	Explain the development of Medical Laboratory Information Management System (MLIMS)			
	5.3 Explain MLIMS under the following: <ul style="list-style-type: none"> • Applications • Manufacturer • Features • Function • Environment 	Explain MLIMS under the following: <ul style="list-style-type: none"> • Applications • Manufacturer • Features • Function • Environment 			
	5.4 Explain the merits and demerits of MLIMS	Explain the merits and demerits of MLIMS			
	5.5 Explain Challenges of MLIMS	Explain Challenges of MLIMS			

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GENERAL OBJECTIVE 6.0: Know the Internet of Things (IoT) in Medical Laboratory Practice						
11-12	6.1 Explain Internet of Things (IoT) in relation to Medical Laboratory	Explain Internet of Things (IoT) in relation to Medical Laboratory	Multimedia Projector Screen, Internet Textbooks Computers			
	6.2 Explain the uses and application of IoT in Medical Laboratory	Explain the uses and application of IoT in Medical Laboratory	Journals Wifi Routers			
	6.3 Explain the merits and demerits of IoT in Medical Laboratory practice	Explain the merits and demerits of IoT in Medical Laboratory practice				
	6.4 Explain the challenges of IoT in Medical Laboratory	Explain the challenges of IoT in Medical Laboratory				
GENERAL OBJECTIVE 7.0: Understand data protection in Medical Laboratory						
13-15	7.1 Define Data Security and privacy.	Explain Data Security and privacy.	Multimedia Projector Screen,			

	7.2 Explain data security and privacy in Medical Laboratory practice	Explain data security and privacy in Medical Laboratory practice	Internet Textbooks Computer Journals			
	7.3 Explain Data Privacy Act in relation to Medical Laboratory Practice	Explain Data Privacy Act in relation to Medical Laboratory Practice				
	7.4 Explain cybersecurity	Explain cybersecurity				
	7.5 Explain Challenges of Cybersecurity attacks on Data in Medical Laboratory	Explain Challenges of Cybersecurity attacks on Data in Medical Laboratory				

EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: MEDICAL LABORATORY TECHNIQUES	COURSE CODE: MLT 125	CONTACT HOURS: 45 HRS
	CREDIT UNITS: 3	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1
GOAL: This course is designed to provide students with the basic knowledge and skills of Medical laboratory Techniques		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Know Medical Laboratory Techniques		
2.0 Know Phlebotomy Techniques		
3.0 Understand Medical Microbiology Techniques		
4.0 Understand Chemical Pathology Techniques		
5.0 Understand Haematology Techniques		
6.0 Understand Histopathology Techniques		

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: MEDICAL LABORATORY TECHNIQUES		COURSE CODE: MLT 125		CONTACT HOURS: 45 HRS		
		CREDIT UNIT: 3		THEORETICAL: 2		
YEAR: I SEMESTER: II		PRE-REQUISITE:		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge of Medical laboratory Techniques						
GENERAL OBJECTIVE: 1.0 Know Medical Laboratory Techniques						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Define Medical Laboratory Techniques 1.2 Explain types of medical laboratory techniques; <ul style="list-style-type: none"> • Medical Microbiology • Chemical pathology • Haematology 	Explain Medical Laboratory Techniques Explain types of medical laboratory techniques; <ul style="list-style-type: none"> • Medical Microbiology • Chemical pathology • Haematology • Histopathology 	Multimedia Projector Screen, Whiteboard and marker, Internet, Textbooks, Computer Flip charts Journals	Identify the types of medical laboratory techniques Use PPE appropriately Demonstrate basic medical laboratory safety measures. Apply basic rules and regulations in medical laboratory practice	Guide students to: Identify the types of medical laboratory techniques Use PPE appropriately Demonstrate basic medical laboratory safety measures.	PPEs Microscopes Thermometers Microtomes Glassware Safety Manual

	<ul style="list-style-type: none"> • Histopathology <p>1.3 Explain the importance of medical laboratory techniques</p> <p>1.4 Explain the importance of medical laboratory testing</p> <p>1.5 Explain simple laboratory wares, equipment and their uses in medical laboratory</p> <p>1.6 Explain basic medical laboratory safety measures.</p>	<p>Explain the importance of medical laboratory techniques</p> <p>Explain the importance of medical laboratory testing</p> <p>Explain simple laboratory wares, equipment and their uses in medical laboratory</p> <p>Explain basic medical laboratory safety measures.</p> <p>Explain basic rules and regulations in medical laboratory practice.</p>		<p>Perform Medical Laboratory tests using the following techniques:</p> <ul style="list-style-type: none"> • Medical Microbiology • Chemical pathology • Haematology • Histopathology <p>Identify Simple laboratory wares, equipment and their uses in medical laboratory</p>	<p>Apply basic rules and regulations in medical laboratory practice</p> <p>Perform Medical Laboratory tests using the following techniques:</p> <ul style="list-style-type: none"> • Medical Microbiology • Chemical pathology • Haematology • Histopathology <p>Identify Simple laboratory wares, equipment and</p>	
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	1.7 Explain basic rules and regulations in medical laboratory practice. 1.8 Explain various safety equipment used in medical laboratory	Explain various safety equipment used in medical laboratory			their uses in medical laboratory	
GENERAL OBJECTIVES: 2.0 Know Phlebotomy Techniques						
3-4	2.1 Define Phlebotomy 2.2 Explain Phlebotomy Technique 2.3 Explain types of Phlebotomy Technique: <ul style="list-style-type: none"> • Venipuncture • Capillary puncture • Arterial 	Explain phlebotomy Explain Phlebotomy Technique Explain types of Phlebotomy Technique: <ul style="list-style-type: none"> • Venipuncture • Capillary puncture • Arterial 	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals Glass wares	Perform: <ul style="list-style-type: none"> • Venipuncture • Capillary puncture • Arterial Identify materials for Phlebotomy	Guide students to: Perform: <ul style="list-style-type: none"> • Venipuncture • Capillary puncture • Arterial Identify materials for Phlebotomy	Vacutainer Vacutainer Holder Phlebotomy beds Chairs Needles Syringes Tourniquets Antiseptic wipes Lancet Capillary tube Slides Blood Sample containers

	2.4 List materials for Phlebotomy					
GENERAL OBJECTIVE 3.0: Understand Medical Microbiology Techniques						
5-6	<p>3.1 Define Medical Microbiology Techniques</p> <p>3.2 List types of Medical Microbiology Techniques</p> <p>3.3 Explain microbiology Specimen collection and processing</p> <p>3.4 Explain Macro/ Microscopic examination of specimen</p> <p>3.5 Explain Culture and sensitivity techniques</p>	<p>Explain Medical Microbiology Techniques</p> <p>Explain types of Medical Microbiology Techniques</p> <p>Explain microbiology Specimen collection and processing</p> <p>Explain Macro/ Microscopic examination of specimen</p> <p>Explain Culture and sensitivity techniques</p>	<p>Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals Microscopes, sample and Specimen containers</p>	<p>Perform Specimen collection and processing</p> <p>Perform Macro/ Microscopic examination of specimen</p> <p>Perform Culture and sensitivity techniques</p>	<p>Guide students to:</p> <p>Perform Specimen collection and processing</p> <p>Perform Macro/ Microscopic examination of specimen</p> <p>Perform Culture and sensitivity techniques</p>	<p>Microscopes</p> <p>Incubators</p> <p>Autoclave</p> <p>Centrifuges</p> <p>Glasswares</p> <p>Samples</p> <p>Specimen Containers</p>

GENERAL OBJECTIVE 4.0: Understand Chemical Pathology Techniques

7-8	<p>4.1 Define Chemical Pathology</p> <p>4.2 List types of Chemical Pathology Techniques</p> <p>4.3 Explain Specimen collection and processing in Chemical Pathology</p> <p>4.4 Explain the Chemical examination of blood and urine in chemical pathology</p> <p>4.5 Describe basic instrumentation in chemical pathology</p>	<p>Explain Chemical Pathology</p> <p>Explain types of Chemical Pathology Techniques</p> <p>Explain Specimen collection and processing in Chemical Pathology</p> <p>Explain the Chemical examination of blood and urine in chemical pathology</p> <p>Explain basic instrumentation in chemical pathology</p>	<p>Multimedia Projector Screen, Whiteboard and marker, Internet, Textbooks, Computer, Flip charts, Journals Glass wares</p>	<p>Perform Specimen collection and processing in Chemical Pathology</p> <p>Perform Chemical examination of blood, urine and stool</p>	<p>Guide students to:</p> <p>Perform Specimen collection and processing in Chemical Pathology</p> <p>Perform Chemical examination of blood, urine and stool</p>	<p>Urinalysis Kit Sample Containers Centrifuges Spectrophotometer Automatic Pipette PPE Glassware</p>
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GENERAL OBJECTIVE 5.0: Understand Haematology Techniques						
9-11	5.1 Define Haematology	Explain Haematology	Multimedia Projector Screen, Internet	Perform Blood collection and processing	Guide the students to:	Microscopes
	5.2 List types of Haematology Techniques	Explain types of Haematology Techniques	Textbooks Computer Flip charts	Perform Full blood count (FBC)	Perform Blood collection and processing	Haematocrit Centrifuge Bucket Centrifuge Capillary Tubes
	5.3 Explain the process of Blood collection and processing	Explain the process of Blood collection and processing	Journals Glass wares and microscope.	Prepare Blood films and Examine	Perform Full blood count (FBC)	EDTA Container Blood collection tubes
	5.4 Explain Full blood count (FBC)	Explain Full blood count (FBC)			Prepare Blood films and Examine	Stains Staining Racks
	5.5 Explain Blood film examination	Explain Blood film examination				
GENERAL OBJECTIVE 6.0: Understand Histopathology Techniques						
12-15	6.1 Define Histopathology	Histopathology	Multimedia Projector Screen, Internet	Perform Specimen collection, preservation and processing in Histopathology	Guide the students to:	Microtome Microscope
	6.2 List types of Histopathology Techniques	Explain types of Histopathology Techniques	Textbooks Computer Flip charts		Perform Specimen collection, preservation and processing in Histopathology	Fixatives Slide racks Slides Cover slips Embedding medium
	6.3 Explain Specimen	Explain Specimen collection, preservation and	Journals			Reagents and

	collection, preservation and processing in Histopathology 6.4 Describe basic instrumentation in Histopathology	processing in Histopathology Explain basic instrumentation in Histopathology				Chemicals
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EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY MANAGEMENT, ORGANIZATION & ETHICS I	COURSE CODE: MLT 126	CONTACT HOURS: 30 HOURS
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: NIL
GOAL: This course is designed to enable students acquire basic knowledge of Laboratory Management, Organization and Ethics		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: <ul style="list-style-type: none"> 1.0 Understand the role of medical laboratory science in health care 2.0 Understand the principles of Management 3.0 Know quality assurance and quality control 4.0 Know safety measures in medical laboratories 5.0 Understand the leadership in Health Facility 6.0 Know the ethics and Good Medical Laboratory Practice. 7.0 Know preventive maintenance and care of laboratory equipment 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY ORGANIZATION & ETHICS I		COURSE CODE: MLT 126		CONTACT HOURS: 45 HOURS		
		CREDIT UNIT: 2		THEORETICAL: 2		
YEAR: I SEMESTER: II		PRE-REQUISITE:		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL						
GOAL: This course is designed to enable students acquire basic knowledge of Laboratory Management, Organization and Ethics						
GENERAL OBJECTIVE 1.0: Understand the role of medical laboratory science in health care						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Explain Health care 1.2 Explain Medical Laboratory Science in health care 1.3 Explain Medical Laboratory Science regulation in health care	Explain Health care Explain Medical Laboratory Science in health care Explain Medical Laboratory Science regulation in	White Board, Maker, Projector, Reference books like MLSCN Act, Journals Posters, Computer			

	1.4 Explain the roles of medical laboratory science in healthcare delivery	health care Explain the roles of medical laboratory science in healthcare delivery				
GENERAL OBJECTIVE 2.0: Understand the principles of Management						
3-4	2.1 Define Management 2.2 Explain the difference between management and Administration 2.3 Explain the 14 Fayol's principle of Management 2.4 Explain techniques of planning	Explain Management Explain the difference between management and Administration Explain the 14 Fayol's principle of Management Explain techniques of planning.	White Board/Maker Board, Projector, Reference books, Posters, Computer			
GENERAL OBJECTIVE 3.0: Know quality assurance and quality control						
5-6	3.1 Define Quality	Explain Quality	White			

	<p>Assurance and Quality Control</p> <p>3.2 Explain types of Quality Assurance and Quality Control</p> <p>3.3 Explain benefits of Quality Assurance in medical laboratory</p> <p>3.4 Explain the following terms: -Internal quality control -External quality control -Precision -Accuracy -Standard deviation</p> <p>3.5 Explain quality in relation to medical laboratory results</p> <ul style="list-style-type: none"> • Pre-analytical 	<p>Assurance and Quality Control</p> <p>Explain types of Quality Assurance and Quality Control</p> <p>Explain benefits of Quality Assurance in medical laboratory</p> <p>Explain the following terms: -Internal quality control -External quality control -Precision -Accuracy -Standard deviation</p> <p>Explain quality in</p>	<p>Board Maker, Projector, Reference books, Journals, Posters, Internet, Computer</p>			
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	<ul style="list-style-type: none"> Analytical Post Analytical stages 	relation to medical laboratory results <ul style="list-style-type: none"> Pre-analytical Analytical Post Analytical stages 				
GENERAL OBJECTIVE 4.0: Know safety measures in medical laboratories						
7-8	4.1 Explain Universal Precaution 4.2 Explain sample management 4.3 Explain laboratory waste management 4.4 Explain types of laboratory waste management 4.5 Explain steps in laboratory	Explain Universal Precaution Explain sample management Explain laboratory waste management Explain types of laboratory waste management Explain steps in laboratory	White Board Maker, Projector, Reference books, Journals, Posters, Internet, Computer	Identify types of laboratory waste Identify the steps in laboratory waste management Use PPE appropriately Dispose Laboratory waste	Guide students to: Identify types of laboratory waste Identify the steps in laboratory waste management Use PPE appropriately Dispose Laboratory waste	PPE Colour codes Waste Bins Charts Video clips Model of Incinerator Autoclave

	waste management 4.6 Explain Personal Protective Equipment (PPE) 4.7 Explain Material Safety Data Sheet (MSDS) 4.8 Describe safety signs and symbols in medical laboratory	waste management Explain Personal Protective Equipment (PPE) Explain Material Safety Data Sheet (MSDS) Explain safety signs and symbols in medical laboratory				
GENERAL OBJECTIVE 5.0: Understand the leadership in Health Facility						
9-10	5.1 Define leadership 5.2 Explain types of leadership styles 5.3 Explain the qualities of a good	Explain leadership Explain types of leadership styles Explain the qualities of a	White Board Maker, Projector, Reference books, Journals, Posters, Internet,	Demonstrate Inter and Intra-departmental relationships of personnel in a typical health facility.	Guide students to: Demonstrate Inter and Intra-departmental relationships of personnel in a typical health	Organisational Charts

	<p>leader</p> <p>5.4 Explain the role of leadership in medical laboratory practice</p> <p>5.5 Explain Inter and Intra-departmental relationships of personnel in health facility.</p>	<p>good leader</p> <p>Explain the role of leadership in medical laboratory practice</p> <p>Explain Inter and Intra-departmental relationships of personnel in health facility.</p>	<p>Computer</p>		<p>facility</p>	
GENERAL OBJECTIVE 6.0: Know the ethics and Good Medical Laboratory Practice.						
11-12	<p>6.1 Define ethics</p> <p>6.2 Define medical laboratory ethics</p> <p>6.3 Explain the following ethical concerns:</p> <ul style="list-style-type: none"> • Confidentiality • Malpractice • Negligence • Medico-legal 	<p>Explain ethics</p> <p>Explain medical laboratory ethics</p> <p>Explain the following ethical concerns:</p> <ul style="list-style-type: none"> • Confidentiality 	<p>White Board Maker, Projector, Reference books, Journals, Posters, Internet, Computer</p>			

	<p>Issues</p> <ul style="list-style-type: none"> • Clients protection • Patient Safety • Insurance for professional health hazards. <p>6.4 Define Good Medical Laboratory Practice</p> <p>6.5 Explain the components of Good Medical Laboratory Practice</p>	<ul style="list-style-type: none"> • Malpractice • Negligence • Medico-legal Issues • Clients protection • Patient Safety • Insurance for professional health hazards. <p>Explain Good Medical Laboratory Practice</p> <p>Explain the components of Good Medical Laboratory Practice</p>				
GENERAL OBJECTIVE 7.0: Know preventive maintenance and care of laboratory equipment						
13-15	7.1 Explain the preventive maintenance of laboratory equipment	Explain the preventive maintenance of laboratory equipment	White Board Maker, Projector, Reference	Demonstrate how to maintain and care for laboratory equipment	Guide students to: Demonstrate how to maintain	Video clips Tools

	<p>7.2 Explain the care of laboratory equipment</p> <p>7.3 Explain the importance of preventive maintenance and care of laboratory equipment</p>	<p>Explain the care of laboratory equipment</p> <p>Explain the importance of preventive maintenance and care of laboratory equipment</p>	<p>books, Journals, Posters, Internet, Computer</p>		<p>and care for laboratory equipment</p>	
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EVALUATION: CA 30%
EXAMINATION 70%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: GENERAL MATHEMATICS II	COURSE CODE: MLT 127	CONTACT HOURS: 2
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL:
GOAL: This course is designed to provide students with the knowledge of General Mathematical and its Applicability in Medical Laboratory Science		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Know Matrices and Determinants, Permutation and Combination, and their Applications in Medical Laboratory Science		
2.0 Know Calculus and its Application in Medical Laboratory Science		
3.0 Know basic Statistics and Tests of Significance and their Applications in Medical Laboratory Science		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: GENERAL MATHEMATICS		COURSE CODE: MLT 127		CONTACT HOURS: 2		
		CREDIT UNIT: 2		THEORETICAL: 2		
YEAR: I SEMESTER: II		PRE-REQUISITE:		PRACTICAL:		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GENERAL OBJECTIVE 1.0: Know Matrices and Determinants, Permutation and Combination, and their Applications in Medical Laboratory Science						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-4	1.1. Illustrate Matrices 1.2. Illustrate Algebra of Matrices 1.3. Illustrate Determinant and its properties 1.4. Solve System of Linear Equations	Illustrate Matrices Illustrate Algebra of Matrices Illustrate Determinant and its properties Solve System of Linear Equations Illustrate	Multimedia Projector Screen Internet Textbooks Computer Flip charts Journals			

	1.5. Illustrate Permutation and Combination	Permutation and Combination				
GENERAL OBJECTIVE 2.0: Know Calculus and its Application in Medical Laboratory Science						
5-10	2.1. Derive a Function. 2.2. Illustrate Rules of Differentiation and its application 2.3. Illustrate Chain Rule 2.4. Illustrate the differentiation of exponential and Logarithmic Functions	Derive a Function. Illustrate Rules of Differentiation and its application Illustrate Chain Rule Illustrate the differentiation of exponential and Logarithmic Functions Illustrate the Rules of Integration	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	2.5. Illustrate the Rules of Integration	Illustrate Integration by Parts				
	2.6. Illustrate Integration by Parts	Illustrate Integration using Partial Functions				
	2.7. Illustrate Integration using Partial Functions	Illustrate Definite Integrals				
	2.8. Illustrate Definite Integrals					
GENERAL OBJECTIVE 3.0. Know basic Statistics and Tests of Significance and their Applications in Medical Laboratory Science						
11-15	3.1. Define Statistics. 3.2. Explain Statistics and its application in Medical Laboratory	Define Statistics. Explain Statistics and its application in Medical Laboratory Science.	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	<p>Science.</p> <p>3.3. Illustrate:</p> <ul style="list-style-type: none"> •Measures of Central Tendency. •Measures of Dispersion •Coefficient of Variation <p>3.4. Illustrate Probabilities.</p> <p>3.5. Define Variables</p> <p>3.6. List types of Variables and their Classification</p> <p>3.7. Define Confidences Interval and P-values</p>	<p>Illustrate:</p> <ul style="list-style-type: none"> •Measures of Central Tendency. •Measures of Dispersion •Coefficient of Variation <p>Illustrate Probabilities.</p> <p>Define Variables</p> <p>List types of Variables and their classification</p> <p>Define Confidences Interval and P-values</p>				
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	<p>3.8. Illustrate</p> <ul style="list-style-type: none"> • Scatter diagram • Correlation. • Regression Analysis • Test of significance 	<p>Illustrate</p> <ul style="list-style-type: none"> • Scatter diagram • Correlation. • Regression Analysis • Test of significance 				
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EVALUATION: CA 30%
EXAMINATION 70%

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YEAR II SEMESTER I

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY			
COURSE TITLE:	MEDICAL	COURSE CODE: MLT 211	CONTACT HOURS: 45 Hour
MICROBIOLOGY I		CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II	SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1
GOAL: To provide students with basic knowledge and skills in Medical Microbiology			
GENERAL OBJECTIVE			
1.0 Understand the concepts and historical development of Medical Microbiology.			
2.0 Understand examination of Microorganisms.			
3.0 Understand the environmental factors affecting the growth of Microorganisms.			
4.0 Know Microscopy, Cultivation, Isolation and Preservation of Microorganisms.			

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY							
COURSE TITLE: MEDICAL MICROBIOLOGY I			COURSE CODE: MLT 211		CONTACT HOURS: 45 Hours		
			CREDIT UNIT: 3		THEORETICAL: 2		
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL							
GOAL: To provide students with basic knowledge and skills in Medical Microbiology							
GENERAL OBJECTIVE 1.0: Understand the concepts and historical development of Medical Microbiology.							
THEORETICAL CONTENT				PRACTICAL CONTENT			
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources	
1-4	1.1 Define Medical Microbiology	Explain Medical Microbiology	Multimedia Projector Screen,				
	1.2 Explain branches of Medical Microbiology	Explain branches of Medical Microbiology	Internet Textbooks Computer Journals				
	1.3 Explain scope of Medical Microbiology	Explain scope of Medical Microbiology					
	1.4 Explain history of Medical Microbiology	Explain history of Medical Microbiology					
		Explain the relationship of Medical Microbiology					

	1.5 Explain the relationship of Medical Microbiology to man.	to man.				
GENERAL OBJECTIVE 2.0: Understand examination of Microorganisms						
5-7	2.1 Define Microorganisms 2.2 List classes of Microorganisms 2.3 Describe the structure of bacterial cell 2.4 List the Morphological classification of bacteria. 2.5 Explain Bacterial growth curve and nutritional	Explain Microorganisms Explain classes of Microorganisms Explain the structure of bacterial cell Explain the Morphological classification of bacteria. Explain Bacterial growth curve and nutritional requirement Explain Microbiological	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals Glass wares	Draw the structure of bacterial cell Identify Microbiological examination techniques Prepare culture plates Perform the following techniques: • Microscopy • Culture • Biochemical tests Sensitivity	Guide students to: Draw the structure of bacterial cell Identify Microbiological examination technique Prepare culture plates Perform the following techniques: • Microscopy • Culture	Microscope Reagents Centrifuge Incubator Culture media Autoclave Weighing balance Petri dishes Hot air Oven Boiling water bath Glasswares Slides Wire loops Spatula

	<p>requirement</p> <p>2.6 List Microbiological examination techniques</p> <p>2.7 Explain Microscopic Examination of bacteria</p> <p>2.8 Explain the cultivation of bacteria</p> <p>2.9 Explain culture media preparation</p> <p>2.10 Explain the biochemical test for bacteria</p> <p>2.11 Explain the sensitivity test</p>	<p>examination techniques</p> <p>Explain Microscopic Examination of bacteria</p> <p>Explain the cultivation of bacteria</p> <p>Explain culture media preparation</p> <p>Explain the biochemical test for bacteria</p> <p>Explain the sensitivity test for bacteria</p>			<ul style="list-style-type: none"> • Biochemical tests Sensitivity 	
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	for bacteria					
GENERAL OBJECTIVE 3.0: Understand the environmental factors affecting the growth of Microorganisms						
8-11	3.1 Explain the environmental factors affecting the growth of Microorganisms 3.2 Explain how these factors are provided in the laboratory 3.3 Explain the bacterial growth curve and nutritional requirements	Explain the environmental factors affecting the growth of Microorganisms Explain how these factors are provided in the laboratory Explain the bacterial growth curve and nutritional requirements	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals Glass wares			
GENERAL OBJECTIVE 4.0: Know Microscopy, Cultivation, Isolation and Preservation of Microorganisms						
12-13	4.1 Define Microscopy. 4.2. Explain Microscopy in	Explain Microscopy. Explain Microscopy in Medical Microbiology.	Multimedia Projector Screen, Internet	Perform: • Microscopy (Direct and Stain)	Guide students to: Perform: • Microscopy (Direct and Stain)	Reagents Centrifuge Incubator Culture media Autoclave

Medical Microbiology.	Explain types of Microscopy.	Textbooks Computer Flip charts Journals Microscope slides, Specimen slide and stains	<ul style="list-style-type: none"> • Cultivation • Isolation • Preservation 	<ul style="list-style-type: none"> • Cultivation • Isolation • Preservation 	Weighing balance Petri dishes Hot air Oven Boiling water bath Glasswares Slides Wire loops Spatula Refrigerator Staining racks Bunsen Burner
4.3. List types of Microscopy.	Explain culture media.		of bacteria in the laboratory	of bacteria in the laboratory	
4.4. Define culture media.	Explain types of culture media				
4.5. List types of culture media	Explain methods of cultivation of bacteria				
4.6. Explain methods of cultivation of bacteria	Explain the isolation of bacteria				
4.7. Explain the isolation of bacteria	Explain the preservation of pure culture.				
4.8. Explain the preservation of pure culture.					

EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: HISTOPATHOLOGY AND CYTOLOGY I	COURSE CODE: MLT 212	CONTACT HOURS: 3
	CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1
GOAL: This course is designed to provide students with the basic knowledge and skills of Histopathology and Cytology.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0. Understand basic concept of Histopathology and Cytology.		
2.0. Understand basic Tissue Preparation in Histopathology Laboratory.		
3.0. Understand the basic Tissue Processing Techniques.		
4.0. Understand tissue sectioning procedures.		
5.0. Understand principles and application of cytological examination.		

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY							
COURSE TITLE: HISTOPATHOLOGY AND CYTOLOGY I				COURSE CODE: MLT 212		CONTACT HOURS: 3	
				CREDIT UNIT: 3		THEORETICAL: 2	
YEAR: II SEMESTER: I				PRE-REQUISITE:		PRACTICAL: 1	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL							
GOAL: This course is designed to provide students with the basic knowledge and skills of Histopathology and Cytology							
GENERAL OBJECTIVE 1.0: Understand basic concept of Histopathology and Cytology.							
THEORETICAL CONTENT				PRACTICAL CONTENT			
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources	
1-3	1.1 Define: <ul style="list-style-type: none"> • Histology • Histopathology • Cytology 1.2. Explain: <ul style="list-style-type: none"> • Histology • Histopathology • Cytology 1.3 Describe basic structure of cell and its function. 1.3 Define: <ul style="list-style-type: none"> • Biopsy 	Explain : <ul style="list-style-type: none"> • Histology • Histopathology • Cytology Explain: <ul style="list-style-type: none"> • Histology • Histopathology • Cytology Explain basic structure of cell and its function. Explain: <ul style="list-style-type: none"> • Biopsy 	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals Glass wares				

	<ul style="list-style-type: none"> •Autopsy •Autolysis •Putrefaction. <p>1.4. Explain Reception in Histopathology and Cytology Laboratory</p>	<ul style="list-style-type: none"> •Autopsy •Autolysis •Putrefaction. <p>Explain Reception in Histopathology and Cytology Laboratory</p>				
GENERAL OBJECTIVE 2.0: Understand basic Tissue Preparation in Histopathology Laboratory.						
4-7	<p>2.1 Define Tissue</p> <p>2.2 List types of Tissues</p> <p>2.3 Explain Tissue Preparation in Histopathology</p> <p>2.4 Explain the Methods of Tissue Preparation.</p> <p>2.5 Define Fixation</p> <p>2.6 Explain Fixation and its importance.</p>	<p>Explain Tissue</p> <p>Explain types of Tissues</p> <p>Explain Tissue Preparation in Histopathology</p> <p>Explain the Methods of Tissue Preparation.</p> <p>Explain Fixation</p> <p>Explain Fixation and its importance.</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p> <p>Glass wares</p>	<p>Prepare fixatives</p> <p>Perform Tissue Processing</p> <p>Prepare decalcifying fluids.</p> <p>Perform the decalcification of a Bone Tissue specimen</p> <p>Determine the end point of decalcification</p>	<p>Guide students to:</p> <p>Prepare fixatives</p> <p>Perform Tissue Processing</p> <p>Prepare decalcifying fluids.</p> <p>Perform the decalcification of a Bone Tissue specimen</p> <p>Determine the end point of decalcification</p>	<p>Reagents</p> <p>Fixatives</p> <p>Containers</p> <p>Cassettes</p> <p>Tissue</p> <p>Decalcifying Fluid</p>

	<p>2.7 Explain fixatives</p> <p>2.8 Explain the classification and composition of fixatives.</p> <p>2.9 Enumerate the advantages and disadvantages of fixatives.</p> <p>2.10 Define Decalcification</p> <p>2.11 Explain the aims of decalcification</p> <p>2.12 Describe methods of decalcification</p> <p>2.13 Explain methods of determination of end point of decalcification</p>	<p>Explain fixatives</p> <p>Explain the classification and composition of fixatives.</p> <p>Explain the advantages and disadvantages of fixatives.</p> <p>Explain Decalcification</p> <p>Explain the aims of decalcification</p> <p>Describe methods of decalcification</p> <p>Explain methods of determination of end point of decalcification</p>				
GENERAL OBJECTIVE 3.0: Understand the basic Tissue Processing Techniques						
8-11	3.1. Explain Tissue	Explain Tissue Processing	Multimedia Projector	Demonstrate Tissue processing	Guide students to: Demonstrate	Reagents Ice block

<p>Processing</p> <p>3.2 Explain methods of Tissue Processing.</p> <p>3.3 List the steps in tissue processing</p> <p>3.4 Explain the steps in tissue processing</p> <p>3.5 Explain Dehydration and its importance in tissue processing.</p> <p>3.6 Enumerate type of dehydrating agents.</p> <p>3.7 Explain clearing and types of clearing agents</p> <p>3.8 Define:</p> <ul style="list-style-type: none"> •Infiltration 	<p>Explain methods of Tissue Processing.</p> <p>Explain the steps in tissue processing</p> <p>Explain the steps in tissue processing</p> <p>Explain Dehydration and its importance in tissue processing.</p> <p>Explain type of dehydrating agents.</p> <p>Explain clearing and types of clearing agents</p> <p>Explain:</p>	<p>Screen, Internet Textbooks Computer Flip charts Journals Glass wares</p>	<p>Perform Embedding</p> <p>Prepare blocks from selected tissue pieces.</p>	<p>Tissue processing</p> <p>Perform Embedding</p> <p>Prepare blocks from selected tissue pieces.</p>	<p>Wax</p> <p>Hot plate</p> <p>Water bath</p> <p>Video clips</p> <p>Pictorials</p>
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	<ul style="list-style-type: none"> •Embedding •Impregnation •Blocking <p>3.9 List types of embedding media</p> <p>3.10 List embedding stations.</p>	<ul style="list-style-type: none"> •Infiltration •Embedding •Impregnation •Blocking <p>Explain types of embedding media</p> <p>Explain embedding stations.</p>				
GENERAL OBJECTIVE 4.0: Understand tissue sectioning procedures						
12-15	<p>4.1. Define Microtomy</p> <p>4.2 Describe Microtomes and their uses</p> <p>4.3 List types of microtomes and their Advantages and disadvantages.</p> <p>4.4. List types of Microtome Knives</p> <p>4.5 Explain the</p>	<p>Explain Microtomy</p> <p>Explain Microtomes and their uses</p> <p>Explain types of microtomes and their Advantages and disadvantages.</p> <p>Explain types of Microtome Knives</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p> <p>Glass wares</p>	<p>Identify Microtome parts.</p> <p>Identify Microtome knives</p> <p>Demonstrate Microtomy</p>	<p>Guide students to:</p> <p>Identify Microtome parts.</p> <p>Identify Microtome knives</p> <p>Demonstrate Microtomy</p>	<p>Microtome</p> <p>Microtome Knives</p> <p>Tissue block</p> <p>Video clips</p> <p>Pictorials</p>

	<p>following:</p> <ul style="list-style-type: none"> •Sharpening •Honing •Polishing •Stropping <p>4.6. Explain Mounting of section</p> <p>4.7. Explain the Use of tissue floatation bath.</p>	<p>Explain the following:</p> <ul style="list-style-type: none"> •Sharpening •Honing •Polishing •Stropping <p>Explain Mounting of section</p> <p>Explain the Use of tissue floatation bath.</p>				
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EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: HAEMATOLOGY AND BLOOD GROUP SEROLOGY I	COURSE CODE: MLT 213	CONTACT HOURS: 45
	CREDIT UNIT: 3	THEORETICAL: 2
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1
GOAL: This course is designed to provide students with the basic knowledge and skills in Haematology and Blood Group Serology		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: <ul style="list-style-type: none"> 1.0 Understand composition and functions of blood 2.0 Understand Haematopoiesis. 3.0 Know anticoagulants in Haematology and Blood Group Serology 4.0 Understand collection and preservation of blood. 5.0 Understand blood Group Serology and Blood Banking 6.0 Know blood antigens and antibodies 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: HAEMATOLOGY AND BLOOD GROUP SEROLOGY I			COURSE CODE: MLT 213	CONTACT HOURS: 45		
			CREDIT UNIT: 3	THEORETICAL: 2		
YEAR: II SEMESTER: I			PRE-REQUISITE:	PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge and skills in Haematology and Blood Group Serology						
GENERAL OBJECTIVE 1.0: Understand composition and functions of blood.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define Blood 1.2 List the compositions of blood 1.3 Explain the composition of blood. 1.4 Differentiate components of blood	Explain Blood Explain the composition of blood Explain the composition of blood. Explain components of blood Explain functions of	Multimedia Projector Screen, Internet Textbooks Computer Journals			

	1.5 List functions of blood	blood				
GENERAL OBJECTIVE 2.0: Understand Haematopoiesis						
3-4	2.1 Define Haematopoiesis 2.2 Explain: •Erythropoiesis •Leucopoiesis •Thrombopoiesis	Explain Haematopoiesis Explain: •Erythropoiesis •Leucopoiesis •Thrombopoiesis	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			
GENERAL OBJECTIVE 3.0: Know anticoagulants in Haematology and Blood Group Serology						
5-7	3.1 Define anticoagulants 3.2 List types of anticoagulants in Haematology and Blood Group Serology 3.3 Explain types of anticoagulants in Haematology and Blood Group Serology 3.4 Explain the principle	Explain anticoagulants Explain types of anticoagulants in Haematology and Blood Group Serology Explain types of anticoagulants in Haematology and Blood Group Serology Explain the principle	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Prepare anticoagulants.	Guide students to: Prepare anticoagulants.	Reagents Weighing balance Glassware Spatula Specimen container

	and uses of anticoagulants in Haematology and Blood Group Serology	and uses of anticoagulants in Haematology and Blood Group Serology				
	3.5 Explain composition of each anticoagulants in Haematology and Blood Group Serology	Explain composition of each anticoagulants in Haematology and Blood Group Serology				
GENERAL OBJECTIVE 4.0: Understand collection and preservation of blood						
8-10	4.1 Explain collection and preservation of blood in Haematology and Blood Group Serology	Explain collection and preservation of blood in Haematology and Blood Group Serology	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Perform blood collection: <ul style="list-style-type: none"> • Capillary • Venous 	Guide the students to: Perform blood collection: <ul style="list-style-type: none"> • Capillary • Venous 	Syringes & Needle Tourniquet Disinfectant Blood sample containers Lancet Dry and Wet Swab Vacutainer Vacutainer holder
	4.2 Explain types of blood collection in Haematology and Blood Group Serology	Explain types of blood collection in Haematology and Blood Group Serology				
	4.3 List blood	Explain blood				

	collection equipment in Haematology and Blood Group Serology 4.4 Explain safety measures in blood collection	collection equipment in Haematology and Blood Group Serology Explain safety measures in blood collection				
GENERAL OBJECTIVE 5.0: Understand blood Group Serology and Blood Banking						
11-13	5.1 Define blood group serology 5.2 Define blood banking 5.3. Explain the importance of blood banking 5.4 List the equipment required for blood banking	Explain blood group serology Explain blood banking Explain the importance of blood banking Explain the equipment required for blood banking	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Identify blood bank equipment	Guide students to: Identify blood bank equipment	Blood bank refrigerator Blood donor's chair Weighing balance Water bath Plasma extractor
GENERAL OBJECTIVE 6.0: Know blood antigens and antibodies						
14-15	6.1 Define: •Antigen •Antibody	Explain: •Antigen •Antibody	Multimedia Projector Screen, Internet Textbooks			

	<p>6.2 Explain blood:</p> <ul style="list-style-type: none"> •Antigen •Antibody <p>6.3 List types of Blood Antigens and Antibodies</p> <p>6.4. Explain blood antigen and antibody reaction</p> <p>6.5. Define Blood Group Systems</p> <p>6.6 Explain Blood Group Systems</p>	<p>Explain blood:</p> <ul style="list-style-type: none"> •Antigen •Antibody <p>Explain types of Blood Antigens and Antibodies</p> <p>Explain blood antigen and antibody reaction</p> <p>Explain Blood Group Systems</p> <p>Explain Blood Group Systems</p>	<p>Computer Flip charts Journals</p>			
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NATIONAL BOARD FOR TECHNICAL EDUCATION

EVALUATION: CA 40%
EXAMINATION 60%

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: CHEMICAL PATHOLOGY I	COURSE CODE: MLT 214	CONTACT HOURS: 3
	CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1
GOAL: This course is designed to provide students with the basic knowledge and skill in Chemical Pathology		
<p>GENERAL OBJECTIVES: On completion of this course, the students should be able to:</p> <ul style="list-style-type: none"> 1.0 Understand the significance of Chemical pathology. 2.0 Understand carbohydrates, proteins and lipids in Chemical Pathology 3.0 Know Chemical Pathology Laboratory Equipment 4.0 Know Blood Chemistry 5.0 Know Urine and Stool Analysis. 6.0 Know anticoagulants in Chemical Pathology 7.0 Know protein precipitation agents and preparation of Protein-free Filtrate 8.0 Know Collection and preservation of specimen in Chemical Pathology 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: CHEMICAL PATHOLOGY I		COURSE CODE: MLT 214		CONTACT HOURS: 3		
		CREDIT UNIT: 3		THEORETICAL: 2		
YEAR: II SEMESTER: I		PRE-REQUISITE:		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge and skill in Chemical Pathology						
GENERAL OBJECTIVE 1.0: Understand the significance of Chemical pathology in health.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Define Chemical pathology 1.2 Explain the significance of Chemical pathology in health 1.3 Explain how Chemical Pathology in diagnosis and treatment monitoring	Explain Chemical Pathology Explain the significance of Chemical pathology in health Explain how Chemical Pathology in diagnostics and treatment monitoring	Lecture notes Pictures Charts Books Journals Computer Projector DVD Multimedia Player Whiteboard Marker			

	1.4 List tests in chemical pathology	Explain tests in chemical pathology				
	1.5 Discuss the importance of Chemical Pathology analysis	Explain the importance of Chemical Pathology analysis				
GENERAL OBJECTIVE 2.0: Understand carbohydrates, proteins and lipids in Chemical Pathology						
3-4	2.1 Define carbohydrate 2.2 Explain the classification and composition of carbohydrates 2.3 Define protein 2.4 Explain the classification and composition of Proteins 2.5 Define lipids	Explain carbohydrate Explain the classification and composition of carbohydrates Explain protein Explain the classification and composition of Proteins Explain lipids	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia Player Whiteboard/Marker	Identify the classes and compositions of: <ul style="list-style-type: none"> • Carbohydrates (sugars) • Proteins • Lipids 	Guide Students to : Identify the classes and compositions of: <ul style="list-style-type: none"> • Carbohydrates (sugars) • Proteins • Lipids 	Water Bath Bunsen Burner Tripod Stand Reagents Glassware Standard Solutions Gas

	2.6 Explain the classification and composition of lipids	Explain the classification and composition of lipids				
	2.3 Explain the importance of carbohydrate, protein and fats in provision of energy for body metabolism	Explain the importance of carbohydrate, protein and fats in provision of energy for body metabolism				
GENERAL OBJECTIVE 3.0: Know Chemical Pathology Laboratory Equipment						
5-6	3.1 List the vital Chemical Pathology Laboratory Equipment	Explain the vital Chemical Pathology Laboratory Equipment	Lecture notes Pictures Charts Books Journals	Identify Chemical Pathology Laboratory Equipment	Guide students to: Identify Chemical Pathology Laboratory Equipment	Colorimeter, Spectrophotometer, Flame photometer Centrifuge PH Meter Water Bath
	3.2 Describe the basic Principle, components and use of Colorimeter	Explain the basic Principle, components and use of Colorimeter	Computer Projector	Identify components of: <ul style="list-style-type: none">• Colorimeter,• Spectrophotometer,	Identify	

	and Spectrophotometer	and Spectrophotometer	DVD/Multimedia Player	<ul style="list-style-type: none"> • Flame photometer 	components of: <ul style="list-style-type: none"> • Colorimeter, • Spectrophotometer, • Flame photometer 	
3.3	Explain the basic Principle, components and use of Flame photometer	Explain the basic Principle, components and use of Flame photometer	Whiteboard/Marker	Use: <ul style="list-style-type: none"> • Colorimeter, • Spectrophotometer, • Flame photometer 		
3.5	Define Automation in Chemical Pathology Laboratory	Explain Automation in Chemical Pathology Laboratory			Use: <ul style="list-style-type: none"> • Colorimeter, • Spectrophotometer, • Flame photometer 	
3.6	List vital automated Chemical Pathology Laboratory equipment	Explain vital automated Chemical Pathology Laboratory equipment				
3.7	List advantages and disadvantages of automation	Explain advantages and disadvantages				

	in Chemical Pathology Laboratory	of automation in Chemical Pathology Laboratory				
GENERAL OBJECTIVE 4.0: Know Blood Chemistry						
7-8	4.1 Define Blood 4.2 List the composition of blood 4.3 Explain the functions of blood	Explain blood Explain the composition of blood Explain the functions of blood	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia Player Whiteboard			
GENERAL OBJECTIVE 5.0: Know Urine and Stool Analysis						
9-10	5.1 Define Urine 5.2 Define urinalysis 5.3 List the normal and abnormal constituents of urine 5.4 Explain how to detect abnormal	Explain Urine Explain urinalysis Explain normal and abnormal constituents of urine Explain how to detect abnormal	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia	Perform urine analysis to Identify normal and abnormal constituents of urine Perform estimation of proteins in urine Perform stool analysis to detect	Guide students to: Perform urine analysis to Identify normal and abnormal constituents of urine Perform	Urine sample Reagents Stool sample Reagents

	constituents in urine (reducing sugars, proteins, bile pigments, ketone bodies, blood, etc)	constituents in urine (reducing sugars, proteins, bile pigments, ketone bodies, blood, etc)	dia Player Whiteboard/Marker	occult blood and faecal fat	estimation of proteins in urine Perform stool analysis to detect occult blood and faecal fat	
5.5	Describe stool	Explain stool and stool analysis				
5.6	Explain stool analysis	Explain the clinical importance of urine analysis (recognition of glucosuria, albuminuria, etc)				
5.7	Discuss the clinical importance of urine analysis (recognition of glucosuria, albuminuria, etc)	Explain the clinical importance of stool analysis (Occult Blood, Faecal fats)				
5.8	Discuss the clinical importance of stool analysis (Occult Blood, Faecal fats)					

GENERAL OBJECTIVE 6.0: Know anticoagulants in Chemical Pathology						
11-12	6.1 Define anticoagulants	Explain the anticoagulants	Lecture notes Pictures Charts	Identify anticoagulants used in Chemical Pathology Laboratory	Guide students to: Identify anticoagulants used in Chemical Pathology Laboratory	Anticoagulant s containers Centrifuge Plain containers Pasture Pipette Whole blood sample
	6.2 Describe the mode of action for anticoagulants in Chemical Pathology	Explain the mode of action for anticoagulants in Chemical Pathology	Books Journals Computer Projector DVD/Multimedia Player	Perform Separation of serum and plasma from whole blood		
	6.3 List the different types of anticoagulants used in Chemical Pathology	Explain the different types of anticoagulants used in Chemical Pathology	Whiteboard/Marker		Perform Separation of serum and plasma from whole blood	
	6.4 Describe the composition of anticoagulants used in Chemical Pathology	Explain the composition of anticoagulants used in Chemical Pathology				
	6.5 Describe the Separation of serum and plasma from whole blood	Explain the Separation of				

	6.6 Explain the difference between serum and plasma	serum and plasma from whole blood Explain the difference between serum and plasma				
GENERAL OBJECTIVE 7.0: Know protein precipitation agents and preparation of Protein-free Filtrate						
13-14	7.1 Define protein precipitants 7.2 List the different types of protein precipitants 7.3 Discuss the preparation of Protein-free Filtrate	Explain protein precipitants Explain the different types of protein precipitants Explain the preparation of Protein-free Filtrate	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia Player Whiteboard/Marker	Prepare Protein-free Filtrate	Guide students to Prepare Protein-free Filtrate	Protein solution Glass wares Centrifuge Whatman filter paper Funnel Protein precipitants
GENERAL OBJECTIVE 8.0: Know Collection and preservation of specimen in Chemical Pathology						
15	8.1 List specimens in Chemical Pathology 8.2 Describe the methods for the Collection of	Explain specimens in Chemical Pathology Explain the methods for the	Lecture notes Pictures Charts Books Journals	Collect blood sample using different methods Identify different blood preservatives	Guide students to: Collect blood sample using different	Tourniquets specimen containers, syringes and needles, Dry and wet

	<p>specimens in Chemical Pathology</p> <p>8.3 Define preservation and preservatives</p> <p>8.4 List preservatives used for specimens in Chemical Pathology</p> <p>8.5 Explain why specimens may be preserved in Chemical Pathology</p>	<p>Collection of specimens in Chemical Pathology</p> <p>Explain preservation and preservatives</p> <p>Explain preservatives used for specimens in Chemical Pathology</p> <p>Explain why specimens may be preserved in Chemical Pathology</p>	<p>Computer</p> <p>Projector</p> <p>DVD/Multimedia Player</p> <p>Whiteboard/Marker</p>	<p>Preserve collected blood using preservatives</p>	<p>methods</p> <p>Identify different blood preservatives</p> <p>Preserve collected blood using preservatives</p>	<p>cotton swabs</p> <p>Reagents and Chemicals</p>
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EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: MEDICAL PARASITOLOGY AND ENTOMOLOGY I	COURSE CODE: MLT 215	CONTACT HOURS: 3
YEAR: II SEMESTER: I	CREDIT UNIT: 3	THEORETICAL: 2
	PREREQUISITE:	PRACTICAL: 1
COURSE SPECIFICATION: THEORY AND PRACTICAL		
GOAL: This course is designed to provide students with the basic knowledge and skill of Medical Parasitology and Entomology		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: <ul style="list-style-type: none"> 1.0 Know Medical Parasitology 2.0 Know the collection, transportation, processing and preservation of clinical samples. 3.0 Know how to prepare reagent for examination of parasites 4.0 Know the principles and application of direct and concentration techniques. 5.0 Know how to Perform routine parasitological Examination on clinical specimen 6.0 Know Medical Entomology 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: MEDICAL PARASITOLOGY AND ENTOMOLOGY I		COURSE CODE: MLT 215		CONTACT HOURS: 3		
		CREDIT UNIT: 3		THEORETICAL: 2		
YEAR: II SEMESTER: I		PRE-REQUISITE:		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge and skill of Medical Parasitology and Entomology						
GENERAL OBJECTIVE 1.0: Know Medical Parasitology.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1. Define parasitology 1.2. Define Medical Parasitology 1.3. List human parasites of Medical importance 1.4. Explain the classification of parasites	Explain parasitology Explain Medical Parasitology Explain human parasites of Medical importance Explain the classification of parasites	Multimedia Projector Screen, Internet Textbooks Computer Journals			

	1.5.Explain the Characteristics of 1.4	Explain the Characteristics of 1.4				
	1.6 List specimen for parasitological examination	Explain specimen for parasitological examination				
GENERAL OBJECTIVE 2.0: Know the collection, transportation, processing and preservation of clinical samples						
3-4	2.1 Define the following: <ul style="list-style-type: none"> • Specimen collection • Transportation • Processing • Preservation of clinical specimen 2.2 Explain the types of specimen collection, transportation, processing, preservation of clinical specimen	Explain the following <ul style="list-style-type: none"> • Specimen collection • Transportation • Processing • Preservation of clinical specimen Explain the types of specimen collection, transportation, processing, preservation of clinical specimen	Textbooks Internet Journals Video clips Projectors	Identify Specimen containers Demonstrate the preparation of specimen containers Illustrate specimen collection Demonstrate how specimen are transported Illustrate the processing and preservation of specimen	Guide students to: Identify Specimen containers Demonstrate the preparation of specimen containers Illustrate specimen collection Demonstrate how specimen are transported Illustrate the processing and preservation of specimen	Containers Microscope Transport medium Needle and Syringe Lancet Centrifuge Glasswares

	2.3 Explain the challenges in specimen collection, transportation, processing, preservation of clinical specimen	Explain the challenges in specimen collection, transportation, processing, preservation of clinical specimen				
GENERAL OBJECTIVE 3.0: Know how to prepare reagent for examination of parasites						
5-6	3.1 Explain reagent for Examination of specimen for parasites 3.2 List reagents for Examination of specimen for parasites 3.3 Explain the uses of reagents for examination of specimen for Parasites	Explain reagent for Examination of specimen for parasites List reagents for Examination of specimen for parasites Explain the uses of reagents for examination of specimen for Parasites Explain the	Textbooks Internet Journals Video clips Projectors	Prepare reagents for examination of specimen for Parasites	Guide students to: Prepare reagents for examination of specimen for Parasites	Reagents Glassware Reagent bottles Weighing balance Water distiller Spatula

NATIONAL BOARD FOR TECHNICAL EDUCATION

	3.4 Explain the preparation of reagent for examination of specimen for Parasites	preparation of reagent for examination of specimen for Parasites				
GENERAL OBJECTIVE 4.0: Know the principles and application of direct and concentration techniques						
7-8	4.1 Explain the principle of direct techniques in the examination of specimen for Parasites 4.2 Explain the principle of concentration techniques in the examination of specimen for Parasites	Explain the principle of direct techniques in the examination of specimen for Parasites Explain the principle of concentration techniques in the examination of specimen for Parasites	Textbooks Internet Journals Video clips Projectors			
GENERAL OBJECTIVE 5.0: Know how to Perform routine parasitological Examination on clinical specimen						
9-12	5.1 Define routine parasitological examination.	Explain routine parasitological examination.	Textbooks Internet Journals Video	Perform parasitological examination on clinical specimen	Guide students to: Perform parasitological examination on	Microscope Centrifuge Reagents Glassware

	5.2 Define clinical specimen	Explain clinical specimen	clips Projectors		clinical specimen	Reagent bottles Weighing balance Water distiller Spatula
	5.3 Explain how to perform routine parasitological examination on clinical specimen	Explain how to perform routine parasitological examination on clinical specimen				
	5.4 Explain the identification of parasites in clinical specimen	Explain the identification of parasites in clinical specimen				
	5.5 List the features for identification of parasites in clinical specimen	Explain the features for identification of parasites in clinical specimen				
GENERAL OBJECTIVE 6.0: Know Medical Entomology						
11-15	6.1 Define Entomology and Medical Entomology	Explain Entomology and Medical Entomology	Textbooks Internet Journals Video clips	Identify Insects causing ill health	Guide students to: Identify Insects causing ill health	Magnifying Lens Sweep net Bottles Trap nets

	<p>6.2 Explain the history of Medical Entomology</p> <p>6.3 Explain the importance of Medical Entomology</p> <p>6.4 List insects causing ill health</p>	<p>Explain the history of Medical Entomology</p> <p>Explain the importance of Medical Entomology</p> <p>Explain insects causing ill health</p>	Projectors			Petri dish
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EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY MANAGEMENT, ORGANIZATION & ETHICS II	COURSE CODE: MLT 216	CONTACT HOURS: 45
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: I SEMESTER: II	PRE-REQUISITE: 126	PRACTICAL: 1
GOAL: This course is designed to enable students acquire basic knowledge of Laboratory Management, Organization and Ethics		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: <ul style="list-style-type: none"> 1.0 Know Organogram of Medical Laboratory services 2.0 Know Standard Operating Procedures (SOPs) in Medical Laboratory Practice 3.0 Understand Occupational Health and Safety 4.0 Understand Medical Laboratory Hazard, Waste, Biosafety and Biosecurity 5.0 Know Medical Laboratory Clients, Services and Satisfaction 6.0 Know Storage of Samples and Reagents 7.0 Understand International Standard Organization and Accreditation Bodies 8.0 Understand the challenges of Medical Laboratory Practice in Nigeria 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO MEDICAL LABORATORY MANAGEMENT, ORGANIZATION & ETHICS II		COURSE CODE: MLT 216		CONTACT HOURS: 45		
YEAR: II SEMESTER: I		CREDIT UNIT: 3		THEORETICAL: 2		
		PRE-REQUISITE: 126		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to enable students gain knowledge of Management, Organization and Ethics during practice in medical laboratory practice						
GENERAL OBJECTIVE 1.0: Know Organogram of Medical Laboratory Department						
THEORETICAL CONTENT			PRACTICAL CONTENT			
Week	Specific Learning Outcome	Week	Specific Learning Outcome	Week	Specific Learning Outcome	Week
1-2	1.1 Explain the hierarchy and organizational structure of medical laboratory department 1.2 Explain the role of Medical Laboratory Technician in a medical laboratory department	Explain the hierarchy and organizational structure of medical laboratory department Explain the role of Medical Laboratory Technician in a medical	Multimedia Projector, Screen, Internet Textbooks Computer Journals	Appreciate the organogram of the Medical Laboratory Department	Guide students to: Appreciate the organogram of the Medical Laboratory Department	Organogram

		laboratory department				
GENERAL OBJECTIVE 2.0: Know Standard Operating Procedures (SOPs) in Medical Laboratory Practice						
3-4	<p>2.1 Explain Standard Operating Procedures (SOPs) in Medical Laboratory Practice</p> <p>2.2 Explain types of SOPs in Medical Laboratory Practice</p> <ul style="list-style-type: none"> • Management SOPs • Testing SOPs <p>2.3 Explain the development of SOPs</p> <p>2.4 Explain the storage of SOPs</p> <p>2.5 Explain Job Aids in Medical Laboratory Practice</p>	<p>Explain Standard Operating Procedures (SOPs) in Medical Laboratory Practice</p> <p>Explain types of SOPs in Medical Laboratory Practice</p> <ul style="list-style-type: none"> • Management SOPs • Testing SOPs <p>Explain the development of SOPs</p>	<p>Multimedia Projector Screen, Internet Textbooks Computer Journals</p>	<p>Develop hypothetical SOPs</p> <p>Develop hypothetical Job Aids</p> <p>Compare SOPs and Job Aids</p>	<p>Guide students to:</p> <p>Develop hypothetical SOPs</p> <p>Develop hypothetical Job Aids</p> <p>Compare SOPs and Job Aids</p>	<p>Sample SOPs</p> <p>Sample Job Aids</p>

	2.6 Explain the difference between SOPs and Job Aids	<p>Explain the storage of SOPs</p> <p>Explain Job Aids in Medical Laboratory Practice</p> <p>Explain the difference between SOPs and Job Aids</p>				
GENERAL OBJECTIVE 3.0: Understand Occupational Health and Safety						
5-6	<p>3.1 Define Occupational health and safety in Medical Laboratory Practice</p> <p>3.2 Explain importance of Occupational health and safety in Medical Laboratory</p>	<p>Explain Occupational health and safety in Medical Laboratory Practice</p> <p>Explain importance of Occupational health and safety</p>	<p>Multimedia Projector Screen, Internet Textbooks Computer Journals</p>			

	Practice	in Medical Laboratory Practice				
GENERAL OBJECTIVE 4.0: Understand Medical Laboratory Hazard, Waste, Biosafety and Biosecurity						
7-8	4.1 Explain Medical Laboratory Hazards 4.2 Explain Medical Laboratory Biosafety and Biosecurity 4.3 Explain Medical Laboratory waste 4.4 Explain segregation and disposal of medical laboratory hazardous waste	Explain Medical Laboratory Hazards Explain Medical Laboratory Biosafety and Biosecurity Explain Medical Laboratory waste Explain segregation and disposal of medical laboratory hazardous waste	Multimedia Projector Screen, Internet Textbooks Computer Journals	Segregate Medical Laboratory waste Dispose Medical Laboratory waste appropriately	Guide students to: Segregate Medical Laboratory waste Dispose Medical Laboratory waste appropriately	Safety Box Colour code Waste Bins Model Incinerator Autoclave PPEs
GENERAL OBJECTIVE 5.0: Know Medical Laboratory Services, Clients and Satisfaction						
9-10	5.1 Explain Medical Laboratory Service 5.2 Explain Medical	Explain Medical Laboratory Service	Multimedia Projector Screen, Internet			

	Laboratory Clientele 5.3 Explain Medical Laboratory Client's services and satisfaction	Explain Medical Laboratory Clientele Explain Medical Laboratory Client's services and satisfaction	Textbooks Computer Journals			
GENERAL OBJECTIVE 6.0: Know Storage of Samples and Reagents						
11-12	6.1 Define Store and Storage 6.2 Define storage of samples and reagents 6.3 Explain methods of storage of samples and reagents 6.4 Explain storage facilities in Medical Laboratory Practice 6.5 Explain	Explain Store and Storage Explain storage of samples and reagents Explain methods of storage of samples and reagents Explain storage	Multimedia Projector Screen, Internet Textbooks Computer Journals	Identify methods of storage of samples and reagents Identify Storage Facilities in Medical Laboratory Practice Complete Inventory documents	Guide students to: Identify methods of storage of samples and reagents Identify Storage Facilities in Medical Laboratory Practice Complete Inventory	Sample storage documents Storage Facilities

	<p>inventory management techniques in Medical Laboratory Practice</p> <ul style="list-style-type: none"> •FIFO •FEFO <p>6.6 Explain inventory documentation in medical laboratory practice</p>	<p>facilities in Medical Laboratory Practice</p> <p>Explain inventory management techniques in Medical Laboratory Practice</p> <ul style="list-style-type: none"> •FIFO •FEFO 			documents	
GENERAL OBJECTIVE 7.0: Understand International Standard Organization and Accreditation Bodies						
13	<p>7.1 Explain the specific roles of various stakeholders:</p> <ul style="list-style-type: none"> •Federal and States MOH •MLSCN •SON •ISO •IFBLS •WHO 	<p>Explain the specific roles of various stakeholders:</p> <ul style="list-style-type: none"> •Federal and States MOH •MLSCN •SON •ISO •IFBLS 	<p>Multimedia Projector Screen, Internet Textbooks Computer Journals</p>			

	7.2 Explain accreditation check list in Medical Laboratory Practice	<ul style="list-style-type: none"> • WHO Explain accreditation check list in Medical Laboratory Practice				
GENERAL OBJECTIVE 8.0: Understand the challenges of Medical Laboratory Practice in Nigeria						
14-15	8.1 Explain the challenges associated with medical laboratory Practice in Nigeria	Explain the challenges associated with medical laboratory Practice in Nigeria	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Identify the challenges associated with medical laboratory Practice in Nigeria	Guide students to: Identify the challenges associated with medical laboratory Practice in Nigeria	

EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: RESEARCH METHODODOLOGY IN LABORATORY TECHNOLOGY	COURSE CODE: MLT 217	CONTACT HOURS: 2
	CREDIT UNITS: 2	THEORETICAL: 2
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: NIL
GOAL: This course is designed to equip students with knowledge of research skills to present research outcomes logically.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Understand the concept of research		
2.0 Know the design and planning of the research		
3.0 Understand sampling techniques		
4.0 Know the use of statistics in research		
5.0 Understand the conduct and presentation of research results		
6.0 Know the layout of a research report		

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE:		RESEARCH	COURSE CODE: MLT 217	CONTACT HOURS: 2		
METHODODOLOGY IN		MEDICAL	CREDIT UNIT: 2	THEORETICAL: 2		
LABORATORY SCIENCE			PRE-REQUISITE:	PRACTICAL: NIL		
YEAR: II SEMESTER: I						
COURSE SPECIFICATION: THEORETICAL						
GOAL: This course is designed to equip students with knowledge of research skills to present research outcomes logically.						
GENERAL OBJECTIVE 1.0: Understand the concept of research						
THEORETICAL CONTENT			PRACTICAL CONTENT			
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define research. 1.2 Explain the types of research: <ul style="list-style-type: none"> • Historical • Descriptive • Analytical • Experimental e.t.c 1.3 Explain the aims of research. 1.4 Define research.	Explain research. Explain the types of research: <ul style="list-style-type: none"> • Historical • Descriptive • Analytical • Experimental e.t.c Explain the aims of research.	<ul style="list-style-type: none"> • Textbooks. • Whiteboard/Marker • Multimedia projector/Laptops. • Internet. • Lecture notes. • Charts. 			

	<p>methodology.</p> <p>1.5 Explain the methods of conducting research:</p> <ul style="list-style-type: none"> • Experimental <p>1.6 Explain how to identify a field of research</p> <p>1.7 Explain how to formulate a research title.</p> <p>1.8 Describe the sources of relevant Information in the research field</p> <ul style="list-style-type: none"> • Museums • Markets • Hospitals • libraries • Internet, etc. <p>1.9 Explain index card system for</p>	<p>Explain research methodology.</p> <p>Explain the methods of conducting research:</p> <ul style="list-style-type: none"> • Experimental <p>Explain how to identify a field of research</p> <p>Explain how to formulate a research title.</p> <p>Explain the sources of relevant Information in the research field</p> <ul style="list-style-type: none"> • Museums • Markets • Hospitals • libraries 				
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	<p>research title</p> <p>1.10 Explain how to review related literature on the subject matter of research</p>	<ul style="list-style-type: none"> • Internet, etc. <p>Explain index card system for research title</p> <p>Explain how to review related literature on the subject matter of research</p>				
GENERAL OBJECTIVE 2.0: Know the design and planning of research						
4-5	<p>2.1 Explain research design.</p> <p>2.2 Explain methods applied in research design e.g.</p> <ul style="list-style-type: none"> • Intervention • non-intervention studies, • questionnaire, • interview, • home visits • observation 	<p>Explain research design.</p> <p>Explain methods applied in research design e.g.</p> <ul style="list-style-type: none"> • Intervention • non-intervention studies, • questionnaire, • interview, • home visits • observation 	<ul style="list-style-type: none"> • Journals. • Whiteboard/Marker. • Multimedia projector/laptops. • Internet. • Lecture notes. • Charts. 			

	e.t.c. 2.3 Explain the merits and demerits of various research designs. 2.4 Explain how to identify the methods most appropriate to your research (project).	e.t.c. Explain the merits and demerits of various research designs. Explain how to identify the methods most appropriate to your research (project).				
GENERAL OBJECTIVE 3.0: Understand sampling techniques						
6-7	3.1 Define sampling 3.2 Explain types of sampling techniques: • Simple random • Stratified etc. 3.3 Explain the merits and demerits of each sampling	Explain sampling Explain types of sampling techniques: • Simple random • Stratified etc. Explain the merits and demerits of each sampling technique in 3.2.	<ul style="list-style-type: none"> • Journals. • Whiteboard/marker. • Multimedia projector/laptops. • Internet. • Lecture notes. • Charts. 			

	technique in 3.2. 3.4 Explain how to calculate the sample size or population appropriate to your research.	Explain how to calculate the sample size or population appropriate to your research.				
GENERAL OBJECTIVE 4.0: Know the use of statistics in research						
8-9	4.1 Define basic statistics 4.2 Explain basic statistical tests. 4.3 Explain the characteristics of each of the tests in 4.2. 4.4 Explain the suitability of each of the tests in 4.2.	Explain basic statistics Explain basic statistical tests. Explain the characteristics of each of the tests in 4.2. Explain the suitability of each of the tests in 4.2.	<ul style="list-style-type: none"> • Journals. • Whiteboard/Marker. • Multimedia projector/Laptops. • Internet. • Lecture notes. • Charts 			
GENERAL OBJECTIVE 5.0: Understand the conduct and presentation of research results						
10-12	5.1 Explain how to carry out the research	Explain how to carry out the research experiment using	<ul style="list-style-type: none"> • Journals • Whiteboard/Marker 			

	<p>experiment using any research design</p> <p>5.2 Explain how to collect data for the experiment in 5.1</p> <p>5.3 Explain how to analyze the data using appropriate methods</p> <p>5.4 Explain how to interpret the results obtained from the research</p> <p>5.5 Explain how to write up the report of the research conducted</p>	<p>any research design</p> <p>Explain how to collect data for the experiment in 5.1</p> <p>Explain how to analyze the data using appropriate methods</p> <p>Explain how to interpret the results obtained from the research</p> <p>Explain how to write up the report of the research conducted</p>	<ul style="list-style-type: none"> • Multimedia projector/laptops • Internet • Lecture notes • Charts 			
GENERAL OBJECTIVE 6.0: Know the layout of a research report						
13-15	<p>6.1 Define research report layout</p> <p>6.2 List research report layout</p>	<p>Explain the research report layout</p>	<ul style="list-style-type: none"> • Journals. • Whiteboard/Marker. • Multimedia. 			

			<ul style="list-style-type: none">• projector/laptops.• Internet.• Lecture notes.• Charts.			
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EVALUATION: CA 30%
EXAMINATION 70%

NATIONAL BOARD FOR TECHNICAL EDUCATION

YEAR II SEMESTER II

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY			
COURSE TITLE:	MEDICAL	COURSE CODE: MLT 221	CONTACT HOURS: 45
MICROBIOLOGY II		CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II	SEMESTER: II	PRE-REQUISITE: MLT 211	PRACTICAL: 1
GOAL: To provide students with basic knowledge and skills in Medical Microbiology			
GENERAL OBJECTIVE: at the end of this course the student should be able to:			
1.0 Know the historical development Mycology			
2.0: Understand Culture Media used for Fungi Identification			
3.0: Understand Immunity to fungal infection			
4.0: Understand Antigen-Antibody Reactions			
5.0: Understand the principles and techniques of serological tests in medical microbiology			
6.0 Understand the quality control in medical microbiology			

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY							
COURSE TITLE:		MEDICAL MICROBIOLOGY II		COURSE CODE: MLT 221		CONTACT HOURS: 45	
YEAR: II SEMESTER: II		PRE-REQUISITE: MLT 211		CREDIT UNIT: 3		THEORETICAL: 2	
				PRACTICAL: 1			
THEORETICAL CONTENT				PRACTICAL CONTENT			
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources	
1-2	1.1 Define mycology 1.2 Explain historical development of mycology 1.3 Explain Classification of fungi base on; <ul style="list-style-type: none"> •Morphology •Life cycle •Production of spore 	Define mycology Explain historical development of mycology Explain Classification of fungi base on; <ul style="list-style-type: none"> •Morphology •Life cycle •Production of spore 	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals				

	<ul style="list-style-type: none"> •Nutrition <p>1.4 Explain the Morphology of fungi</p> <p>1.5 Explain the general characteristics of medically important fungi</p>	<ul style="list-style-type: none"> •Nutrition <p>Explain the Morphology of fungi</p> <p>Explain the general characteristics of medically important fungi</p>				
GENERAL OBJECTIVE 2.0: Understand Culture Media used for Fungi Identification						
3-4	<p>2.1. List culture media for the identification of fungi</p> <p>2.2 Explain the types of culture media for fungi identification</p> <ul style="list-style-type: none"> •Sabouraud Dextrose Agar (SDA) •Potato Dextrose Agar 	<p>Explain culture media for the identification of fungi</p> <p>Explain the types of culture media for fungi identification</p> <ul style="list-style-type: none"> •Sabouraud Dextrose Agar (SDA) •Potato Dextrose 	<p>Multimedia Projector Screen Internet Textbooks Computer Flip charts Journals Glass wares</p>	<p>Prepare culture media for fungal specimen</p>	<p>Guide student to Prepare culture media for fungal specimen</p>	<p>Microscope Reagents Centrifuge Incubator Culture media Autoclave Weighing balance Petri dishes Hot air Oven Boiling water bath Glasswares Slides Wire loops</p>

	(PDA) •Brain Heart Infusion Agar (BHIA) •Corn meal Agar (CMA) 3.3 Explain the preparation for fungi culture media	Agar (PDA) •Brain Heart Infusion Agar (BHIA) •Corn meal Agar (CMA) Explain the preparation for fungi culture media				Spatula
GENERAL OBJECTIVE 3.0: Understand Immunity to fungal infection						
5-6	3.1 Define Immunity 3.2 Explain different types of immunity; Innate and acquired immunity 3.3 Differentiate between 3.2	Define Immunity Explain different types of immunity; Innate and acquired immunity Differentiate between 3.2	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			
GENERAL OBJECTIVE 4.0: Understand Antigen-Antibody Reactions						
7-8	4. 1 Define Antigen-Antibody reactions	Explain Antigen-Antibody reactions	Multimedia Projector			

	<p>4.2 List types of Antigen-Antibody reactions</p> <p>4.3 Explain the properties of Antigen-Antibody reactions</p> <p>4.4 Explain Principle and application of;</p> <ul style="list-style-type: none"> • Agglutination • Precipitation • Flocculation reaction 	<p>List types of Antigen-Antibody reactions</p> <p>Explain the properties of Antigen-Antibody reactions</p> <p>Explain Principle and application of;</p> <ul style="list-style-type: none"> • Agglutination • Precipitation • Flocculation reaction 	<p>Screen, Internet Textbooks Computer Flip charts Journals Microscope slides, Specimen slide and stains</p>			
GENERAL OBJECTIVE 5.0; Understand the principles and techniques of serological tests in medical microbiology						
9-12	<p>5.1 Define serological test in medical microbiology</p> <p>5.2 List serological test in medical microbiology</p> <p>5.3 Explain the</p>	<p>Explain serological test in medical microbiology</p> <p>List serological test in medical microbiology</p> <p>Explain the principles</p>	<p>Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals</p>			

	principles and techniques of; <ul style="list-style-type: none"> • Widal • VDRL • Latex agglutination 	and techniques of; <ul style="list-style-type: none"> • Widal • VDRL • Latex agglutination 				
GENERAL OBJECTIVE 6.0: Understand the quality control in medical microbiology						
13-15	6.1 Define Quality control 6.2 Explain quality control in medical microbiology 6.3 Explain types of quality control in medical microbiology 6.3 Explain merits and demerits of quality control in medical microbiology	Explain Quality control Explain quality control in medical microbiology Explain types of quality control in medical microbiology Explain merits and demerits of quality control in medical microbiology	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

EVALUATION: CA 40%
EXAMINATION 60%

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: HISTOPATHOLOGY AND CYTOLOGY II	COURSE CODE: MLT 222	CONTACT HOURS: 3
	CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II SEMESTER: II	PRE-REQUISITE: MLT 212	PRACTICAL: 1
GOAL: This course is designed to provide students with the knowledge and skills of Histopathology and Cytology.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0. Know staining technique in Histopathology		
2.0. Know staining techniques in Cytology		
3.0. Understand museum techniques in Histopathology.		

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PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: HISTOPATHOLOGY AND CYTOLOGY II		COURSE CODE: MLT 222		CONTACT HOURS: 3		
		CREDIT UNIT: 3		THEORETICAL: 2		
YEAR: II SEMESTER: II		PRE-REQUISITE: MLT 212		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the knowledge and skills of histopathology and Cytology.						
GENERAL OBJECTIVE 1.0: Know staining technique in Histopathology.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-5	1.1 Define Stain and Staining in Histopathology and Cytology 1.2 List Histological Staining Techniques 1.3 Explain Histological Staining Techniques 1.4 Explain the principles, uses, merits and	Explain Stain and Staining in Histopathology and Cytology Explain Histological Staining Techniques Explain Histological Staining Techniques Explain the principles, uses, merits and demerits of each staining techniques in	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals Glass wares	Identify Staining Apparatus. Perform: <ul style="list-style-type: none"> • H and E staining. • PAS staining • Masson's Trichrome Staining. • Perl's Prussian blue 	Guide students to: Identify Staining Apparatus. Perform: <ul style="list-style-type: none"> • H and E staining. • PAS staining • Masson's Trichrome Staining. • Perl's Prussian 	Stains Tissue slides Staining racks Reagents Video clips Slide racks

<p>demerits of each staining techniques in 1.2</p> <p>1.5 List the procedures for each staining Techniques in Histopathology</p> <p>1.6 Explain the procedures for each staining Techniques in Histopathology</p> <p>1.7 Define:</p> <ul style="list-style-type: none"> • Deparaffinization • Hydration. • Differentiation • Blueing. • Counterstaining • Dehydration. • Creasing. 	<p>Explain the procedures for each staining Techniques in Histopathology</p> <p>Explain the procedures for each staining Techniques in Histopathology</p> <p>Explain:</p> <ul style="list-style-type: none"> • Deparaffinization • Hydration. • Differentiation • Blueing. • Counterstaining • Dehydration. • Creasing. • Solvents. 		<p>staining.</p> <ul style="list-style-type: none"> • Oil Red 'O' • Von Gieson's staining 	<p>blue staining.</p> <ul style="list-style-type: none"> • Oil Red 'O' • Von Gieson's staining 	
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	<ul style="list-style-type: none"> • Solvents. • Mordants. <p>1.8 Explain Mounting and Mountants</p>	<ul style="list-style-type: none"> • Mordants. <p>Explain Mounting and Mountants</p>				
GENERAL OBJECTIVE 2.0: Know staining techniques in Cytology						
6-10	<p>2.1 List staining techniques in cytology</p> <p>2.2 Explain staining techniques in cytology</p> <p>2.3 Explain the principles, uses, merits and demerits of each staining techniques in 2.1</p> <p>2.4 List the procedures for each staining Techniques in cytology</p> <p>2.5 Explain the procedures for each staining Techniques in</p>	<p>Explain staining techniques in cytology</p> <p>Explain staining techniques in cytology</p> <p>Explain the principles, uses, merits and demerits of each staining techniques in 2.1</p> <p>Explain the procedures for each staining Techniques in cytology</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p> <p>Glass wares</p>	<p>Identify simple stains</p> <p>Perform:</p> <ul style="list-style-type: none"> • Gram's staining • Ziehl Nelson staining • Giemsa staining • Papanicolaou staining <p>Wright staining</p>	<p>Guide students to:</p> <p>Identify simple stains</p> <p>Perform:</p> <ul style="list-style-type: none"> • Gram's staining • Ziehl Nelson staining • Giemsa staining • Papanicolaou staining <p>Wright staining</p>	<p>Stains</p> <p>Tissue slides</p> <p>Staining racks</p> <p>Reagents</p> <p>Video clips</p> <p>Slide racks</p>

	cytology					
GENERAL OBJECTIVE 3.0: Understand Museum Technique in Histopathology						
11-15	<p>3.1. Define Museum</p> <p>3.2 Explain Histopathology Museum.</p> <p>3.3. Explain the Historical development of Histopathology Museum</p> <p>3.4. List the types of specimens typically found in histopathology museums.</p> <p>3.5 List the chemicals for Preservation of tissues for the Museum.</p> <p>3.6 Explain mounting and</p>	<p>Explain Museum</p> <p>Explain Histopathology Museum.</p> <p>Explain the Historical development of Histopathology Museum</p> <p>Explain the types of specimens typically found in histopathology museums.</p> <p>Explain the chemicals for Preservation of tissues for the Museum.</p> <p>Explain mounting and preservation of Slides</p> <p>Explain storage and preservation techniques in</p>	<p>Multimedia</p> <p>Projector</p> <p>Screen,</p> <p>Internet</p> <p>Textbooks</p> <p>Computer</p> <p>Flip charts</p> <p>Journals</p> <p>Glass wares</p>			

	<p>preservation of Slides</p> <p>3.7. Explain storage and preservation techniques in Histopathology Museums.</p> <p>3.8. Explain Cataloging and Documentation.</p> <p>3.9. Explain the role of digital Technology in Histopathology Museums.</p> <p>3.10. Explain Maintenance and Management of Histopathology Museums.</p>	<p>Histopathology Museums.</p> <p>Explain Cataloging and Documentation.</p> <p>Explain the role of digital Technology in Histopathology Museums.</p> <p>Explain Maintenance and Management of Histopathology Museums.</p>				
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EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: HEAMATOLOGY AND BLOOD GROUP SEROLOGY II	COURSE CODE: MLT 223	CONTACT HOURS: 3
	CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II SEMESTER: II	PRE-REQUISITE: MLT 213	PRACTICAL: 1
GOAL: This course is designed to provide students with the basic knowledge and skills in Haematology and Blood Group Serology		
GENERAL OBJECTIVES: On completion of this course, the students should be able to:		
1.0 Know Basic Haematological Techniques		
2.0 Understand Anaemia		
3.0 Understand Staining Techniques in Haematology		
4.0 Know Basic Serological Techniques		
5.0 Understand Blood Transfusion Science		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: HEAMATOLOGY AND BLOOD GROUP SEROLOGY II			COURSE CODE: MLT 223	CONTACT HOURS: 3		
YEAR: II SEMESTER: II			CREDIT UNIT: 3	THEORETICAL: 2		
			PRE-REQUISITE: MLT 213	PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GENERAL OBJECTIVE 1.0: Know Basic Haematological Techniques						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1. Explain Haematological Technique 1.2. List Basic Techniques in Haematology 1.3. Explain Erythrocyte sedimentation rate (ESR) 1.4. Explain Packed Cell Volume	Explain Haematological Technique Explain Basic Techniques in Haematology Explain Erythrocyte sedimentation rate (ESR) Explain Packed Cell Volume (PCV).	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Perform: <ul style="list-style-type: none"> • ESR • PCV • WBC Count • RBC Count Prepare blood films Perform Haemoglobin Estimation using	Guide students to: Perform: <ul style="list-style-type: none"> • ESR • PCV • WBC Count • RBC Count Prepare blood films Perform Haemoglobin	Slides Cover slip Blood sample syringe and needle EDTA bottles Capillary tube Cotton wool Western green tubes and rack Haematocrit Centrifuge and reader Neubauer Counting chamber

	(PCV). 1.5 Explain Full Blood Count. 1.7. Explain Bood Film Making 1.8 Explain Haemoglobin Estimation. 1.9. List the different methods of Hb estimation 1.10. Explain Sickling Test.	Explain Full Blood Count. Explain Bood Film Making Explain Haemoglobin Estimation. List the different methods of Hb estimation Explain Sickling Test.		Drabkins Solution	Estimation using Drabkins Solution	Sahli pipet Reagents Microscope
GENERAL OBJECTIVE 2.0: Understand Anaemia						
4-6	2.1 Define Anaemia 2.2. List the classification	Explain Anaemia Explain the classification of	Multimedia Projector Screen, Internet Textbooks			

	of anaemia. 2.3 Explain: •Reference range. •Absolute values. 2.4. Explain Haematological Indexes.	anaemia. Explain the following terms. Reference range. Absolute values. Explain Haematological Indexes	Computer Flip charts Journals			
GENERAL OBJECTIVE 3.0: Understand Staining Techniques in Haematology						
7-9	3.1 Define Staining in Haematology 3.2 List Staining Techniques in Haematology 3.3 Explain the principles and use of each Staining Technique in Haematology	Explain Staining in Haematology Explain Staining Techniques in Haematology Explain the principles and use of each Staining Technique in Haematology Explain merits	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Perform Staining techniques on blood film.	Guide students to: Perform Staining techniques on blood film	Blood sample Reagents PPE

	3.4 Explain merits and demerits of each staining technique in haematology 3.5 List haematological stains	and demerits of each staining technique in haematology Explain haematological stains				
GENERAL OBJECTIVE 4.0: Know Basic Serological Techniques						
10-12	4.1 Define ABO Blood Grouping System. 4.2. Explain ABO Blood Grouping System. 4.3. Explain the formation of ABO antigens.	Explain ABO Blood Grouping System. Explain the principle of ABO blood grouping. Explain the formation of ABO antigens. Explain the	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals	Perform: <ul style="list-style-type: none"> • Direct blood grouping • Indirect blood grouping. • Rh blood grouping 	Guide students to Perform: <ul style="list-style-type: none"> • Direct blood grouping • Indirect blood grouping. • Rh blood grouping 	Syringe and needle Blood collection tube Hand Gloves Alcohol swab Antisera A,B, AB and D Whole Blood sample. Stop watch Tile Micro titration plate Test Tubes

	<p>4.4. Explain the principle of ABO blood grouping.</p> <p>4.5. List types of ABO blood grouping.</p> <p>4.6 Define Rhesus Blood Grouping System.</p> <p>4.7 Explain Rhesus Blood Grouping System.</p> <p>4.8. Explain the clinical implications of ABO and Rh blood grouping.</p>	<p>principle of ABO blood grouping.</p> <p>List types of ABO blood grouping.</p> <p>Explain Rhesus Blood Grouping System.</p> <p>Explain the clinical implications of ABO and Rh blood grouping.</p> <p>Explain the challenges of ABO and Rh Grouping Systems.</p>				
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	4.9. Explain the challenges of ABO and Rh Grouping Systems.					
GENERAL OBJECTIVE 5.0: Understand Blood Transfusion Science.						
13-15	5.1. Define Blood Transfusion Science. 5.2. Explain Blood Transfusion Science. 5.3. Explain the History of Blood Banking. 5.4. List blood donation criteria. 5.5. Explain	Explain Blood Transfusion Science. Explain the History of Blood Banking. Explain blood donation criteria. Explain types of blood donation Explain anticoagulants used in blood banking.	Multimedia Projector Screen, Internet Textbooks Computer Flip charts Journals			

	<p>blood donation criteria.</p> <p>5.6. List types of blood donation</p> <p>5.7. List anticoagulants used in blood banking.</p> <p>5.8. Explain Blood collection and storage for transfusion.</p>	<p>Explain Blood collection and storage for transfusion.</p> <p>Explain Anticoagulants used in blood banking.</p>				
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EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: CHEMICAL PATHOLOGY II	COURSE CODE: MLT 224	CONTACT HOURS: 3
	CREDIT UNITS: 3	THEORETICAL: 2
YEAR: II SEMESTER: II	PRE-REQUISITE: MLT 214	PRACTICAL: 1
GOAL: This course is designed to provide students with the basic knowledge and skill in Chemical Pathology		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the concept of metabolism of glucose 2.0 Know Plasma proteins and their methods of estimation. 3.0 Understand Cholesterol and its methods of estimation 4.0 Know the electrolytes and trace elements 5.0 Understand Formation of Bilirubin and its methods of estimation. 6.0 Know the Functions of kidney and Renal Function Tests 7.0 Know the Basic Functions of selected enzymes and their methods of estimation 8.0 Know the basic Quality Control in Chemical Pathology		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: CHEMICAL PATHOLOGY II		COURSE CODE: MLT 224		CONTACT HOURS: 3		
		CREDIT UNIT: 3		THEORETICAL: 2		
YEAR: II SEMESTER: II		PRE-REQUISITE: MLT 214		PRACTICAL: 1		
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge and skill in Chemical Pathology						
GENERAL OBJECTIVE 1.0: Know the concept of metabolism of glucose						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Explain metabolism of glucose 1.2 Define renal threshold of glucose 1.3 List Methods for the estimation of blood glucose 1.4 Discuss the Principles, merits and demerits of each method for Blood Glucose estimation	Explain metabolism of glucose Explain renal threshold of glucose Describe Methods for the estimation of blood glucose Explain the Principles, merits and demerits of each method for Blood Glucose estimation	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia Player Whiteboard	Perform blood glucose estimation and glucose tolerance test	Guide students to Perform blood glucose estimation and glucose tolerance test	Specimen, reagents, Colorimeter, Spectrophotometer, Centrifuge PH Meter Water Bath

	1.5 Explain glucose tolerance test 1.6 Discuss the clinical importance of blood glucose estimation and glucose tolerance test	Explain glucose tolerance test Explain the clinical importance of blood glucose estimation and glucose tolerance test	/Marker			
GENERAL OBJECTIVE 2.0: Know Plasma proteins and their methods of estimation.						
3-4	2.1 Define Plasma proteins 2.2 List the functions of Plasma proteins 2.3 List methods of estimation of Total Protein and Albumin 2.4 Discuss the principles, merits and demerits of each method for estimation of Total Protein	Explain Plasma proteins Explain the functions of Plasma proteins Explain methods of estimation of Total Protein and Albumin Explain the principles, merits and demerits of each method for estimation of Total Protein	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia Player Whiteboard /Marker	Perform serum Total Protein estimation Perform serum Albumin estimation	Guide students to: Perform serum Total Protein estimation Perform serum Albumin estimation	Specimen, reagents, Colorimeter, Spectrophotometer, Centrifuge PH Meter Water Bath

	2.5 Discuss the principles, merits and demerits of each method for estimation of Albumin	Explain the principles, merits and demerits of each method for estimation of Albumin				
	2.6 State reference values and clinical importance of Total Protein and Albumin estimation	Explain reference values and clinical importance of Total Protein and Albumin estimation				
GENERAL OBJECTIVE 3.0: Understand Cholesterol and its methods of estimation						
5-6	3.1 Define cholesterol.	Explain cholesterol	Lecture notes	Perform serum cholesterol estimation	Guide students to Perform serum cholesterol estimation	Specimen, reagents, Colorimeter, Spectrophotometer, Centrifuge
	3.2 List methods of estimation of cholesterol	Explain the methods of estimation of cholesterol	Pictures Charts Books Journals			PH Meter Water Bath
	3.3 Discuss principles, merits and demerits of	Explain the principles, merits and demerits of each method for	Computer Projector			

	each method for estimation of cholesterol	estimation of cholesterol	DVD/Multi media Player			
	3.4 State reference values and clinical importance of cholesterol estimation	Explain the reference values and clinical importance of cholesterol estimation	Whiteboard /Marker			
GENERAL OBJECTIVE 4.0: Know the electrolytes and trace elements						
7-8	4.1 Define electrolytes and trace elements	Explain electrolytes and trace elements	Lecture notes Pictures Charts	Perform electrolytes (Na+, K+ and Cl-) estimation	Guide students to	Specimen, reagents, Colorimeter, Spectrophotometer,
	4.2 List the major electrolytes and trace elements	Explain the functions of the major electrolytes and trace elements	Books Journals	Perform Calcium and Phosphate estimation	Perform electrolytes (Na+, K+ and Cl-) estimation	Centrifuge PH Meter Water Bath
	4.3 List the functions of electrolytes and trace elements	Explain the functions of electrolytes and trace elements	Computer Projector		Perform Calcium and Phosphate estimation	Flame Photometer
	4.3 List methods for estimation of electrolytes and trace elements	Explain methods for estimation of electrolytes and	DVD/Multi media Player Whiteboard			

	4.4 Explain principles, merit and demerits of each method for estimation of electrolytes and trace elements 4.4 State reference values and clinical importance of electrolytes and trace elements	trace elements Explain the principles merit and demerits of each method for estimation of electrolytes and trace elements Explain the reference values and clinical importance of electrolytes and trace elements estimation	✓Marker			
GENERAL OBJECTIVE 5.0: Understand Formation of Bilirubin and its methods of estimation.						
9-10	5.1 Define Bilirubin and Bile pigments 5.2 Explain the Formation of Bilirubin and Bile pigments 5.3 Explain the principles,	Explain Bilirubin and Bile pigments Explain the Formation of Bilirubin and Bile pigments Explain the principles, merit and demerits of each	Lecture notes Pictures Charts Books Journals Computer Projector	Perform serum bilirubin estimation	Guide students to Perform serum bilirubin estimation	Specimen, reagents, Colorimeter, Spectrophotometer, Centrifuge PH Meter Water Bath

	merit and demerits of each method for estimation of bilirubin	method for estimation of bilirubin	DVD/Multimedia Player			
	5.4 State reference values and clinical importance of bilirubin estimation	Explain the reference values and clinical importance of bilirubin estimation	Whiteboard/Marker			
GENERAL OBJECTIVE 6.0: Know the Functions of kidney and Renal Function Tests						
11-12	6.1 Describe the features and functions of the kidneys	Explain the features and functions of the kidneys	Lecture notes Pictures Charts	Perform serum and urine Creatinine, Urea, Uric Acid estimation	Guide students to	Specimen, reagents, Colorimeter, Spectrophotometer,
	6.2 List the Renal Function Tests	Explain the Renal Function Tests	Books Journals	Perform Creatinine clearance and urea clearance estimation	Perform serum and urine Creatinine, Urea, Uric Acid estimation	Centrifuge PH Meter Water Bath
	6.3 Explain principles, merit and demerits of each method for estimation of	Explain the principles, merit and demerits of each method for estimation of serum and urine Creatinine, Urea, Uric Acid.	Computer Projector DVD/Multimedia Player		Perform Creatinine clearance and	

	serum and urine Creatinine, Urea, Uric Acid. 6.4 Explain the principles and procedures for Creatinine clearance and urea clearance	Explain the principles and procedures of methods for estimation of Creatinine clearance and urea clearance.	Whiteboard /Marker		urea clearance estimation	
GENERAL OBJECTIVE 7.0: Know the Basic Functions of selected enzymes and their methods of estimation						
13-14	7.1 Define enzymes 7.2 List the commonly estimated enzymes in Chemical Pathology 7.3 Describe the sources and functions of the enzymes: • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST • ALT	Explain enzymes Explain the commonly estimated enzymes in Chemical Pathology Explain the sources and functions of the enzymes: • Alkaline Phosphatase • Acid Phosphatase, • Amylase	Lecture notes Pictures Charts Books Journals Computer Projector DVD/Multimedia Player	Perform estimation of: • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST • ALT	Guide students to Perform estimation of: • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST • ALT	Specimen, reagents, Colorimeter, Spectrophotometer, Centrifuge PH Meter Water Bath

	<p>7.3 Explain the general principles, procedures and methods for estimation of:</p> <ul style="list-style-type: none"> • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST • ALT <p>7.4 Explain the clinical importance of estimation of:</p> <ul style="list-style-type: none"> • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST • ALT 	<ul style="list-style-type: none"> • AST • ALT <p>Explain the general principles, procedures and methods for estimation of:</p> <ul style="list-style-type: none"> • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST • ALT <p>Explain the clinical importance of estimation of:</p> <ul style="list-style-type: none"> • Alkaline Phosphatase • Acid Phosphatase, • Amylase • AST 	<p>Whiteboard /Marker</p>			
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NATIONAL BOARD FOR TECHNICAL EDUCATION

		• ALT				
GENERAL OBJECTIVE 8.0: Know the basic Quality Control in Chemical Pathology.						
15	8.1 Define Quality Control in Chemical Pathology	Explain Quality Control in Chemical Pathology	Lecture notes Pictures Charts Books Journals	Prepare Quality Control charts (e.g. Levey Jennings chart)	Guide students to Prepare Quality Control charts	Charts Graph sheets Ruler Pencil Quality Control Values
	8.2 List the importance of Quality Control in Chemical Pathology	Explain the importance of Quality Control in Chemical Pathology	Computer Projector			
	8.3 Explain use of Quality Control charts (e.g. Levey Jennings chart) in Chemical Pathology	Explain the use of Quality Control charts (e.g. Levey Jennings chart) in Chemical Pathology	DVD/Multimedia Player Whiteboard/Marker			

EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: MEDICAL PARASITOLOGY AND ENTOMOLOGY II	COURSE CODE: MLT 225	CONTACT HOURS: 3
YEAR: II SEMESTER: II	CREDIT UNIT: 3	THEORETICAL: 2
	PRE-REQUISITE: MLT 215	PRACTICAL: 1
COURSE SPECIFICATION: THEORY AND PRACTICALS		
GOAL: This course is designed to provide students with the basic knowledge and skill of Medical Parasitology and Entomology		
GENERAL OBJECTIVE: On completion of this course, the student should be able to: <ul style="list-style-type: none"> 1.0 Know the basic life cycle of Protozoa and Helminthes 2.0 Know the Laboratory diagnosis of parasitic infections 3.0 Know the methods for the control of parasitic infections 4.0 Know the life cycle of common Insects of Medical Importance 5.0 Understand the methods for the control of arthropods 		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: MEDICAL PARASITOLOGY AND ENTOMOLOGY II				COURSE CODE: MLT 225	CONTACT HOURS: 3	
				CREDIT UNIT: 3	THEORETICAL: 2	
YEAR: II SEMESTER: II				PRE-REQUISITE:	PRACTICAL: 1	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to provide students with the basic knowledge and skill of Medical Parasitology and Entomology						
GENERAL OBJECTIVE 1.0: Know the basic life cycle of Protozoa and Helminthes						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
1-3	1.1 Explain the basic life cycle: <ul style="list-style-type: none"> • Amoeba • Flagellates • Cilliates • Sporozoa 1.2 Explain the basic life cycle of Cestodes <ul style="list-style-type: none"> • Taenia species • Echinococcus species 1.3 Explain the life cycle of Trematodes <ul style="list-style-type: none"> • Schistosoma 	Explain the basic life cycle of <ul style="list-style-type: none"> • Amoeba • Flagellates • Cilliates • Sporozoa Explain the basic life cycle of Cestodes <ul style="list-style-type: none"> • Taenia species • Echinococcus species Explain the life cycle of Trematodes <ul style="list-style-type: none"> • Schistosoma 	Textbooks Whiteboard Marker Multimedia projector Lecture notes			

	species • Lung flukes	species • Lung flukes				
GENERAL OBJECTIVES 2.0: Know the Laboratory diagnosis of parasitic infections						
4-6	<p>2.1 List the reagents for the diagnosis of intestinal parasites</p> <p>2.2 List reagents for the diagnosis of urinary parasites</p> <p>2.3 List the reagents for the diagnosis of haemoparasites</p> <p>2.4 Explain the diagnostic methods for</p> <ul style="list-style-type: none"> • intestinal parasites • Urinary parasites 	<p>Explain the reagents for the diagnosis of intestinal parasites</p> <p>Explain reagents for the diagnosis of urinary parasites</p> <p>Explain the reagents for the diagnosis of haemoparasites</p> <p>Explain the diagnostic methods for</p> <ul style="list-style-type: none"> • intestinal parasites • Urinary parasites • Haemoparasites 	<p>Textbooks</p> <p>Whiteboard</p> <p>Marker</p> <p>Multimedia</p> <p>projector</p> <p>Lecture notes</p>	<p>Identify reagents for the diagnosis of:</p> <ul style="list-style-type: none"> • intestinal parasites • Urinary parasites • Haemoparasites <p>Examine samples for:</p> <ul style="list-style-type: none"> • intestinal parasites • Urinary parasites • Haemoparasites <p>Report results</p>	<p>Guide students to:</p> <p>Identify reagents for the diagnosis of:</p> <ul style="list-style-type: none"> • intestinal parasites • Urinary parasites • Haemoparasites <p>Examine samples for:</p> <ul style="list-style-type: none"> • intestinal parasites • Urinary parasites • Haemoparasites 	<p>Microscope</p> <p>Video clips</p> <p>Atlas</p> <p>Glasswares</p> <p>Centrifuge</p>

	<ul style="list-style-type: none"> • Haemoparasites <p>2.5 Explain the reporting pattern of the examination</p>	Explain the reporting pattern of the examination			Report results	
GENERAL OBJECTIVE 3.0 Know the methods for the control of parasitic infections						
7-9	<p>3.1 Explain the methods for the control of :</p> <ul style="list-style-type: none"> • Intestinal parasites • Urinary parasites • Haemoparasites 	<p>Explain the methods for the control of :</p> <ul style="list-style-type: none"> • Intestinal parasites • Urinary parasites • Haemoparasites 	<p>Textbooks Whiteboard Marker Multimedia projector Lecture notes</p>			
GENERAL OBJECTIVE 4.0 Know the life cycle of common Insects of Medical Importance						
10-12	<p>4.1 Define life cycle in Entomology</p> <p>4.2 Explain the life cycle of insects</p> <p>4.3 Explain vectors</p> <p>4.4 Explain the role of vectors in the</p>	<p>Explain life cycle in Entomology</p> <p>Explain the life cycle of insects</p> <p>Explain vectors</p> <p>Explain the role of vectors in the life cycle of insects</p>	<p>Textbooks Whiteboard Marker Multimedia projector Lecture notes</p>			

	life cycle of insects					
GENERAL OBJECTIVE 5.0 Understand the methods for the control of Arthropods						
13-15	5.1 Explain the methods for the control of Arthropods 5.2 Explain the methods for the control of Insects and Arachnids	Explain the methods for the control of Arthropods Explain the methods for the control of Insects and Arachnids	Textbooks Whiteboard Marker Multimedia projector Lecture notes			

EVALUATION: CA 40%
EXAMINATION 60%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO IMMUNOLOGY AND VIROLOGY	COURSE CODE: MLT 226	CONTACT HOURS: 2
	CREDIT UNIT: 2	THEORETICAL: 2
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: NIL
COURSE SPECIFICATION: THEORETICAL		
GOAL: This course is designed to provide students with the basic knowledge of Immunology and Virology		
GENERAL OBJECTIVE 1.0 Understand the concept of immunity and immunization. 2.0 Understand the nature of the immune system 3.0 Understand the basic structure and classifications of virus of medical importance 4.0 Understand the antigen-antibody and allergic reactions 5.0 Understand the interaction between virus and the host immune system 6.0 Understand the collection, transport and storage of samples for viral studies		

NATIONAL BOARD FOR TECHNICAL EDUCATION

PROGRAMME: NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO IMMUNOLOGY AND VIROLOGY			COURSE CODE: MLT 226		CONTACT HOURS: 2	
YEAR: II SEMESTER: II			CREDIT UNIT: 2		THEORETICAL: 2	
COURSE SPECIFICATION: THEORETICAL			PRE-REQUISITE:		PRACTICAL: NIL	
GOAL: This course is designed to provide students with the basic knowledge of Immunology and Virology						
General Objective 1.0: Understand the concept of immunity and immunization.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Define the following terms: <ul style="list-style-type: none"> • immunology • immunity • immunization 1.2 Explain method of acquiring immunity	Explain the following terms: <ul style="list-style-type: none"> • immunology • immunity • immunization Explain method of acquiring immunity	Multimedia White Board/Maker Board, Projector, Reference books, Posters, Charts, Computer			
	1.3 explain the factors	explain the factors				

	affecting immunity	affecting immunity				
1.4	explain the importance of immunization	explain the importance of immunization				
1.5	Explain the mechanism of infection	Explain the mechanism of infection				
1.6	List common communicable diseases in Nigeria	List common communicable diseases in Nigeria				
1.7	Define: <ul style="list-style-type: none"> • epidemics • endemics • pandemic 	Define: <ul style="list-style-type: none"> • epidemics, • endemics • pandemics, 				
1.8	Explain immunization schedules in	Explain immunization schedules in Nigeria				

NATIONAL BOARD FOR TECHNICAL EDUCATION

	Nigeria					
GENERAL OBJECTIVE 2.0: Understand the nature of the immune system						
3-6	<p>2.1 Define Immune system</p> <p>2.2 list types of immune system</p> <p>2.3 State the components and characteristics of 2.2 above</p> <p>2.4 Define:</p> <ul style="list-style-type: none"> • antigen, • antibody <p>2.5 Describe the basic structure of antibodies.</p> <p>2.6 List the classes of antibodies.</p> <p>2.7 Explain natural and artificial immunity</p>	<p>Explain Immune system</p> <p>list types of immune system</p> <p>State the components and characteristics of 2.2 above</p> <p>Explain:</p> <ul style="list-style-type: none"> • antigen, • antibody <p>Describe the basic structure of antibodies.</p> <p>List the classes of antibodies.</p>	<p>Multimedia</p> <p>White Board/Maker Board, Projector, Reference books, Posters, Charts, Computer</p>			

		Explain natural and artificial immunity				
GENERAL OBJECTIVE 3.0: Understand the basic structure and classifications of virus of medical importance						
7-9	3.1 Define virus	Explain virus	Multimedia			
	3.2 List Virus of medical importance	Discuss Virus of medical importance	White Board/Maker Board, Projector, Reference books, Posters, Charts, Computer			
	3.3 Explain the impact of viruses on human health.	Explain the impact of viruses on human health.				
	3.4 Describe Basic structure of a virus	Describe Basic structure of a virus				
	3.5 list the classification of viruses	list the classification of viruses				
GENERAL OBJECTIVE 4.0: Understand the antigen-antibody and allergic reactions						
10-11	4.1 Explain antigen – antibody reactions	Explain antigen – antibody reactions	Multimedia			
	4.2 Explain allergic reactions	Explain allergic reactions	White Board/Maker Board, Projector, Reference books,			
	4.3 Describe factors	Describe factors				

	affecting antigen-antibody reactions	affecting antigen-antibody reactions	Posters, Charts, Computer			
GENERAL OBJECTIVE 5.0: Understand the interaction between virus and the host immune system						
12-13	<p>5.1 Explain the mechanism of viral entry and spread within the host</p> <p>5.2. Explain host immune response to viral infection</p> <p>5.3. Explain immune invasion strategies by virus</p> <p>5.4 List techniques for virus detection:</p> <ul style="list-style-type: none"> • microscopy, • culture, • serology • molecular methods 	<p>Explain the mechanism of viral entry and spread within the host</p> <p>Explain host immune response to viral infection</p> <p>Explain immune invasion strategies by virus</p> <p>Explain techniques for virus detection:</p> <ul style="list-style-type: none"> • microscopy, • culture, • serology • molecular methods 				

GENERAL OBJECTIVE 6.0: Understand the collection, transport and storage of samples for viral studies						
14-15	6.1 Explain collection of viral samples	Explain collection of viral samples				
	6.2 Explain transportation methods of viral samples	Explain transportation methods of viral samples				
	6.3 Explain the storage of viral samples	Explain the storage of viral samples				
	6.4 Explain the challenges of collection transportation and storage of viral samples	Explain the challenges of collection transportation and storage of viral samples				

EVALUATION: CA 30%
EXAMINATION 70%

NATIONAL BOARD FOR TECHNICAL EDUCATION

PRACTICAL MANUAL FOR NATIONAL DIPLOMA (ND) MEDICAL LABORATORY TECHNOLOGY

COURSE	PRACTICAL CONTENTS
Introduction to Medical Laboratory Information Management System (MLIMS) MLT 124	<ul style="list-style-type: none"> • Identify Data in Medical Laboratory • Identify sources of Data in Medical Laboratory • Identify Medical Laboratory registers • Make entry into the Medical Laboratory Registers • Identify data storage methods • Identify Data retrieval Methods • Store Data • Retrieve Data • Archive Data • Identify Document and Records in Medical Laboratory • Classify Medical Laboratory Documents • Classify Medical Laboratory Records • Fill Documents • Manage Records
Medical Laboratory Techniques MLT 125	<ul style="list-style-type: none"> • Identify the types of medical laboratory techniques • Use PPE appropriately • Demonstrate basic medical laboratory safety measures. • Apply basic rules and regulations in medical laboratory practice

	<ul style="list-style-type: none"> • Perform Medical Laboratory tests using the following techniques: <ul style="list-style-type: none"> - Medical Microbiology - Chemical pathology - Haematology - Histopathology • Identify Simple laboratory wares, equipment and their uses in medical laboratory • Perform: <ul style="list-style-type: none"> - Venipuncture - Capillary puncture - Arterial • Identify materials for Phlebotomy • Perform Specimen collection and processing • Perform Macro/ Microscopic examination of specimen • Perform Culture and sensitivity techniques • Perform Specimen collection and processing in Chemical Pathology • Perform Chemical examination of blood, urine and stool • Perform Blood collection and processing • Perform Full blood count (FBC) • Prepare and examine Blood films • Perform Specimen collection, preservation and processing in Histopathology
Introduction to Medical Laboratory	<ul style="list-style-type: none"> • Identify types of laboratory waste

<p>Management, Organization & Ethics I MLT 126</p>	<ul style="list-style-type: none"> • Identify the steps in laboratory waste management • Use PPE appropriately • Dispose Laboratory waste • Demonstrate Inter and Intra-departmental relationships of personnel in a typical health facility. • Organizational Charts • Demonstrate how to maintain and care for laboratory equipment
<p>Medical Microbiology I MLT 211</p>	<ul style="list-style-type: none"> • Draw the structure of bacterial cell • Identify Microbiological examination techniques • Prepare culture plates • Perform the following techniques : <ul style="list-style-type: none"> - Microscopy - Culture - Biochemical tests - Sensitivity • Perform: <ul style="list-style-type: none"> - Cultivation - Isolation - Preservation of bacteria in the laboratory
<p>Hispathology and Cytology I MLT 212</p>	<ul style="list-style-type: none"> • Prepare fixatives • Perform Tissue Processing • Prepare decalcifying fluids.

	<ul style="list-style-type: none"> • Perform the decalcification of a Bone Tissue specimen • Determine the end point of decalcification • Demonstrate Tissue processing • Perform Embedding • Prepare blocks from selected tissue pieces. • Identify Microtome parts. • Identify Microtome knives • Demonstrate Microtomy • Demonstrate preparation of smears for cytology
Haematology and Blood Group Serology I MLT 213	<ul style="list-style-type: none"> • Prepare anticoagulants • Perform blood collection: <ul style="list-style-type: none"> - Capillary - Venous • Identify blood bank equipment
Chemical Pathology I MLT 214	<ul style="list-style-type: none"> • Identify the classes and compositions of: <ul style="list-style-type: none"> - Carbohydrates (sugars) - Proteins - Lipids • Identify Chemical Pathology Laboratory Equipment • Identify components of: <ul style="list-style-type: none"> - Colorimeter, - Spectrophotometer, - Flame photometer • Use:

	<ul style="list-style-type: none"> - Colorimeter, - Spectrophotometer, - Flame photometer • Perform urine analysis to • Identify normal and abnormal constituents of urine • Perform estimation of proteins in urine • Perform stool analysis to detect occult blood and faecal fat • Identify anticoagulants used in Chemical Pathology Laboratory • Perform Separation of serum and plasma from whole blood • Prepare Protein-free Filtrate • Collect blood sample using different methods • Identify different blood preservatives • Preserve collected blood using preservatives
<p>Medical Parasitology and Entomology I MLT 215</p>	<ul style="list-style-type: none"> • Identify Specimen containers • Demonstrate the preparation of specimen containers • Illustrate specimen collection • Demonstrate how specimen are transported • Illustrate the processing and preservation of specimen • Prepare reagents for examination of specimen for Parasites

	<ul style="list-style-type: none"> • Perform parasitological examination on clinical specimen • Identify Insects causing ill health
Introduction to Medical Laboratory Management, Organisation and Ethics I MLT 216	<ul style="list-style-type: none"> • Appreciate the organogram of the Medical Laboratory Department • Develop hypothetical SOPs • Develop hypothetical Job Aids • Compare SOPs and Job Aids • No Practical Content • Segregate Medical Laboratory waste • Dispose Medical Laboratory waste appropriately • Identify methods of storage of samples and reagents • Identify Storage Facilities in Medical Laboratory Practice • Complete Inventory documents • Identify the challenges associated with medical laboratory Practice in Nigeria
Medical Microbiology II MLT 221	<ul style="list-style-type: none"> • Prepare culture media for fungal specimen
Hispathology and Cytology II MLT 222	<ul style="list-style-type: none"> • Identify Staining Apparatus. • Perform: <ul style="list-style-type: none"> - H and E staining. - PAS staining - Masson's Trichrome Staining. - Perl's Prussian blue staining. - Oil Red 'O'

	<ul style="list-style-type: none"> - Von Gieson's staining • Identify simple stains • Perform: <ul style="list-style-type: none"> - Gram's staining - Ziehl Nelson staining - Giemsa staining - Papanicolaou staining - Wright staining
Haematology and Blood Group Serology II MLT 223	<ul style="list-style-type: none"> • X Perform: <ul style="list-style-type: none"> - ESR - PCV - WBC Count - RBC Count • Prepare blood films • Perform Haemoglobin Estimation using Drabkins Solution • Perform Staining techniques on blood film • Perform Direct and Indirect Blood Grouping. • Perform Rh Blood Grouping
Chemical Pathology II MLT 224	<ul style="list-style-type: none"> • Perform blood glucose estimation and glucose tolerance test • Perform serum Total Protein estimation • Perform serum Albumin estimation • Perform serum cholesterol estimation • Perform electrolytes (Na⁺, K⁺ and Cl⁻) estimation • Perform Calcium and Phosphate estimation

	<ul style="list-style-type: none"> • Perform serum bilirubin estimation • Perform serum and urine Creatinine, Urea, Uric Acid estimation • Perform Creatinine clearance and urea clearance estimation • Perform estimation of: <ul style="list-style-type: none"> • Alkaline Phosphatase <ul style="list-style-type: none"> - Acid Phosphatase, - Amylase - AST - ALT • Prepare Quality Control charts (e.g. Levey Jennings chart)
<p>Medical Parasitology and Entomology II MLT 225</p>	<ul style="list-style-type: none"> • Identify reagents for the diagnosis of: <ul style="list-style-type: none"> - intestinal parasites - Urinary parasites - Haemoparasites • Examine samples for: <ul style="list-style-type: none"> - intestinal parasites - Urinary parasites - Haemoparasites - Report results obtained

NATIONAL BOARD FOR TECHNICAL EDUCATION

1. BASIC SCIENCE LABORATORY

- a. Physics Laboratory
- b. Chemistry Laboratory
- c. Biology Laboratory

2. MEDICAL LABORATORY

S/N	ITEMS AND EQUIPMENT	QUANTITY REQUIRED
1.	Anticoagulants containers	100
2.	Antiseptic wipes	1 Carton
3.	Autoclave	5
4.	Automatic Pipette (Assorted)	5 for each volume range
5.	Blood bank refrigerator	2
6.	Blood collection tubes	100
7.	Blood donor's chair	2
8.	Blood Sample containers	100
9.	Water bath	5
10.	Bucket Centrifuge (Electronic)	10
11.	Manual Centrifuge	10
12.	Bunsen Burner	2 students to 1
13.	Manual Cabinets/Shelves	5
14.	Fire Proof Cabinets	2
15.	Capillary tube	1 carton
16.	Tissue Cassettes	100
17.	Chairs (Laboratory Stool)	100
18.	Colorimeter/Spectrophotometer	5
19.	Colour code	As required by the section

20.	Cotton wool	1 carton
21.	Cover slips	50 Packs
22.	Culture media	5 containers for each medium
23.	Decalcifying Fluid	20 litres
24.	Disinfectants	20 litres
25.	EDTA bottles	1 carton
26.	Embedding medium/Paraffin Wax	50kg
27.	Fire Extinguisher and Sand Bucket	2 in each Lab
28.	Fixatives	As required
29.	Flame photometer	2
30.	Funnel	20
31.	Gas Cylinder (25kg)	3
32.	General register	As needed
33.	Glasswares (Assorted)	Test Tubes(100) and 50 for others (Measuring cylinders flasks beakers, etc)
34.	Grease Marker	5
35.	Haematocrit Centrifuge and Reader	5
36.	Haemoglobinometer	5
37.	Hand Tally Counter	20
38.	Hot air Oven	5
39.	Hot Plate	5
40.	Incubator	5
41.	Lancet	20 packs
42.	Magnifying Lens	20
43.	Microscopes (Binocular)	2 students to 1 Microscope
44.	Microtomes	2

45.	Microtomes Knives	10
46.	Model Incinerator	1
47.	Improved Neubauer Counting chamber	2 students to 1
48.	Pasture Pipette	200
49.	Petri dish	100
50.	PH Meter	5
51.	Phlebotomy beds	2
52.	Plain containers	1000
53.	Plasma extractor	1
54.	PPEs	As many as required
55.	Protein precipitants	As needed per time
56.	Pipette Filter	20
57.	Protein solution	As Required
58.	Reagent bottles	30
59.	Reagents	As many as required
60.	Chemicals	As many as required
61.	Record books	As Required for each department
62.	Refrigerator	6
63.	Register	As Required for each department
64.	Safety Box	5
65.	Safety Manual	As required in each Lab
66.	Sahli pipette	10
67.	Sample Containers	50
68.	Sample Job Aids	As required for each section
69.	Sample SOPs	As required for each section
70.	Sample storage documents	As required in each Lab
71.	Samples	As needed for each procedure

72.	Slide racks	10
73.	Slides	1 carton
74.	Specimen Containers	As required in each Lab
75.	Staining Racks	50
76.	Stains	As Required
77.	Standard Solutions	As Required
78.	Stool sample Reagents	As Required
79.	Stop Watch/Timer	2 students to 1
80.	Sweep net	10
81.	syringes and needles,	1 carton
82.	Thermometers	50
83.	Tissue Block	As Required
84.	Tissue slides	1 Carton
85.	Tissues	As Required
86.	Tools	1 Tool Box
87.	Tourniquets	50
88.	Transport medium	As Required
89.	Trap nets	20
90.	Tripod Stand	20
91.	Urinalysis Kit	10 packs
92.	Urine sample	When needed
93.	Vacutainer	1 Carton
94.	Vacutainer needles and Holder	1 Carton
95.	Voltage Stabilizer	1 per each electrical appliance
96.	Waste Bins	20
97.	Water distiller	2
98.	Weighing balance (Electronic)	5

99.	Weighing Balance (Manual)	5
100.	Western green tubes and rack	1 carton
101.	Whatman filter paper	1 carton
102.	Whole blood sample	As needed
103.	Wire loops	1 per student

3. AUDIO-VISUAL AND COMPUTER LABORATORY REQUIREMENTS

S/N	ITEMS	QUANTITY REQUIRED
1.	Atlas	As required in each department
2.	Electronic Cabinets	2
3.	CD ROM	1 Pack
4.	Charts	As required by the section
5.	Cloud	As required
6.	Computers	20
7.	Flash drives	5
8.	Google Drive	1 Terabite
9.	Hard Drive	1 terabite
10.	Internet	Access With Router
11.	Memory Card	5
12.	Organogram	As required
13.	Pictorials	As many as necessary
14.	Text books	As required adequate
15.	Video clips	As required

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