THE REPUBLIC OF UGANDA

MINISTRY OF EDUCATION AND SPORTS

BUSINESS, TECHNICAL,
VOCATIONAL EDUCATION AND
TRAININING (BTVET) SUB-SECTOR

CURRICULUM FOR CERTIFICATE IN PHARMACY

May 2018

TABLE OF CONTENTS

FOREWORD

The curriculum for a Certificate in Pharmacy is designed for the training of pharmacy assistants to supplement the current limited numbers of professionals to offer pharmaceutical services.

The limited number of pharmacists, pharmacy technicians/dispensers has been due to shortage of avenue and supply from training. The current 5 year bachelors in pharmacy and the 3 year diploma program available in our Higher Education institutions yields a combined output of less than three hundred graduates per year. With the need of one pharmacy assistant at each of the Health Centre levels IV, III and II, the Health Sector estimated a minimum requirement of 4556 of these cadres in 2016.

The need for training of pharmacy assistants' cadres cannot be over emphasized. The MoES attaches great importance to HRH training for effective health service delivery in accordance to the requirements of the health sector. The severe shortage of the pharmaceutical cadres in the health service delivery was communicated to MoES by Ministry of Health in 2016.

The ministry is happy to present this draft curriculum for the training of pharmacy assistants. The development of the curriculum involved long consultative review and designing process by MoES and MOH with their respective Quality Assurance Organs (QAOs); the private sector and training institutions. The curriculum was developed within the Competence Based Training (CBET) framework to ensure that the certificate graduates attain the essential levels of knowledge, techniques, pragmatic skills and attitudes for the desired competences for effective execution of pharmacy assistant roles while at the same time guaranteeing their horizontal and vertical growth for development and improvement of the health service delivery in general.

The Ministry of Education and Sports of MoES therefore to present this draft Pharmacy Assistant Curriculum for the pilot phase. The effective delivery of the curriculum requires efforts of both the trainers and trainees; tutors, clinical instructors/preceptors and all those involved in the training of these cadres inclusive of trainees to judiciously implement it for enhanced finalization of the curriculum.

The MoES is grateful to all her partners and most especially Allied Health Professional Council (AHPC) for the technical and financial support that has enabled the preparation of this draft Pharmacy Assistant Curriculum.

Alex Kakooza
Permanent Secretary

1.0 Introduction

The National Health Policies (NHPs) and the Health Sector Strategic Investment Plan (HSSIP) to operationalize them are all geared at increasing access to essential medicines as part of National efforts to deliver the Uganda National Minimum Healthcare Package (UNMHCP). The increasing population poses steady increase and demand for medicines and health supplies in the country. The number of hospitals, clinics, drug shops across the country has been on the rise for this course. There has never the less not been a corresponding increase in the human resource for meeting the increasing need for health care providers and most especially the pharmaceutical cadre. The shortage of pharmacists and Pharmacy Technicians/Dispensers has remained very low due to limited supply from the training institutions. This has consequently left the management of medicines and health supplies, especially at lower Health Facilities to non-pharmaceutical staff, imposing additional responsibilities, and workload thus, compromising their efficiency.

Like other countries both within and outside the region such as Cameroon, Tanzania, Namibia, the United States, training of pharmacy assistants has been adopted as a feasible, sustainable and sure way of accessing the larger population. This in line with the Governments' commitment of skilling Uganda aimed at providing sufficient mass of competent and skilled workforce to effectively meet the job requirements.

1.1 Rationale for the Certificate in Pharmacy Programme

Medicines and Health supplies are one of the critical resources at hospitals and lower level health facilities required for addressing the health care needs of the population. The Government of Uganda Strategic Agenda for the management of medicines and health supplies inscribed in the Ministry of health sector development plan, 2015-2020, is to ensure the availability, accessibility, affordability and the utilization of essential medicines of appropriate quality, safety and efficiency at all times for the attainment of the highest standard of health for all.

Regulation and quality assurance of health products, most especially medicines and supplies, procurement, ware housing and distribution, utilization are being tailored within the WHO ''Seven Rights'' principles (Right medicine, right condition, right dose, right time, right place given to the right person by the right person). These arguments the need for addressing the current serious shortage of the supply and availability of pharmaceutical cadres with concomitant capacity to forecast and quantify medicines and health supplies needs for the country.

With the 185 Health Centre IVs, 1,238 Health Centre IIIs and 3,133 Health Centre IIs in 2016, with a staffing need of one Pharmaceutical assistant at each health facility, a

minimum of 4,556 pharmaceutical assistants would be required. Cognizance of the fact that this is the number for only public, not considering those required in the private sector, this situation require urgent redress. Hence the critical need for this curriculum and the training of Pharmacy assistants.

1.2 Target group

Ordinary 'O' level certificate holders with at least a pass in the following,

- English,
- Mathematics,
- Chemistry,
- Physics And
- Biology.

Qualified Health workers.

1.3 Occupational profile

- Arrange equipment, medicines and materials at the workplace
- Dispense authorized medicines appropriately
- Stores assigned medicines and supplies
- Maintain proper records of medicines and supplies
- Assist in preparation and compounding of pharmaceuticals

1.4 Aim.

This curriculum is aimed at addressing the current identified gap in pharmaceutical human resource needs both in the public and private sector throughout Uganda's health care systems by tapping into the huge numbers of stranded 'O' level leavers and mature age potential entrants and turning these into resourceful professionals.

1.5 Competences

Trainees are expected to develop the necessary knowledge skills, attitudes and values. The following learning outcomes shall be expected of graduates.

1. **Arrange equipment, medicines and materials at the workplace;**
   a. Carry out general cleanliness of equipment
   b. Store medicines, equipment and raw materials appropriately
   c. Prepare equipment as required for particular procedures

2. **Dispense authorized medicines appropriately;**
   a. Maintain suitability of dispensing area and tools
   b. Build rapport with patients/care takers

c. Receive, interpret and validate prescriptions
d. Ensure rational medicines use
e. Package medicines to be dispensed appropriately
f. label medicines to be dispensed appropriately
g. Issue medicines with correct and appropriate instructions and health information to patients/caretakers
h. Record action taken and maintain medicines and supplies consumption information
i. Clear the working area and ensure safety of the dispensing area after work

3 Store assigned medicines and supplies

a. Receive and record all medicines and supplies
b. Maintain stock cards and ledgers
c. Communicate returns
d. Document and Justify stock adjustments
e. Store medicines and supplies appropriately

4. Maintain proper records of medicines and supplies;

a. Capture and properly keep patients' data
b. Document and keeping data on medicines supplies received and issued

5. Assist in preparation and compounding of pharmaceuticals;

a. Prepare equipment and materials for compounding and mixing of pharmaceuticals
b. Assist in sterilization of pharmaceutical products
c. Assist in distillation procedures
d. Assist in carrying out any other pharmaceutical procedures

2.0 Award

The award shall be **CERTIFICATE IN PHARMACY**

3.0 Duration of the Programme:

The program duration shall be two years, subdivided into Four (4) Semesters. A semester is seventeen (17) weeks. Fifteen (15) weeks shall be for studying and two (2) weeks of examinations. However if a student is not able to complete in the two years, the student will be expected to finish within four years. In case the student still fails to finish, then that student will be discontinued.

4.0 Relationship with other Programmes

A graduate of certificate in pharmacy can proceed to diploma in pharmacy and any other health related courses.

5.0 Programme Design

The program shall be two year full time:

5.1 Study Centers

The Pharmacy Certificate programme shall be available only in Approved, accredited Institutions.

Assessment (refer to existing program curricula to modify this)

Each Course shall be assessed in two parts basing on total 100 marks with two proportions; Continuous Assessment and Final Examination. The structure of assessment for both theory and practical examinations shall be as prescribed by the curriculum. For hospital/community and industrial experiential practice, a course assessment report shall be presented at the end of the practical attachment in a format that shall from time to time be prescribed in the curriculum.

Grading of courses:

The overall marks obtained in each course offered shall be graded out of a maximum of 100 marks and assigned a letter grade and grade points as follows:-

Marks ranging from	*Letter grade*	*Grade Points*
80-100	A	5.0
75-79.9	B^{+}	4.5
70-74.9	B	4.0
65-69.9	B^{-}	3.5
60-64.9	C^{+}	3.0
55-59.9	C	2.5
50-54.9	C^{-}	2.0
≤ 49	F	00

Examination

It will be examined by Uganda Allied Health Examinations (UAHEB) the body mandated under the BTVET Act 2008 shall determine from time to time and prescribe examination regulations and shall include but not be limited to the following general regulations;

Marks:

Continuous Assessment 30%
Final Assessment 70%

Assessment

Assessment will be both progressive continuous assessment (30%) as well as summative/End of semester Examinations per module unit (70%) of the total mark.

Continuous (Formative) Assessment:

Training Institutions shall administer formative assessment to all students on soft skills, knowledge and hands-on through: group works, presentations, assignments, tests, practical tests, clinical placements, case studies, clinical record books and co -curricular activities participation. All continuous assessments marks shall be recorded by the respective Tutors, compiled and submitted to UAHEB. Continuous assessment from training institutions shall consist of:

•	Assignments consisting of;	
-	Class exercises or home taken assignment	05%
-	Individual class tests	05%
•	Fieldwork assessment /Community participation	10%
•	Clinical placements/Health centre/logbook assessment	10%
Total		**30%**

For continuous assessment to be authentic, a learner shall undertake, a minimum of **One** (1) class exercise/home-taken assignment, **One** (1) individual class test, **One** (1) fieldwork assessment /community participation. Progressive continuous assessment will include assignments, practical projects, clinical placements, log book assessment and fieldwork.

Summative Examinations.

Summative/End of semester final examinations will be done both in practical and written form. UAHEB will administer examinations and the students shall be marked out of 100% row mark for each module unit. The 100% row mark for each module unit shall then be subjected to 0.7 multiplying factor to convert the row marks into 70% of each candidates score. The 70% converted mark shall be added with the submitted continuous marks from the institution for the final award

Progression: (to be harmonized between UAHEB and NCDC)

Progression through the course shall be in three ways;

Normal progression: A student who passes each course unit with a minimum of grade point 2.0 progresses normally.

Probationary progress: A student who scores below 2 grade points shall be put on probationary progress. That student shall retake the failed course when it is next offered.

Re-Taking a Course: A student may retake any course unit when it is next offered in

order to pass it if the student had failed it before subject to applicable UAHEB regulations

Admission Requirements

The minimum requirements for admission on certificate in Pharmacy Programme shall be as set by the National Council for Higher Education for certificate programs.

- 'O' level leavers entrants shall be enrolled into two years full time Programme on the basis of standard semester system.
- Other health related workers approved by the allied health council.

6.0 Programme Structure

This programme is spread out in four semesters and involves basic sciences, foundational health sciences, pharmaceutical sciences/subjects and experiential/ field attachment training.

KEY:

- ***CH****=Contact Hours,* ***CU****=Credit Unit,* ***LH****=Lecture Hours,* ***PH****=Practical Hour and* ***TH****=Tutorial Hour*
- *Practical Hours Includes time for practical sessions conducted in the School laboratory.*
- *Tutorial Hours includes tutorials conducted in the school laboratory; industrial/pharmaceutical practice during attachment.*
- *1 CH= 2PH=2TH*
- *I CU=15 CH (a credit unit is equivalent to one contact hour per week per semester or a series of* ***fifteen*** *credit hours)*
- ***Semester Load:*** *The smallest course shall be at least* ***two*** *credit units. The program load shall range from 18 to 28 credit units (no course shall carry less than two credit units). The maximum semester load of twenty eight (28) credit units is meant to cater for students who may have courses to retake or those who may not be able to complete the requirements for the award of the Certificate within the stipulated maximum duration.*

6.1 Curriculum Structure

YEAR ONE SEMESTER ONE						
Code	**Courses**	**LH**	**TH**	**PH**	**CH**	**CU**
CPHA 1101	Human Anatomy and Physiology I	45	-	-	45	3.0
CPHA 1102	First Aid	45	-	60	75	5.0
CPHA 1103	Computer applications	45	30	30	75	5.0
CPHA 1104	Microbiology and parasitology	45	-	-	45	3.0

CPHA 1105	Pharmaceutical chemistry I	45	-	30	60	4.0
CPHA 1106	Primary Health Care	45	-	-	45	3.0
TOTAL CREDIT UNITS						**23.0**

YEAR ONE
SEMESTER TWO

Code	Courses	LH	TH	PH	CH	CU
CPHA 1201	Human Anatomy and Physiology II	45	-	-	45	3.0
CPHA 1202	Basic Pharmacognosy	40	-	10	45	3.0
CPHA 1203	Communication Skills	30	-	-	30	2.0
CPHA 1204	Medical psychology	45	-	-	45	3.0
CPHA 1205	Pharmaceutical chemistry II	45	-	-	45	3.0
CPHA 1206	Pharmaceutical Calculations	45	-	-	45	3.0
TOTAL CREDIT UNITS						**17.0**

YEAR TWO
SEMESTER ONE

Code	Courses	LH	TH	PH	CH	CU
CPHA 2101	Pharmaceutics 1	40	40	10	60	4.0
CPHA 2102	Pharmacy laws and regulations	30	-	-	30	2.0
CPHA 2103	Pharmacy practice 1	45			45	3.0
CPHA 2104	Therapeutics 1	45	-	-	45	3.0
CPHA 2105	Basic Pharmacology	45	-	-	45	3.0
CPHA 2107	Stores and Inventory management	30	30		45	3.0
CPHA 2106	*Field attachment I*		30	90	60	4.0
TOTAL CREDIT UNITS						**24.0**

YEAR TWO
SEMESTER TWO

Code	Courses	LH	TH	PH	CH	CU
CPHA 2201	Pharmaceutics II	30	30	30	60	4.0
CPHA 2202	Quality Assurance of pharmaceuticals	45	-	-	45	3.0
CPHA 2203	Pharmacy practice II	60	-	-	60	4.0
CPHA 2204	Therapeutics II	45	-	-	45	3.0
CPHA 2205	Entrepreneurship	45	30	-	60	4.0
CPHA 2206	*Field attachment II*		30	120	75	5.0
TOTAL CREDIT UNITS						**23.0**

COURSE CONTENT

YEAR ONE

SEMESTER ONE

Course Name: ***HUMANANATOMY AND PHYSIOLOGY I***

Course Code: **CPHA 1101**

CreditUnits: 3

Course Description

Trainees will be introduced to the human body structures, their relationship with each other and their functions. The course will also cover homeostasis to develop their understanding of how the human body works and maintains itself.

Course objectives

By the end of this course, the learner should be able to;

(a) Define anatomy and physiology and the respective terminologies

(b) identify cell structures, basic cell functions and levels of organization

(c) Identify organs and locate organs systems in the body

(d) Outline the physiological processes that occur in the human body

(e) Outline human body systems

(f) Identify the structure of nervous system and its functions

No	TOPICS	Duration
1.0	**Structural organization**: cells, tissues (histology), organs and organ systems of the human body **and a general overview of the structure and functions of the human body**. Membranes and integuments, Pex2.1: locating body organs from outside surface Pex 2.2: identify body cavities and sections/planes	10 LH
2.0	**Over view of Human Biology, Introduction to anatomy and Physiology** and definition of common terms used in anatomy; Surface and gross anatomy and anatomical planes (appreciation may be enhanced by use of illustrations in anatomy and pathology department) Practical exercises Pex1: locating body organs from outside surface	10 LH

	Pex 2: identify body cavities and sections/planes Pex 3. Identify and locate human bones	
3.0	**Musculo-skeletal system**: Bones and joints, Muscle anatomy - Motion and locomotion Pex 3.1 Identify and locate human bones	10 LH
4.0	**Anatomy and Physiology of the nervous system (CNS and PNS)** • Description of the structure of nervous system • Effects and biomedical importance of the various components of the nervous system.	15 LH
	TOTAL LECTURE HOURS	**45 LH**
NO	**TOTAL CONTACT HOURS**	**45 CH**

Teaching Method: Lectures,
Resources: Class room anatomy departments/skills laboratory,

Suggested references:

(1) AB Mc Naught and Callander R, "Illustrated Physiology"
(2) GMedical Physiology By A. Guyton
(3) Medical Physiology By Sanders.
(4) Review of Medical Physiology By Gannong
(5) Samson's Wright Applied Physiology By Cyril A Kelly, Eric Niel, Norman Joels

Course Name: First Aid
Course Code: CPHA 1102
CreditUnits: 5
Course Description
This course covers the basic principles of first aid and basic life support.

Course Objectives
By the end of this course, trainees should be able to provide immediate health care to the affected individual.

Course Contents

No	TOPICS	Duration
1.0	Introduction to first aid; the First aid box and personal protective equipment/gears. Practical exercises Pex1.1: identification of items in the first aid box	**15** **15LH**

	Pex 2: identifying personal protective equipments pex 3. Demonstrate the ability to use personal protective equipments	
2.0	Review of body structures and functions, Immediate measures to be taken in case of emergency, Shocks and Handling the unconscious, Vital signs, patient resuscitation and artificial respiration, Positioning a patient /Positioning a casualty Wounds and bleeding and Controlling bleeding Burns and scalds: Burn treatment including accidents caused by electric current Casualty rescue and transport. Pex1: secure and asses the scene Pex 2: identify the casualities and carry out triage pex 3. Demonstrate ability to triage,vital process and referrals	**10LH** **15LH**
3.0	Fractures and soft tissue injuries: Bandages, Standard dressings and use materials in emergency kits. Infection prevention and control Pex 3.1 identify different types of fractures Pex 3.2Demonstrate the mobilization of fractures/bandaging and dressings	**15LH** **10LH**
4.0	Stings, bites and Oral poisoning management Pex 4.1identify the type of bite,sting and poison Pex 4.2 Administer first aid to sting,bite and poison	**10LH** **10LH**
5.0	Hypo and hyperthermia; Cold and heat stroke management Pex 5.1 identify stoke Peex 5.1administer first aid for stroke management	**4 LH**
	LECTURE HOURS	**45LH**
	PRACTICALS	**60PH**
	TOTAL CONTACT HOURS	**75CH**

Teaching Method: Lectures, Tutorials, Practicals
Resources: Laboratory, Class room, Hospitals/Health Facilities

Suggested references:

1. Sarah Anderson and Beverley Snell;

2. Where there is no doctor;
3. A guide to managing illnesses for all health workers
4. First Aid Manual. By St John Ambulance

Course Name: ***computer applicaations***
Course Code: **CPHA 1103ICT**
Credit Units: 5

Course Description: This course will equip trainees with skills and techniquics of how to use a computer in their training and daily work

Course Objectives:
By the end of this course trainees should be able to:
a) Identify components of a computer
b) Use a computer for self study and work.

Course Content:

No	Topic	Duration
1.0	Introduction to Computers • Physical components of the computer: Disc Drive Computer types: Desktop, Laptop, Input devices: Keyboards; (computer control keys; numeric keypad, program assignable function keys); Cursor movement devices (joysticks, mouse, paddles, track balls); Scanners (picture recognition, text recognition). • Output devices: Video display units, Thin Film Transistor (TFT) monitors. Printers: Dot Matrix printers; Ink-Jet Printers; Laser Jet Printers, Thermal Printers; Colour Printers. Plotters. Multi-Media Projectors. Smart Boards. Practical exercises Pex1 identify the components of a computer Pex connect a computer with its accessories Pex Uses of computer components Pex typing skills Pex formatting skills Pex Data entry skills Pex Using tables Pex Using graphs PexUse of formulae	10LH
2.0	Ms Word Central processors, processor categories, size, speed number	5LH

	of simultaneous users. Computer memory, Read-Only-Memory (ROM), Read-Write Memory (or Random Access Memory- RAM). Data storage Units: Discs; hard discs, floppy diskettes; tapes; microfilms; microfiche; compact disc, flash drive/ memory sticks. Storage capacity: bytes, kilobyte, megabyte, gigabyte, terabyte.	
3.0	Ms excel	**10LH**
4.0	Network Computing and Network Communications: E-mail, internet Account, opening,uploading and downloading documents. Network devises Internet. . An Introduction to Network Devices: Wireless Access points, Routers, Servers, Hubs, Switches. Network Security; Antivirus, Firewalls.	10 LH
5.0	Power point	
6.0	Drafting and editing various types of documents, Professional Considerations: Preparation and utilization of written communication in supporting treatment, drug Information retrieval, storage Use Review. Computerized Prescription dispensing. Patient Drug Usage Information. Sales and usage repor ts. Accounting and Ledger control. Price updating.	**10 TH**
	TOTAL LECTURES	**45 LH**
	TOTAL TUTORIALS	**30 TH**
	PRACTICALS	**30 PH**
	TOTAL CONTACT HOURS	**75 CH**

Teaching Methods: Lectures, Practicals and Tutorials
Resources: Laboratory, Class room, Hospitals/Health Facilities

Suggested Reading Materials:

(1) Addison Wesley Professionals (2004). Introduction to computer. ISBN-10:0321247442; ISBN-13: 978-0321247445.
(2) Comer, DE. (2004). Computer networks and internets, 4th edn, Pearson, ISBN 0-13-143351-2
(3) Database Systems: a practical approach to design, implementation and management. 5th Edn, Addison Wesley, 2009
(4) De Palma, P (2004). Computers in society. McGraw Hill
(5) Vincent Nestler, Arthur Conklin, Gregory White and Mathew Hirsch (2005); Computer security laboratory manual (information assurance and security); career education

Course Name: ***MICROBIOLOGY AND PARASITOLOGY***
Course Code: **CPHA 1104**
CreditUnits: **3**

Course Description:

Trainees will be equipped acquire knowledge and skills for infection prevention, control and management of infestations and infectious diseases

Course Objectives

By the end of this course trainees should be able to:

(a) classify microbes and their life cycles

b.)Identify diseases caused by microbes and parasites.

(b) Prevent and control infections

(c) Provide health education.

Course Contents

No	TOPICS	Duration
1.0	**Introduction to Microbiology;** definition of microbiology and Parasitology; history and branches of microbiology Description and classification of microbes, **Bacteriology:**Define bacteriology, Describe bacterial cell structure, Describe bacterial;- classification citing out relevant examples and the diseases they causes, reproduction, growth requirements and growth phases, normal flora, Pathogenesis, transmission routes, factors that influence transmission and spread of bacterial infections, Practical exwercises Pex 1.1 identify microbes Pex1.2control infections	12LH
2.0	**Virology;** Definition, structure, general characteristics and classification of viruses. Infection of cells by viruses (Viral Replication), transmission routes of viruses and factors that influence transmission.	10 LH
3.0	**Mycology**; Definition ,structure, general characteristics and classification of fungi Fungi of medical importance and fungal infections Pex.1.1 identify infection and prevention	8 LH
4.0	**Parasitology**; Define parasitology and associated terms, characteristics and classification of parasites. Describe various groups of protozoa; **Amoebae**, **Flagellates andcoccidian.** Describe and classify helminthes, Cestodes and trematodes.	**5 LH**

	Pex4.1identify infections caused by protozoa Pex4.2identify and control infections caused by protozoa	
5.0	**Immunology**: Definition of immunology, types of immunity, immunoglobulins and immunologic disorders. Vaccination and immunization. Pex	6 LH
6.0	**Infection prevention and control**: disinfectants, antiseptics, preservatives and factors that affect their actions. Pex6.1Identify various antiseptics, disinfectants and preservatives used in infection prevention and control Pex6.2apply disfectants,antiseptics and preservatives	4 LH
7.0	**LECTURE HOURS**	45 LH
	TOTAL CONTACT HOURS	**45 CH**

Teaching Methods: Lectures, illustrations and Tutorials

Resources: Class room, Hospitals/Health Facilities

(1) Chiodini, P., Moody, D. and Manser, W. (2013). Atlas of Medical Helminthology and Protozology. 4th Edition.

(2) Geo, B., Karen, C., Janet, B., and Stephen, M. (2007). Jawetz, Melnick, &Adelberg's Medical Microbiology. McGraw-Hill. [24th Edition].

(3) Roberts, E., Nester, E., Anderson, G. and Pearsall, N. (2014). Microbiology a human Perspective. McGraw-Hill. New York. [8thEdition]

Course Name: PHARMACEUTICAL CHEMISTRY I

Course Code: CPHA 1105

CreditUnits: 4

Course Description

This course introduces basic medicinal organic, inorganic, physical and analytical chemistry as it is encountered in daily life. In this course trainees will be equipped with knowledge on properties of carbon, nomenclature, synthesis and reactions of organic compounds.

Course Objectives:

By the end of the course trainees will be able to;

(1) Classify and name organic compounds according to IUPAC

(2) Prepare selected organic compounds.

(3) Outline official preparations and their uses

Course content

Detailed Content		
No		**Duration**
1.0	Introduction to organic chemistry Terms used in organic chemistry, Organic reactions, Homologous series and rule of nomenclature of organic compounds, Bond formation and bond cleavage in organic compounds, Hybridization of carbon, Isomerism in organic compounds Classifications of organic compounds. **Practical exercise** Pex 1.1 Identify various classes of organic compound using BP methods Pex 1.2 Carry out organic reactions	
2.0	Alkanes; Nomenclature, Physical properties and chemical reactions (substitution reactions and the associated free radical mechanisms). • Examples of official preparations and their properties and uses. • Hard paraffin • Soft paraffin (white soft and yellow soft paraffin). **Practical exercise** Pex 2.1 Identify some of the examples of alkanes Pex 2.2 Identify the official preparations of alkanes	5 LH
3.0	Alkenes and alkynes Nomenclature, Physical properties, Chemical reactions. (epoxidation, ozonolysis, polymerization). • Examples of official preparations, their properties and uses. • Thalidomide **Practical exercise** Pex 3.1 Prepare the common alkene using ethanol and concsulphuric acid. Pex 3.2 Carry out various reactions involving alkenes (for example with bromine)	4 LH
4.0	Benzene and its compounds; Keküle structure, Nomenclature, physical properties and chemical reactions of benzene (electrophilic aromatic substitution reactions) Electrophilic aromatic substitution reactions. • Field craft's acylation and alkylation.	6 LH
5.0	Aliphatic alcohols; (primary, secondary and tertiary alcohols) Classification and nomenclature, Physical properties, Chemical reactions official preparation and uses. Examples of official preparations. • Absolute alcohol • Glycerol • Menthol • Chlorbutol • Methylated spirit **Practical exercise**	6 LH

	Pex 5.1carry out identification test for alcohols	
6.0	Carbonyl compounds: Nomenclature, Physical properties, Chemical reactions (nucleophilic addition and condensation reactions), Pharmacologically important Carbonyl compounds and their uses • Formaldehyde • Paraldehyde • Choralhydrate • Hexamine **Practical exercise** Pex 6.1 carry out identification test for carbonyl compounds in the lab.	6LH
7.0	Carboxylic acids; Nomenclature, Physical properties, Chemical reactions, Acid derivatives such as esters, Pharmacological preparations and their uses. • lactic acid • citric • oleic **Practical Exercise** pex7.1 Carry out identification test for carboxylic acids	6 LH
8.0	Amines; Classification and nomenclature, Physical properties, Chemical reactions and Pharmacologically important uses **Practical exercise** Pex 8.1 carry out identification test for the amines	6 LH
	PRACTICALS	30 PH
	LECTURER	45 PH
TOTAL CONTACT HOURS		**60 CH**

Teaching Methods: Lectures, Practicals and Tutorials
Resources: Laboratory, Class room,

Suggested References

(1) Beckett &Stenlake, Practical Pharmaceutical Chemistry
(2) Morrison & Boyd, Organic Chemistry, Allyn&Baco
(3) Synthesis of Essential Drugs 2006 by*R.S. Vardanyan and V.J. Hruby*
(4) Pharmaceutical drug analysis (2007) by AshutoshKar

Course Name: ***PRIMARY HEALTH CARE***
Course Code: **CPHA 1106**
CreditUnits: **3**

Course Description

This course will equip trainees with the general public health knowledge so as to be resourceful in different health care needs in the community.

Course Objectives

By the end of the course the trainee should be able to:

(a) Describe the concept of Primary Health Care.

(b) Explain the pillars of Primary Health Care

(c) Describe the roles of the different players (government, public, private sector) in Primary Health Care delivery.

(d) Explain the approaches in Health Promotion

(e) Describe the levels of health care delivery in the country.

(f) Ability to carry out health promotion activities (e.g. community sensitization, mobilization and participation).

Course Content

No	Topic	Duration
1.0	**Introduction to primary health care:** • Definition of PHC, Health and wholeness; • The concept of primary health Care; • Pillars/elements of PHC.; • Responsibilities of individuals and communities in health (i.e. restoration, maintenance and health promotion). • Health information in PHC • Planning, monitoring and evaluation of PHC activities • Community participation and involvement in PHC activities • Integration and co-ordination in PHC • Multi-Sectorial collaboration in PHC • Sustainable development goals • Social mobilization and the role of community leaders in PHC • PHC Resources; Procurement and management. **Health Promotion** • Nutrition education o Introduction to nutrition o Types of food	**15 LH**

	o Food preparation o Food storage and hygiene o Healthy life styles o Malnutrition and management o Water and sanitation in public health o Water sources and contamination. o Human waste disposal and how to control diseases caused by poor waste disposal o Primary health care systems (public and private) in health care delivery. Roles of the different players; (individuals, communities and government). **Practical exercise** PEX 1.1: Carry out hygienic procedures PEX 1.2: Carry out disinfection PEX 1.3: Correctly use personal protective equipment	
2.0	• **Levels of health care delivery:** o Hospitals and health centres, Patient referral systems. o The different PHC activities at different levels o Community Diagnosis, and pharmaceutical needs assessment o Barriers to quality health care PEX 1.1: Carry out community pharmaceutical needs assessment PEX 1.2: Carry out health education	**10 LH**
	LECTURES	**45 LH**
	TOTAL CONTACT HOURS	**45 CH**

Teaching Method: Lectures and Tutorials,
Resources: Class room, Community
Suggested References:

1) Training Guidelines Primary Health Care and Community Based Health Care, 1995, AMREF, Nairobi, Kenya
2) Training of Trainer's Manual- Uganda Community Based Health Care Association. Entebbe, Uganda
3) Infection Control, Policies and procedures, Department of Quality Assurance, Ministry of Health (2005) Kampala, Uganda
4) Implementation of Primary Health Care through Community Based Health Care and importance of Community participation in Health. Bikiika C.S (2006)
5) Health information for primary health care, J. Tiers Boerma (1991) ISBN 9966-874-02-X

6) Community Health, 3rd edition by Chris Wood, AMREF (2008), Nairobi, Kenya ISBN: 978-9966-874-91-7
7) Primary Health Care concepts and challenges in a changing world, E. Tarimo, E.G Webster (1996), WHO/ARA/97.1
8) WHO & UNICEF; ALMA-ATA 1978 Primary Health Care, Geneva 1978;

YEAR ONE
SEMESTER TWO

Course Name: ***ANATOMY AND PHYSIOLOGY II***
Course Code: **CPHA 1201**
CreditUnits: 3
Course Description

This course covers the elementary anatomy and physiology of the **Cardiovascular system** (blood tissue and Lymphatic system**),** Nervous System a**nd innervations**, (**Sensation, sensory organs, CNS/ PNS),** Endocrine systems, **Reproductive System, Respiratory Systems, Urinary System and Digestive System**.

Course objectives
By the end of this course, trainees should be able to;

a).Identify, locate and describe the various organs and systems of the body
b).Describe physiological processes that occur various organs
c).Describe the overall functions of each organ and how such functions affect the functioning of the body
d).Describe common physiological disorders

No	TOPICS	Duration
1.0	**Cardiovascular system** (blood tissue, Lymphatic system and Electrolyte balance). • **Blood:** Definition Composition of blood Functions of blood Types of anaemia and their causes Listing blood disorders • Description of body fluids compartments: Intracellular and extracellular fluids • Differences between blood and lymph fluid • Anatomy of the heart • Types and functions of blood vessels (structure of the blood vessels) • Diseases of the heart (pathophysiology of the heart)	13 LH
2.0	Endocrine system:	**8 LH**

	• Introduction • Definition of key terms: -gland Hormones • Types of glands and differences between endocrine and exocrine and location • Examples of the hormones produced by each gland and their functions • Reproduction and hormonal functions of male and female reproductive system. • Hormones secreted by cells in tissues and their functions (prostaglandins,eicosanoids leukotriens, arachnidonic acid, thromboexin)	
3.0	**Respiratory system:** • Description of anatomy and the functions of upper and lower respiratory system • Ventilation • Description of tidal volume, inspiratory reserve volume, expiratory reserve volume, residual volume • The acid base balance of respiratory system • Pathophysiology of respiratory system	**8LH**
4.0	**Digestive system** • Description anatomy and physiology, structure and functions of GIT • Description of phases of digestion system: Cephalic, Gastric and Intestinal phases • Hormones of GIT, Liver and Pancreas: exocrine and endocrine secretions • Disorders of GIT	**8 LH**
	TOTAL LECTURE HOURS	**45 LH**
NO	**TOTAL CONTACT HOURS**	**45 CH**

Teaching Method: Lectures,
Resources: Class room,
Suggested references:

(6) A Textbook of Histology-12th Edition. By D.W.Fawcett
(7) AB Mc Naught and Callander R, "Illustrated Physiology"

(8) Clinical Anatomy 7th Edition. By R.S. Snell
(9) Clinically Oriented Anatomy 4th Edition. By:K.L.Moore and A.F
(10) Cunningham's Manual of Practical Anatomy, Volume 1,2 and 3: By G.J.Romanes
(11) Grant' Atlas of Anatomy-11th Edition. By A.M.R.Agur and A.F.Dally
(12) Medical Physiology By A. Guyton
(13) Medical Physiology By Sanders.
(14) Review of Medical Physiology By Gannong
(15) Samson's Wright Applied Physiology By Cyril A Kelly, Eric Niel, Norman Joels
(16) Ross and wilson

Course Name: BASIC PHARMACOGNOSY
Course Code: CPHA 1202
CreditUnits: 3
Course Description
This course introduces basic medicinal chemistry as it is encountered in daily life. Medicinal plants and pharmacologically active compounds of plant origin will be covered.
Course Objective: By the end of the course students should be able to identify medicinal plants and describe how crude medicines can be extracted from plants
Course content

Detailed Content		
No	**Sub-Topic**	**Duration**
1.0	Introduction to pharmacognosy; definitions of terms and concepts, Traditional medicines/ alternative medicine and practices of traditional medicine; common plants locally used in African traditional medicine plant medicines. Medicinal Plants description, morphology classification and phytochemical variation within species. sources of drugs crude drugs.	8LH
2.0	The plant cell, Cell differentiation and ergastic cell contents Plant tissues and tissue culture. Processes of Basic metabolic pathways and origin of secondary metabolites Photosynthesis, respiration, carbon fixation. Pharmaceutically important derivatives of metabolic pathways; active principles (definitions and classification of active principles of medicinal plants of pharmaceutical importance).	10 LH

3.0	Plant growth regulators and Medicinal plants cultivation; Commercial plant derived fibres and products, absorbent cotton wool algal gelling agents, gums and mucilage collection, preparation and pharmaceutical uses of honey	8 LH
4.0	Collection of raw materials; Cleaning, Grating, Washing, Drying, Grinding, Preservation, Packaging, Labeling, Storage Production of crude drugs and Commerce in crude drugs. Deterioration of stored drugs.	10 LH
5.0	**Extraction of drugs; instrumentation, methods and** Procedures**, Advantages** and disadvantages of the various methods. Practicals will involve simple methods of extraction such as percolation and maceration.	10 PH
6.0	Homeopathic medicine and aromatherapy and the regulation of traditional/ herbal medicine in Uganda).	4 PH
	PRACTICALS	10 PH
	LECTURER	40 LH
TOTAL CONTACT HOURS		**45 CH**

Resources: Herbal medicine gardens and Laboratory, Class room, Field Hospitals/Health Facilities

Suggested Reference

(1) Evans, W. C. (2009). *Trease and Evans Pharmacognosy*. USA, Saunders Ltd.

(2) Houghton, P. and Mukherjee, P. K. (2009). *Evaluation of Herbal Medicinal Products*. London, Pharmaceutical Press.

(3) Medicinal chemistry

Course Name: ***COMMUNICATION SKILLS***

Course Code: **CPHA 1203**

Credit Units: 2

Course Description: This course will also inculcate communication, Counseling and Stress Management skills into trainees as a means to ensure good communication with patients/carers, their fellow health services provider and the community as a whole. This course will also provide students with negotiation skills to enable them manage personal enterprises

Course Objectives:

By the end of this course trainees should be able to:

a) Discuss the methods and importance of communication at the workplace
b) State common communication barriers and ways to overcome them
c) Discuss the role of beliefs, culture, attitudes, and values in communication

d) Communicate confidently with other members of the health team
e) Counsel patients on medicines and health matters in an appropriate way
f) Prepare written communication to health facilities and units
g) Demonstrate negotiation communication skills.

Course Content:

No	Topic	Duration
1.0	Communication Skills; Meaning and importance of communication at work places, Concepts and principles of human communication: verbal and non-verbal communication, language; Interviewing: definition, environment, behaviours, techniques, recording and reproduction of interview session. Social cultural variation, attitudes, culture, belief and values in communication and Barriers to effective communication, use of appropriate communication skills for the patients' culture during interview. Basic principles of effective communication, effective speaking, public address, the art of persuasion, conducting interviews, conducting meetings and writing minutes, group discussion, non-verbal communication cues.	**15 LH**
2.0	The GATHER approach in counselling on medicines use and health. **Listening and writing Skills:** active listening, understanding non-verbal communication and thinking critically. Selecting and organizing relevant details logically, evidence based writing, task analysis, strategies for problem solving and use of appropriate language in written communication. GATHER approach= Greet, Ask, Tell/explain/discuss, Help, Explain/provide information or instructions, Return/discuss follow up date or referral Use of "open end questions" and familiar language in patient care	**10 LH**
3.0	**Presentation skills** Counselling Skills**:**Adherence and compliance counselling vs. Patients involvement in decision making. **Negotiation & Advocacy Skills, Conflict Resolution Skills and Stress Management Skills** Presenting papers/reports in tutorials, seminars, seeking clarification and explanation, giving and justifying opinions, agreeing and disagreeing	**10TH**
	TOTAL LECTURES	**25 LH**
	TOTAL TUTORIALS	**10 TH**
	TOTAL CONTACT HOURS	**30 CH**

Teaching Methods: Lectures, Practicals and Tutorials
Resources: Laboratory, Class room, Hospitals/Health Facilities

Suggested Reading Materials:

(1) Communication skills for medicine by M. Lloyd R Bor (Churchill Livingston)
(2) Curriculum for Accredited Drug Dispensing Outlets (ADDO) Dispensers; TFDA/MSH 2004 (latest)
(3) WHO, From Access to Adherence the challenge of ARV Treatment; Studies from Botswana, Tanzania and Uganda, 2006

Course Name: ***MEDICAL PSYCHOLOGY***
Course Code: CPHA 1204
CreditUnits: 3
Course Description

This course provides the student with the knowledge of the basic behavioral sciences – psychology and sociology that is necessary for understanding their application in health care delivery and pharmacy practice in particular.

Course Objectives

At the end of the course the student should be able to:
(a) To describe the basic principles of psychology, medical sociology and anthropology
(b) To identify and classify psychological and anthropological factors that affect health in the community
(c) To explain the relationship between human behavior, health and illness.
(d) Discuss health and wholeness and spiritual dimensions of health and healing

Course Content

No	Topic	Duration
1.0	**Introduction to social psychology**; Principles and key concepts and definitions in psychology; medical sociology, and anthropology, Personality, Emotions, Motivation, Perception, Sensations and perception, perception disorders Learning: Types, learning theories; classical conditioning, operant conditioning, social learning, disorders of human learning. Memory: Storage and transfer model of memory, theories of forgetting, memory disorders Delayed development; mental retardation.	10LH
2.0	**Sociology**: Brief treatise on Physical, Psychosexual.Sexual orientation and homosexuality, sexual disorders coping with the death of someone else, breaking bad news, Death and Dying- Comforting the dying and relatives, crisis intervention. Family: Types and functions of the family, socialization of family members, marriage and divorce, responses to health seeking behaviour. Human Behaviour	20 LH

	and Illness:The theories of health seeking behaviour; behaviour-related to disease and health; attitudes, side role behaviour, health, the health belief model; relationship between socio- economic factors and health, Indigenous African healing, health and environment; societal response to illness.	
3.0	**Medical anthropology:** Different types of Traditional healers and their medicines. Principles of medical sociology and anthropology: definition and scope; types of societies; predominant social sciences theories; culture. Adequate liaison with and acceptable conduct within a community	15 LH
	TOTAL LECTURES	**45 LH**
	TOTAL CONTACT HOURS	**45 CH**

Teaching Method: Lectures and Tutorials,
Resources: Class room, Community
Suggested References:
(1) Readings in contemporary sociological theory By Englewood Cliffs

Course Name: PHARMACEUTICAL *CHEMISTRY II*
Course Code: CPHA 1205
CreditUnits: 4
Course Description
This course introduces basic inorganic medicinal physical and analytical chemistry as it is encountered in daily life. The course will explore properties of derived drugs in each

chemical group

Course Objectives: By the end of the course students should be able to;

1) Classify medicines derived from inorganic elements according to their chemical groups.
2) Describe reactions, preparation and the use of common derived medicines in each group and analysis of organic compounds

Course contents

Detailed Content		
No	**Sub-Topic**	**Duration**
1.0	Introduction to Inorganic chemistry in life: grouping of inorganic elements and their compounds, common reactions of inorganic chemical substances reactions and chemical equations,	6 LH
2.0	**Group VII derived drugs** a) **Halogens;** Introduction to halogens: Atomic structure, physical and chemical properties of halogens b) **Halogen compounds:- Hydrogen halides (HCl, HBr, HI)** • Hydrochloric acid: Properties of hydrochloric acid and uses of hydrochloric acid • **Chlorinated lime** application of chlorinated lime • **Alkali metal halides** (NaCl, KCl, KI, NaI, NaBr, KBr) Sources, formulation and medical applications of Alkali metal halides c) **Iodine** Sources, preparations(5 and 10 % alcohol solutions and Lugols' solution) and uses	8 LH
3.0	**Group VI derived drugs** Introduction to group VI elements, Oxygen and Sulphur and its compounds a) **Oxygen;** Sources and, properties, impurities, storage and uses b) **Distilled water;** Properties,storage c) **Hydrogen peroxide;** chemical behavior (oxidizing, reducing and acidic properties), uses and storage d) **Sulphur compounds;** Precipitated sulphur, Properties and uses.	8 LH
4.0	a) **Group V derived drugs;** Introduction to group V elements, **Nitrous oxide,** properties, uses and storage b) **Sodium nitrate,**Physical and chemical properties, uses and storage	4LH
5.0	• **Group III derived drugs** Introduction to group III elements a) Boron compounds, properties, and uses of boric acid	6LH

	b) **Aluminum** properties, and uses of aluminum	
6.0	**Group II derived drugs** Introduction to group II elements a) **Magnesium** Sources, physiological actions b) **Magnesium sulphates**Natural sources, and uses c) **Magnesium trisilicate**Natural sources, and uses d) **Calcium** Natural sources, physiological roles e) **Calcium chloride:**properties, and uses f) Barium compounds; Barium sulphate,properties, and uses g) Zinc compounds; Zinc sulphate,properties, and uses, Zinc oxide Properties and uses	8LH
7.0	Group I derived drugs Introduction to group I elements a) Silver nitrate b) properties,uses and storage	5 LH
	PRACTICALS	
	LECTURER	
TOTAL CONTACT HOURS		**45 CH**

Suggested References

Teacher's and Student's list of references:

(1) House, J. (2012). Inorganic Chemistry. Academic Press, Cambridge, USA

(2) Graham, S. and Fryhle, B. (2007). Organic Chemistry. John Wiley and Sons, USA.

(3) Quin, L. and Tyrel, A. (2010). Fundamentals of Heterocyclic Chemistry: Importance in Nature and in the Synthesis of Pharmaceuticals. Wiley Blackwell.

Course Name: PHARMACEUTICAL CALCULATIONS

Course Code: CPHA 1206

CreditUnits: 3

COURSE DESCRIPTION:

This course unit introduces the basic calculations in pharmacy. The concepts involved in this course unit require basic mathematical skills. In general the course is designed to enable trainees perform pharmaceutical calculations accurately, collect, analyse and interprete pharmacy related data. This course is central to the provision of pharmaceutical care in every health care environment.

Course objectives:

(a) Trainees should be able to perform basic pharmaceutical calculations

(b) Trainees should be able to apply the mathematics' skill in dosage calculations.

(c) Collect, analyse and interprete

Course content.

No.	Topics	Duration
1.0	**Prerequisite Mathematics Review** Numbers and numerals Arabic and roman numerals Fractions, Ratio and proportion, Decimals and Percentages, Percentage concentrations expression	10LH
2.0	**Systems of measurements:** International units,IU Metric systems House hold systems and their applications Interconversions	10 LH
3.0	Enlarging and reducing formulae(scaling down) Dilution and concentration. Alligation involving only two solutions Parts per million	10 LH
4.0	Basic dosage calculation(posology) Dose Frequence Duration of treatment Unit dose Daily dose total dose	15LH
	LECTURE HOURS	45 LH
	TOTAL CONTACT HOURS	45 CH

References

(1) MansoorA,Khan and IndraK.Reddy (2nd Edition,2000) Pharmaceutical and clinical culculations

(2) Reddy. I. K and M. A. Khan (2004) Essential Math and Calculations for pharmacy technicians. CRC Press, New York.
(3) Ansel's Pharmaceutical Dosage Forms and Drug Delivery system. By L V Allen Jr, et al.

YEAR TWO
SEMESTER ONE
Course Name: ***PHARMACEUTICS I***
Course Code: **CPHA 2101**
CreditUnits: 4
Course Description:
In this unit the student is expected to acquire basic knowledge of pharmaceutical formulations. They also expected to acquire knowledge and skills in Pharmaceutical laboratory safety, emergency response, equipment and hazardous materials management. The students are expected to practice become proficient in this area and at all times apply the knowledge and skills whenever it is required during pharmacy practice. This is aimed at ensuring staff and equipment safety as well as improving the quality of services provided to patients for better health outcomes.
Course Objectives
At the end of this course, the candidate should be able to:
(a) Explain the basics of pharmaceutical formulations
(b) Discuss the methods and importance of general laboratory safety
(c) State common laboratory and work place safety rules and ways to prevent them
(d) Discuss the culture of safety
(e) Assess biological, chemical and physical hazards
(f) Appreciate the role of standard operating procedure pharmacy practice
(g) Demonstrate ability to adhere to established laboratory and workplace safety protocols

Course Content

No	TOPICS	Duration
1.0	Introduction to pharmaceutics and its importance in pharmacy Pharmaceutical dosage forms and formulations Routes of medicines administrations; Factors influencing the choice of route of administration, advantages and	

	disadvantages of each route of administration	10 LH
2.0	Pharmaceutical excipients The use of excipients such as co-solvent, preservative, flavouring and colouring agents in pharmaceutical formulations. Labelling and storage of various pharmaceutical formulations Basics of compounding/mixing and stability of various pharmaceutical formulations.	10 LH
3.0	**Basic principles of effective use of a laboratory**; Introduction to laboratory use and safety; Define common terms, Laboratory, safety, hazard/hazardous materials, accident, sharps/handling sharps, caustic corrosive and toxicity, precautions/warning signs, prevention and first aid. Describe the importance of laboratory and work place safety and chemical safety. Attitudes, culture, belief and values in laboratory and chemical safety Barriers to safe and effective practice of laboratory safety and chemical safety; Qualities of a good laboratory, Laboratory furniture, furnishings and safety equipments, Basic laboratory rules and practices (standard operating procedures) Fire safety, Fire prevention, Fire response	**15LH**
4.0	Laboratory and workplace hazards, Hazard identification, Hazard assessment, Handling and storage of hazardous materials Hazard communication, Spill response, Laboratory waste management and Engineering and administrative controls	**5LH**
5.0	Personal protective equipment (PPE), Laboratory safety ware and work-place clothing.	**4 PH**
6.0	**Common Laboratory Equipment and their uses in formulation** Equipment used in Pharmaceutical compounding; Weighing scales, Mortar and pestle, Measuring cylinders, Pipettes, stirring rods, spatulas Filtration sets, water baths autoclave e.t.c	
	PRACTICAL HOURS	**10 PH**
	TUTORIAL HOURS	**30 TH**
	LECTURE HOURS	**40 LH**

	TOTAL CONTACT HOURS	60 CH

Suggested Reading Materials:

(1) Pharmaceutics: Science of Dosage and Dosage form Design ed. By M E Aulton.
(2) Ansel's Pharmaceutical Dosage Forms and Drug Delivery system. By L V Allen Jr, et al.
(3) Remington the Science and Practice of Pharmacy.
(4) Modern Pharmaceutics. edited By GS Baner& CT Rhodes.
(5) Martin Physical Pharmacy
(6) Shorton - Physical Pharmacy.
(7) Bean and Bucket - Advances in Pharmaceutical Sciences.

Course Name: ***PHARMACY LAWS AND REGULATIONS***
Course Code: CPHA 2102
CreditUnits: 2
Course Description:

This course covers pharmacy laws, regulations and other procedures that govern the licensing, production, distribution and use of medicines**.** It also tackles selected comparative aspects ofregulatory framework. It's intended to enable the student to appreciate the key legal and regulatory issues related to pharmacy practice and medicine use.

Course Objective:

By the end of this course, the learner should be able to:

(a) Define commonly used pharmacy related legal terms.
(b) Describe the Ugandan Pharmaceutical sector Regulatory system
(c) Compare Uganda's Pharmacy Practice Regulatory system with other systems in the world
(d) To be adhere to applicable regulations and guidelines in relation to importation, exportation, procurement, distribution and use of drugs.

Course Contents

NO	TOPICS	Duration
1.0	The general overview of the International Pharmaceutical Industry. Definition of: - Law (types and sources laws), Statute, Act, Ordinance, Courts and Felony, Treaty and Convention. The Uganda Licensing system for Medicines (NDA). Pharmacy as a profession; Roles and Pharmacy Professional Ethics. Professional Bodies: Introduction to pharmacy legal and regulatory systems; Laws and regulations governing pharmacy practice and medicine use. Bodies responsible for the control and regulation of	12 LH

	pharmaceutical services and their basic roles	
2.0	Legal categorization of Pharmaceutical products and other health supplies: Categories and definitions, Prescription-only medicines, Controlled medicines and Over the counter medicines Legal requirements for procurement, receiving, storage/safe custody, distribution, issuing, dispensing recording, use, loss and disposal of various categories of pharmaceutical products.	8 LH
3.0	Product and practice related license applications and conditions and the role of the medicines inspectorate. Drug safety, quality and efficacy.	6 LH
4.0	Counterfeiting and procedures for prevention. Drug promotion and guidelines for control.	4 LH
	TOTAL CONTACT HOURS	**30 CH**

Resources: Laboratory, Inspectorate Facilities

References:

(1) Allied Health Professionals Act 1996

(2) The Uganda Pharmacy and Drugs Act, 1971

(3) The Uganda National Drug Policy and Authority Statute, 1993

(4) The National Medical stores Act

(5) The National Clinical Guidelines

(6) The National Statutory instruments

(7) The Uganda National Drug Policy

(8) The Uganda National Drug Policy and Authority Regulations, 1995

Course Name: ***PHARMACY PRACTICE I***

Course Code: **CPHA 2103**

CreditUnits: **3**

Course Description

This course introduces the learner to pharmacy practice. In this course, trainees will be taken through the origins and history of pharmacy profession and it evolution to today's contemporary pharmacy practice. It is important that those assigned to dispense medicines have sufficient knowledge and skills to achieve good health outcomes and this is central in this course unit

Course Objectives

At the end of this course, the candidate should be able to:

(a) Appreciate the importance of rational use of medicines so as to be able to understand factors underlying and the adverse impact of rational use of medicine, and support strategies to improve medicine use in the hospital, appreciate the importance of pharmaco-vigilance and the role it plays in improving patient care
(b) Systematically dispense medicines
(c) Maintain and manage dispensing environment
(d) Document and keep accurate records of dispensing

Course Contents

NO	TOPICS	Duration
1.0	**Pharmacy as a profession**: history of Pharmacy Practice in the world and in Uganda, comparative pharmacy, trends and challenges in Pharmacy Practice, Medical Ethics and professional code of conduct; Pharmacy ethical practice and behavior, Role of assistant pharmacists What the patient,community/society expects out of assistant pharmacy cadre	10 LH
2.0	**Medicine use;** definition of rational medicines use, proper medicine use process in diagnosis and follow up, prescribing, dispensing and adherence/ compliance (posological table) Irrational Use of Medicines meaning and Impact on: quality of drug therapy and medical care, cost and waste of financial resources, psychosocial impact, antimicrobial resistance Factors underlying irrational use of medicine; health systems, Industry (medicines promotion), Prescriber, Dispenser, Patient/ community Improving rational use of medicine; Medicines and therapeutic committees, Understanding the underlying problems of irrational medicine use, Public awareness and community education. Field experiences related to rational use of medicine from candidates; Examples of efforts taken at the hospital to improve rational use of medicines, Examples of irrational use of medicines experienced at the hospital	10 LH
3.0	**Prescription**- definition of a prescription, parts of a prescription, commonly used abbreviations in prescriptions and common errors e.g. interpretation of writing; “sound alike” – “look alike” medicines	

	Basic steps in good dispensing; Description of the dispensing environment and dispensing equipment, a good dispensing environment and the importance of having a clean and orderly dispensing environment, maintenance of a clean and orderly dispensing environment (including equipment) arrangement of medicines and equipment in a dispensing room, recognition of medicines (distinctive features, packaging, labeling),	10 LH
4.0	**PRACTICALS** Dispensing practice "role play" Prescription refills, Prescription retention, Documenting and keeping dispensing records	30 PH
5.0	**PRACTICAL HOURS**	30 TH
6.0	**LECTURES**	30 LH
	TOTAL CONTACT HOURS	**45 CH**

Teaching Method: Lectures, Tutorials and Placements.

Resources: Class room, Hospitals/Health Facilities

Suggested References:

(1) Community Health, 3rd edition by Chris Wood, AMREF (2008), Nairobi Kenya, ISBN 978-9966-874-91-7

(2) Essential medicines and Health supplies list for Uganda 2012 (MoH)

(3) Health information for primary health care, J Tiers Boerma (1991), ISBN 9966-874-02-X

(4) Implementation of Primary Health Care through community based Health care and importance of community participation in Health, Bikiika C.S (2006)

(5) Management of medicines and Health supplies manual 2012 (MoH)

(6) Training guidelines primary Health Care and Community based health care, 1995 AMREF, Nairobi, Kenya

(7) British National Formulary (BNF), British Medical association and the pharmaceutical society of Great Britain

(8) Management sciences for Health 2014

Course Name: ***THERAPEUTICS I***

Course Code: **CPHA 2104**

CreditUnits: **3**

Course Description: Many times the pharmacy staff is required to manage some common health conditions in private practice, contribute valid medicines information on the health team and validate prescriptions for consistence and rational medicine use. To perform this accurately and efficiently, the trainees need to have some basic

knowledge on presentations (signs and symptoms) of these health conditions and the most disease management approach taking into consideration the prevailing circumstances. This course aims at providing the trainees with the knowledge and skills on commonly encountered health conditions and the management approaches

Course Objectives

At the end of this course, the candidate should be able to:

(a) Recognize the common health conditions

(b) Interpret the laboratory findings in respect to the common health conditions

(c) Advise on the best treatment options

(d) Detect and prevent irrational medicine use

Course content

Detailed Content		
No	**Sub-Topic**	**Duration**
1.0	**Introduction to therapeutics** Meaning and relevance of therapeutics and the roles of a Pharmacy practitioner on the Health care Team, Drug interactions; definition, clinical relevance; types,	10LH
2.0	**Introduction to infections:** Presentation and management the following cases: Respiratory tract infections, URTIs: Common cold, sinusitis, rhinitis, otitis media, pharyngitis, acute epiglottitis, LRTIs: Tuberculosis, bronchitis, Pneumonia **Gastro-intestinal infections** (helminthes, amoebiasis, gardiasis, salmonelosis, shigellosis, campylobacteriosis, infectious diarrhea, pseudomembranous colitis) Peptic ulcer disease, Gastro-esophageal reflux , Inflammatory bowel disease, Nausea and vomiting , Diarrhoea and constipation **Central nervous system infections** (meningitis and encephalitis), Bone and joint infections (osteomyelitis and infectious arthritis), Urinary tract infections, **Sexually transmitted infections** (gonorrhea, syphilis, lympho granuloma venereum, chancroid, trichomoniasis, genital herpes-HSV-2) HIV/AIDs and opportunistic infections, Mycotic infections (superficial and systemic mycoses), Parasitic infections (malaria, trypanasomiasis, schistosomiasis, leishmaniasis)	25 LH
3.0	Bronchial asthma; Chronic obstructive pulmonary disease, Cystic fibrosis Drug induced pulmonary disease	10 LH
	TOTAL CONTACT HOURS	**45 CH**

READING MATERIALS:

1. Uganda clinical guidelines
2. British national formulary
3. Russel J Greeen and Norman D.Harris,3rd Edition (2008)Pathology and therapeutics for pharmacists

Course Name: ***PHARMACOLOGY***
Course Code: **CPHA 2105**
CreditUnits: **3**

Course Description

In this course the student will learn about the importance of pharmacology to pharmacy practice. The basic language of pharmacology is introduced and common pharmacological terms; pharmacokinetics and pharmacodynamics will be explored. This course is designed to give an overview of the principles of pharmacology using the basic concepts of drugs and their action.

COURSE OBJECTIVES:

(a) To define key terms as refers to drugs.
(b) To explain the basic principles of drug action.
(c) To describe how drugs function
(d) To describe the principles of using drugs in the management of disease states.
(e) To describe how drugs cause relief of or cure disease states.
(f) To explain how drugs are broken down by the body

COURSE CONTENT

No	Topic	Duration
1.0	**Introduction to basic principles of Pharmacology:** Clinical Pharmacokinetics concepts: plasma concentration, bioavailability, volume of distribution, drug clearance, order of drug clearance from the body. Pharmacokinetic and pharmacodynamic changes in common disease	10LH

	states. Definition of drug effect, efficacy, idiosycrancy, Interactions; Broad outline of how a drug can affect the body through interaction with proteins, receptors and biochemical process modification. Drug metabolism and elimination. Routes of administration. Therapeutic drug monitoring (drug level profile): **Principles of toxicology**; Acute, sub acute and chronic toxicity; General principles of treatment of acute toxicity and acute poisoning; Signs, symptoms and treatment of acute poisoning due to barbiturates, alcohols, benzodiazepines, antidepressants, neuroleptics, insecticides, snake bites, heavy metals (iron lead mercury arsenic); Drug - drug interactions, drug and food interactions	
2.0	**Analgesics and other musculoskeletal agents**: Classification and mode of action of common analgesics and their selection.	6LH
3.0	**Cardiovascular agents:** glycosides, antiarrythmic agents, vasodilators, α and β adrenergic blocking agents, calcium channel blockers, centrally acting antihypertensive agents.	8LH
4.0	**Drugs acting of the digestive system:** anti-ulcer drugs, laxatives and purgatives, antidiarrhoeal agents, emetics and anti-emetics, antihelminthics. Classification of drugs used in management of common upper respiratory conditions	8LH
5.0	Clarification of drugs used in bacterial, viral and protozoal and fungal infections.	8LH
6.0	Topical agents for common allergic/inflammatory, septic, viral, bacterial and fungal ailments,	5LH
	TOTAL CONTACT HOURS	**45CH**

Teaching Method: Lectures, Tutorials, Practicals

Resources: Class room, Hospitals/Health Facilities

SUGGESTED REFERENCES:

1) Pharmacology text book by Laurence and Bennet
2) Pharmacology text book by Rang and Dale

Course Name: STORES AND INVENTORY MANAGEMENT

Course Code: CPHA 2107

CreditUnits: 3

Course Description:

Medicines supply management addresses how people involved at different levels can work, plan and organize a supply system to ensure that high quality essential medicines and supplies are available, accessible, affordable and rationally used. Medicines have particular importance in that they save lives, improve health and promote trust to health

system; they take up a substantial amount of the budget of a hospital and increase client participation in health care services. It is therefore important for those working in the pharmacy at any level to have some basic knowledge and skills on medicine supply management.

Course Objectives

At the end of this course, the candidate should be able to:

(a) Appreciate the medicines management cycle
(b) Define basic terms used in inventory control
(c) Discuss the benefits of a good inventory system and common inventory control problems
(d) Discuss the disposal procedure for unwanted medicines
(e) Maintain basic inventory control records
(f) Receive medicines and supplies in the health facility
(g) Set up distribution points in hospital/ health center settings
(h) State the objectives of inventory control
(i) Understand the basics of quantifying medicine needs for a health facility

Course Contents

No	TOPICS	Duration
1.0	Rationale for medicine supplies management (basic), Overview of the medicines management cycle, Definition of commonly used medicine supply management terms, Why manage medicines supply, Financial objectives, Operational objectives, Customer service objectives, Health objectives, Benefits of efficient medicine supply management system to patients and facility, Implications of inefficient medicine supply management system, Components of a medicine supply management system, Selection, Procurement, Distribution, Policy or legal framework, Management support, The information management system for the hospital pharmacy	4LH
2.0	The procurement cycle and procurement methods commonly used by hospitals, Direct purchase, Negotiated purchase, Procurement processes and terminologies (Requisitions, Purchase orders, Order status report, Delivery notes and invoices, Receipts and packing lists, Credit and debit notes, Delivery versus collection of medicines, Good procurement practices; Use of generic names, EML and formularies, Bulk procurement, Supplier selection, Separation of key functions and involvement of medicines and therapeutic committees, Product quality assurance, Quantification of medicines needs in hospital	10 LH

	settings, The importance of having accurate medicines consumption data for the hospital, Assessing the need of quantification, Preparing for quantification, Basic quantification methods; The consumption methods relevant for hospital settings, Morbidity method; Factors to consider when selecting the optimum method, Prioritising procurements, VEN classification, ABC classification, Documentation in medicine purchasing	
3.0	Medicines' receiving procedures, Documentation of medicines' consignment receipts, Consignment receipts report, Key elements of the receipt record, General status of the consignment received, Quality of receipts, Managing variances: under/over supplies, short expiry, breakages/damages, Rejection and return of consignments to suppliers, Legal implications of signed receipts, Receipt of consignments that require special handling: cold chain medicines, narcotics, vaccines, Use of barcode technology	10LH
4.0	Introduction to medicine distribution system in the hospital / health centre settings, Distribution methods/ options in hospital settings, Outpatient supply system, Bulk ward supply system, Individual in- patient supply system, Unit dose system, Emergency supply system	**4 LH**
5.0	Controlling and monitoring medicines distribution in hospital / health centre settings, Distribution procedure and documentation; Responsibilities at various levels within the distribution system; Managing satellite pharmaceutical distribution units	**5 LH**
6.0	Introduction to pharmacy records management and information systems Records management, Record-keeping documents, Inventory control in hospital settings, Definitions, -Stock, inventory, bin card, ledger. Principles of inventory control;.Basic concepts in inventory management, -Inventory control, -Lead time and service level, -Stock rotation and stock retrieval, -Buffer/ safety stock, -Stock consumption, -Stock counting/ stock taking, Inventory record keeping, Inventory control records and documentation, -Stock cards and bin cards, -Stock ledger, -Requisition/ receiving documents, -Check lists, -Stock control reports, -Recording stock information, -Use	**8LH**

	of inventory records, -Quantity determination, -Audits and supervision, -Prevention of security breaches, -Budgeting, planning and reporting, -Research, training and education, Common inventory problems: -Types of inventory control problems, -Stock-outs, stock expiry, stock losses, -Implications of stock control failure, -Resolving and prevention of inventory problems, Management of unusable pharmaceuticals; -Causes of unusable stock, -Bad donations, -Breakages/ spoilage/ expiry, -Obsolescence, -Problems due to presence of unusable stock -Disposal methods; Regulations on disposal of medicines	
7.0	Definition and introduction to good store keeping, Tools and equipment for medicines storage, Storage conditions for different products, -Products stored at normal temperatures, -Products that need controlled environment, -Products that require special care; narcotics, flammables, corrosives. Managing stock in the medicine storeroom, -Stores arrangement, -Dispensing stock and bulk storage, -Security, -Accountability and documentation, Store cleaning and pest control, Setting up a pharmacy store, Data reporting forms, Data compilation, Report preparation	**4 LH**
	LECTURES	**45CH**
	TOTAL CONTACT HOURS	**45 CH**

Teaching Method: Lectures, Tutorials

Resources: Laboratory, Class room, Hospitals/Health Facilities

Suggested References:

(1) A.J. Winfield and R.M.E. Richards, Pharmaceutical Practice, 2004, 3rd Edition

(2) B. Liebsch; D.S, Nyamageni, K.F. Steinhausen and S. Senya; Tanzania Pharmaceutical handbook, 1988

(3) Commodity ART training tool for Ministry of Health, Uganda.
(4) Communication skills for medicine by M. Lloyd R Bor (Churchill Livingston
(5) Estimating Drug Requirements; A practical manual, WHO Action Programme on Essential Drugs and Vaccine 1998, 3rd Edition

(6) Managing Drug supply Training Series- Participants' Guide, MSH, 2nd Edition

(7) Managing medicine Supply: The Selection, Procurement and Use of Pharmaceuticals, 2nd ed-MSH.
(8) ommunication skills for medicine by M. Lloyd R Bor (Churchill Livingstone)

(9) Patricia Stone and Stephen J. Curtis; Pharmacy Practice, 1989

(10) The logistics handbook deliver project June 2006.
(11) WHO, Operational Principles for Good Pharmaceutical Procurement; Geneva 1999

Course Name: ***FIELD ATTACHMENTS***
Course Code: **CPHA 2106**
CreditUnits: 5
Course Description:
Field based practical training experience prepares trainees for the tasks they are expected to perform upon completion of their training. This field based practical work will be carried out by staff and students for the purposes of teaching in selected Health Facilities (Health Centers, Community pharmacies and Hospitals) , but, the training institution will be responsible for the safety of its staff, students, and others exposed to their activities. The field attachment is expected to produce practically oriented graduates that meet the required job related competencies of their future employees.
Course Objectives:
By the end of the course the student is expected to;
1. Get hands on experience in real life situation they are required to work in after graduation
2. Be able to apply the principles and techniques of theory into practice
3. Interact with key stakeholders to enable the academic staff supervisors generate information for curricula review
4. Enable the student develop understanding of work ethics, employment demands, responsibilities and opportunities
5. Strengthen the link with stakeholders for community transformation

Course Contents

NO	TOPICS	Duration
1.0	Students' will be provided log book in a standardized format where they will enter daily records of the activities performed as well as new lessons skills and innovations learnt. The on-site supervisors (preceptors) shall assess the daily records in the log book. The academic supervisors shall	

	assess and sign the log books each time they visit the students in the field. At the end of the field attachment period the student shall produce a report of their field attachment experience based on guidelines set out in the Log book	
2.0	**TOTAL PRACTICAL AND TUTORIAL HOURSS**	150
	TOTAL CONTACT HOURS	**75 CH**

Teaching Method: Tutorials, Practicals

Resources: Hospitals/Health Facilities and Pharmacies, Uganda Allied Health Examinations Log Book

References

(1) British National Formulary
(2) Allied Health Professionals Act
(3) National Drug Policy and Authority Act
(4) Uganda Clinical Guidelines

YEAR TWO

SEMESTER TWO

Course Name: ***PHARMACEUTICS II***

Course Code: **CPHA 2201**

CreditUnits: 4

Course Description:

Many times the pharmacy staff is required to carry out some basic calculations while managing medicines, and compounding pharmaceutical preparations. To perform this accurately and efficiently, the candidate needs to have some basic skills. This course aims at providing the candidate with knowledge and skills in dispensing and compounding of simple pharmaceutical formulation.

Course Objectives

At the end of this course, the candidate should be able to:

(a) Carry out basic pharmaceutical calculations during dispensing and compounding
(b) Convert volumes, weights and lengths to their equivalents in metric units
(c) List the various International Units (IU) and their use in pharmacy
(d) Use pharmaceutical reference during pharmaceutical formulations
(e) Identify the right equipment and materials necessary during dispensing and compounding
(f) Interpret and calculate percentage strength, ratio strength often encountered in pharmacy practice
(g) Calculate quantities of medicines to be dispensed per prescription
(h) Carry out basic dose calculations (posology) for various age groups

(i) Demonstrate ability to systematically adhere to established methods in mixing and compounding of simple pharmaceutical solutions

Course Contents

No	TOPICS	Duration
1.0	**Pharmaceutical simple solutions:** Definition of; Solution, Solute, Solvent; Vehicle, Solubility Advantages and disadvantages of solutions, Factors affecting solubility, Methods to enhance solubility. Preparation of simple solutions; Excipients used in oral pharmaceutical solutions, Types of simple solutions (eg; syrups, elixir, paints); definition, Formulation, Method of preparation, Packaging and labeling; Equipments and materials and conditions required during compounding and mixing of simple liquid preparations	10 LH
2.0	Production formulae and ingredients, Components of formulae, Interpretations and referencing. Reference materials for compounding; British Pharmacopoeia, United States Pharmacopoeia, Extra Pharmacopoeia (Martindale) Compounding manuals and formularies e.t.c Calculation and measurement of quantities, Expression of concentration; Percentage, Parts, Molarity and normal solutions Percentage strength, ratio strength and units of strength, Parts per million, Enlarging and reducing formula, Dose calculations (posology), Unit dose , daily dose and total course, Adult's and children's doses, Calculation based on body weight, Calculation based on body surface area, Young's rule and Field's rule. Containers, labeling and storage of finished products	10 LH
3.0	Powder reconstitution; basic reconstitution calculations and measurement of volumes of liquid for reconstitution, Powder reconstitution techniques for dry powders and effervescent powders	5 LH

	Mixing; solutions, Suspensions, Dosing instruction of reconstituted mixtures, Storage of reconstituted medicines	
4.0	Dilution of antiseptics and disinfectants	5LH
	LECTURES	30LH
	PRACTICALS	30 PH
	TUTORIALS	30 TH
	TOTAL CONTACT HOURS	**60 CH**

Teaching Method: Lectures, Tutorials, Practicals
Resources: Laboratory, Class room, Hospitals/Health Facilities

Suggested Reading Materials:
(1) Pharmaceutics: Science of Dosage and Dosage form Design ed. By M E Aulton.
(2) Ansel's Pharmaceutical Dosage Forms and Drug Delivery system. By L V Allen Jr, et al.
(3) Remington the Science and Practice of Pharmacy.
(4) Modern Pharmaceutics. edited By GS Baner& CT Rhodes.
(5) Martin Physical Pharmacy
(6) Shorton - Physical Pharmacy.
(7) Bean and Bucket - Advances in Pharmaceutical Sciences.
(8) Physical library resources and manuals

Course Name: QUALITY ASSURANCE OF PHARMACEUTICALS
Course Code: CPHA 2202
CreditUnits: 4
Course Description:
The purpose of quality assurance (QA) in public pharmaceutical supply systems is to ensure that each medicine reaching the patient is safe, effective, and of standard quality. Quality assurance activities should be comprehensive spanning the entire supply process from medicine selection to medicine use. This course therefore is at expanding the learners' understanding of the determinants of medicine quality. Both the technical and managerial actions necessary to ensure medicine quality as well as the role of Medicines and Therapeutics committees (MTC) in ensuring the quality of medicines in the health care system are covered.
Course Objectives
By the end of this course, trainees should be able to:

- Define key terms used in quality assurance
- Appreciate how medicine quality is assessed
- Appreciate how medicine quality is ensured
- Describe the role of the Medicines and Therapeutic Committee in pharmaceutical

quality assurance

Course Contents

No	TOPICS	Duration
1.0	Introduction to Quality assurance of Pharmaceuticals; definition of key terms; pharmaceutical quality assurance, pharmaceutical quality control, and Good Manufacturing Practices (GMP). Characteristics of a comprehensive quality assurance programme and effects of poor quality medicines. Determinants and aspects of medicine quality; identity, purity, potency, uniformity, bioavailability, stability and pharmacopoeial standards **Critical elements of a comprehensive quality assurance programme;** • **How is quality assessed;** inspection of shipment and laboratory testing • **How is quality assured;** product selection by MTC, selection of appropriate suppliers, product certification, contract specifications, appropriate storage, storage, distribution, dispensing and use procedures, product monitoring system; product problem reporting and product recall) and • **Who ensures quality? -** The role regulators, MTC, Hospital/clinic Procurement unit, Pharmacy department, prescriber and patient). **Implications of Pharmaceutical Quality Assurance for the MTC;** Providing technical advice on procurement of pharmaceuticals and other departments, analysing product problem reports	45LH
	LECTURES	45 LH
	TOTAL CONTACT HOURS	**45 CH**

Teaching Method: Lectures, Tutorials, Practicals
Resources: Class room, Hospitals/Health Facilities

Suggested Reading Materials:
Management Sciences for Health (MSH) Managing Drug Supply

Year I Semester II

Course Name: *PHARMACY PRACTICE II*
Course Code: CPHA 2203
CreditUnits: 4
Course Description:
Medicines supply management addresses how people involved at different levels can work, plan and organize a supply system to ensure that high quality essential medicines and supplies are available, accessible, affordable and rationally used. Medicines have particular importance in that they save lives, improve health and promote trust to health system; they take up a substantial amount of the budget of a hospital and increase client participation in health care services. It is therefore important for those working in the pharmacy at any level to have some basic knowledge and skills on medicine supply management.
Course Objectives
At the end of this course, the candidate should be able to:
(j) Analyse and use data commonly applied in pharmaceutical practice for drug selection
(k) Apply drug use indicators in the control of drug use
(l) Appreciate the basics of medicines procurement for the health facility
(m) Appreciate the essential drugs concepts
(n) Appreciate the medicines management cycle
(o) Define basic terms used in inventory control
(p) Describe the medicines distribution options commonly applied in hospital settings
(q) Discuss the benefits of a good inventory system and common inventory control problems
(r) Discuss the disposal procedure for unwanted medicines
(s) Maintain basic inventory control records
(t) Quantify drugs and identify drug use problems
(u) Receive medicines and supplies in the health facility
(v) Set up distribution points in hospital/ health center settings
(w) State the objectives of inventory control
(x) Understand the basics of quantifying medicine needs for a health facility
Course Contents

No	TOPICS	Duration
1.0	Standard Operating Procedures: Definition of the following terms, Standard, Procedure, Operation, Types of SOPs, Importance of having different types of SOPs, Developing SOPs, Steps of each SOP, updating SOPs Methods of developing SOPs for dispensing, Types of dispensing procedures: Procedures for extemporaneous dispensing and Procedure for dispensing a prescription, Steps of each of the SOPs for dispensing, Importance of developing and using SOPs for	15LH

	dispensing Dispenser patient relationship and maintaining patient privacy and confidentiality in a dispensing environment Moral obligations, Patient rights, Courtesy and respect during patient interviews Relationships and Collaboration with others providers on the health care team, with other health providers, Commercial relationship with medical representatives and pharmaceutical suppliers with other providers.	
2.0	The process and rationale for medicines selection in health facilities; Approaches to developing, implementing and updating essential medicines lists, formularies and treatment guidelines. Prioritizing medicines selection to meet essential needs and financial resources available	10LH
3.0	Definition of Pharmacovigilance, adverse effects, side effects, Adverse drug events and ADRs, Procedures for detecting and reporting ADRs, Clinical relevance of reporting ADRs, types and factors predisposing to drug interactions, Impact of Adverse effects and adverse drug reactions	10 LH
4.0	Medicines and Therapeutic Committees. Formation of MTCs. Medicines use indicators: characteristics of sound indicators: Relevant, Easily generated and measured, reliable, valid action oriented.	**15LH**
5.0	Prescription: Calculating prescribing indicators from prescription records. Analysis and Representation: Aggregate Data, Defined Daily Dose, VEN Analysis, ABC Analysis Applications for a MTC.	**10LH**
	LECTURES	**60 TH**
	TOTAL CONTACT HOURS	**60 CH**

Teaching Method: Lectures, Tutorials

Resources: Laboratory, Class room, Hospitals/Health Facilities

Suggested References:

(12) A.J. Winfield and R.M.E. Richards, Pharmaceutical Practice, 2004, 3rd Edition

(13) B. Liebsch; D.S, Nyamageni, K.F. Steinhausen and S. Senya; Tanzania Pharmaceutical handbook, 1988

(14) Commodity ART training tool for Ministry of Health, Uganda.

(15) Communication skills for medicine by M. Lloyd R Bor (Churchill Livingston

(16) Estimating Drug Requirements; A practical manual, WHO Action Programme on Essential Drugs and Vaccine 1998, 3rd Edition

(17) Managing Drug supply Training Series- Participants' Guide, MSH, 2nd Edition

(18) Managing medicine Supply: The Selection, Procurement and Use of Pharmaceuticals, 2nd ed-MSH.

(19) ommunication skills for medicine by M. Lloyd R Bor (Churchill Livingstone)

(20) Patricia Stone and Stephen J. Curtis; Pharmacy Practice, 1989

(21) The logistics handbook deliver project June 2006.

(22) WHO, Operational Principles for Good Pharmaceutical Procurement; Geneva 1999

Course Name: ***THERAPEUTICS II***
Course Code: **CPHA 2204**
CreditUnits: 3
Course Description: This course, a continuation of therapeutics I, aims at providing the trainees with the knowledge and skills on additional commonly encountered health conditions and the management approaches
Course Objectives
At the end of this course, the candidate should be able to:
1) Recognize the common health conditions
2) Advise on the best treatment options
3) Detect and prevent irrational medicine use

COURSE CONTENT

No	Topic	Duration
1.0	Introduction to the common cardiovascular diseases, Hypertension, Ischaemic heart disease Heart failure, Cardiac arrhythmias, Anemia, Megaloblastic , Hemolytic, Microcystic, Aplastic Anemia, Coagulation disorders; Bleeding, Blood clots , Introduction to renal diseases, Acute renal disease, Chronic kidney disease.	15 LH
2.0	Allergic disorders, Eczema, Seborrhoeic Psoriasis, Vitiligo, Acne vulgaris, Keloids , Burns Drug induced skin conditions	10LH
3.0	Introduction of central nervous system disorders, Headache (mild, moderate, severe/migraine), Seizures, Mental illnesses (psychotic illnesses) Peripheral	10LH

	neuropathy	
4.0	Introduction to reproductive system diseases; Contraception (male and female) Pregnancy and lactation	10LH
	TOTAL LECTURE HOURS	45 LH
	TOTAL CONTACT HOURS	**45 CH**

Teaching Method: Lectures, Tutorials
Resources: Class room

References

1) Bertran G. Katzung et al, Basic and clinical pharmacology, 11th Ed.
2) Richard A Helms, et al Text book of therapeutics, Drug and disease management, 8th edition
3) Roger Walker, Cate Whittlesea, Clinical pharmacology and therapeutics, 4thed.

Course Name: ***ENTREPRENEURSHIP***
Course Code: **CPHA 2205**
CreditUnits: 4
Course Description
This course covers entrepreneurship, business plan development, marketing, financial management human resource management and business management in general.
Course Objectives
At the end of this course trainees should be able to:
Establish and manage a pharmaceutical enterprise (Business) as per legal requirements.
Course Contents

NO	sTOPICS	Duration
1.0	**Meaning and role of entrepreneurship**, entrepreneurial attitude and qualities of an entrepreneur, Entrepreneurial ethics, Forms of small business ownership (sole proprietorship and partnership) Laws and guidelines, requirements and processes of starting and registering a pharmaceutical business	**6LH**
2.0	**Business plan**, meaning and uses of a business plan, Writing a simple business plan, Components of a business plan.Summarizing business plan; enterprise vision, mission and objectives, basic strategies, action plan, Budgeting, keep costs for materials, labour and operations as low as possible, uncertainties, profitability period, Taxes and other legal obligations, licences, registration and other taxes, running cost minimization, keeping business finances and budget implementation.	**6LH**
3.0	**Business Financing**; Sources of funds, Saving culture, and investment from small to big, resource mobilization and financial management,	**6 LH**

	Dealing with funders, Institution/enterprise integrity, Donor search, Human resources management, machinery and equipment,	
4.0	Market survey Market, product, security survey, row materials, environmental survey, Skilled and unskilled labor survey, Product cultural, conformity survey Marketing mix (price, place, people, product -4Ps), Marketing plan, Components of a marketing plan/ writing a simple marketing plan, Sales promotion, Brochures/flyers, Radio and TV announcements and displays Product promotions and Ethical concerns, Product stickers, Product seals, Trademarks and logos, Contacts and Correspondences, Customer language and care, Use of gifts and Discounts	**7LH**
5.0	**Procurement planning**: requirements and specifications, budgeting, guaranteeing funding and making requisitions, Procurement process; bidding documents and invitation of offers, Selecting suppliers and signing contract, Procurement performance, Monitoring supply performance, Meeting suppliers and sealing differences/resolving problems, conflicts/misunderstandings, payment and payment certificates and reporting	**10LH**
6.0	**Analysis of enterprise**; personnel demands and planned expansions; Equal employment opportunity, Analysis on job descriptions, Staff performance evaluations/ appraisals, Records of transactions, journals, Cash books, business source documents; Invoices, Vouchers, Receipts, LPOs, Petty cash books, Ledger books, Components functions and applications of each source document, correlation among the source documents, Simple income statement, Simple balance sheet, Simple cash flows, Bank reconciliations, Accounting statements	**10LH**
	LECTURE HOURS	**45 LH**
	TUTORIALS	**30 TH**
	TOTAL CONTACT HOURS	**60 CH**

Teaching Method: Lectures, Tutorials,

References:

(1) Bessant, J., &Tidd, J. (2007). Innovation and entrepreneurship. John Wiley & Sons.
(2) Bessant, J., &Tidd, J. (2007). Innovation and entrepreneurship. John Wiley & Sons.
(3) Chisholm-Burns, M. A., Vaillancourt, A. M., & Shepherd, M. (2012). Pharmacy management, leadership, marketing, and finance. Jones & Bartlett Publishers.
(4) Chisholm-Burns, M. A., Vaillancourt, A. M., & Shepherd, M. (2012). Pharmacy management, leadership, marketing, and finance. Jones & Bartlett Publishers.
(5) Drucker, P. (2014). Innovation and entrepreneurship. Routledge.
(6) Tootelian, D. H., Wertheimer, A. I., &Mikhailitchenko, A. (2012). Essentials of Pharmacy Management. Pharmaceutical Press.

(7) Zhao, F. (Ed.). (2006). Entrepreneurship and Innovations in E-Business: An Integrative Perspective: An Integrative Perspective. IGI Global.
(8) Zhao, F. (Ed.). (2006). Entrepreneurship and Innovations in E-Business: An Integrative Perspective: An Integrative Perspective. IGI Global.
(9) Zimmerer, T., Scarborough, N. M., & Wilson, D. (2005). Essentials of entrepreneurship and small business management. Pearson/Prentice Hall.

Course Name: ***EXPERIENTIAL TRAINING***
Course Code: **CPHA 2107**
CreditUnits: 5
Course Description:
Hospital/health facility experiential training prepares trainees for the hospital pharmacy practice they are expected to perform upon completion of their training. This training will take place in the course of the semester in selected pharmacy units of a health facility nearest to the training institutions. **Course Objectives**:
By the end of the course the student is expected to;
(a) Get hands on experience in real life dispensing situations they are required to work in after graduation
(b) Be able to apply the freshly acquired theoretical principles in real hospital setting.
(c) Interact with members of the health team and to enable the academic staff provide the critical real time coaching and mentorship.
(d) Enable the student to further develop their understanding of work ethics, employment demands, responsibilities and opportunities
Course Contents

NO	TOPICS	Duration
3.0	Students' keep will be provided with log book where they will enter daily records of the activities performed as well as lessons and innovations learnt. The hospital/health centre supervisor together with the tutors will guide, monitor, coach mentor and assess students and ensure accurate entry of the daily records in the log book. At the end of the experiential training trainees shall be required to produce a report that will be independently score and a warded credit units	
4.0	**TOTAL PRACTICAL AND TUTORIAL HOURS**	150
	TOTAL CONTACT HOURS	**75 CH**

Teaching Method: Tutorials, Practicals
Resources: Hospitals/Health Facilities and Pharmacies, Uganda Allied Health Examinations Log Book
References

(1) British National Formulary

(2) Allied Health Professionals Act
(3) National Drug Policy and Authority Act
(4) Uganda Clinical Guidelines

7.0 General Resources

The programme shall be only be available in MoES approved health training institutions under the BTVET context.

Facilities:

In order to be approved offer this certificate in pharmacy programme, a given institution shall, among others, be required to have adequate space for study, recreation and sports, well furnished resource center, a functional pharmacy specific skills laboratory, qualified and adequate academic and technical support staff and evidence of partnership (memorandum of understanding) with recognized practicum health facility

Academic Staff minimum qualifications:

Tutors: Bachelors degree in Pharmacy or course unit specific Bachelors Degree / Bachelor of Medical Education with pharmacy specific teaching specialty

Clinical Instructors and Laboratory Assistants shall have a minimum of a diploma in Pharmacy

CONTRIBUTORS TO THIS CURRICULUM

3.0 Facilitators

The Workshop was facilitated by the

i. MrOjangole Max the Principal; School of Pharmacy Mulago.

ii. Mr. Basalirwa Richard a curriculum consultant

iii. MrMuzigeBruhan, Ag Head Quality Assurance and in Charge Education.

4.0 Participants

NO.	NAME	TITTLE/ORGANISATION
1.	Mr. Mugerwa James	Assistant Commissioner-Vocational MOES-BTVET
2.	Mr. Sempala Patrick	Senior Educational officer MOES-BTVET
3.	Pro. Charles Okiria	University Representative

		Pharmacy Board Member- AHPC
4.	Mr. Isanga Umar	President- Uganda Dispensers' Association
5.	Mr. Kasagga Aloysius	Chair AHPC
6.	Mr. Basalirwa Richard	Curriculum Consultant Skills Initiative Uganda
7.	Mr. Ojangole Max	Pharmacy School Mulago
8.	Mr. Cheptoek Denis	Mbale SOCO Pharmacy Department
9.	Mr. Lubowa Nasser	Principal Regulatory Officer (NDA)
10.	Mr. Mpiima Patrick	Registrar AHPC
11.	Mr. Tigawalana Robert	Programs Officer (SHRH)
12.	Mr. Tumwesigye Ambrose	Health Tutor UIAHMS Mulago
13.	Mr. Musoke David	Senior lecturer Gulu University
14.	Mr. Nahabwe Charles Kahwa	QAO(D) SERVICES AHPC
15.	Mr. MuzigeBalikowaBruhan	QAO/ET
16.	Mr. OjakMikloth	SEO-UAHEB
17.	Mr. OlukaWilfrfed	Principal Tutor St.Elizabeth-Mukono
18.	Mr. Edeku Simon	MOE –BTVET
19.	Mrs. Oteba Neville Okuna	Registrar – Pharmacy Division (MOH)
20.	Mpiima Israel	Accounts Assistant

Cross References

(1) Allied Health Professionals' (AHP) Act 1996
(2) Business Technical and Vocational Education and Training (BTVET) Act 2008
(3) Curriculum for certificate in pharmaceutical and health supplies management. Gulu University.
(4) Curriculum for Diploma in Pharmacy (2010) School of Pharmacy- Uganda Institute of Allied Health and Management Sciences
(5) Curriculum for Diploma in Pharmacy (2014) School of Pharmacy -Uganda Institute of Allied Health and Management Sciences
(6) Curriculum for Diploma in Pharmacy (2016). Ministry of Education and Sports BTVET Sub sector
(7) National Council for Higher Education. (2014). Quality Assurance Frame
(8) National Drug Policy and Authority (NDP&A) Act 1993
(9) Pharmacy and Drugs Act 1971
(10) Universities and other Tertiary Institutions (UOTIA) Act 2001 (as Amended in 2003 and 2006)