NATIONAL BOARD FOR TECHNICAL EDUCATION

PLOT B BIDA ROAD, P.M.B. 2239, KADUNA, NIGERIA

NATIONAL DIPLOMA

IN

PHARMACY TECHNICIAN PROGRAMME

CURRICULUM AND COURSE SPECIFICATIONS

IN

COLLABORATION WITH

PHARMACY COUNCIL OF NIGERIA

PLOT 7/9 IDU, INDUSTRIAL LAYOUT, IDU, ABUJA, NIGERIA

DECEMBER, 2025

PREFACE

The National Diploma (ND) in Pharmacy Technician Programme was midwifed through the collaborative efforts of the Honourable Minister of Education and Coordinating Minister of Health and Social Welfare to produce competent and skilled middle-level manpower capable of supporting pharmaceutical services in various health settings. As the dynamics of global healthcare delivery evolve with technological advancements and a shift towards patient-centered care, it becomes imperative to continuously update the training standards of health professionals to meet these emerging challenges.

This curriculum is to ensure that the training of Pharmacy Technicians in Nigeria remains relevant, robust, and aligned with global best practices. It focuses on bridging the gap between theoretical knowledge and practical applications, equipping students with the modern competencies required in hospital and community pharmacy practice, and prepare them for further studies or professional registration after graduation.

The review of ND Pharmacy Technician Curriculum was made possible through the sponsorship of the National Curriculum Review and Harmonization Workshop by the Pharmacy Council of Nigeria (PCN). Their commitment to the success of the workshop demonstrates their unwavering dedication to advancing the standards of Pharmacy Technician training and practice in Nigeria.

We also acknowledge the profound contributions of the resource persons and reviewer who brought their wealth of experience to bear to enrich the contents of this curriculum. It is our earnest hope that this curriculum will produce a new generation of Pharmacy Technicians who are professionally competent and ethically grounded. The NBTE will remain committed to the regular review of this programme curriculum in order to meet the needs the stakeholders in the Nigerian healthcare system.

Prof. Idris M. Bugaje
Executive Secretary
National Board for Technical Education (NBTE)
Kaduna,
Nigeria
December, 2025

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GENERAL INFORMATION

1. PROGRAMME NOMENCLATURE

National Diploma in Pharmacy Technician Programme.

2. PROGRAMME GOAL

This programme is designed to train and produce Pharmacy Technicians who will work under the supervision of registered and licensed Pharmacists.

3. OBJECTIVES OF THE PROGRAMME

At the end of the programme, the diplomates should be able to:

a. Apply the basic knowledge and skills acquired in handling simple medicines for use at health facilities under the supervision of registered and licensed Pharmacists;
b. Handle equipment used in Pharmacy for dispensing, packaging and storage of medicines;
c. Assist registered and licensed Pharmacists during compounding of pharmaceutical preparations;
d. Read, interpret and dispense medical prescriptions to patients under the supervision of registered and licensed Pharmacists;
e. Establish and manage micro, small and medium scale enterprises;
f. Perform measurements such as weight, density, specific gravity and specific volume of excipients and galenicals;
g. Carry out supplies, inventory and store management and keep stock accounts at Primary Health Care (PHC) level;
h. Use basic digital skills effectively to perform their responsibilities under the supervision of registered and licensed Pharmacists;
i. Manage Drug Revolving Fund (DRF) to sustain regular supply of drugs at Primary Health Care level.

4. ENTRY REQUIREMENTS

The entry requirements into National Diploma in Pharmacy Technician programme are as follows:-

a. At least five credit level passes in GCE, WASC, SSCE, WAEC, NBAIS, NECO or NABTEB at not more than two sittings. The five subjects must include English Language, Mathematics, Biology, Chemistry and Physics.
b. A minimum score in the Unified Tertiary Matriculation Examination (UTME) as stipulated by JAMB.

5. PROGRAMME STRUCTURE AND DURATION

The ND Pharmacy Technician programme is structured to last for two (2) years (4 semesters) of classroom and laboratory activities. The National Diploma is a two-year terminal academic programme. The 10-month hospital and community experience shall take place during the mandatory industrial training after the successful completion of all courses by the ND II students.

The duration also incorporates 3-4 months Supervised Industrial Work Experience (SIWES) which shall take place at the end of the first semester of the first year. Each semester shall be for 17 weeks, made up of as follows:

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

6. CURRICULUM

6.1 The curriculum of all ND programme consists of four main components. These are

a. General studies/education
b. Foundation courses.
c. Professional courses.
d. Supervised Industrial work experience scheme (SIWES)
e. Hospital and Community Practice

6.2 The General education component shall include courses in:

- Art and Humanities – English Language, communication, History. These are compulsory.
- Mathematics and Science (for non-Science based programmes)
- Social Studies – Citizenship (the Nigerian constitution) Political science, sociology, Philosophy, geography, entrepreneurship Studies.

The courses in citizenship education, entrepreneurship are compulsory. The General Education component shall account for not more than 15% of total contact hours for the programme.

6.3 Foundation Courses include Economics, Mathematics, Pure Sciences, Technical Drawing, Descriptive Geometry, and Statistics, etc. The number of hours will vary and may account for about 10 – 15% of the total contact hours.

6.4 Professional Courses are courses, which give the student the theory and practical skills he needs to practice his field of calling at the technician/technologists level.

6.5 Student Industrial Work Experience Scheme (SIWES) shall be taken during vacation following the end of the second semester of the first year. See details of SIWES at paragraph 14.0

7. STAFFING REQUIREMENTS

7.1 Core Teaching Staff

A minimum of four (4) Core teaching staff who should possess at least a B.Sc. Pharmacy, B.Pharm, MPharm, or PharmD.

7.2 Technical Staff

Technical staff should be a registered Pharmacy Technician.

7.3 Headship of the Department

The Head of Department shall be a registered and licensed Pharmacist with at least a Master's Degree in Pharmacy or related field, or Fellowship of West African Postgraduate College of Pharmacists. He or she shall not be less than the rank of a Senior Lecturer.

7.4 Career/Academic Prospects
The diplomate would work as Pharmacy Technician. They can also proceed to University for further studies.

8. CERTIFICATION
A diplomate of this programme shall be awarded ND in Pharmacy Technician.

9. ACCREDITATION
The programme shall be accredited by the NBTE in conjunction with the Pharmacy Council of Nigeria (PCN) before the diplomates can be awarded the National Diploma qualifications. Details about the process of approving and accrediting a programme for the award of the ND in Pharmacy Technician are available from the Executive Secretary, National Board for Technical Education, P. M. B. 2239, Kaduna, Nigeria and the Pharmacy Council of Nigeria (PCN), Plot 7-9, Idu Industrial Layout, P.M.B 415 Garki, Abuja.

10. CONDITIONS FOR THE AWARD OF THE ND
10.1 Institutions offering accredited programmes will award the National Diploma to candidates who successfully completed the programme after passing prescribed coursework, examinations, diploma project and the Students Industrial Work Experience Scheme (SIWES). Such candidates should have completed a minimum of between 72 and 80 semester credit units depending on the programme.

10.2 National Diplomas shall be classified as follows:

Distinction	CGPA of 3.50 and above
Upper Credit	CGPA of 3.00- 3.49
Lower Credit	CGPA of 2.50 – 2.99
Pass	CGPA of 2.00 – 2.49

10.3 Grading of Courses:
Courses shall be graded as follows:

MARKED RANGE	LETTER GRADE	WEIGHTING
75% and above	A	4.00
70% – 74%	AB	3.50
65% – 69%	B	3.25
60% – 64%	BC	3.00
55% – 59%	C	2.75

50% – 54%	CD	2.50
45% – 49%	D	2.25
40% – 44%	E	2.00
Below 40%	F	0.0

For all the core and professional courses in the curriculum, the pass mark is 50%. The above grading system shall however apply to all service courses.

10.2 Probation and Withdrawal
Probation

- A candidate with CGPA between 1.5 – 1.99 shall be on a probation and for not more than two (2) consecutive semesters. Such Candidate shall be advised to withdraw from the programme.

Withdrawal

- Candidate with CGPA less than 1.5 shall be withdrawn from the programme.
- A candidate who is absent from the Institution for two (2) consecutive semesters is considered self-withdrawn, and is not acceptable to be admitted into the same programme unless he or she re-applies based on the rules and regulations of the Institution.

11. GUIDANCE NOTE FOR TEACHERS

11.1 The new curriculum is drawn in unit courses. This is keeping with the provisions of the National Policy on education which stress the need to introduce the semester credit units which will enable a student who so wish to transfer the units already completed in an institution of similar standard from which he is transferring.

11.2 In designing the units, the principles of the modular system by product has been adopted; thus making each of the professional modules, when completed provide the students with technician operative skills, which can be used for employment purposes.

11.3. As the success of the credit unit system depends on the articulation of programmes between the institutions and industry, the curriculum content has been written in the behavioral objectives, so that is clear to all, the special Learning objective of the student who successfully completed some of the courses or the diplomates of the programme. There is a slight departure in the presentation of the performance based curriculum which state categorically, the special learning objective for the students, also, there is a deliberate attempt to further involve the staff of the department teaching by having another column called Teachers activities. This is to ensure that the teachers deliver the required learning objectives. There is a third column for the Resources required for each learning objective. Each department is expected to develop its own teaching curriculum from this minimum Guide curriculum and ensure that the resources required are available. The Academic Board of the institution may vet departmental submission on the final curriculum. 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 TVET Institutions.

11.4 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 if possible. For each course, there should be a balance of theory to practice in the ratio 50:50 or 60:40, or the reverse.

12. PRACTICAL LOGBOOK

A personal Logbook to be kept by each student shall contain all day-to-day, weekly summary and semester summary of all the practical activities from day one to the end of the programme. This is to be checked, marked, endorsed and recorded by the lecturers concerned at the end of every week.

13. FINAL PROJECT

Final year students in this programme are expected to carry out a project work. This could be on individual basis or group work of not more than five students per group, but reporting must be undertaken individually. The project should, as much as possible be related to the programme and core professional discipline. Project reports should be well presented and should be properly supervised. The department should make its own arrangement of schedules for project work.

14. GUIDELINES ON SIWES PROGRAMME

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

14.1 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 of 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. The Placement Officer should discuss and agree with industry on the following
b. The Placement Officer should discuss and agree with industry on the following:
    i. A task inventory of what the student is expected to experience during the period of attachment. It may be wise to adopt the one already approved for each field by the industry-based supervisor.
    ii. The evaluation of the student by the industry-based supervisor and the institution-based supervisor.
    iii. The final grading of the student during the period of attachment should be weighted more on the evaluation by industry-based supervisor.

14.2 Evaluation of Student during the SIWES

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

i. Punctuality
ii. Attendance
iii. General attitude to work

iv. Respect for authority
v. Interest in the field/technical area
vi. Technical competence as a potential technician in his field.

14.3 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 TVET Institutions is adopted.

14.4 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 given to them by their industry-based supervisor.

14.5 Frequency of visit

Institutions should ensure that students placed on the 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.

14.6 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 the NBTE.

14.7 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 skilled technician in his field. The SIWES should be graded on a ***fail*** or ***pass*** basis. Where a student has satisfied all other requirements but failed SIWES, s/he may only be allowed to repeat another four months SIWES at his own expense.

Note: Due to the requirements of Pharmacy Technician Training, all ND I students shall undergo Students Industrial Work Experience Scheme (SIWES) which is restricted to Basic Science and Dispensing Laboratories, and Demonstration Rooms within accredited Colleges/Schools of Health Technology for a period of four (4) months.

On successful completion of ND II, students shall be posted for Hospital experience for a period of six (6) months and Community experience for a period of four (4) months, after which a PCN certification of completion and final ND certificate will be issued to them.

ONLY students who possess National Diploma in Pharmacy Technician shall be eligible to sit for National Pre-Certification Examination for Pharmacy Technicians (NPCE) in Nigeria.

CURRICULUM TABLE

Year One, Semester One

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	GNS 101	Use of English I	2	0	0	2	2
2.	COM 101	Introduction to Computing	1	0	2	3	3
3.	GNS 111	Citizenship Education I	2	0	0	2	2
4.	STB 101	General Biology	2	0	3	5	5
5.	STC 101	General Chemistry	2	0	3	5	5
6.	STP 101	General Physics	2	0	3	5	5
7.	MTH 111	General Mathematics	3	0	0	3	3
8.	MSQ 111	Mandatory Skills Qualification	1	0	1	2	2
9.	PTP 111	Principles of Pharmacy Technician Practice I	3	0	0	3	3
10.	PTP 112	Basic Dispensing Theory I	3	0	0	3	3
11.	PTP 113	Introduction to Laboratory Techniques	1	0	2	3	3
TOTAL			**22**	**0**	**14**	**36**	**36**

Year One, Semester Two

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	GNS 102	Communication in English I	2	0	0	2	2
2.	GNS 121	Citizenship Education II	2	0	0	2	2
3.	ENT 128	Introduction to Entrepreneurship I	2	0	1	3	3
4.	STA 111	Descriptive Statistics I	2	0	0	2	2
5.	PTP 121	Anatomy and Physiology I	2	0	2	4	4
6.	PTP 122	Basic Dispensing Theory II	3	0	0	3	3
7.	PTP 123	Basic Dispensing Practical I	0	0	3	3	3
8.	PTP 124	Pharmaceutical Calculations	3	0	0	3	3
9.	PTP 125	Basic Microbiology I	2	0	2	4	4
10.	PTP 126	Action and Uses of Medicines I	3	0	0	3	3
11.	PTP 127	Primary Health Care I	2	0	2	4	4
12.	PTP 128	SIWES	0	0	4	4	4
TOTAL			**23**	**0**	**14**	**37**	**37**

Year Two, Semester One

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	ENT 126	Introduction to Entrepreneurship II	2	0	1	3	3
2.	GNS 411	Introduction to Psychology	2	0	0	2	2
3.	PTP 211	Action and Uses of Medicines II	4	0	0	4	4
4.	PTP 212	Basic Dispensing Theory III	3	0	0	3	3
5.	PTP 213	Basic Dispensing Practical II	0	0	3	3	3
6.	PTP 214	Anatomy and Physiology II	2	0	2	4	4
7.	PTP 215	Logistics and Supply Chain Management System	2	0	1	3	3
8.	PTP 216	Basic Microbiology II	2	0	2	4	4
9.	PTP 217	Primary Health Care II	2	0	2	4	4
10.	PTP 218	Research Methodology	1	0	1	2	2
TOTAL			**20**	**0**	**12**	**32**	**32**

Year Two, Semester Two

S/N	COURSE CODE	COURSE TITLE	L	T	P	CU	CH
1.	PTP 221	Basic Dispensing Theory IV	3	0	0	3	3
2.	PTP 222	Basic Dispensing Practical III	0	0	3	3	3
3.	PTP 223	Computer Applications in Pharmacy	1	0	2	3	3
4.	PTP 224	Anatomy and Physiology III	2	0	2	4	4
5.	PTP 225	Principles of Pharmaceutical Technician Practice II	1	0	1	2	2
6.	PTP 226	Action and Uses of Medicines III	3	0	0	3	3
7.	PTP 227	Project	0	0	4	4	4
TOTAL			**10**	**0**	**12**	**22**	**22**

Hospital Experience – Six months	**Community Experience – Four months**

YEAR ONE SEMESTER ONE

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: PRINCIPLES OF PHARMCY TECHNICIAN I	**COURSE CODE: PTP 111**	**Contact Hours: 3 Hrs/Week**
Year: I **Semester**: I	**Credit Units:** 3	**Theoretical: 3 Hrs/Week**
	Pre-requisite:	**Practical: 0**
GOAL: This course is designed to acquaint students with the roles of pharmacy technicians, and interpersonal relationship with pharmacists and other health care workers.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1.0 Understand the roles and functions of a Pharmacist; 2.0 Know the roles and functions of other healthcare personnel in the health care delivery system; 3.0 Understand the implication of operating outside regulation; 4.0 Know the functions and roles of relevant stakeholders in regulation.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: **PRINCIPLES OF PHARMACY TECHNICIAN PRACTICE I**			Course Code: **PTP 111**		Contact Hours: 3Hrs/Week	
			Credit Unit: 3		Theoretical: 3Hrs/Week	
Year: I Semester: I			Pre-requisite:		Practical: 0	
COURSE SPECIFIFCATION: THEORETICAL						
General Objectives 1.0: Understand the roles and functions of a Pharmacist						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Discuss the brief history of pharmacy education and pharmacy profession in Nigeria and globally. 1.2 Define a Pharmacist. 1.3 Explain the functions and roles of a Pharmacist. 1.4 Explain the different practice areas and role of Pharmacists in various practice settings.	• Give assignments to students on the history of Pharmacy education and profession in Africa and Nigeria. • Refer students to websites explaining the functions and roles of Pharmacists	• Classroom furniture • Audio visuals • Whiteboard • Projector • Marker • Text books • Relevant journals • Online Courses • Lecture notes etc			

General Objective 2.0: Know the roles and functions of other healthcare workers in the health care delivery system						
5-7	2.1 Define a Pharmacy Technician. 2.2 Explain the steps to become a registered Pharmacy Technician in Nigeria 2.3 Explain the functions and roles of Pharmacy Technician. 2.4 Explain the relationship between a Pharmacist and a Pharmacy Technician.	• Use pictorial charts and in fongraphics to illustrates the procedure to become a registered Pharmacy Technicians. • Highlight the differences between a Pharmacist and a Pharmacy Technician	• Classroom furniture • Audio visuals • Whiteboard • Projector • Marker • Text books • Relevant journals etc			
General Objective 3.0: Understand the implication of operating outside regulation.						
8-11	3.1 Explain code of conduct of a Pharmacy Technician. 3.2 Explain legal definition of poison and controlled substances as it relates to pharmacy. 3.3 Discuss the various schedules of poison and controlled substances. 3.4 State the relationship	• Discuss code of conducts for Pharmacy Technicians • Discuss the scope of practice of pharmacy technicians. • Emphasise relationship between the Pharmacy Technician and other Health Workers. • Explain the relationship between	• Classroom furniture • Audio visuals • PCN Establishment Act • e-books • Internet • Journals etc			

	between the Pharmacy Technician and other Health Workers. 3.5 Describe relationship between the Pharmacy Technician and patient. 3.6 Explain the role of Pharmacy Technician in patient care and maintenance of confidentiality. 3.7 Explain the importance of confidentiality between Pharmacy Technician and patient. 3.8 Explain the need for maintenance of good conduct. 3.9 Discus good image and self-discipline e.g. No smoking in the pharmacy.	the Pharmacy Technician and the patient. • Discuss the role of Pharmacy Technician in patient care and maintenance of confidentiality. • Explain the importance of confidentiality between pharmacy technician and patient • Explain code of conduct for Pharmacy Technicians. • Understand the sanctions applicable in the event of breach. • Discuss the roles of pharmacy technician in the health facility and relationship with other health workers.				
GENERAL OBJECTIVE 4.0: Know the functions and roles of relevant stakeholders in regulation						
12-15	4.1 Explain the mandates of Pharmacy Council of Nigeria (PCN). 4.2 State the functions of National Agency for Food and Drug Administration and Control (NAFDAC). 4.3 Explain the functions	• Discuss the mandates of Pharmacy Council of Nigeria (PCN). • Enumerate the functions of National Agency for Food and Drug Administration and Control (NAFDAC).	• Classroom furniture • Audio visuals • White Board • Lecture notes • Flip charts • PCN, NAFDAC,			

	of National Drug Law Enforcement Agency (NDLEA). 4.4 Explain the functions of States Ministries of Health and Federal Ministry of Health. 4.5 Discuss the functions Hospitals Management Boards. 4.6 State the responsibilities and objectives of Pharmaceutical Society of Nigeria (PSN). 4.7 Enumerate the functions and powers of the Federal Competition and Consumer Protection Commission (FCCPC). 4.8 Explain the roles of Standard Organization of Nigeria (SON).	• Highlight the functions of National Drug Law Enforcement Agency (NDLEA). • Highlight the functions of States Ministries of Health and Federal Ministry of Health. • Explain the functions Hospitals Management Boards. • Describe the responsibilities and objectives of Pharmaceutical Society of Nigeria (PSN). • Explain the functions and powers of the Federal Competition and Consumer Protection Commission (FCCPC). • Discuss the roles of Standard Organization of Nigeria (SON). • Highlight the mandates of National Board for Technical Education (NBTE) to regulate training of	NDLEA, SON, & CPC Establishment Acts • Newsletter and Gazetter of Ministries • Internet • Computers			

		middle level and skilled technical manpower in Nigeria				

Course Assessment:

Course work:	20%
Test/Assignments:	20%
Examination:	60%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: BASIC DISPENSING THEORY 1	**COURSE CODE: PTP 112**	**Contact Hours: 3Hrs/Week**
	Credit Units: 3	**Theoretical: 3Hrs/Week**
Year: I **Semester**: I	**Pre-requisite**:	**Practical: 0**
GOAL: This is course is designed to provide students with the knowledge on various types of pharmaceutical preparations		

GENERAL OBJECTIVES

On completion of this course, the student should be able to:

1. Understand different types of pharmaceutical preparations;
2. Understand different solid dosage forms;
3. Understand tablet packaging of pharmaceutical preparation;
4. Know capsules packaging of pharmaceutical preparation;
5. Understand suppositories and pessaries.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: **BASIC DISPENSING THEORY 1**		Course Code: **PTP 112**		Contact Hours: 3Hrs/Week		
		Credit Unit: 3		Theoretical: 3Hrs/Week		
Year: I Semester: I		Pre-requisite:		Practical: 0		
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL						
GENERAL OBJECTIVE1.0: Understand different types of pharmaceutical preparations						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-4	1.1 Define dosage form. 1.2 Explain different dosage forms (Solid, liquid, semi-solids, powders etc). 1.3 Explain emerging dosage forms.	• Explain dosage form. • Describe different dosage forms (Solid, liquid, semi-solids, powders etc). • Explain emerging dosage forms	• YouTube • videos • Internet • Projector • Computers • Marker • Marker board • Journals etc			
GENERAL OBJECTIVE 2.0: Understand different solid dosage forms						
3-4	2.1 Define solid dosage. 2.2 List types of powders. 2.3 Explain compounding. 2.4 Explain the concept of granulation. 2.5 Explain preparation of granules.	• Explain solid dosage. • Enumerate types of powders. • Describe compounding.	• YouTube • videos • Internet • Projector • Marker • Marker			

	2.6 Explain types of granulations. 2.7 Explain wet granulation. 2.8 Explain dry granulation. 2.9 Discuss packaging and storage of powders and granules.	• Explain the concept of granulation. • Describe preparation of granules. • Describe types of granulations. • Explain wet granulation. • Explain dry granulation. • Discuss packaging and storage of powders and granules.	board • Journals etc			
General Objective 3.0: Understand tablet packaging of pharmaceutical preparation						
5-8	3.1 Define tablets. 3.2 Enumerate advantages and disadvantages of tablets. 3.3 Explain the reasons for the popularity of tablets. 3.4 Explain tablet excipients and their uses. 3.5 Explain process/steps in using tableting machines with illustration. 3.6 Describe tablet coating. 3.7 Explain reasons for	• Define tablets. • Enumerate advantages and disadvantages of tablets. • Explain the reasons for the popularity of tablets. • Explain tablet excipients and their uses. • Explain process/steps in tableting machines with	• Text books • Marker, • Marker board, • Projector • Journals etc			

	coating. 3.8 List the types of coating.	illustration. • Describe tablet coating. • Explain Reasons for coating. • List the types of coating.				
General Objective 4.0: Know capsules packaging of pharmaceutical preparation						
9-11	4.1 Explain capsules. 4.2 List types of capsules and sizes. 4.3 Explain advantages and disadvantages of capsules. 4.4 Describe packaging of capsules. 4.5 Discuss storage of capsules.	• Explain capsules. • List types of capsules and sizes. • Explain advantages and disadvantages of capsules. • Describe packaging of capsules. • Discuss storage of capsules.	• Pharmacy Text books • Marker, • Marker board, • Projector • Journals etc			
General Objective 5.0: Understand suppositories and pessaries.						
12-15	5.1 Define suppositories and pessaries. 5.2 Explain advantages and disadvantages of suppositories. 5.3 Explain reasons for the formulation of suppositories. 5.4 Explain suppository processes.	• Explain suppositories and pessaries. • Describe advantages and disadvantages of suppositories. • Highlight reasons for the	• Pharmacy Text books • Marker, • Marker board, • Projector • Journals • Internet • Youtube etc			

	5.5 Discuss the propreties of an ideal suppository base. 5.6 List uses of pessaries. 5.7 Describe 'Ds' of production of pessaries. 5.8 Explain packaging of suppositories and pessaries. 5.9 Explain storage suppositories and pessaries.	formulation of suppositories. • Discuss Suppository processes. • Explain the proprieties of an ideal suppository base. • Enumerate Uses of pessaries. • Explain 'Ds' of production of pessaries. • Discuss packaging of suppositories and pessaries. • Describe Storage Suppositories and Pessaries.				

Course Assessment:

Course work:	20%
Test/Assignments:	20%
Examination:	60%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN				
COURSE TITLE: INTRODUCTION TO LABORATORY TECHNIQUES				
COURSE CODE: PTP 113				
Duration: 45 HRS	Lecture: - 1Hr/Week	Tutorial: Nil	Practical: - 2 Hrs/Week	Contact Hour: 3 Hrs/Week
CREDIT UNITS: 3				
GOAL: The course is intended to equip the students with the basic knowledge of laboratory wares, equipment, uses, procedures and basic laboratory interpretation in Pharmacy Technician practice				
GENERAL OBJECTIVES: On completion of the course, the student should be able to: 1. Know the use of laboratory wares and simple laboratory equipment; 2. Understand the calibration of laboratory wares; 3. Know the various uses of laboratory wares; 4. Understand the principles, and applications of microscopes; 5. Understand the principles, and applications of cooling equipment; 6. Understand temperature measurement apparatus and their importance; 7. Understand the different types and functions of dissecting kit; 8. Understand the concept of dispensing; 9. Understand safety procedures in the laboratory; 10. Understand weighing technique.				

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
COURSE TITLE: INTRODUCTION TO LABORATORY TECHNIQUES						
COURSE CODE: PTP 113						
DURATION: 45 HRS	Lecture: - 1 Hr/Week	Tutorial: Nil	Practical: - 2Hrs/Week	Contact Hour: 3Hrs/Week		
CREDIT UNIT: 3						
GOAL: The course is intended to equip the students with the basic knowledge of laboratory wares, equipment, uses, procedures and basic laboratory interpretation in Pharmacy Technician practice.						
GENERAL OBJECTIVE 1.0: Know the use of laboratory wares and simple laboratory equipment.						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
1-2	1.1 Describe the different types of laboratory wares e.g. beakers, test tube, funnels, flaks (different types) etc. 1.2 State the uses of different laboratory wares in 1.1 above. 1.3 Describe different types of fittings in the laboratory e.g. for water, gas, light. 1.4 Explain the uses of parcel in centered glass, nickel, and platinum crucibles. 1.5 Explain various heating apparatus like burners, hot plate, autoclaves etc 1.6 Describe the application of each type in 1.5 above.	• Explain the different types of laboratory wares e.g. beakers, test tube, funnels, flaks (different types) etc. • Enumerate the uses of different laboratory wares in 1.1. • Explain different types of fittings in the laboratory e.g. for water, gas, light. • Explain the uses of parcel in centered glass, nickel, and platinum crucibles. • Explain various heating apparatus like burners, hot plate, autoclaves etc • Describe the application of each type in 1.5 above	• Bulletins • Charts • Internet/Intranet • Journals • Lecture notes • Pictorials • Projector • Text books etc	• Identify the different type of laboratory wares e.g. beakers, test tube, funnels, flaks (different types) etc. • Prepare cleaning agents for laboratory wares • Clean laboratory wares using cleansing agents • Store and maintain laboratory wares • Identify the various heating apparatus like burners, hot plate, autoclaves etc.	**Guides students to:** Identify the different type of laboratory glass wares e.g. beakers, test tube, funnels, flaks (different types) etc. Prepare cleaning agents for laboratory wares Clean laboratory wares using cleansing agents	Beakers Test tubes Conical Flasks Volumetric Flask Crucible Measuring Cylinders Cleaning Agent Test tubes racks Hot Plate Hearting mantle Bunsen Burner Autoclave etc

	1.7 Explain sterilisation. 1.8 Explain the various methods of sterilization. 1.9 State the importance of sterilisation.	• Identify applications of sterilization • Give assignments to students on the various methods of sterilization • Highlight the importance of sterilisation		• Carry out sterilisation using different methods.	Store and maintain laboratory wares Identify the various heating apparatus like burners, hot plate, autoclaves etc. Carry out sterilisation using different methods.	
GENERAL OBJECTIVE 2.0: Understand the calibration of laboratory wares.						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
3	2.1 Define calibration. 2.2 Define graduation. 2.3 Distinguish between calibration and graduation. 2.4 Explain the effect of heat on calibration of glass wares. 2.5 Explain the importance of accurate calibration and graduation of glassware.	• Explain calibration. • Discuss graduation. • Highlight between calibration and graduation. • Describe the effect of heat on calibration of glass wares. • Describe the importance of accurate calibration and graduation of glassware.	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc	• Demonstrate fluid level of calibrated glass wares e.g. water level, mercury level. • Graduate simple laboratory glassware, using standard volumes. • Calibrate simple	Guide students to: Demonstrate fluid level of calibrated glass wares e.g. water level, mercury level. Graduate simple laboratory glassware, using standard	Glassware, Top Loading, Balance, Analytical Balance, Pipettes, Water bath, Digital thermometer, Volumetric flask, Burette Calibration, log sheet,

				laboratory glassware, using standard volumes.	volumes. Calibrate simple laboratory glassware, using standard volumes	PH Meter, Bunsen Burner,
GENERAL OBJECTIVE 3.0: Know the various uses of glass wares in the laboratory						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
4	3.1 Explain types of glass wares suitable for storage in the laboratory. 3.2 Explain the factors to consider for the use of certain glass wares. 3.3 Explain types of glass wares suitable for laboratory use. 3.4 State the precautions necessary in the storage of chemicals e.g. Hydrofluoric acid in plastic containers, Sodium metal in paraffin and silver nitrate in amber containers on a balance etc.	• Describe types of glass wares suitable for storage in the laboratory • Discuss the factors to consider for the use of certain glass wares • Describe types of glass wares suitable for laboratory use • Highlight the precautions necessary in the storage of chemicals e.g. Hydrofluoric acid in plastic containers, Sodium metal in paraffin and silver nitrate in amber containers on a balance etc	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc	• Identify types of glass wares suitable for storage in the laboratory. • Identify types of glass wares suitable for storage of photosensitive reagents and some acids. • Identify other laboratory storage containers e.g. plastics and ceramics.	**Guide students to:** Identify types of glass wares suitable for storage in the laboratory Identify types of glass wares suitable for storage of photosensitive reagents and some acids Identify other laboratory storage containers e.g. plastics and ceramics	Glassware, Reagents, Acids, Plastic containers, Ceramic containers, Practical manuals.

GENERAL OBJECTIVE 4.0: Understand the principles, and applications of microscopes						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
5	4.1 Explain the principles of microscopes. 4.2 Explain the applications of microscope. 4.3 List the various types of microscopes in use in the laboratory. 4.4 Describe the use of various microscopes in 4.3 above. 4.5 State the range of magnification of various types of microscopes.	• Explain the principles of microscopes. • Explain the applications of microscope. • List the various types of microscopes in use in the laboratory. • Explain the use of various microscopes in 4.3 above. • Highlight the range of magnification of various types of microscopes.	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc	• Identify a simple microscope and its parts. • Demonstrate the use of microscope for examination of specimen.	Guide students to: Identify a simple microscope and its parts. Demonstrate the use of microscope for examination of specimen.	Microscope, Slides, Practical manual, Specimen, Petri dish, PPEs.
GENERAL OBJECTIVE 5.0: Understand the principles and applications of cooling equipment						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
6	5.1 Explain cooling equipment. 5.2 List the types of cooling equipment. 5.3 Explain the temperature range of different cooling equipment. 5.4 Explain the importance of cooling equipment.	• Describe cooling equipment • Enumerate the types of cooling equipment. • Explain the temperature range of different cooling equipment. • Discuss the importance of cooling equipment.	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc	• Demonstrate the use of water bath for cooling effect • Demonstrate the use of refrigerator for storage and preservation.	Guide students to: Demonstrate the use of water bath for cooling effect Demonstrate the use of refrigerator for storage and preservation	Water bath, Refrigerator
GENERAL OBJECTIVE 6.0: Understand temperature measurement apparatus and their importance						
Weeks	**Specific Learning Objectives**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective**	**Teachers Activities**	**Learning Resources**

	(Theory)			**(Practical)**		
7-8	6.1 Explain the importance of temperature control. 6.2 Describe the temperature measurement devices. 6.3 Explain the operating principle of temperature measuring devices. 6.4 Distinguish between the various temperature scale e.g. Fahrenheit, Kelvin Celsius etc.	• Describe the importance of temperature control. • Explain the temperature measurement devices. • Explain the operating principle of temperature measuring devices . • Distinguish between the various temperature scale e.g. Fahrenheit, Kelvin Celsius etc	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc	• Identify apparatus for temperature control e.g. thermometer; pyrometer. • Demonstrate the use of a thermometer to measure temperature • Measure temperature using scale in 6.4	Guide students to: Identify apparatus for temperature control e.g. thermometer; pyrometer. Demonstrate the use of a thermometer to measure temperature Measure temperature using scale in 6.4	Pyrometer, Thermo-meter, Digital Thermo-meter,
GENERAL OBJECTIVE 7.0: Understand the different types and functions of dissecting kits.						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**		**Teachers Activities**	**Learning Resources**
9-10	7.1 Explain dissecting kit. 7.2 Describe the different types of dissecting kit. 7.3 Describe the components of dissecting kit. 7.4 Explain the functions of dissecting kit. 7.5 Explain the care of dissecting kit.	• Explain dissecting kit. • Describe the different types of dissecting kit. • Describe the components of dissecting kit. • Explain the functions of dissecting kit. • Explain the care of dissecting kit.	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc	• Perform identification of different types of dissecting kit. • Perform identification of the different parts of dissecting kit and their functions.	Guide students to: Identify different types of dissecting kit Identify the different parts of dissecting kit and explain their functions	Dissecting Kit, Dissecting Board, Specimen, Porcelain tiles, Practical manual/logbooks, PPEs etc

GENERAL OBJECTIVE 8.0: Understand the concept of dispensing.						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
11-12	8.1 Explain the concept of compounding and Fundamental operations of compounding. 8.2 Explain the concept of dispensing. 8.3 Explain the concept of dissolution. 8.4 Explain the concept of size reduction (grinding). 8.5 Explain the concept of size separation (sifting). 8.6 Explain the concept of clarification (straining, decantation and filtration).	• Describe the fundamental operations of compounding. • List of equipment and reference book used in dispensing laboratory. • Describe the concept of dispensing. • List of equipment and reference book used in dispensing laboratory. • Discuss the concept of dissolution. • Describe the concept of size reduction (grinding). • Describe the concept of size separation (sifting). • Highlight the concept of clarification (straining, decantation and filtration).	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc			
GENERAL OBJECTIVE 9.0: Understand safety procedures in the laboratory						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
13	9.1 Describe the required dress code in the laboratories.	• Discuss the required dress code in the laboratories.	• Bulletins, • Charts, • Internet,			

	9.2 Explain safety regulations in the laboratory. 9.3 Describe safety signs.	• Discuss safety regulations. in the laboratory • Explain safety signs.	• Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc			
GENERAL OBJECTIVE 10: Understand weighing techniques.						
Weeks	**Specific Learning Objectives (Theory)**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objective (Practical)**	**Teachers Activities**	**Learning Resources**
14-15	10.1 Explain weighing technique using different balances. 10.2 Enumerate the types of balances. 10.3 Explain dosage form. 10.4 Explain care and maintenance of balances. 10.5 Explain the effect of vibration on balance.	• Explain weighing technique using different balances. • Enumerate the types of balances. • Explain dosage form. • Explain care and maintenance of balances. • Describe the effect of vibration on balance.	• Bulletins, • Charts, • Internet, • Journals, • Lecture notes, • Pictorials, • Projector, • Textbooks etc			
Course Assessment: Course work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% **Total: 100%**						

YEAR ONE SEMESTER TWO

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: ANATOMY AND PHYSIOLOGY I	**COURSE CODE: PTP 121**	**Contact Hours: 4 Hrs/Week**
	Credit Units: 4	**Theoretical: 2 Hrs/Week**
Year: I **Semester**: Il	**Pre-requisite**:	**Practical: 2 Hrs/Week**
GOAL: This course is designed to equip the student with basic knowledge of Anatomy and Physiology of the human system.		

GENERAL OBJECTIVES

On completion of this course, the student should be able to:

1. Know body cavities, body fluids and homeostasis;
2. Know the human cells, cell division and transport across cell membranes;
3. Know body tissues, types of tissues, types of membranes, skeletal muscle and body joints;
4. Know blood cells and blood vessels and cardiovascular system;
5. Know respiratory system.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **ANATOMY AND PHYSIOLOGY I**	Course Code: **PTP 121**	Contact Hours: 4 Hrs/Week
	Duration: 60Hrs	Theoretical: 2 Hrs/Week
Year: I Semester: II	Pre-requisite:	Practical: 2 Hrs/Week

COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL

GENERAL OBJECTIVE 1.0: Know body cavities, body fluids and homeostasis.

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain body cavities. 1.2 List the four body cavities. 1.3 Describe body fluids. 1.4 Describe the body fluids compartments. 1.5 List the contents of the extra cellular fluids (ECF) and the intra cellular fluids (ICF). 1.6 Explain Homeostasis. 1.7 Explain the concept of osmosis 1.8 Explain mechanism in the regulations of	• Describe body cavities. • Enumerate the four body cavities. • Explain body fluids. • Describe the body fluids compartments. • Highlight the contents of the Extra cellular Fluids (ECF) and the Intra Cellular Fluids (ICF). • Explain	• Diagrams, • White board, • Marker, • Computer • Projector, • Educational videos. • Textbooks etc	• Identify models showing body cavities. • Carry out experiment to demonstrate the concept of Osmosis.	Guide students to: • Identify models showing body cavities • Carry out Osmosis	Diagrams, anatomical, models, Anatomy models/videos, Plasticized, Semi Permeable membrane,

	body fluids	Homeostasis. • Explain the concept of osmosis. • Explain mechanism in the regulations of body fluids.				
General Objective 2.0: Know the human cell, cell division and transport across cell membranes						
4-6	2.1 Define a cell. 2.2 Describe the human cell: somatic cell and the gametes. 2.3 Explain cell division. 2.4 Describe Mitosis and Meiosis. 2.5 Explain transport across the cell membrane 2.6 Explain solvent drag.	• Define a cell. • Describe the human cell: somatic cell and the gametes • Explain cell division • Describe Mitosis and Meiosis • Explain transport across the cell membrane • Explain solvent drag.	• Diagrams and visual aids, • Textbooks, • White board, • Marker, • Computer • projector, • Classroom with adequate lighting, seats and tables.	• Perform experiments on transports across cell membrane. • Perform microscopic examination of a cell • Perform simulation of transport across cell membranes mechanism eg osmosis and diffusion.	Guide students to: • Perform experiments on transports across cell membrane • Perform microscopic examination of a cell • Perform simulation of transport across cell membranes mechanism eg osmosis and diffusion.	Microscopes, cell models, Semi Permeable membrane Simulators
General Objective 3.0: Know body tissues, types of tissues, types of membranes, skeletal muscle and body joints						
7-10	3.1 Define tissues. 3.2 List the tissues: epithelial, connective, muscular and nervous tissues. 3.3 Define membranes. 3.4 Differentiate between mucous	• Explain tissues. • Highlight the tissues: epithelial, connective, muscular and nervous tissues. • Explain membranes.	• Diagrams, • White board, • Marker, • Computer • Projector, • Educational videos. • Textbooks etc	• Identify parts of human skeletal system • Identify types of bones and joints in the skeletal system	Guide students to: • Identify parts of human skeletal system • Identify types of bones and joints in the skeletal	Skeletal models of bones, including skull, torso, limbs, and joints. Real bones. Videos, charts/diagrams.

	and serous membrane. 3.5 Explain the skeletal system. 3.6 Explain the axial and the appendicular skeleton. 3.7 List the 5-types of bones: long bone, short bones, irregular bones, flat bones and sigmoid bones. 3.8 Describe types of bones. 3.9 Define a joint in the human body. 3.10 Describe types of joints in the body. 3.11 Explain functions of the skeleton. 3.12 Explain the skeletal muscles. 3.13 Explain the functions of the muscles as: synergist, antagonist fixator and prime movers.	• Enumerate between mucous and serous membrane. • Describe the skeletal system. • Describe the axial and the appendicular skeleton. • Highlight the 5-types of bones: long bone, short bones, irregular bones, flat bones and sigmoid bones. • Describe types of bones • Describe joint in the human body. • Explain types of joints in the body. • Describe functions of the skeleton. • Describe the skeletal muscles. • Describe the functions of the muscles as: synergist, antagonist fixator and prime			system	White board and markers 3 D models

		movers.				
General Objective 4.0: Know blood cells, blood vessels, and cardiovascular system.						
12-13	4.1 Explain the cardiovascular system. 4.2 Explain blood, blood vessels and the heart. 4.3 Define blood cells 4.4 Explain Erythrocytes, Leucocytes, Thrombocytes 4.5 Explain the functions of the blood cells: transportation, body defence. 4.6 Explain blood clotting. 4.7 Explain the major blood vessels 4.8 Differentiate between arteries and veins. 4.9 Describe blood capillaries. 4.10 Describe the heart. 4.11 Describe the circulation of blood in the heart: Pulmonary and systemic circulation. lymphatic system.	• Describe the cardiovascular system. • Discuss blood, blood vessels and the heart. • Explain blood cells. • Discuss Erythrocytes. Leucocytes, Thrombocytes. • Describe the functions of the blood cells: transportation, body defence. • Explain blood clotting. • Describe the major blood vessels. • Enumerate between arteries and veins. • Explain blood capillaries. • Describe the heart. • Describe the circulation of blood in the heart:	• Textbooks, • Whiteboard • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc	• Identify blood cells in pictures • Identify the major blood vessels in models and charts. • Identify arteries and veins in models and charts	Guide students to: • Identify blood cells in pictures • Identify the major blood vessels in models and charts. • Identify arteries and veins in models and charts	Pictorials, Pictures, Models, Charts, PPEs, Practical manual, Log Books,

		Pulmonary and systemic circulation, lymphatic system.				
General Objective 5.0: Know respiratory system.						
14-15	5.1 Explain respiratory system. 5.2 Differentiate between the right and the left lungs. 5.3 Describe the mechanism of inspiration and expiration. 5.4 Distinguish between external and internal respiration. 5.5 Explain transportation of gases, lung volumes, tidal volume, inspiratory reserve volume, expiratory reserve volume and the residual volume.	• Explain respiratory system. • Differentiate between the right and the left lungs. • Describe the mechanism of inspiration and expiration. • Explain transportation of gases, lung volumes, tidal volume, inspiratory reserve volume, expiratory reserve volume and the residual volume.	• Textbooks, • Whiteboard • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc	• Identify parts of respiratory system in anatomical models	Guide students to: Identify parts of respiratory system in anatomical models	Pictorials Pictures Models Charts PPEs Practical manual Log Books
Course Assessment: Course work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% **Total: 100%**						

<table>
<tr><td colspan="3">PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN</td></tr>
<tr><td rowspan="2">COURSE: BASIC DISPENSING THEORY II</td><td>COURSE CODE: PTP 122</td><td>Contact Hours: 3 Hrs/Week</td></tr>
<tr><td>Credit Units: 3</td><td>Theoretical: 3 Hrs/Week</td></tr>
<tr><td>Year: I Semester: II</td><td>Pre-requisite: Basic Dispensing Theory I (PTP 112)</td><td>Practical: 0</td></tr>
<tr><td colspan="3">GOAL: This is course is designed to equip students with the knowledge on various types of liquid pharmaceutical preparations.</td></tr>
<tr><td colspan="3">GENERAL OBJECTIVES:

On completion of this course, the student should be able to:
1. Understand types, advantages and disadvantages of mixtures;
2. Understand types, advantages, and disadvantages of suspension;
3. Know forms and methods of preparation of syrups;
4. Know formulation and storage of linctuses.
5. Understand definition and formulation of elixirs.</td></tr>
</table>

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: **BASIC DISPENSING THEORY II**			Course Code: **PTP 122**		Contact Hours: 3 Hrs/Week	
			Credit Unit: 3		Theoretical: 3 Hrs/Week	
Year: I Semester: II			Pre-requisite: **Basic Dispensing Theory I**		Practical: 0	
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL						
General Objective 1.0: Understand types, advantages and disadvantages of mixtures.						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Define a mixture. 1.2 Discuss types of mixtures (heterogeneous mixtures, homogeneous mixtures). 1.3 Explain methods of preparation of different types of mixtures. 1.4 List advantages and disadvantages of homogenous mixtures.	• Explain a mixture. • Discuss types of mixtures (heterogeneous mixtures, homogeneous mixtures). • Describe methods of preparation of different types of mixtures. • Enumerate advantages and disadvantages of homogenous mixtures.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc	•		
General Objective 2.0: Understand types, advantages, and disadvantages of suspension.						
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**

4-6	2.1 Define suspension. 2.2 Explain the preparation of suspension. 2.3 Describe suspending agents. 2.4 Explain the advantages and disadvantages of suspension. 2.5 Explain suspension instability. 2.6 Describe the packaging and storage of suspension.	• Explain suspension. • Describe the preparation of suspension. • Discuss suspending agents. • Highlight the advantage and disadvantages of suspension. • Describe suspension instability. • Highlight the packaging and storage of suspension.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			
General Objective 3.0: Know forms and methods of preparation of syrups						
6-8	3.1 Define syrup. 3.2 Explain forms/classes (medicated syrups, flavoured syrups). 3.3 Describe methods of preparation of syrups (solution with heat and solution without heat i.e agitation). 3.4 List examples of medicated and flavoured syrups (briefly explain	• Explain syrup. • Describe forms/classes (medicated syrups, flavoured syrups). • Explain methods of preparation of syrups (solution with heat and solution without heat i.e agitation).	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			

	their methods of preparation).	• Enumerate examples of medicated and flavoured syrups (briefly explain their methods of preparation)				
General Objective 4.0: Know formulation and storage linctuses						
8-11	4.1 Define linctuses. 4.2 State examples of linctuses 4.3 Discuss the formulation of linctuses. 4.4 Explain vehicle and excipients of linctuses. 4.5 Discuss the storage, conditions and considerations of linctuses.	• Explain linctuses. • Highlight examples of linctuses • Describe the formulation of linctuses. • Discuss vehicle and excipients of linctuses. • Discuss the storage, conditions and considerations of linctuses.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			
General Objective 5.0: Understand definition and formulation of elixirs						
12-15	5.1 Define elixirs. 5.2 State the examples elixirs. 5.3 Describe the process of formulation of elixirs. 5.4 Discuss vehicles and excipients of	• Explain elixirs. • Highlight the examples elixirs. • Describe the process of formulation of elixirs. • Discuss vehicles and excipients of	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc,			

	elixirs.	elixirs.				

Course Assessment:

Course work:	20%
Test/Assignments:	20%
Examination:	60%
Total:	**100%**

<table>
<tr><td colspan="3">PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN</td></tr>
<tr><td rowspan="2">COURSE: BASIC DISPENSING PRACTICAL I</td><td>COURSE CODE: PTP 123</td><td>Contact Hours: 3 Hrs/Week</td></tr>
<tr><td>Credit Units: 3</td><td>Theoretical: 0</td></tr>
<tr><td>Year: I Semester: II</td><td>Pre-requisite:</td><td>Practical: 3 Hrs/Week</td></tr>
<tr><td colspan="3">GOAL: This course is designed to equip students with basic knowledge and skills of extemporaneous preparation in hospitals and community pharmacies.</td></tr>
<tr><td colspan="3">GENERAL OBJECTIVES:

On completion of this course, the student should be able to:
1. Demonstrate the formulation of powder;
2. Demonstrate the formulation of solution;
3. Demonstrate the formulation of suspension;
4. Demonstrate formulation of linctuses;
5. Demonstrate the formulation of elixir.</td></tr>
</table>

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: **BASIC DISPENSING PRACTICAL I**			Course Code: **PTP 123**		Contact Hours: 3Hrs/week	
			Duration: 45 Hrs		Theoretical: 0	
Year: I Semester: II			Pre-requisite:		Practical: 3Hrs/Week	
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL						
General Objective 1.0: Demonstrate formulation of powders						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
General Objective 1.0: Demonstrate the formulation of powders						
1-3				1.1 Prepare bulk powder used internally. 1.2 Produce dusting powder. 1.3 Prepare powder for reconstitution.	Guide students to: Prepare bulk powder used internally Produce dusting powder Prepare powder for reconstitution	Active ingredients, Beaker, Bunsen burner , Calculator, Crucible, Dispensing bottles , Excipients, Filter holders, Foil paper, Glass funnel, Grease proof Papers, Hot plate, Hygrometer, Labels,

						Measuring cylinder, Mixer, Mortar and pestle (porcelain and glass), Petri-dish, pH meter, pipette, Powder boxes, PPE, Retort stand, Shaker, Sieve, Stirring rod, Tripod stand, Water bath, Weighing balance etc
General Objective 2.0: Demonstrate the formulation of solution						
4-6				2.1 Produce aromatic waters and dilutions. 2.2 Prepare simple mixtures (solutions).	Guide students to: Produce aromatic waters and dilutions Prepare simple mixtures (solutions)	Active ingredients, Beaker, Bunsen burner, Calculator, Crucible, Dispensing bottles, Excipients, Filter holders,

						Foil paper, Glass funnel, Grease proof papers, Hot plate, Hygrometer, Labels, Measuring cylinder, Mixer, Mortar and pestle(porcelain and glass), Petri-dish, pH meter, Pipette, Powder boxes, PPE, Retort stand, Shaker, Sieve, Stirring rod, Tripod stand, Water bath, Weighing balance.
General Objective 3.0: Demonstrate the formulation of suspension						
7-9				3.1 Prepare suspension containing indiffusible solids.	Guide students to: Prepare suspension containing indiffusible	Mortar and pestle(porcelain and glass),

				3.2 Prepare suspension containing diffusible.	solids Prepare suspension containing diffusible	PPE, Mixer, Measuring cylinder, Beaker Weighing balance, Active ingredients, Excipients, Petri-dish, Retort stand, Tripod stand, Bunsen burner, Labels, Dispensing bottles, Powder boxes, Grease proof papers, Stirring rod, Hot plate, Water bath, pH meter, Hygrometer, Calculator, Glass funnel, Foil paper Crucible Filter holders

						Pipette Sieve Shaker etc
General Objective 4.0: Demonstrate formulation and storage linctuses						
10-13				4.1 Prepare linctuses. 4.2 Determine the viscosity of linctuses.	Guide students to: Prepare linctuses Determine the viscosity of linctuses	Mortar and pestle(porcelain and glass), PPE, Mixer, Measuring cylinder, Beakers, Weighing balance, Active ingredients, Excipients, Petri-dish, Retort stand, Tripod stand, Bunsen burner, Labels, Dispensing bottles, Grease proof papers, Stirring rod Water bath, pH meter, Hygrometer,

						Calculator, Glass funnel, Foil paper, Crucible filter holders, Pipette, Sieve, Shaker Viscometer etc
General Objective 5.0: Demonstrate the formulation of elixirs						
13-15				5.1 Prepare elixirs. 5.2 Determine weight per volume of active components in elixir. 5.3 Determine the viscosity of elixir.	Guide students to Prepare elixirs. Determine weight per volume of active components in elixir. Determine the viscosity of elixir.	Mortar and pestle(porcelain and glass), PPE, Mixer, Measuring cylinder, Beaker Weighing balance, Active ingredients, Excipients, Petri-dish, Retort stand, Tripod stand, Bunsen burner, Labels, Dispensing bottles,

						Powder boxes, Grease proof papers, Stirring rod, Water bath, pH meter, Hygrometer, Calculator, Glass funnel Foil paper crucible pipette Sieve Shaker Viscometer
Course Assessment: Course work (Practical based): Practical: Examination (Practical based): **Total:**		**100%**	10% 50% 40%			

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: PHAMACEUTICAL CALCULATIONS	**COURSE CODE: PTP 124**	**Contact Hours: 3 Hrs/Week**
	Credit Unit: 3	**Theoretical: 3 Hrs/Week**
Year: I **Semester**: II	**Pre-requisite**:	**Practical: 0**
GOAL: This course is designed to equip students with the knowledge of basic pharmaceutical calculations		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Comprehend measurement and calculations in pharmaceutical preparations; 2. Understand systems and unit of measurements in pharmaceutical calculations; 3. Understand calculations of dosage forms and applications; 4. Understand manipulations, reduction and enlargement of formulae using the adjustment factor; 5. Understand density, volumes, dilutions and concentrations in pharmaceutical calculations.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **PHARMACEUTICAL CALCULATIONS**	Course Code: **PTP 124**	Contact Hours: 3 Hrs/Week
	Credit Unit: 3	Theoretical: 3 Hrs/Week
Year: I Semester: II	Pre-requisite:	Practical: 0
COURSE SPECIFIFCATION: THEORETICAL		
General Objective 1.0: Comprehend measurement and calculations in pharmaceutical preparations		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the terminologies in pharmaceutical calculations i.e – Numbers – Numerals – Enumeration – Notations – Estimations – percentage errors, – decimal fractions – proportions – variations. etc 1.2 Explain significant numbers, estimations, percentage errors. 1.3 Explain aliquot methods of	• Describe the terminologies in pharmaceutical calculations • Discuss significant numbers, estimations, percentage errors. • Highlight aliquot methods of measurement and decimal fractions, ratio, proportion and variations. • Describe the process of calculating dosage forms during compounding. • Highlight the	• Classroom • Furniture, • Audio visuals, • Smart boards, • Calculator, • Four figure table, • Metric Table etc			

	measurement and decimal fractions, ratio, proportion and variations. 1.4 Explain the process of calculating dosage forms during compounding. 1.5 Explain the applications of density and volumes, dilutions and concentrations in compounding. 1.6 Explain different systems and units of measurements in dispensing. 1.7 Explain the importance of pharmaceutical measurements and calculations in dispensing.	applications of density and volumes, dilutions and concentrations in compounding. • Describe different systems and units of measurements in dispensing. • Explain the importance of pharmaceutical measurements and calculations in dispensing.				
General Objective 2.0: Understand systems and unit of measurements in pharmaceutical calculations.						
4-5	2.1 Define the metric system of measurement. 2.2 Discuss and appreciate the table of metric system. 2.3 Explain the role of Apothecaries in formulation and dispensing.	• Explain the metric system of measurement. • Describe and appreciate the table of metric system. • Describe the role of Apothecaries in formulation and dispensing.	• Classroom furniture, • Audio visuals, • Smart boards, • Calculator, • Four figure table,			

	2.4 Explain the avoirdupois system of weight including; weights, pounds, ounces.	• Highlight the avoirdupois system of weight including; weights, pounds, ounces.	• Metric Table etc			
General Objective 3.0: Understand calculations of dosage forms and applications						
6-7	3.1 Explain pharmaceutical dosage form. 3.2 List dosage form 3.3 Discuss the steps required in calculation of dosages. 3.4 Discuss the steps required in calculation of dosages for children. 3.5 List the drug therapy problems. 3.6 Explain the concept of medication errors.	• Discuss pharmaceutical dosage form. • Enumerate dosage form. • Explain the steps required in calculation of dosages. • Describe the steps required in calculation of dosages for children. • Highlight the drug therapy problems. • Discuss the concept of medication errors.	• Classroom furniture, • Audio visuals, • Smart boards, • Calculator, • Four figure table, • Metric Table etc			
General Objective 4.0: Understand manipulations, reduction and enlargement of formulae using the adjustment factor.						
8-10	4.1 Explain the concept of formulation. 4.2 Describe types of pharmaceutical formulations. 4.3 Explain the process of formula reduction and enlargement during formulation. 4.4 Determine the proportion of	• Discuss the concept of formulation. • Explain types of pharmaceutical formulations. • Describe the process of formula reduction and enlargement during formulation. • Explain the proportion	• Classroom furniture, • Audio visuals, • Smart boards, • Calculator, • Four figure table,			

	ingredients during pharmaceutical formulation by formula reduction and enlargement.	of ingredients during pharmaceutical formulation by formula reduction and enlargement.	• Metric Table etc			
General Objective 5.0: Understand density, volumes, dilutions and concentrations in pharmaceutical calculations.						
11-15	5.1 Define density, specific gravity and specific volumes. 5.2 Explain the concept of volume and metric system of measurement. 5.3 Explain the concept of dilution, forms and processes. 5.4 Explain computations in a volume, weight in relation to volume of liquid preparation. 5.5 Discuss percentages in preparations (Percentage weight – in weight, Weight- in-volume, volume in weight, ratio of measure of strength 5.6 Explain the concept of isotonic solutions and how to calculate the amount of NaCl needed for isotonicity using the NaCl equivalent value table.	• Explain density, specific gravity and specific volumes. • Describe the concept of volume and metric system of measurement. • Discuss the concept of dilution, forms and processes. • Describe computations in a volume, weight in relation to volume of liquid preparation. • Explain percentages in preparations (Percentage weight –in weight, Weight- in-volume, volume in weight, ratio of measure of strength. • Explain the concept of isotonic solutions and how to calculate the amount of NaCl needed for isotonicity using the NaCl equivalent value table.	• Classroom furniture, • Audio visuals, • Smart boards, • Calculator, • Four figure table, • Metric Table.			

Course Assessment:	
Course work:	20%
Test/Assignments:	20%
Examination:	60%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN				
COURSE TITLE: BASIC MICROBIOLOGY I				
COURSE CODE: PTP 125				
DURATION: 60 Hrs	**Lecture: 2 Hrs/Week**	**Tutorial: 0**	**Practical: 2 Hrs/Week**	**Contact Hours: 4 Hrs/Week**
CREDIT UNITS: 4				
GOAL: This course is designed to provide the students with the broad knowledge of different types of organisms, their contributions to disease causation and the application of microbiological principles in disease control.				

GENERAL OBJECTIVES:

At the end of the course, the students should be able to:

1.0 Understand the historical development of microbiology, its contributions to medicine and health.

2.0 Understand the nomenclature of micro-organisms.

3.0 Know the classification, characteristics, features and importance of microorganisms.

4.0 Understand the concept of Bacteriology.

5.0 Understand infection and disease control through the process of sterilisation and disinfection.

PROGRAMME:NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
COURSE TITLE: BASIC MICROBIOLOGY I	**Course Code: PTP 125**	**Contact Hours: 4Hrs/Week**				
COURSE SPECIFICATION: THEORY/PRACTICAL						
GENERAL OBJECTIVE 1.0: Understand the historical development of microbiology and its contributions to medicine and health						
Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
1-3	1.1 Define microbiology. 1.2 Define the various microbiological terms. 1.3 Outline the historical development of microbiology. 1.4 List the sources of microorganisms. 1.5 Explain the applications of microbiology.	• Explain microbiology. • Describe the various microbiological terms. • Highlight the historical development of microbiology. • Highlight the sources of microorganisms. • Explain the applications of microbiology	• Classroom furniture • Audio visuals • Smart boards • Internet • Online courses			
GENERAL OBJECTIVE 2.0: Understand the nomenclature of Micro-organisms						
4-5	2.1 Describe the nomenclature of micro-organisms. 2.2 Describe the key aspects of microbial	• Explain the nomenclature of micro-organisms • Explain the key aspects of microbial	• Pictures, • White board /Markers, • Charts, • Diagrams,	• Prepare slides and view the structure of microorganis	Guide students to: Prepare slides and	Microscopes Slides Loop test tubes lab coats

	nomenclature: - Binomial system - Scientific style - derivation of names (Phenotypic characteristics, Eponyms, Toponyms) - Abbreviations - Taxanomic Hierarchy - Exclusions e.g Viruses	nomenclatures	• Classroom furniture.	ms using a microscope	view the structure of microorganisms using a microscope	Bunsen burners Gas etc
General Objective 3.0: Know the classification, characteristics, features and importance of microorganisms.						
Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
6-8	3.1 Explain the characteristics and features of the following microorganism i.e: - Bacteria - Viruses - Protozoa - Parasites etc. 3.2 Explain classification of each of the microorganism listed in 3.1 above. 3.3 Explain the importance of microorganisms. 3.4 List the microorganisms of pharmaceutical importance.	• State the characteristics and features of the following microorganisms. • Parasites etc. • Explain classification of each of the microorganism listed in 3.1 above. • Explain the importance of microorganisms. • List the microorganisms of pharmaceutical	• White board /Markers • Charts	• Identify various micro-organisms • Carry out the classification of bacteria • Identify microorganisms of pharmaceutical importance and medicines produced with them	• Guide students to: Identify various micro-organisms Carry out the classification of bacteria Identify microorganisms of pharmaceutical importance and	• Microscopes • Slides • Specimens • Gloves/masks • Bunsen burners

		importance.			medicines produced with them	
General Objective 4.0: Understand the concept of Bacteriology.						
Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
9-11	4.1 Explain Bacteriology. 4.2 Explain Eukaryotes and Prokaryotes. 4.3 Explain the characteristics of Eukaryotes and Prokaryotes in terms of size, shape, similarities and differences. 4.4 Define infectious agents. 4.5 Explain the process of identifying bacteria using Gram Staining techniques. 4.6 Explain the features and characteristics of gram negative (-) and gram positive (+) bacteria, acid-fast bacteria (Mycobacteria).	• Define Bacteriology. • Highlight Eukaryotes and Prokaryotes. • Describe the characteristics of Eukaryotes and Prokaryotes in terms of size, shape, similarities and differences. • Explain infectious agents. • Describe the process of identifying bacteria using Gram Staining Techniques • Highlight the features and characteristics of gram negative (-) and gram positive (+) bacteria, acid-fast bacteria (Mycobacteria)	• White board/ markers • Specimen slide • gloves/masks • Goggles etc	• Perform culture of bacteria. • Identify bacteria in the laboratory • Culture and identify infectious agents • Carryout differential staining techniques • Observe reactions of microorganisms to Gram staining • Identify bacteria using Gram Staining Techniques	• Guide students to: Culture bacteria in the Identify bacteria in the laboratory Culture and identify infectious agents Carryout differential staining techniques Observe reactions of microorganisms to Gram	• Microscopes • Slides • Specimens • Gloves • Masks • Petridish

					staining Identify bacteria using Gram Staining Techniques	
General Objective 5.0: Understand Infection and disease control through the process of sterilization and disinfection						
Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
12-15	5.1 Explain sterilization. 5.2 Describe the methods of sterilization (physical methods): i. Incineration ii. Moist heat iii. Dry Heat iv. Filtration' v. Radiation 5.3 State the methods of disinfection namely: - Physical disinfection i. Boiling ii. Pasteurization iii. Radiation - Chemical disinfection i. Alcohols ii. Aldehydes iii. Halogens iv. Tinctures v. Phenols & Quaternary vi. Ammonium Compounds	• Define sterilization • Explain the methods of sterilization • Describe the methods of disinfection	• White board • Markers • Microscopes etc	• Carry out sterilization using different methods. • Carryout disinfection using different methods.	Guide students to: - Carry out sterilization using different methods listed - Carryout disinfection using different methods	• Autoclave • Filters • Microscopes • Disinfecting wipes etc

Course assessment:	
Course work:	10%
Test:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: ACTION AND USES OF MEDICINES I	**COURSE CODE: PTP 126**	**Contact Hours: 3 Hrs/Week**
	Credit Unit: 3	**Theoretical: 3 Hrs/Week**
Year: I **Semester**: II	**Pre-requisite**:	**Practical: 0**
GOAL: This course is designed to equip students with basic knowledge on fundamental principles of pharmacology which include understanding different medications work and their uses.		

GENERAL OBJECTIVES

On completion of this course, the student should be able to:

1. Know sources of common medicines;
2. Understand basic principles in Pharmacology;
3. Know the actions and uses of essential medicines;
4. Understand drug nomenclature;
5. Know route of drug administration;
6. Understand classification of drugs by actions;
7. Know skeletal, musculoskeletal and joint diseases drugs.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: **ACTION AND USES OF MEDICINES 1**		Course Code: **PTP 126**		Contact Hours: 3 Hrs/Week		
		Credit Unit: 3		Theoretical: 3 Hrs/Week		
Year: I Semester: II		Pre-requisite:		Practical: 0		
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL						
General Objective 1.0: Know sources of common medicines						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Define drugs. 1.2 Explain illicit drugs. 1.3 Define medicine. 1.4 Differentiate between medicine and drugs. 1.5 Explain the sources of medicines, e.g plant, animal, mineral sources, etc. 1.6 Explain emerging technology in drug design.	• Define drugs. • Discuss illicit drugs. • Explain medicine. • Enumerate between medicine and drugs. • Describe the sources of medicines, e.g plant, animal, mineral sources. • Describe emerging technology in drug design.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			
General Objective 2.0: Understand basic principles in Pharmacology.						
3-5	2.1 Define Pharmacology. 2.2 Discuss the origin and history of Pharmacology.	• Explain Pharmacology. • Describe the	• Textbooks, • Whiteboard, • Markers,			

	2.3 Explain the terminologies in Pharmacology i.e. - Dose - Dosage Forms - Side Effects - Contra-Indication - Antagonism - Tolerance - Addiction - Dependence, - Sensitivity - Hypersensitivity Compliance - Synergism - Potentiation - Cumulative Effects - Chemotherapy - Therapeutics - Allergy - Abuse/Misuse of drugs etc 2.4 Explain the branches of Pharmacology.	origin and history of Pharmacology. • Give assignments to students to define the terminologies in Pharmacology • Explain the branches of Pharmacology.	• Diagrams, • Audio visual aids • Computer • Projector etc			
General Objective 3.0: Know the actions and uses of essential medicines						
6-7	3.1 Explain essential medicines. 3.2 Explain the fate of medicines after administration in human body. 3.3 Discuss absorption. 3.4 Explain distribution. 3.5 Discuss metabolism. 3.6 Explain excretion. 3.7 Explain actions and mechanisms of actions.	• Describe essential medicines • Describe the fate of medicines after administration in human body. • Define absorption. • Describe distribution. • Explain metabolism Explain excretion.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			

	3.8 Explain actions (Potentiation, synergism, cytotoxicity etc). 3.9 Explain mechanism of action (Receptor mediated mechanism of action, non receptor mediated mechanism of action).	• Highlight actions and mechanisms of actions • Describe actions (Potentiation, Synergism, Cytotoxicity etc) • Explain mechanism of action (Receptor mediated mechanism of action, non-receptor mediated mechanism of action)				
General Objective 4.0: Understand drug nomenclature.						
8-9	4.1 Explain the generic names of drugs. 4.2 Discuss the proprietary and brand names of drugs. 4.3 Explain the differences between generic and brand names.	• Discuss the generic names of drugs. • Explain the proprietary and brand names of drugs. • Describe the differences between generic and brand names	• Textbooks, • whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			
General Objective 5.0: Know route of drug administration.						
10-11	5.1 Discuss the following: oral route, intravenous routes, subcutaneous routes, rectal route, inhalation, instillation, external application. 5.2 Explain drug dosages. 5.3 Discuss factors that modify	• Discuss the following: oral route, intravenous routes, subcutaneous routes, rectal route, inhalation,	• Textbooks, • Whiteboard • Markers, • Diagrams, • Audio visual aids • Computer			

	the effects of drugs **(**dosage forms, route of administration, time of administration, age, sex, rate of elimination, medication errors, patients compliance, tolerance, diet, physiological variables, co-morbidity, genetic factors, drug Interactions etc).	instillation, external application. • Explain drug dosages. • Discuss factors that modify the effects of drugs (dosage forms, route of administration, time of administration, age, sex, rate of elimination, medication errors, patients compliance, tolerance, physiological variables, Pathology, genetic factors, drug Interactions).	• Projector etc			
General Objective 6.0: Understand classification of drugs by actions.						
12-13	6.1 Explain the classification of drugs. 6.2 Discuss antacids, anti-spasmodic, ulcers healing drugs. 6.3 Explain anti–diarrheal drugs. 6.4 Describe respiratory System drugs such as expectorants, bronchodilators, corticosteroids. 6.5 Explain anti–infective Drugs	• Explain the classification of drugs. • Discuss antacids, anti-spasmodic, ulcers healing drugs. • Explain anti – diarrheal drugs. • Describe respiratory system.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			

	such as anti -bacterial, anti-fungal, anti- viral, anti – protozoa, anti-helminths	drugs such as expectorants, bronchodilators, corticosteroids. • Explain anti – infective drugs such as anti -bacterial, anti- fungal, anti-viral, anti – protozoa etc.				
General Objective 7.0: Know skeletal, musculoskeletal and joint diseases drugs.						
14-15	7.1 Explain skeletal, musculoskeletal, and joint diseases. 7.2 Explain the signs and symptoms. of musculoskeletal. and joint diseases. 7.3 Discuss the action of muscle relaxants. 7.4 Explain the uses of anti – rheumatics. 7.5 Explain the uses of analgesics and antipyretic.	• Describe skeletal, musculoskeletal, and joint diseases. • Highlight the signs and symptoms of musculoskeletal, and joint diseases. • Explain the action of muscle relaxants. • Describe the uses of anti – rheumatics • Explain the uses of analgesics and antipyretic.	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			
Course assessment: Course work: 20% Test/Assignment: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: PRIMARY HEALTH CARE I	**COURSE CODE: PTP 127**	**Contact Hours: 4 Hrs/Week**
	Credit Unit: 4	**Theoretical: 2 Hrs/Week**
Year: I **Semester**: II	**Pre-requisite**:	**Practical: 2 Hrs/Week**
GOAL: This course is designed to equip students with knowledge and skills needed to promote health, prevent diseases and provide basic medical care at the community level		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Understand the concept of Primary Health Care and the development of Nigerian Healthcare system; 2. Understand the concept of health education and factors that affect health; 3. Understand care of the elderly and patient counselling; 4. Understand first aid treatment and procedures; 5. Appreciate oral health care.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **PRIMARY HEALTH CARE I**	Course Code: **PTP 127**	Contact Hours: 4 Hrs/Week
	Credit Unit: 4	Theoretical: 2 Hrs/Week
Year: I Semester: I1	Pre-requisite:	Practical: 2 Hrs/Week
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
General Objective 1.0: Understand the concept of Primary Health Care and the development of Nigerian Healthcare system		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Weeks	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Define concept of health. 1.2 Discuss the factors that affect health especially in Nigeria e.g. Culture etc. 1.3 Explain Alma-Ata declaration. 1.4 List common sources of Healthcare in Nigeria. 1.5 Define Primary Health Care (PHC) according to WHO. 1.6 List components of PHC. 1.7 Identify the roles of PHC in the Nigerian Healthcare System (NHS) as being a central focus. 1.8 Describe the three (3)	• Explain concept of health. • Describe the factors that affect health especially in Nigeria e.g. Culture etc. • Discuss Alma-Ata declaration. • Highlight common sources of Healthcare in Nigeria. • Explain Primary Health Care (PHC) according to WHO. • Enumerate components of	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			

	levels of NHS. 1.9 Discuss the relationship between the three (3) levels of NHS 1.10 Describe PHC approach of the NHS.	PHC. • Describe the roles of PHC in the Nigerian Healthcare System (NHS) as being a central focus. • Explain the three (3) levels of NHS. • Enumerate the relationship between the three (3) levels of NHS. • Describe PHC approach of the NHS.				
General Objective 2.0: Understand the concept of health education and factors that affect health.						
4-6	2.1 Explain the principles of Health Education. 2.2 Discuss the factors that promote effective health. 2.3 Describe the elements of good communication. 2.4 Explain various methods of public awareness in Healthcare systems.	• Describe the principles of Health Education • Explain the factors that promote effective health • Explain the elements of good communication • Explain various methods of public awareness in Healthcare systems	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc.			
General Objective 3.0: Understand care of the elderly and patient counselling.						

9-10	3.1 Define care of the aged. 3.2 Discuss the process of aging. 3.3 Explain the medical classifications used for the aged. 3.4 Discuss Aged common problems affecting them such as failing sight etc. 3.5 Discuss preventive measures and treatment of common illness in elderly or aged patients. 3.6 Describe the requirement for managing aged persons in health facilities, and how to obtain the requirements. 3.7 Discuss appropriate counselling techniques. 3.8 Explain how Facilities can be utilized to care for the aged e.g. Village. Development Committee (VDC), Religious bodies.	• Explain care of the aged. • Describe the process of aging . • Discuss the medical classification used for the aged. • Explain Aged common problems affecting them such as failing sight etc. • Describe preventive measures and treatment of common illness in elderly or aged patients. • Explain the requirement for managing aged persons in health facilities, and how to obtain the requirements. • Explain appropriate counselling techniques. • Discuss how Facilities can be utilized to care for	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc			

		the aged e.g. Village Development Committee (VDC), Religious bodies.				
General Objective 4.0: Understand first aid treatment and procedures.						
11-12	4.1 Define first aid. 4.2 Explain the rules of first aid. 4.3 Explain the reasons for first aid. 4.4 Describe the contents of a standard first aid Box. 4.5 Explain the various life - saving procedures. 4.6 List the types of emergency conditions such as shock, fracture, Burns, bleeding, Acute abdomen, Asphyxia. 4.7 Discuss each emergency condition in 4.6. under the following sub topics: - Definition - Types - Signs and symptoms 4.8 Discuss accident prevention measures at the clinic, dispensing laboratory, homes etc.	• Explain first aid. • Describe the rules of first aid. • Discuss the reasons for first aid. • Explain the contents of a standard first aid Box. • Describe the various life - saving procedures. • Highlight the types of emergency conditions such as shock, fracture, Burns, bleeding, Acute abdomen, Asphyxia. • Describe each emergency condition in 4.6. under the following sub	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc	• Demonstrate ABCs of first aid emergencies.	Guide student to: Demonstrate ABCs of first aid emergencies.	Mannequin .

		topics: • Definition • Types • Signs and symptoms. • Explain accident prevention measures at the clinic, dispensing laboratory, homes etc.				
General Objective 5.0 Appreciate oral health care.						
13-15	5.1 Define oral health. 5.2 Explain Draw the anatomy of the buccal or oral cavity. 5.3 Describe types of teeth. 5.4 Discuss the diseases associated with oral cavity. 5.5 Explain the diseases of the mouth. 5.6 Explain the preventive and control measures of mouth infection. 5.7 Explain the roles of Pharmacy Technician in mobilizing the clients in promoting positive oral health behaviours	• Explain oral health. • Enumerate the anatomy of the Buccal or oral cavity. • Describe types of teeth. • Explain the diseases associated with oral cavity. • Describe the diseases of the mouth. • Enumerate the preventive and control measures of mouth infection. • Describe the roles of Pharmacy	• Textbooks, • Whiteboard, • Markers, • Diagrams, • Audio visual aids • Computer • Projector etc	• Perform practicals on oral health care	Guide student to: Perform practicals on oral health care	Buccal cavity model Tooth brush Tongue scrapper Mouth wash dental floss

		Technician in mobilizing the clients in promoting positive oral health behaviours				
Course assessment: Course work: 10% Test: 10% Practical: 40% Examination: 40% **Total: 100%**						

YEAR TWO SEMESTER ONE COURSES

<table>
<tr><td colspan="3">PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN</td></tr>
<tr><td rowspan="2">COURSE: ACTION AND USES OF MEDICINES II</td><td>COURSE CODE: PTP 211</td><td>Contact Hours: 2Hrs/Week</td></tr>
<tr><td>Credit Unit: 2</td><td>Theoretical: 2 Hrs/Week</td></tr>
<tr><td>Year: II Semester: I</td><td>Pre-requisite: Action and Uses of Medicines I</td><td>Practical: 0</td></tr>
<tr><td colspan="3">GOAL: This course is designed to equip the learners with knowledge of drugs/medicine use in human.</td></tr>
<tr><td colspan="3">GENERAL OBJECTIVES:

On completion of this course, the student should be able to:
1. Understand action and uses of medicines acting on the respiratory system;
2. Understand action and uses of medicines acting on the alimentary canal;
3. Understand action and uses of medicines acting on the central nervous system;
4. Understand action and uses of anti-microbial agents.</td></tr>
</table>

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: **ACTION AND USES OF MEDICINES II**		Course Code: **PTP 211**		Contact Hours: 2 Hrs/Week		
		Credit Unit: 2		Theoretical: 2 Hrs/Week		
Year: II Semester: I		Pre-requisite: **Action and Uses of Medicines I**		Practical: 0		
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL						
GENERAL OBJECTIVE 1.0: Understand actions and uses of drugs on the respiratory system.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	Resources
1-3	1.1 Explain drugs acting on the respiratory system. 1.2 Discuss drugs used in Asthma management (bronchodilators, corticosteroids, leukotriene antagonist, xanthenes etc). 1.3 Explain cough suppressant (antitussives). 1.4 Discuss the uses of expectorant. 1.5 Discuss the effect of anti-histamines.	• Discuss drugs acting on the respiratory system. • Explain drugs used in Asthma management (bronchodilators, corticosteroids, leukotriene antagonist, xanthenes etc). • Define cough suppressant (antitussives). • Enumerate the uses of expectorant. • Explain the effect of anti-histamines.	• White board, • Marker, • Projector, • Flipchart, • Online courses, • e-books, • Lecture notes etc.			
General Objective 2.0: Understand action and uses of drugs acting on the alimentary canal.						

4-7	2.1 Explain drugs acting on the gastrointestinal tract (GIT). 2.2 Explain the action and uses of antacids. 2.3 Discuss action and uses of antispasmodics. 2.4 Explain action and uses of ulcers healing drugs (H2-antagonist, Proton pump inhibitors, antibiotics etc). 2.5 Discuss action and uses of anti – diarrhea. 2.6 Explain the action and uses of anti – emetics. 2.7 Describe action and uses of laxative, cathartics and purgatives.	• Describe drugs acting on the gastrointestinal tract (GIT). • Discuss the action and uses of antacids. • Highlight action and uses of Antispasmodics. • Describe action and uses of ulcers healing drugs (H2-antagonist, Proton pump inhibitors, antibiotics etc). • Explain action and uses of anti – diarrhea. • Discuss the action and uses of anti – emetics. • Explain action and uses of laxative, cathartics and purgatives.	• White board, • Marker, • Projector, • Flipchart, • Online courses, • e-books, • Lecture notes etc.			
General Objective 3.0: Understand action and uses of drugs acting on the Central Nervous System (CNS).						
8-11	3.1 Explain drugs acting on the Central Nervous System. 3.2 Discuss action and uses of Opioids Analgesics (Narcotics).	• Discuss drugs acting on the Central Nervous System. • Describe action and uses of Opioids Analgesics (Narcotics). • Describe the action	• White board, • Marker, • Projector, • Flipchart, • Online courses,			

	3.3 Explain the action and uses of Non-Opioids Analgesics. 3.4 Discuss effect and uses of anti-migraine. 3.5 Explain action and uses sedatives hypnotics and tranquilizers. 3.6 Describe action and uses of anti-depressants. 3.7 Explain Antipsychotics. 3.8 Explain action and uses of anti – epileptics. 3.9 Explain action and uses of anti – Parkinsonian agents. 3.10 Explain action and uses of general anesthetics. 3.11 Explain action and uses of local anesthetics.	and uses of Non-Opioids Analgesics. • Highlight effect and uses of anti-migraine. • Describe action and uses sedatives hypnotics and tranquilizers. • Explain action and uses of anti-depressants. • Define Antipsychotics. • Describe action and uses of anti – epileptics. • Highlight action and uses of anti – Parkinsonian agents • Highlight action and uses of general anesthetics • Describe action and uses of local anesthetics.	• e-books, • Lecture notes etc.			
General Objective 4.0 Understand the action and uses of anti- microbial agents.						
12-15	4.1 Explain action and uses anti-microbials. 4.2 Discuss uses of antiseptics, disinfectants,	• Describe action and uses anti-microbials. • Explain uses of antiseptics, disinfectants,	• White board, • Marker, • Projector, • Flipchart,			

	sterilants, preservatives, germicides etc. 4.3 Explain action and uses of anti-bacterial (antibiotics). 4.4 Explain action and uses of anti-virals. 4.5 Explain action and uses of anti-fungals 4.6 Explain action and uses of anti-protozoal (e.g anti-malarial etc). 4.7 Explain action and uses of anti-helminthics.	sterilants, preservatives, germicides etc. • Discuss action and uses of anti-bacterial (antibiotics). • Discuss action and uses of anti-virals. • Enumerate action and uses of anti-fungals. • Highlight action and uses of anti-protozoal (e.g anti-malarial etc). • Discuss action and uses of anti-helminthics.	• Online courses, • e-books, • Lecture notes etc.			

Course assessment:

Course work:	20%
Test/Assignments:	20%
Examination:	60%
Total :	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: BASIC DISPENSING THEORY III	**COURSE CODE: PTP 212**	**Contact Hours: 3 Hrs/Week**
	Credit Units: 3	**Theoretical: 3 Hrs/Week**
Year: II **Semester**: I	**Pre-requisite**: Basic Dispensing Theory II	**Practical: 0**
GOAL: This course is designed to equip the students with knowledge and skills to accurately prepare and dispense medications.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1.0 Understand emulsion types of emulsion; 2.0 Understand mouth washes and gargles; 3.0 Understand various forms of liquid preparations for external use (liniment, lotion and paint).		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **BASIC DISPENSING THEORY III**	Course Code: **PTP 212**	Contact Hours: 3 Hrs/Week
	Credit Unit: 3	Theoretical: 3 Hrs/Week
Year: II Semester: I	Pre-requisite: Basic Dispensing Theory II	Practical:
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
GOAL: This course is designed to equip the student with knowledge and skills to accurately prepare and dispense medications.		
GENERAL OBJECTIVE 1.0: Understand emulsion and types of emulsion		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Weeks	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-6	1.1 Explain emulsion. 1.2 Explain types of emulsion. 1.3 Explain advantages of oral emulsions. 1.4 List emulsifying agents (classify with examples). 1.5 Explain primary emulsifying agents. 1.6 Explain secondary emulsifying agents. 1.7 Explain dry and wet gum method. 1.8 Explain hydrophile – lipophile balance (HLB). 1.9 Explain acacia emulsions and soap emulsions.	• Define emulsion • Describe types of emulsion • Enumerate advantages of oral emulsions • Highlight emulsifying agents (classify with examples) • Describe primary emulsifying agents • Discuss secondary emulsifying agents	• White board, • Marker, • Computer • Projector, • Flipcharts, • Textbooks, • Lecture notes etc			

	1.10 List types of soap Emulsions (alkali, ammonium, lime cream) . 1.11 Explain instability in emulsions (phase inversion, flocculation, sedimentation, cracking and creaming etc).	• Describe dry and wet gum method • Discuss hydrophile – lipophile balance (HLB) • Discuss acacia emulsions and soap emulsions • Highlight types of soap Emulsions (alkali, ammonium, lime cream) • Describe instability in emulsions (phase inversion, flocculation, sedimentation, cracking and creaming etc)				
General Objective 2.0: Understand mouth washes and gargles.						
7-11	2.1 Explain mouth washes and gargles. 2.2 Discuss Formulation, Vehicle and Excipients. 2.3 Explain storage. 2.4 Describe containers and closures. 2.5 Discuss labelling (auxiliary labels).	• Define mouth washes and gargles. • Explain Formulation, Vehicle and Excipients • Define storage • Explain containers and closures	• White board, • Marker, • Computer • Projector, • Flipcharts, • Textbooks, • Lecture notes etc			

		• Explain labelling (auxiliary labels).				
General Objective 3.0: Understand various forms of liquid preparations for external use (lotion, liniment and paints).						
12-15	3.1 Explain the lotion, liniment and paint. 3.2 Explain the method of preparation of lotion, liniments and paints. 3.3 Discuss vehicle and excipients. 3.4 Describe containers and closure. 3.5 Explain labels and auxiliary labels. 3.6 Explain storage of liquid preparation.	• Describe the lotion, liniment and paint • Describe the method of preparation of lotion, liniments and paint • Discuss vehicle and Explain • Define containers and closure • Describe labels and auxiliary labels. • Describe methods of storage for liquid preparations.	• White board, • Marker, • Computer • Projector, • Flipcharts, • Textbooks, • Lecture notes etc			

Course assessment

Course work:	20%
Test/Assignment:	20%
Examination:	60%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: BASIC DISPENSING PRACTICAL II	**COURSE CODE: PTP 213**	**Contact Hours: 3Hrs/Week**
	Credit Units: 3	**Theoretical: 0**
Year: II **Semester**: I	**Pre-requisite**: Basic Dispensing Practical I	**Practical: 3Hrs/Week**
GOAL: This course is designed to equip the student with knowledge and skills to accurately prepare and dispensing medications.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1.0 Prepare emulsion and types of emulsion; 2.0 Prepare mouth washes and gargles; 3.0 Prepare various forms of liquid preparation (lotion, liniment and paint) for external use.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **BASIC DISPENSING PRACTICAL II**	Course Code: **PTP 213**	Contact Hours: 3Hrs/Week
	Duration: 3 Hours	Theoretical: 0
Year: II Semester: I	Pre-requisite: **Basic Dispensing Practical I**	Practical:3Hrs/Week
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
GOAL: This course is designed to equip the student with knowledge and skills to accurately prepare and dispensing medications.		
GENERAL OBJECTIVE 1.0: Prepare emulsion and types of emulsion		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-5				1.1 Prepare emulsions. 1.2 Prepare different types of emulsions (Oil in water, and water in oil etc)	• Guide student to: Prepare an Emulsion Prepare different types of emulsions (Oil in water, and water in oil etc)	Weighing balance, mortar and pestle, measuring cylinder, pipette, containers, closures, spatula PPEs Label Running water Porcelain sink Galenicals Cleaning Towels/Hand

						dryer Distilled water Distilling unit
General Objective 2.0: Prepare mouth washes and gargles						
6-10				2.1 Prepare mouth wash and gargles 2.2 Prepare different types of mouth wash and gargles.	Guide student to: Prepare mouth washes and gargles Prepare different types of mouth wash and gargles.	Weighing balance, mortar and pestle, measuring cylinder, pipette, containers, closures, spatula Distilled water Distilling unit
General Objective 3.0: Prepare various forms of liquid preparations for external use						
11-15				3.1 Prepare lotions, Liniments and paints 3.2 Prepare different types of lotions, liniments and paints	Guide student to: Prepare lotions, Liniments and paints Prepare different types of lotions, liniments and paints.	Weighing balance, mortar and pestle, measuring cylinder, pipette, containers, closures, spatula, Distilled water Distilling unit
Course assessment Course work Assessment (Practical based): 20% Test/Assessment: 20% Examination (Practical based): 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: ANATOMY AND PHYSIOLOGY II	**COURSE CODE: PTP 214**	**Contact Hours:4 Hrs/Week**
	Credit Units: 4 Hours	**Theoretical: 2 Hrs/Week**
Year: II **Semester**: I	**Pre-requisite**: **Anatomy and Physiology I**	**Practical: 2 Hrs/Week**
GOAL: This course is designed to equip the students with knowledge and skills on human anatomy and physiology.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Understand the endocrine system; 2. Understand reproductive system and changes that take place at puberty; 3. Understand the nervous system; 4. Understand special senses.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN					
COURSE: ANATOMY AND PHYSIOLOGY II		Course Code: **PTP 214**		Contact Hours: 4 Hrs/Week	
		Credit Unit: 4		Theoretical: 2 Hrs/Week	
Year: II Semester: I		Pre-requisite: **Anatomy and Physiology I**		Practical: 2 Hrs/Week	
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL					
GENERAL OBJECTIVE 1.0: Understand the endocrine system					
THEORETICAL CONTENT				**PRACTICAL CONTENT**	
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain endocrine glands. 1.2 Explain the secretion of endocrine glands. 1.3 Explain functions of the endocrine glands. 1.4 Explain abnormalities of the endocrine glands	• Define endocrine glands. • Describe the secretion of endocrine glands. • Highlight functions of the Endocrine glands. • Describe abnormalities of the endocrine glands	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Identify parts of endocrine system using analogical model.	Guide students to: Identify parts of endocrine system	Human models, PPEs Practical manual Drawing set Logbook etc
General Objective 2.0: Understand reproductive system and the changes that take place at puberty						
4-7	2.1 Describe reproductive system. 2.2 Describe the male reproductive system. 2.3 Describe the female	• Explain reproductive system. • Explain the male reproductive system. • Explain the female	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Identify position of reproductive organs on anatomical models	Guide students to: Demonstrate position of reproductive organs	Anatomical models, Practical manual,

	reproductive system. 2.4 Describe the uterine cycle and the menstrual cycle. 2.5 Explains the changes that take place at puberty.	reproductive system. • Explain the uterine cycle and the menstrual cycle. • Highlight the changes that take place at puberty			on anatomical models	Logbooks, PPEs
General Objective 3.0: Understand the Nervous System						
8-12	3.1 Explain the nervous system and its components. 3.2 Explain the Central Nervous System: (brain and spinal cord). 3.3 Explain the peripheral nervous system. 3.4 Explain the autonomic nervous system. 3.5 Explain chemical division of the autonomic nervous system (Sympathetic and Para-sympathetic). 3.6 Explain somatic nervous system. 3.7 Explain adrenergic and cholinergic	• Describe the nervous system and its components. • Describe the Central Nervous System: (brain and spinal cord). • Discuss the peripheral nervous system. • Highlight the autonomic nervous system. • Describe chemical division of the autonomic nervous system (Sympathetic and Para-sympathetic). • Enumerate somatic nervous system • Explain adrenergic and cholinergic nervous system.	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Identify different parts of the nervous system	Guide students to: Identify different parts of the nervous system	Anatomical models, Practical Manual Charts Models Log Books Simulators etc

	nervous system.					
General Objective 4.0: Understand special senses.						
13-15	4.1 Explain the ear mechanism of hearing. 4.2 Explain common ear defects. 4.3 Explain the drugs used in the management of ear defects. 4.4 Explain the eye: the mechanism of sights. 4.5 Explain common eye defects. 4.6 Explain the drugs used in the management of eye defects.	• Explain the ear mechanism of hearing. • Explain common ear defects. • Discuss the drugs used in the management of ear defects. • Discuss the eye: the mechanism of sights. • Describe common eye defects. • Highlight the drugs used in the management of eye defects.	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Perform practical to describe features of ears and eyes including their functions.	Demonstrate to students; ears and eyes	Anatomical models, Practical Manual Charts Models Log Books Simulators etc
Course assessment Course work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total : 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: LOGISTICS AND SUPPLY CHAIN MANAGEMENT SYSTEM	**COURSE CODE: PTP 215**	**Contact Hours: 3Hrs/Week**
	Credit Units: 3	**Theoretical: 2Hrs/Week**
Year: II **Semester**: I	**Pre-requisite**:	**Practical: 1Hr/Week**
GOAL: This course is designed to equip students with knowledge and skills for medicine procurement, stocking, storage and conversant with legal medicines distribution system in the country.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Understand ordering of drugs and process of drug stocking; 2. Understand the steps for stocking medicines; 3. Know storage of pharmaceutical preparations; 4. Understand the steps involved in issuing medicines; 5. Know how to quantify essential medicines needed by the requesting units; 6. Know the key concepts of store management; 7. Understand the concept of drug revolving funds, the rationale and operations in sustaining regular supply of drugs.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **LOGISTICS AND SUPPLY CHAIN MANAGEMENT SYSTEM**	Course Code: **PTP 215**	Contact Hours: 3Hrs/Week
	Credit Unit: 3	Theoretical: 2Hrs/Week
Year: II Semester: I	Pre-requisite:	Practical: 1Hr/Week
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		

General Objective 1.0: Understand ordering of drugs and process of drug stocking

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Define logistics. 1.2 Define supply chain management. 1.3 Describe the relationships between logistics and supply chain management. 1.4 Discuss data collection for estimating medicine requirements, the ordering intervals, i.e. how often to order, the common medicines needed. 1.5 Explain calculation of the amount of medicines needed within a specified ordering interval based on local and seasonal usage (e.g. measles vaccine prior to measles	• Define logistics. • Explain supply chain management. • Explain the relationships between logistics and supply chain management. • Explain data collection for estimating medicine requirements, the ordering intervals, i.e. how often to order, the common medicines needed. • Describe calculation of the amount of medicines needed within a specified ordering interval	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Demonstrate the procedure for procurement, storage and transportation of medicine in health facilities.	Guide students to: Demonstrate the procedure of procurement, storage and transportation of medicine in health facilities	A functional medicine store

	outbreak). 1.6 Explain completion of medicines requisition form. 1.7 Discuss calculate on of the cost of the medicines ordered.	based on local and seasonal usage (e.g. measles vaccine prior to measles outbreak). • Explain completion of medicines requisition form. • Explain calculation of the cost of the medicines ordered.				
General Objective 2.0: Understand the steps for stocking medicines						
3	2.1 Describe receipt of medicines. 2.2 Explain keeping record of medicines received. 2.3 Discuss completion of a ledger form for each item (adding the new quantity received to that already in stock). 2.4 Explain stacking medicines on shelves or in refrigerators as appropriate for each.	• Explain receipt of medicines. • Explain keeping record of medicines received. • Explain completion of a ledger form for each item (adding the new quantity received to that already in stock). • Describe stacking medicines on shelves or in refrigerators as appropriate for each.	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Use inventory management tools. • Stack and arrange medicine using different techniques.	Guide students to: Use inventory management tools. Demonstrate the stacking and arrangement techniques	Inventory management tools Manufactures guides and manuals SOPs
General Objective 3.0: Know storage of pharmaceutical preparations.						
4-5	3.1 Explain storage of mixtures, galenicals, ointments, creams etc. 3.2 Discuss conditions governing storage – temperature, heat and	• Describe storage of mixtures, galenicals, ointments, creams etc. • Explain conditions governing storage –	• White board, • Marker, • Computer • Projector, • Flipcharts	• Demonstrate the optimum storage conditions of medicines • Demonstrate the	Guide students to: Demonstrate the storage practices required for optimum storage of	Functional medicine store

	light. 3.3 Discuss labelling of preparations for all purposes. 3.4 Explain First-to Expire-First – Out (FEFO) principles. 3.5 Explain importance of expiry dates.	temperature, heat and light. • Explain labelling of preparations for all purposes. • Discuss First- to Expire-First – Out (FEFO) principles. • Explain importance of expiry dates.	• NAFDAC and PCN regulations • Procurement regulations	regulatory requirements in medicine procurement, storage and handling.	medicine. Explain the procedure for disposal of expired medicines.	
General Objective 4.0: Understand the steps involved in issuing medicines.						
6	4.1 Explain filing of requisition form from the requesting unit. 4.2 Discuss evaluation of requisition. 4.3 Discuss issuing of medicines. 4.4 Explain balancing ledger-book for each item by subtracting the issued from previous balance. 4.5 Discuss importance of the receiving unit signing products receipt voucher.	• Describe filing of requisition form from the requesting unit. • Explain evaluation of requisition. • Explain issuing of medicines. • Describe balancing ledger-book for each item by subtracting the issued from previous balance. • Highlight importance of the receiving unit signing products receipt voucher.	• White board, • Marker, • Computer • Projector, • Flipcharts etc	• Carry out the issuance of medicines in a functional store.	Demonstrate the procedure of issuing medicines and using the appropriate tools.	Functional medicine store
General Objective 5.0: Know how to quantify essential medicines needed by the requesting units						
7-8	5.1 Explain how often to order medicines (i.e. ordering intervals)	• Explain how often to order medicines (i.e. ordering	• SOPs • Inventory management			

	5.2 Describe how many people are treated within the ordering intervals. 5.3 Explain record keeping of the quantity of medicines used for treatment.	intervals) • Describe how many people are treated within the ordering intervals. • Describe record keeping of the quantity of medicines used for treatment.	tools. • Consumption record tools • White board, • Marker, • Computer • Projector, • Flipcharts etc			
General Objective 6.0: Know the key concepts of store management.						
9-10	6.1 Define store management. 6.2 Explain the concept of ownership of store. 6.3 List the responsibilities of store keepers. 6.4 Discuss store safety, store organization, 6.5 Explain receipts and issues in store management.	• Explain store management. • Describe the concept of ownership of store. • Highlight the responsibilities of store keepers. • Describe store safety, store organization • Discuss receipts and issues in store management.	• White board, • Marker, • Computer • Projector, • Flipcharts etc			
General Objective 7.0: Understand the concept of drug revolving funds, the rationale and operations in sustaining regular supply of drugs						
11-15	7.1 Explain the concept of Drug Revolving Fund (DRF) for sustainability of the system. 7.2 Explain the general operation of DRF scheme.	• Discuss the concept of Drug Revolving Fund (DRF) for sustainability of the system. • Describe the general operation of	• White board, • Marker, • Computer • Projector, • Flipcharts			

	7.3 Explain advantages of DRF. 7.4 State some reasons why DRF may fail and/or succeed. 7.5 List the essential medicines required for the health unit. 7.6 Determine the ordering interval; 7.7 Describe the source(s) of funds to capitalize the DRF scheme, i.e. for initial seed stock; 7.8 Explain the advantages and disadvantages of specific levels of cost recovery (e.g. partial cost recovery, full cost recovery and full plus other cost recovery), and letting the community decide the level of cost they will use. 7.9 Explain opening of an account book and a separate bank account for the medicines revolving fund. 7.10 Explain how to keep accurate records, which will include: Receipt of medicines; Cash sales; Bank tellers;	DRF scheme. • Highlight advantages of DRF • Enumerate some reasons why DRF may fail and/or succeed. • Highlight the essential medicines required for the health unit. • Explain the ordering interval; • Explain the source(s) of funds to capitalize the DRF scheme, i.e. for initial seed stock. • Highlight the advantages and disadvantages of specific levels of cost recovery (e.g. partial cost recovery, full cost recovery and full plus other cost recovery), and letting the community decide the level of cost they will use. • Explain opening of	etc			

	7.11 Explain how to maintain petty cash expenses if any; 7.12 Explain Maintain cash receipt books; 7.13 Explain steps involved in pricing of medicines.	an account book and a separate bank account for the medicines revolving fund. • Describe how to keep accurate records, which will include: Receipt of medicines; Cash sales; Bank tellers; • Explain how to maintain petty cash expenses if any. • Explain cash receipt books. • Explain steps involved in pricing of medicines.				
Course assessment: Course Work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN				
COURSE TITLE: BASIC MICROBIOLOGY II				
COURSE CODE: PTP 216				
DURATION: 60Hrs	**Lecture: 2Hrs/Week**	**Tutorial: 0**	**Practical: 2Hrs/Week**	**Total Contact Hours: 4Hrs/Week**
CREDIT UNIT: 4				
GOAL: This course is designed to provide the students with the broad knowledge of different types of organisms, their contributions to disease causation and the application of microbiological principles in disease control.				

General Objectives:

At the end of the course, the students should be able to:

1. Understand host parasites and relationship between them;
2. Understand microbial diseases and anti-bacterial therapy;
3. Understand microbial metabolism;
4. Understand the concept of microbial cultivation;
5. Understand the concept of virology.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
COURSE TITLE: BASIC MICROBIOLOGY II						
COURSE CODE: PTP 216						
DURATION: 60 Hrs	**Lecture: 2 Hrs/Week**	**Tutorial: 0**	**Practical: 2Hrs/Week**	**Contact Hours: 4Hrs/Week**		
CREDIT UNIT: 4						
GOAL: This course is designed to provide the students with the broad knowledge of different types of organisms, their contributions to disease causation and the application of microbiological principles in disease control.						
General Objective 1.0: Understand host parasites and relationship between them						
Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
1-3	1.1 Define a parasite. 1.2 Explain host parasite relationship, mutation, resistance, virulence, infectivity, and immunity. 1.3 List the types of immunity.	• Explain a parasite. • Describe host parasite relationship, mutation, resistance, virulence, infectivity, and immunity • State the types of immunity	• White board • Markers • Charts • Diagrams • Classroom furniture etc			
General Objective 2.0 Understand microbial diseases and anti-bacterial therapy						
Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
4-7	2.1 Explain microbial diseases and anti-bacterial therapy 2.2 Discuss anti-microbial agents and uses.	• Describe microbial diseases and anti-bacterial therapy • Explain anti-microbial agents and uses	• White board /Markers • Lectures • Charts • Diagrams • Classroom			

	2.3 Explain mechanisms of action of anti-microbial agents. 2.4 Describe selective toxicity, and drug resistance. 2.5 Describe briefly chemical basis of microorganisms (atoms, molecules, acids, bases, organic compounds).	• Describe mechanisms of action of anti-microbial agents • Highlight selective toxicity, and drug resistance • Describe the chemical basis of microorganisms (atoms, molecules, acids, bases, organic compounds)	furniture • Textbooks • Reference books etc			
GENERAL OBJECTIVE 3.0: Understand microbial metabolism						
8-10	3.1 Explain the concept of microbial metabolism. 3.2 Explain the key aspects of microbial metabolism. 3.3 Explain the concepts of cellular respiration, Photosynthesis, Energy Fixing Reactions, Carbon Fixing Reaction, and Chemical reaction. 3.4 Explain microbial cultivation and growth. 3.5 Describe the factors that support microbial growth, cultivation and	• Describe the concept of microbial metabolism • Highlight the key aspects of microbial metabolism • Describe the concepts of cellular respiration, Photosynthesis, Energy Fixing Reactions, Carbon Fixing Reaction, and Chemical reaction • Explain microbial cultivation and growth • Explain the factors that support microbial growth, cultivation and	• White board • Markers • Charts • Diagrams • Classroom furniture etc			

	reproduction. 3.6 Describe with examples the metabolic pathway. 3.7 Explain the significance and applications of microbial metabolism.	reproduction • Explain with examples the metabolic pathway • Explain the significance and applications of microbial metabolism.				
GENERAL OBJECTIVE 4.0: Understand the concept of microbial cultivation.						
10-12	4.1 Explain microbial cultivation and growth. 4.2 Describe the factors that support microbial growth, cultivation and reproduction. 4.3 Describe with examples the microbial cultivation. 4.4 Explain the significance and applications of microbial cultivation.	Explain microbial cultivation and growth. Explain the factors that support microbial growth, cultivation and reproduction. Describe with examples the microbial cultivation. Explain the significance and applications of microbial cultivation.	• White board • Markers • Charts • Diagrams • Classroom furniture etc	• Cultivation of microorganisms into agar medium and visualize microbial growth	Guide students to: Cultivation of microorganisms into agar medium and visualize microbial growth	Agar medium Loop Petri dishes Test tubes Bunsen burners gas
GENERAL OBJECTIVE 5.0: Understand the concept of virology						
12-15	5.1 Explain the concept of virology. 5.2 Explain the origin of	• Discuss the concept of virology.	• White board • Markers • Charts			

	virus. 5.3 Describe the life cycle of a basic virus. 5.4 Explain the virus replication cycle. 5.5 Describe the nomenclature of viruses (structure). 5.6 Classify viruses. 5.7 List the diseases caused by viruses. 5.8 Explain the virus in relation to immune response.	• Discuss the origin of virus. • Explain the life cycle of a basic virus. • Describe the virus replication cycle. • Explain the nomenclature of viruses (structure). • Highlight viruses. • Explain the diseases caused by viruses. • Describe the virus in relation to immune response.	• Diagrams • Classroom furniture etc			
Course assessment Course work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: PRIMARY HEALTH CARE II	**COURSE CODE: PTP 217**	**Contact Hours: 4 Hrs/Week**
	Credit Units: 4	**Theoretical: 2 Hrs/Week**
Year: II **Semester**: I	**Pre-requisite**: **Primary Health Care I**	**Practical: 2 Hrs/Week**
GOAL: This course is designed to equip the student with knowledge and skills on how to prevent diseases at the community level.		

GENERAL OBJECTIVES:
On completion of this course, the student should be able to:

1. Understand reproductive health and family planning;
2. Know integrated Maternal and Child Health, and the role of Pharmacy Technicians;
3. Understand the basic knowledge of common non-communicable diseases;
4. Understand the basic knowledge of common communicable diseases;
5. Understand referral system in the healthcare system;
6. Understand the principles and importance of Immunisation.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **PRIMARY HEALTH CARE II**	Course Code: **PTP 217**	Contact Hours: 4 Hrs/Week
	Duration: 60 Hrs	Theoretical: 2 Hrs/Week
Year: II Semester: I	Pre-requisite: **Primary Health Care I**	Practical: 2 Hrs/Week
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
General Objective 1.0: Understand reproductive health and family planning		

Weeks	**Specific Learning Objectives (Theory)**	**Teacher's Activities**	**Resources**	**Specific Learning Objectives (Practical)**	**Teacher's Activities**	**Resources**
1-5	1.1 Define reproductive health. 1.2 Explain the role of father, mother and child in reproductive health and right. 1.3 Describe specific adolescent reproductive health services in the areas of drug abuse, adolescent pregnancy education. 1.4 Explain information and education, voluntary counselling and testing (VCT) on HIV/Aids. 1.5 Explain the concept of family planning. 1.6 Explain the importance of family	• Explain Reproductive Health. • Describe the role of father, mother and child in reproductive Health and right. • Highlight specific adolescent reproductive health services in the areas of drug abuse, adolescent pregnancy education. • Describe information and education, voluntary counselling and	• White board • Markers • Charts • Diagrams Classroom furniture etc	• Demonstrate the use of MEC wheel. • Perform role play counselling for men and women of reproductive age. • Demonstrate administration of Depot Medroxy-Progesterone Acetate (DMPA) to a patient.	Guide student to: Demonstrate the use of MEC wheel. Perform Role play counselling for men and women of reproductive age. Demonstrate administration of Depot Medroxy-Progesterone Acetate (DMPA-SC/SI) to a patient.	Family planning manual, Sharp Box/improvise disposal of sharp Box Template for case study report, PPE

	planning. 1.7 Explain the use of medical eligibility criteria (MEC) wheel. 1.8 Describe the probable and positive signs of pregnancy. 1.9 Discuss family planning methods and types available. 1.10 Explain the advantages and disadvantages of the various family planning methods. 1.11 Discuss the myth and misconceptions about family planning. 1.12 Explain how to stimulate the acceptance of family planning services to the clients or in the community. 1.13 Explain how to manage any problems reported as side effect on family planning methods.	testing (VCT) on HIV/Aids. • Discuss the concept of family planning • Describe the importance of family planning • Enumerate the use of medical eligibility criteria (MEC) wheel. • Explain the probable and positive signs of pregnancy • Explain family planning methods and types available • Describe the advantages and disadvantages of the various family planning methods • Discuss the myth and misconceptions about family planning • Describe how to stimulate the acceptance of family planning services to the				

		clients or in the community • Explain how to manage any problems reported as side effect on family planning methods.				
General Objective 2.0: Understand Integrated Maternal and Child Health, and the role of Pharmacy Technicians						
6-8	2.1 Explain the roles of Pharmacy Technicians in Integrated Community Case Management (ICCM), Integrated Maternal and Child Illnesses (IMCIs), Bundling of Mama Kits, etc. 2.2 Discuss signs of common childhood illnesses (chest in drawing, fast breathing, unusually sleepy child, unconscious child etc). 2.3 Discuss how to identify dehydration following diarrhea and vomiting in children. 2.4 Discuss how to identify malnutrition in children. 2.5 Explain the signs and symptoms of dehydration and malnutrition in	• Explain the roles of Pharmacy Technician in Integrated Community Case Management (ICCM), Integrated Maternal and Child Illnesses (IMCIs), Bundling of Mama Kits, etc. • Explain signs of common childhood illnesses (chest in drawing, fast breathing, unusually sleepy child, unconscious child etc). • Describe how to identify dehydration following diarrhea	• White board • Markers • Charts • Diagrams • Classroom furniture etc	• Identify chest in-drawing in a child • Count breathing and interpret the reading according to the ICCM manual • Identify danger signs of dehydration • Use Mid Upper Arm Circumference (MUAC) strap and interpreted the readings • Role play in management of childhood illnesses	Guide student using videos or pictures to: Identify chest in-drawing in a child Count breathing and interpret the reading according to the ICCM manual Identify danger signs of dehydration Use Mid Upper Arm Circumference (MUAC) strap and interpreted the readings	Practical notes ICCM and IMCI check list MUAC strap Related videos Mama Kit Stop watch

	children.	and vomiting in children. • Explain how to identify malnutrition in children. • Discuss the signs and symptoms of dehydration and malnutrition in children.			Role play in management of childhood illnesses	
GENERAL OBJECTIVE 3.0: Understand the basic knowledge of common non-communicable diseases						
9-10	3.1 Define Non-Communicable Diseases (NCD). 3.2 State examples of common NCDs. 3.3 Discuss signs and symptoms of common NCD. 3.4 Discuss risk factors of common NCDs. 3.5 Explain prevention of common NCDs.	• Define Non-Communicable Diseases (NCD) • Highlight examples of common NCDs • Describe signs and symptoms of common NCD • Explain risk factors of common NCDs • Describe prevention of common NCDs	• White board • Markers • Charts • Diagrams • Classroom furniture etc			
GENERAL OBJECTIVE 4.0: Understand the basic knowledge of common communicable diseases						
11-12	4.1 Define Communicable Diseases (CD). 4.2 State types with examples of common CDs.	• Explain Communicable Diseases (CD). • Highlight types with examples of	• White board • Markers • Charts • Diagrams • Classroom			

	4.3 Describe the mode of transmission and vectors of CDs. 4.4 Discuss signs and symptoms of common CDs. 4.5 Discuss risk factors of common CDs. 4.6 Discuss prevention of common CDs. 4.7 Describe surveillance strategies when there are outbreak of CDs.	common CDs. • Explain the mode of transmission and vectors of CDs. • Describe signs and symptoms of common CDs. • Explain risk factors of common CDs. • Describe prevention of common CDs. • Describe surveillance strategies when there are outbreak of CDs.	furniture etc			
GENERAL OBJECTIVE 5.0 Understand referral system in the healthcare system.						
13	5.1 Define referral. 5.2 Explain the referral process. 5.3 Discuss danger signs for referral for the three (3) childhood killer diseases (Malaria, Diarrhea, pneumonia). 5.4 Explain pre-referral treatment. 5.5 State the golden rule for referral	• Define referral. • Explain the referral process. • Discuss danger signs for referral for the three (3) childhood killer diseases (Malaria, Diarrhea, pneumonia). • Describe pre-referral treatment • Highlight the golden rule for	• White board • Markers • Charts • Diagrams • Classroom furniture etc			

		referral.				
GENERAL 6.0: Understand the principles and importance of immunisation.						
14-15	6.1 Define immunization. 6.2 Describe the principle of immunization. 6.3 Explain the use of immunization. 6.4 Describe the common vaccine preventable illnesses in children in Nigeria. 6.5 Explain the Nigerian Immunization schedule. 6.6 Explain good vaccine storage practices. 6.7 Explain good vaccine distribution practices.	• Discuss immunization • Explain the principle of immunization • Describe the use of immunization • Explain the common vaccine preventable illnesses in children in Nigeria • Describe the Nigerian Immunization schedule • Enumerate good vaccine storage practices • Describe good vaccine distribution practices	• White board • Markers • Charts • Diagrams • Classroom furniture etc			
Course assessment Course work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: RESEARCH METHODOLOGY	**COURSE CODE: PTP 218**	**Contact Hours: 4Hrs/Week**
	Credit Units: 4	**Theoretical: 2Hrs/Week**
Year: II **Semester**: I	**Pre-requisite**:	**Practical: 2Hrs/Week**
GOAL: This course is designed to equip the students with knowledge on research and data collection		

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:

1. Understand the meaning, types and purpose of research;
2. Understand various methods of conducting research;
3. Know the approach to research;
4. Understand the process of planning for research work;
5. Understand sampling technique used in research;
6. Understand the role of basic statistics in research;
7. Understand the conduct and organization of research work;
8. Understand the meaning and concept of rhetorical strategies in research Communication;
9. Understand drafting and writing -up research outcomes and findings;
10. Understand the knowledge and skills in research.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
COURSE: RESEARCH METHODOLOGY	**COURSE CODE: PTP 218**			**Contact Hours: 4Hrs/Week**		
Credit Unit: 4				**Theoretical: 2 Hrs/Week**		
COURSE SPECIFICATION:				**Practical: 2 Hrs/Week**		
General Objective 1: Understand the meaning, types and purpose of research.						
Week	**Specific Learning Objectives**	**Teachers Activities**	**Learning Resources**	**Specific Learning Objectives**	**Teachers Activities**	**Learning Resources**
1-2	1.1 Define research. 1.2 Explain types of research i.e. historical, descriptive, experimental research etc. 1.3 Explain aim and purpose of research.	• Define research. • Explain types of research i.e. historical, descriptive, experimental research etc. • Explain aim and purpose of research.	• Textbooks, • White board, • Marker • Internet etc			
General Objective 2: Understand various methods of conducting research.						
3-4	2.1 Explain research methodology. 2.2 List various methods of conducting research i.e. Authoritarian method, mystical approach, logical approach, scientific approach etc.). 2.3 Explain the merits and demerits of each of the methods of conducting research.	• Explain research methodology • Explain various methods of conducting research i.e. Authoritarian method, mystical approach, logical approach, scientific approach etc.)	• Textbooks, • White board, • Marker • Internet etc			

		• Explain the merits and demerits of each of the methods of conducting research.				
General Objective 3: Know the approach to research.						
5-6	3.1 Define research titles. 3.2 Explain factors to consider when choosing research titles. 3.3 Explain the importance of research titles 3.4 Discuss the dos and don'ts of research titles.	• Explain factors to consider when choosing research titles	• Textbooks, • White board, • Marker • Internet etc			
General Objective 4: Understand the process of planning for research work.						
7-8	4.1 Explain research design giving examples. 4.2 Explain study design used for descriptive and experimental research. 4.3 Explain intervention and non-intervention studies, questionnaire, interview, home and observation. 4.4 State merits and demerits of various research designs.	• Explain research design giving examples. • Explain study design used for descriptive and experimental research. • Explain intervention and non-intervention studies, questionnaire, interview, home and observation. • State merits and demerits of various research designs.	• Textbooks, • White board, • Marker • Internet etc			
GENARAL OBJECTIVE 5: Understand sampling technique used in research						

9	5.1 Define sampling and sampling technique. 5.2 Define sample and sample size. 5.3 Explain various types of sampling techniques e.g simple random, stratified, cluster etc. 5.4 Explain the advantages and disadvantages of each type of sampling techniques in 5.3 above. 5.5 Explain the calculation of sample size for a given population. 5.6 Describe the application of the sampling techniques in research.	• Define sampling and sampling technique • Define sample and sample size • Explain various types of sampling techniques e.g simple random, stratified, cluster etc. • Explain the advantages and disadvantages of each type of sampling techniques in 5.3 above • Explain the calculation of sample size for a given population • Describe the application of the sampling techniques in research.				
General Objective 6: Understand the roles of basic statistics in research						
10	6.1 Define basic statistics. 6.2 Explain various test statistic used in research e.g (Chi-Square, Z test, ANOVA, Correlation, regression analysis, student t – test etc.) 6.3 Describe characteristics of each of the test statistic in 6.2 above	• Define basic statistics • Explain various test statistic used in research e.g (Chi-Square, Z test, ANOVA, Correlation, regression analysis, student t – test etc.)	• Textbooks, • White board, • Marker etc.			

		• Describe characteristics of each of the test statistic in 6.2 above				
General Objective 7: Understand the conduct and organization of research work						
11-12	7.1 Explain how to carry out descriptive research using any of the appropriate designs. 7.2 Explain how to collect data for a given research title. 7.3 Explain how to analyze data using appropriate test statistic methods. 7.4 Explain how to interpret the result obtained at the end of the research work. 7.5 Explain steps to write up the report at the end of the conduct of research 7.6 Organize the project work to cover the topics discussed	• Explain how to Carry out descriptive research using any of the appropriate designs • Explain how to Collect data for a given research title • Explain how to analyze data using appropriate test statistic methods • Explain how to Interpret the result obtained at the end of the research work. Explain how to Write up the report at the end of the conduct of research Explain how to Organize the project work to cover the topics discussed	• Computer set • Statistical kit • Packages	• Carry out descriptive research using any of the appropriate designs • Collect data for a given research title • Analyze data using appropriate test statistic methods • Interpret the result obtained at the end of the research work. • Write up the report at the end of the conduct of research • Organize the project	Guide students to: Carry out descriptive research using any of the appropriate designs Collect data for a given research title Analyze data using appropriate test statistic methods Interpret the result obtained at	Sample data collection design Computers Statistical soft wares

				work to cover the topics discussed	the end of the research work. Write up the report at the end of the conduct of research Organize the project work to cover the topics discussed	
General Objective 8: Understand the meaning and concept of rhetorical strategies in research Communication						
13	8.1 Define rhetorical strategies. 8.2 Outline types of rhetorical strategies; - Argumentation strategy; - Cause and Effect Strategy; - Division strategy; - Compare and contrast strategy; - Narrative Strategy; - Description Strategy; - Exemplification Strategy; 8.3 Explain each of the types of rhetorical strategies in 8.2 above. 8.4 Compare and contrast the types	• Define rhetorical strategies. • Outline types of rhetorical strategies: - Argumentation strategy - Cause and Effect Strategy, - Division strategy, - Compare and contrast strategy, - Narrative	• White board • Marker • Computers • Projectors • Charts • Diagrams • Posters etc. • Audio Equipment • Audio-visual media etc	• Adopt the strategies in 8.5 on a related topic in Pharmacy Technician.	Guide and Supervise Students to carry out activities listed in 8.5	Text books Relevant of ware

	of rhetorical strategies to pharmacy technician practice. 8.5 Describe the process of search strategies in research communication: - Finding literature sources, reference, resources – textbooks, references, textbooks, etc. - Using research databases, electronic sources, web / Internet resources, - Integrating and crediting sources and avoiding plagiarism.	Strategy, - Description Strategy, - Exemplification Strategy • Explain each of the types of rhetorical strategies in 8.2 above. • Compare and contrast the types of rhetorical strategies to Pharmacy Technician. • Explain the process of search strategies in research Communication: - Finding literature sources, reference, resources – textbooks, references, textbooks, etc. - Using research databases, electronic sources, web / Internet resources, - Integrating and crediting sources and				

		avoiding plagiarism.				
General Objective 9: Understand drafting and writing -up research outcomes and findings.						
14	9.1 Define the following basic concepts: - Research Findings, - Reports, - Proposals, - Clinical Outcomes, - Clinical trials, 9.2 Explain each of the concepts listed in 9.1. 9.3 Explain the steps involved in drafting and writing research outcomes:- - Title of report - Introduction/ background: definition of terms and concepts, purpose /objectives, research questions / hypotheses - Writing the body: literature review, build essay around the focus of study or report, explanations, summaries, analysis, use of tables, chart, diagrams etc. - Writing conclusion; summarize argument, draw conclusions, make recommendations, - Revising the final drafts: observe sequence of ideas, , use transition, check	• List the characteristics of research findings, report, proposal etc	• White board • Marker • Computers • Projectors • Charts • Diagrams • Posters etc. • Audio Equipment • Audio-visual media etc	• Apply the steps stated in 9.3 to write a mini-report. • Make oral presentation of the report.	Guide and supervise students to carry out research activities	Library / Online / Internet Resources: Textbooks Journals Reference materials

	punctuations, spellings and follow rules of grammar etc. - Documentation: citation of all materials used, accuracy of all works cited. - Typesetting, finishing and binding: print document and bind in relation to use and keep personal copy for back-up. 9.4 State uses of research findings, reports, proposals, clinical outcomes, and clinical trials in Pharmacy Technician practice.					
General Objective 10: Understand the knowledge and skills in research						
15	10.1 List published reports, findings and outcomes in Pharmacy Technician practice. 10.2 Explain listed publications, reports, outcomes in 10.1. 10.3 Identify organizations and agencies that are involved in Communicating research findings: - LGA Health Department - State Ministry of Health - Federal Ministry of Health - NAFDAC - HMOs - NPHCDA - NACA - USAID - WHO - UNICEF	• Show the students examples of published report, research findings, journal publications. • Use the following tools; Posters, Charts, textbooks, journals etc to teach.	• White board • Marker • Computers • Projectors • Charts • Diagrams • Posters etc. • Audio Equipment • Audio-visual media etc	• Visit a nearby healthcare facility within the Local Government or State and write a short report	Guide and supervise Students to carry out the industrial visits.	Library / Online / Internet Resources: Textbooks Journals Reference materials

	- UNESCO - Medical and Health NGOs etc. 10.4 State uses of research communication in Pharmacy Technician practice					
Course assessment Course work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total: 100%**						

YEAR TWO SEMESTER TWO COURSES

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: BASIC DISPENSING THEORY IV	**COURSE CODE: PTP 221**	**Contact Hours: 3 Hrs/Week**
	Credit Units: 3	**Theoretical: 3 Hrs/Week**
Year: II **Semester**: II	**Pre-requisite**: **Basic Dispensing Theory III**	**Practical: 0**
GOAL: This course is designed to equip students with knowledge of the types, compounding procedures and properties of semi-solid emulsions		

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:

1. Know the types and compounding procedures for creams;
2. Understand the uses and preparation of ointments;
3. Understand the uses and preparation of pastes;
4. Understand the preparation and forms of gels or jellies;
5. Know the importance and uses of Suppositories and Pessaries;
6. Understand the principles and practice of sterile dosage forms;
7. Know Quality Assurance and Control in drug manufacturing.

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **BASIC DISPENSING THEORY IV**	Course Code: **PTP 221**	Contact Hours: 3 Hrs/Week
	Credit Unit: 3	Theoretical: 3 Hrs/Week
Year: II Semester: II	**Pre-requisite**: **Basic Dispensing Theory III**	Practical: 0
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
GOAL: This course is designed to equip students with knowledge of the types, compounding procedures and properties of semi-solid emulsions		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
General Objective 1.0 Know the types and compounding procedures for creams						
1-2	1.1 Explain creams. 1.2 List types of creams (hydrophobic and hydrophilic creams). 1.3 Explain the properties of an ideal cream base. 1.4 Describe precautions taken for preparation of creams. 1.5 Discuss general compounding procedure for creams. 1.6 Explain precautions to take while cooling and storing creams. 1.7 Explain the preparation of different classes of creams	• Define creams • Highlight types of creams (hydrophobic and hydrophilic creams). • Describe the properties of an ideal cream base. • Explain precautions taken for preparation of creams. • explain general compounding procedure for creams. • Describe precautions to take while cooling and storing creams.	• Marker, • White board, • Flipchart, • Computer • Projector etc			

	(with suitable examples). 1.8 Discuss sterol creams and soap creams: triethanolamine creams, Borax creams, Anionic emulsifying wax creams, Cationic emulsifying wax creams. 1.9 Explain creams emulsified with non- ionic surfactants	• Enumerate the preparation of different classes of creams (with suitable examples). • Explain sterol creams and soap creams: triethanolamine creams, Borax creams, Anionic emulsifying wax creams, Cationic emulsifying wax creams. • Explain creams emulsified with non-ionic surfactants				
General Objective 2.0: Understand the uses and preparation of ointments						
3-4	2.1 Explain ointments. 2.2 Explain uses of ointments. 2.3 Explain the basis for use of ointments bases such as: Hydrocarbon base, Water miscible base, Water soluble base, Absorption base, and additives to ointment base. 2.4 Discuss the properties of a well-made ointment. 2.5 Explain the preparation of ointments using: fusion and trituration methods with examples. 2.6 Describe containers and closures for ointments. 2.7 Explain labels for	• Define ointments. • Describe uses of ointments • Highlight the basis for use of ointments bases such as: Hydrocarbon base, Water miscible base, Water soluble base, Absorption base, and additives to ointment base. • Explain the properties of a well-made ointment • Describe the preparation of ointments using:	• Marker, • White board, • Flipchart, • Computer • Projector etc			

	ointments.	fusion and trituration methods with examples. • Explain Containers and closures for ointments. • Explain Labels for ointments.				
General Objective 3.0: Understand the uses and preparation of pastes						
5-6	3.1 Explain paste. 3.2 List uses of pastes. 3.3 Explain bases used in pastes. 3.4 Explain method of preparation of pastes. 3.5 Discuss the official example of pastes and method of preparation. 3.6 Describe containers and closures for pastes. 3.7 Explain labels for pastes.	• Define paste • Enumerate uses of pastes • Discuss bases used in pastes. • Describe method of preparation of pastes. • Explain the official example of pastes and method of preparation. • Explain containers and closures for pastes. • Explain labels for pastes.	• Marker, • White board, • Flipchart, • Computer • Projector etc			
General Objective 4.0: Understand the preparation and forms of gels or jellies.						
7-8	4.1 Explain gels or jellies. 4.2 List types of gels. 4.3 Explain medicated gels. 4.4 Discuss lubricants. 4.5 Explain gelling agents. 4.6 List excipients/ additives used in gels (preservatives,	• Define gels or jellies • Highlight types of gels. • Describe medicated gels. • Explain lubricants. • Describe gelling agents.	• Marker, • White board, • Flipchart, • Computer • Projector etc			

	humectants and chelating agents). 4.7 Explain why containers and closures are used for gels.	• Enumerate excipients/ additives used in gels (preservatives, humectants and chelating agents) • Discuss why containers and closures are used for gels.				
General Objective 5.0: Know the importance and uses of Suppositories and Pessaries.						
9-10	5.1 Explain Suppositories and Pessaries. 5.2 Discuss reasons for prescribing medicaments as suppositories. 5.3 Explain importance of systemic effect of drugs via the rectal route. 5.4 Describe uses of pessaries as a dosage form. 5.5 Explain method of preparation of suppositories and pessaries. 5.6 Explain types of suppository base with examples of suppository made from such base. 5.7 Discuss properties of an ideal suppository base. 5.8 Explain packing of suppositories and pessaries. 5.9 Discuss labelling of suppositories and	• Discuss Reasons for prescribing medicaments as suppositories • Explain importance of systemic effect of drugs via the rectal route • Describe uses of pessaries as a dosage form. • Explain method of preparation of suppositories and pessaries. • Explain types of suppository base with examples of suppository made from such base. • Discuss properties of an ideal suppository base. • Explain packing of	• Marker, • White board, • Flipchart, • Computer • Projector etc			

	pessaries.	suppositories and pessaries. • Discuss labelling of suppositories and pessaries.				
General Objective 6.0: Understand the principles and practice of sterile dosage forms						
11-13	6.1 Explain the injectables. 6.2 Discuss briefly the uses of ophthalmics. 6.3 Define implants. 6.4 State the uses of medical devices. 6.5 Discuss water as a vehicle for parenteral dosage forms. 6.6 Explain the general methods for purifying water (distillation, deionization and reverse osmosis). 6.7 Explain uses of water for injections. 6.8 Discuss the advantages and disadvantages of Pyrogens. 6.9 Explain methods of sterilization. 6.10 Discuss commonly used physiological solutions and their composition. 6.11 Explain factors affecting storage of medicines, cold chain and packaging materials.	• Define the injectables. • Explain briefly the uses ophthalmic • Define implants. • Explain the uses of medical devices. • Explain water as a vehicle for parenteral dosage forms. • Describe the general methods for purifying water (distillation, deionization and reverse osmosis). • Highlight uses of water for injections. • Describe the advantage and disadvantages of Pyrogens. • Explain methods of Describe. • Explain commonly used physiological	• Marker, • White board, • Flipchart, • Computer • Projector etc			

		solutions and their composition. • Describe factors affecting storage of medicines, cold chain packaging materials.				
General Objective 7.0: Know Quality Assurance and Control in drug manufacturing						
14-15	7.1 Discuss quality assurance. 7.2 Explain quality control. 7.3 Discuss Good Manufacturing Practice (GMP). 7.4 List the advantages of quality assurance and control in drug manufacturing.	• Discuss quality assurance • Explain quality control. • Discuss good manufacturing Practice • List the advantages of quality assurance and control in drug manufacturing	• Marker, • White board, • Flipchart, • Computer • Projector			
Course assessment Course work: 20% Test/Assessment: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: BASIC DISPENSING PRACTICAL III	**COURSE CODE: PTP 222**	**Contact Hours: 3Hrs/Week**
	Credit Unit: 3	**Theoretical: 0**
Year: II **Semester**: II	**Pre-requisite**: **Basic Dispensing Practical II**	**Practical: 3Hrs/Week**
GOAL: This course is designed to equip the students with knowledge and skills to accurately prepare and dispensing medications.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Prepare compounding creams; 2. Prepare ointments; 3. Prepare different types of pastes; 4. Prepare different forms of gels or jellies; 5. Prepare distilled water.		

PROGRAMME: NATIONAL DIPLOMA PHARMACY TECHNICIAN		
Course Title: **BASIC DISPENSING PRACTICAL III**	Course Code: **PTP 222**	Contact Hours: 3Hrs/Week
	Credit Unit: 3	Theoretical: 0
Year: II Semester: II	Pre-requisite: **Basic Dispensing Practical II**	Practical: 3Hrs/Week
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
General Objective 1.0: Prepare and compound creams		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2				1.1 Perform practical to prepare different types of creams.	• Guide students to perform practical to prepare different types of creams	Pharmacy Laboratory, Practical Manuals, Logbooks, PPE, reagents Pestle and Mortar Weighing balance Measuring cylinder Water Bath Porcelain tiles Spatula Grease proof paper

						Distiller Distilled water Containers Closures.
General Objective 2.0: Prepare ointments.						
3-5				2.1 Perform practical to prepare ointments.	• Arrange the students into groups. • Guide the students during practical classes • Plan the practical classes with the students • Support the students during the laboratory exercises. • Assess the students log books and provide feedback to them • Ensure that the laboratory is safe for experiments	Pharmacy Laboratory, Practical Manuals, Logbooks, PPE, reagents Pestle and Mortar Weighing balance Measuring cylinder Water Bath Porcelain tiles Spatula Grease proof paper Distiller Distilled water Containers Closures
General Objective 3.0: Prepare different types of pastes.						

6-8				3.1 Perform practicals to prepare different types of paste.	• Guide the students to prepare different types of paste Plan the practical classes with the students • Support the students during the laboratory exercises. • Assess the students log books and provide feedback to them • Ensure that the laboratory is safe for experiments	Pharmacy Laboratory, Practical Manuals, Logbooks, PPE, reagents Pestle and Mortar Weighing balance Measuring cylinder Water Bath Porcelain tiles Spatula Grease proof paper Distiller Distilled water Containers Closures
General Objective 4.0: Prepare forms of gels or jellies						
9-11				4.1 Perform practical to prepare various forms of gels or jellies.	• Guide the students to prepare various forms	Pharmacy Laboratory, Practical Manuals,

					of gels or jellies • Plan the practical classes with the students • Support the students during the laboratory exercises. • Asssess the students log books and provide feedback to them • Ensure that the laboratory is safe for experiments	Logbooks, PPE, reagents Pestle and Mortar Weighing balance Measuring cylinder Water Bath Porcelain tiles Spatula Grease proof paper Distiller Distilled water Containers Closures
General Objective 5.0: Prepare distilled water						
12-15				5.1 Perform practical to prepare distilled water.	• Guide the students to Perform practical to prepare distilled water • Plan the	Pharmacy Laboratory, Practical Manuals, Logbooks, PPE, reagents Pestle and Mortar

					practical classes with the students • Support the students during the laboratory exercises. • Assess the students log books and provide feedback to them • Ensure that the laboratory is safe for experiments	Weighing balance Measuring cylinder Water Bath Porcelain tiles Spatula Grease proof paper Distiller Distilled water Containers Closures

Course assessment	
Assessment (Practical based):	10%
Practical:	50%
Examination (Practical based):	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: COMPUTER APPLICATIONS IN PHARMACY	**COURSE CODE: PTP 223**	**Contact Hours: 3Hrs/Week**
	Credit Units: 3	**Theoretical: 1Hr/Week**
Year: II **Semester**: II	**Pre-requisite**:	**Practical: 2Hrs/Week**
GOAL: This course is designed to equip the student with knowledge and skills to accurately use computer.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Understand types and uses of application packages; 2. Understand the features and applications of word processors; 3. Know different types and applications of spread sheets; 4. Know common types and application of educational packages.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN						
Course Title: COMPUTER APPLICATION IN PHARMACY		Course Code: **PTP 223**		Contact Hours: 3Hrs/Week		
		Credit Unit: 3		Theoretical: 1Hr/Week		
Year: II Semester: II		Pre-requisite:		Practical: 2Hrs/Week		
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL						
General Objective 1.0: Understand types and uses of application packages						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Differentiate among system software, program generators and application packages. 1.2 Describe the modes of acquisition of packages: in-house, purchase, lease. 1.3 State the criteria for application package acceptability: good documentation, user-friendliness, efficiency, appropriateness etc. 1.4 List various types of packages such as word processing, spread sheets, DBMS,	• Enumerate among system software, program generators and application packages. • Explain the modes of acquisition of packages: in-house, purchase, lease. • Highlight the criteria for application package acceptability: good documentation,	• Pictures • Videos, • Manufacturers guides • Manuals, • Textbooks, • White board	• Operate a computer with application packages. • Identify the application packages on the computer. • Install at least one application package on a computer.	Guide students to: • Operate a computer with application packages • Identify the application packages on the computer • Install at least one application package on	Computers, Application Software packages, Practical Manual, Logbook, Power supply etc

	statistical and graphics, expert system etc. 1.5 Highlight some packages in each type listed in 1.4.	user- friendliness, efficiency, appropriateness etc. • Enumerate various types of packages such as word processing, spread sheets, DBMS, statistical and graphics, expert system etc. • List some packages in each type listed in 1.4.			a computer.	
General Objective 2.0: Understand the features and applications of word processors						
4-7	2.1 Define a word processor. 2.2 State the uses of word processor. 2.3 Explain the use of the main menu 2.4 Implement block editing commands. 2.5 Distinguish between document and non-document editing. 2.6 Explain document and non-document editing. 2.7 Describe functions of professional word processors e.g. desktop publishing systems.	• Explain the uses of word processor. • Highlight the use of the main menu • Describe block editing commands. • Enumerate between document and non-document editing. • Describe document and non-document editing. • Explain functions of professional word processors e.g. desktop publishing systems.	• Application manuals • Application SOPs • Manufacturer guides	• Type stock taking reports using a word processor. • Perform document and non-document editing using a word processor • Identify functions of professional word processors e.g. desktop publishing systems.	Guide students to: • Type stock taking reports using a word processor. • Perform document and non-document editing using a word processor • Identify functions of	Computer with application package

					professional word processors e.g. desktop publishing systems.	
General Objective 3.0: Know different types and applications of spread sheets.						
8-11	3.1 Define a spread sheet. 3.2 List different types of spread-sheet packages. 3.3 Explain the uses of spread-sheet in forecasting. 3.4 Discuss at least one of the spread sheet package. 3.5 Describe how to solve statistical problems using a spread sheet package.	• Explain a spread sheet. • Highlight different types of spread-sheet packages. • Describe the uses of spread-sheet in forecasting. • Explain at least one of the spread sheet packages. • Explain how to solve statistical problems using a spread sheet package.	• Application manuals • Application SOPs • Manufacturer guides	• Practice with at least one of the spread sheet package. • Solve statistical problems using a spread sheet package.	Guide students to: • Practice with at least one of the spread sheet package. • Solve statistical problems using a spread sheet package.	Computer with application
General Objective 4.0: Know common types and application of educational packages.						
12-15	4.1 Explain common educational packages. 4.2 Describe how to implement at least one educational package (e.g power point). 4.3 Explain the use of dispensing software. 4.4 Explain the use of	• Describe common educational packages • Explain at least one educational package (e.g power point). • Explain the use of dispensing	• Educational applications and packages i.e Martindale, BP • Computers etc	• Practice the use and features of the applications. • Practice the use of dispensing software • Practice the use of inventory	Guide students to: • Practice the use and features of the applications . • Practice the	Dispensing software Inventory software Sample patient record Electronic Medical

	inventory software. 4.5 Explain the use of Electronic Medical Record software (EMR).	software • Explain the use of inventory software • Explain the use of Electronic Medical Record software (EMR).		software	use of dispensing softwares • Practice the use of inventory software	Records (EMR) Computers
Course assessment Course work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: ANATOMY AND PHYSIOLOGY III	**COURSE CODE: PTP 224**	**Contact Hours: 4 Hrs/Week**
	Credit Unit: 4	**Theoretical: 2Hrs/Week**
Year: II **Semester**: II	**Pre-requisite**: **Anatomy and Physiology II**	**Practical: 2Hrs/Week**
GOAL: This course is designed to equip the students with knowledge and skills to understand the digestive and excretory system		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Understand digestive system; 2. Appreciate chemical digestion of foods in the various digestive organs; 3. Understand the excretory system.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **ANATOMY AND PHYSIOLOGY III**	Course Code: **PTP 224**	Contact Hours: 4Hrs/Week
	Credit Unit: 4	Theoretical: 2Hrs/Week
Year: II Semester: II	Pre-requisite: **Anatomy and Physiology II**	Practical: 2Hrs/Week
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
GENERAL OBJECTIVE 1.0: Understand digestive system		
THEORETICAL CONTENT	**PRACTICAL CONTENT**	

Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-4	1.1 Explain the digestive system. 1.2 List organs of digestion. 1.3 Explain the chemical digestion of food as it takes place in the mouth, stomach, duodenum, jejunum and ileum.	• Describe the digestive system. • Highlight organs of digestion. • Describe the chemical digestion of food	• Marker, • White board, • Flipchart, • Computer • Projector etc	• Identify organs of digestive system using anatomical models and charts	Guide students to; Identify organs of digestive system using anatomical models and charts	Human models and charts
General Objective 2.0: Appreciate chemical digestion of foods in the various digestive organs						
5-9	2.1 Explain absorption of food. 2.2 Explain transport of amino acids, fatty acids, glycerol and glucose across membranes.	• Describe absorption of food. • Describe transport of amino acids, fatty acids, glycerol and glucose across membranes.	• Marker, • White board, • Flipchart, • Computer • Projector etc			

	2.3 Explain different types of transport of amino acids, fatty acids, glycerol and glucose across membranes. 2.4 Explain factors affecting absorption of amino acids, fatty acids, glycerol and glucose across membranes.	• Describe different types of transport of amino acids, fatty acids, glycerol and glucose across membranes. • Highlight factors affecting absorption of amino acids, fatty acids, glycerol and glucose across membranes.				
General Objective 3.0: Understand the excretory system						
10-15	3.1 Define excretory system. 3.2 List the organs of excretion. 3.3 List the products and by-products of excretion system 3.4 Describe skin and its functions 3.5 Describe homeostasis. 3.6 Describe kidneys and their functions. 3.7 Describe Nephron and its functions. 3.8 Explain the	• Explain excretory system. • Highlight the organs of excretion. • Enumerate the products and by-products of excretion system • Explain the skin and its functions. • Explain homeostasis. • Explain the kidneys and their functions. • Explain Nephron and its functions. • Describe the mechanism of urine formation. • Describe the liver and its functions.	• Marker, • White board, • Flipchart, • Computer • Projector etc	• Perform practical experiments on excretory systems • Identify the following organs of excretion: – Skin – Lings – Kidney – Nephron – Lungs	Guide students to: • Perform practical experiments on excretory systems • Identify the following organs of excretion: – Skin – Lings – Kidney – Nephro – Lungs	Models of Skin, lungs, kidney, nephrons, and kidneys

	mechanism of urine formation. 3.9 Describe the liver and its functions. 3.10 Describe lungs and their functions.	• Describe lungs and their functions.				

Course assessment

Course work:	10%
Test/Assessment:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: PRINCIPLES OF PHARMACY TECHNICIAN PRACTICE II	**COURSE CODE: PTP 224**	**Contact Hours: 2 Hrs/Week**
	Credit Units: 2	**Theoretical: 2 Hrs/Week**
Year: II **Semester**: II	**Pre-requisite**: **Principles of Pharmacy Technician Practice I**	**Practical: 0**
GOAL: This course is designed to equip the students with knowledge and skills on duties of Pharmacy Technician in Country and Hospital Environs.		
GENERAL OBJECTIVES: On completion of this course, the student should be able to: 1. Understand the roles of Pharmacy Technician in hospital pharmacy and community practice; 2. Know inventory control, record control, receiving and checking supplies; 3. Understand roles and functions of Pharmacy Technicians in bulk stores and maintaining records.		

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **PRINCIPLES OF PHARMACY TECHNICIAN PRACTICE II**	Course Code: **PTP 225**	Contact Hours: 2Hrs/Week
	Credit Unit: 2	Theoretical: 1Hr/Week
Year: II Semester: I	Pre-requisite: **Principles of Pharmacy Technician Practice I**	Practical: 1Hr/Week

COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL

GENERAL OBJECTIVE 1.0: Understand the roles of Pharmacy Technician in hospital pharmacy and community practice

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-5	1.1 Explain receiving written prescription. 1.2 Explain dispensing of prescription. 1.3 Explain compounding. 1.4 Explain how to help to maintain patient medication profile. 1.5 Explain pre -packaging and repackaging of medicines. 1.6 Explain use of computers and software in dispensing. 1.7 Explain Tiered accreditation system. 1.8 Explain Task shifting,	• Describe receiving written prescription • Describe dispensing of prescription • Define compounding • Discuss how to help to maintain patient medication profile. • Describe pre -packaging and repackaging of medicines. • Describe use of computers and	• Marker, • White board, • Flipchart, • Computers • Projector etc	• Perform practicals to receive prescription • Demonstrate dispensing of prescription manually. • Carry out repackaging of medicines • Perform practicals using computers and software to dispense prescriptions.	Guide students to: • Perform practical to receive prescription • Demonstrate dispensing of prescription manually • Carry out repackaging of medicines • Perform practicals using computers and software to	Computers, Dispensing software, Samples of prescription, Sample patient record, Standard Operating Procedure (SOPs), Manufacturers' guide, Practical Manual etc

	task sharing policy 1.9 Explain National Drug policy.	software in dispensing. • Describe Tiered accreditation system. • Describe Task shifting, task sharing policy • Describe National Drug policy			dispense prescriptions.	
General Objective 2.0: Know inventory control, record control, receiving and checking supplies.						
6-10	2.1 Describe billing and its procedures. 2.2 Explain keeping records of drugs. 2.3 Explain preparation of weekly and monthly reports. 2.4 Discuss the importance of regular stock taking.	• Explain billing and its procedures. • Describe keeping records of drugs. • Describe preparation of weekly and monthly reports. • Explain the importance of regular stock taking	• Marker • White board, • Flipchart, • Computer • Projector • Sample copies of patient medication bill. • Inventory control tools, such as bin cards, tally cards etc	• Perform stock taking in a Pharmacy Store • Prepare weekly and monthly report • Prepare patient bill for medicines	Guide students to: • Perform stock taking in a Pharmacy Store • Prepare weekly and monthly report • Prepare patient bill for medicines	Computers, Dispensing software, Samples of prescription, Sample patient record, Standard Operating Procedure (SOPs), Manufacturers' guide, Practical Manual etc
General Objective 3.0: Understand roles and functions of Pharmacy Technicians in bulk stores and maintaining records						
11-15	3.1 Explain monitoring of stock levels of drugs in the store. 3.2 Explain receiving and checking supplies	Describe monitoring of stock levels of drugs in the store. Describe receiving	• Lecture notes • Store management • SOPs etc	• Perform receiving and checking of drug supplies	• Support the students during the laboratory exercises.	Computers, Dispensing software, Samples of

	purchased. 3.3 Explain issuing supplies from the store.	and checking supplies purchased. Describe issuing supplies from the store.	• Marker, • White board, • flipchart, • Computer • Projector etc		• Assess the students log books and provide feedback to them • Ensure that the laboratory is safe for experiments	prescription, Sample patient record, Standard Operating Procedure (SOPs), Manufacturers' guide, Practical Manual etc
Course assessment Course work: 10% Test/Assessment: 10% Practical: 40% Examination: 40% **Total: 100%**						

ROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
COURSE: ACTION AND USES OF MEDICINES III	**COURSE CODE: PTP 226**	**Contact Hours: 3Hrs/Week**
	Credit Units: 3	**Theoretical: 3Hrs/Week**
Year: II **Semester**: II	**Pre-requisite**: **Action and uses of Medicines III**	**Practical: 0**
GOAL: This course is designed to equip the student with knowledge and skills on action and uses of medicine.		

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:

1. Understand actions and uses of anti-cancer drugs;
2. Understand the relevance of nutritional supplements;
3. Appreciate rational uses of drugs;
4. Understand drugs acting on cardiovascular systems;
5. Understand drugs acting on endocrine systems;
6. Understand drugs acting on reproductive systems;
7. Understand drugs used in contraception and family planning;
8. Understand drugs of abuse and dependence (Psyhco-active substances).

PROGRAMME: NATIONAL DIPLOMA IN PHARMACY TECHNICIAN		
Course Title: **ACTION AND USES OF MEDICINES III**	Course Code: **PTP 226**	Contact Hours: 3Hrs/Week
	Credit Unit: 3	Theoretical: 3Hrs/Week
Year: II Semester: II	Pre-requisite: **Action and uses of Medicines III**	Practical: 0
COURSE SPECIFIFCATION: THEORETICAL AND PRACTICAL		
GENERAL OBJECTIVE 1.0: Understand actions and uses of anti-cancer drugs		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Define anti-cancer drugs. 1.2 List the types of anti-cancer drugs. 1.3 Explain chemotherapy of cancer disease. 1.4 Explain the classification of anti-cancer drugs.	• Explain anti-cancer drugs. • Highlight the types of anti-cancer drugs. • Describe chemotherapeutics of anti-cancer drugs.	• Marker • White board, • Flipchart, • Compute • Projector etc			
General Objective 2.0 Understand the relevance of nutritional supplements						
3	2.1 Define nutritional supplements. 2.2 Explain vitamins and minerals. 2.3 Explain essential fatty acids and amino acids. 2.4 Explain nutritional disorders.	• Explain nutritional supplements. • Describe vitamins and minerals. • Highlight essential fatty acids and amino acids	• Marker, • White board, • Flipchart, • Computer • Projector etc			

		• Describe nutritional disorders.				
General Objective 3.0: Appreciate rational uses of drugs.						
4-5	3.1 Define rational uses of medicines. 3.2 Explain the criteria for rational uses of medicines. 3.3 Explain irrational drugs use. 3.4 Explain the advantages of rational uses of medicines. 3.5 Explain how to promote rational uses of medicines. 3.6 Explain the challenges in promoting rational uses of medicines. 3.7 Explain the effect of drugs on ecosystem.	• Explain rational uses of medicines • Describe the criteria for rational uses of medicines. • Describe irrational drugs use. • Describe the advantage of rational uses of medicines. • Discuss how to promote rational uses of medicines • Demonstrate the challenges in promoting rational uses of medicines.	• Marker, • White board, • Flipchart, • Computer • Projector etc			
General Objective 4: Understand drugs acting on cardiovascular systems.						
6-7	4.1 Discuss drugs acting on cardiovascular system. 4.2 Explain anti-hypertensive, anti-arrhythmic agents, coagulants and anticoagulants. 4.3 Explain drugs used in heart failure, angina pectoris, myocardial infarction.	• Discuss acting on cardiovascular system. • Explain anti-hypertensive, anti-arrhythmic agents, coagulants and anticoagulants. • Explain drugs used in heart failure, angina, myocardial infarction	• Marker, • White board, • Flipchart, • Computer • Projector etc			

General Objective 5.0: Understand drugs acting on endocrine systems						
8-9	5.1 Discuss drugs acting on endocrine system. 5.2 Explain action and uses of anti-diabetics. 5.3 Explain action and uses of thyroid and anti-thyroid drugs. 5.4 Explain action and uses of hormones (analogue) of pituitary gland. 5.5 Explain action and uses of steroids.	• Explain drugs acting on endocrine system • Describe action and uses of anti-diabetics • Describe action and uses of thyroid and anti-thyroid drugs • Describe action and uses of hormones (analogue) of pituitary gland • Describe action and uses of steroids.	• Marker, • White board, • Flipchart, • Computer • Projector etc			
General Objective 6: Understand drugs acting on reproductive systems						
10-11	6.1 Explain uses of oxytocics. 6.2 Explain uses of tocolytics. 6.3 Explain drugs used in the treatment of infertility in women. 6.4 Explain drugs used in erectile dysfunction in men.	• Highlight uses of oxytocics, • Enumerate uses of tocolytics. • Describe drugs used in the treatment of infertility in women • Describe drugs used in erectile dysfunction in men	• Marker, • White board, • Flipchart, • Computer • Projector etc			
General Objective 7: Understand drugs used in contraception and family planning						
12-13	7.1 Explain methods of contraception. 7.2 Explain oral, injectable and implantable contraceptives. 7.3 Discuss emergency contraception.	• Describe methods of contraception. • Describe oral, injectable and implantable contraceptives. • Explain emergency contraception.	• Marker, • White board, • Flipchart, • Computer • Projector etc			

General Objective 8: Understand drugs of abuse and dependence (Psycho-active substances).						
14-15	8.1 Explain psycho-active substances. 8.2 List psycho-active substances. 8.3 Define drug of abuse with examples. 8.4 Explain the effects and treatment of dependence and addiction. 8.5 Explain addiction. 8.6 Explain the procedure for rehabilitation of drug addicts (People with drug use problem)	• Describe psycho-active substances • Highlight psycho-active substances • Explain drug of abuse with examples • Describe the effects and treatment of dependence and addiction • Define addiction • Explain the procedure for rehabilitation of drug addicts (People with drug use problem)	• Marker, • White board, • Flipchart, • Computer • Projector etc			

Course assessment

Course work:	20%
Test/Assessment:	20%
Examination:	60%
Total:	**100%**

LIST OF MINIMUM RESOURCES/PHYSICAL FACILITIES

A. Laboratories

1. Biology/Microbiology laboratory (See ND Science Laboratory Technology Curriculum)
2. Chemistry laboratory (See ND Science Laboratory Technology Curriculum)
3. Physics laboratory (See ND Science laboratory Technology Curriculum)
4. Anatomy/Demonstration Laboratory (See ND Community Health Technology Curriculum)
5. Dispensing Laboratory

B. Studios

1. Computer laboratory/studio (See ND Computer Science Curriculum)
2. Audio/Visual Studio
3. Model Pharmacy Store

I. Audio Visual Studio

S/NO	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1.	Computer System	1
2.	Projectors (Film/Overhead/slide/LCD/Power Point)	1
3.	Public Address System	1
4.	Display Screen	1
5.	Scanner	1
6.	Flip Charts/Board	1

II. Dispensing Laboratory

A. Equipment and Apparatus

S/NO	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1.	Water Baths	4
2.	Mortars and Pestles (Porcelain types)	30
3.	Mortars and Pestles (Glass Types)	30
4.	Porcelain Tiles	30
5.	Stainless Steel Spatulae	30
6.	Wooden Spatulae	30
7.	Weighing Balances (Digital)	5
8.	Weighing Balances (Beam/ Analytical)	5
9.	Glass Rods	40
10.	Glass Funnels (various sizes)	30
11.	Shaker	1
12.	Drying Ovens	1
13.	Refrigerator	1
14.	Hand Dryers	2
15.	Evaporating Dishes	30
16.	Measuring Cylinders (Metric System Calibration) (5ml,10ml, 25ml, 50ml, 100ml, 250ml,)	10 each
17.	Beakers (100ml, 250ml, 500ml)	10 each
18.	Pipettes (small, medium, large)	10 each
19.	Dispensing Bottles (60ml, 100ml, 200ml)	100 each

20.	Ointment Jars	50
21.	Powder Boxes	50
22.	Filter Papers (various sizes)	5 Pkts each
23.	Grease Proof Paper or (aluminum foil)	4 Pkts
24.	Water Distilling Kit	2
25.	PH Meter	2
26.	Porcelain Dispensing Sinks	6
27.	Organic Reagent Disposal Jar	2
28.	Counting Trays	10
29.	Disposable Hand-gloves	1 pkt
30.	Gas Cooker	1
31.	Metric System Calibrated Stainless Steel Buckets	1
32.	Stainless Steel Cooking Utensils 5 litres	2
33.	Sieves (various sizes)	2 each
34.	Drug Transfer Trolley	2
35.	Thermometer	Lot

B. Safety and Personal Protective Equipment

S/NO	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1.	First Aid Box	1
2.	Recommended Laboratory Overalls for each student and staff nose mask and head cover	Lot
3.	Fire Extinguishers	Lot
4.	Sand Bucket	1
5.	Water Supply	Lot

C. Teaching Aids and Others

S/NO	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1.	Projector	1
2.	Computer	Lot
3.	Inventory/ Dispensing software	Lot
4.	Electricity Supply and or alternative source	Lot

III. Model Pharmacy Store

S/NO	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1.	Shelves	Lot
2.	Drugs	Lot
3.	Table	1
4.	Chairs	1
5.	Visitors' chairs	2
6.	Laptop Computer	1
7.	Official/Reference book	1
8.	Aluminum Snow Glass	1

LIST OF PARTICIPANTS IN THE NATIONAL CURRICULUM REVIEW AND HARMONIZATION WORKSHOP

S/N	NAME	ADDRESS	EMAIL ADDRESS
1.	Dr. David Atuwo	Senior Special Assistant, Honourable Minister of Education, Federal Ministry of Education, Abuja.	datuwo@yahoo.com
2.	Pharm. I. B Ahmed	The Registrar/CEO Pharmacy Council of Nigeria, Abuja	shehubiahmed@yahoo.com
3.	Pharm. Halima Abdullahi Gero	FCT Hospital Management Board, Abuja	halidububny@gmail.com
4.	Pharm. Kobo Yahaya Muhammad	Director, Pharmaceutical Services, Niger State Hospital Management Board, Minna	yahayakobo@gmail.com
5.	Pharm. Niyi Joseph Bada	Federal Medical Centre, Abuja	bnjcopharm@yahoo.com
6.	Pharm. Haruna Hassan	Bill and Melinda Gates College of Health Sciences and Technology, Ningi, Bauchi	harhas111@gmail.com
7.	Pharm. Dr. Rabiu U. Tanko	Director, Pharmaceutical Services, Federal Medical Centre, Keffi	uthsar8@gmail.com
8.	Pharm. Dr. Anthony S. Idoko	Director, Education and Training Pharmacy Council of Nigeria, Abuja	idokotony8@gmail.com
9.	Pharm. Agbomma Igbokwe	Pharmacy Council of Nigeria, Abuja	agbommeigbokwe@gmail.com
10.	Pharm. Aizobu Mojisola	Pharmacy Council of Nigeria, Abuja	maizobu@gmail.com
11.	Pharm. Nwora Okpalaeke PhD	Pharmacy Council of Nigeria, Abuja	nworask.07@yahoo.com
12.	Dr. O.O. Bello	Director, Curriculum Development National Board for Technical Education, Kaduna	engroobello@gmail.com

13.	Pharm. Ibrahim Salihu	Director, Nursing and Health Technology Programmes, National Board for Technical Education, Kaduna	ibrahim22salihu@gmail.com
14.	Mrs. Ruqayya M. Rabiu	National Board for Technical Education, Kaduna	rukyras4reel@yahoo.com
15.	Mal. Fahad Sani Abdallah	National Board for Technical Education, Kaduna	sfabdallah@yahoo.com
16.	Mrs. Foluke Ewuruje	National Board for Technical Education, Kaduna	pholukeng@yahoo.com
17.	Mal. Abdulhamid Usman	National Board for Technical Education, Abuja Liaison Office	hamid97@gmail.com