



THE REPUBLIC OF UGANDA

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Business, Technical, Vocational Education and Training (BTJET) Sub-Sector



TEACHER'S GUIDE FOR DIPLOMA IN PHARMACY

November 2016



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Foreword

The Ministry of Education and Sports (MoES), in co-operation with the private sector and other stakeholders, has embarked on reforming Business, Technical, Vocational Education and Training (BTJET) in Uganda based on Competence-Based Education and Training (CBET) principles.

As the Ministry executes its obligation of ensuring quality in training standards, the public-private partnership is being strengthened to improve occupational competence of the country's workforce without gender bias.

Any health-training provider and/or those who wish to present themselves for Occupational Assessment and Certification in Pharmacy at Diploma level will use this Teacher's Guide.

Herewith, the MoES presents the Teacher's Guide based on the revised edition of the competence-based curriculum for training, assessing and certifying learners pursuing a Diploma in Pharmacy.

Finally, I thank all individuals, organisations and development partners who have contributed and/or participated in the development of this Teacher's Guide.

PERMANENT SECRETARY

Ministry of Education and Sports

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Abbreviations and Acronyms

BTVET	Business, Technical, Vocational Education and Training
CBET	Competence-Based Education and Training
DES	Directorate of Education Standards
FEFO	First Expiry First Out
FIFO	First In First Out
LWA	Learning-Working Assignment
MoES	Ministry of Education and Sports
MoH	Ministry of Health
NCDC	National Curriculum Development Centre
NCHE	National Council for Higher Education
PEX	Practical Exercise
SHRH	Strengthening Human Resource for Health
SIU	Skills Initiative Uganda
TMD	Training Modules Development
UAHEB	Uganda Allied Health Examinations Board
USAID	United States Agency for International Development

Introduction

This Teacher's Guide is aimed at equipping you, the teacher, with learner-centred methods of conducting training sessions here referred to as teaching and learning strategies, by ensuring that learners gain the desired competences. You should therefore ensure that the learners fully participate in the lesson administration.

The Guide emphasises practical teaching, projects and acquisition of skills by the learner. The competences that learners are expected to acquire are clearly spelt out in each module covered in the term. You should ensure that learners are well versed with practical work. The teaching methodologies developed in this Guide, if implemented effectively, should be able to produce Pharmacy Diploma graduates who are able to:

1. Maintain a pharmaceutical unit.
2. Manage pharmaceutical stocks.
3. Compound pharmaceutical products.
4. Dispense drugs.
5. Assess quality of pharmaceutical products.
6. Perform administrative tasks.

You should therefore try as much as possible to guide learners to acquire these competences during the course of study.

Rationale

This Teacher's Guide is meant to facilitate you to effectively interpret and use the curriculum to deliver updated and relevant content to the learners. It outlines the teaching methods to use, the procedures to be taken and the assessment. It is an essential document in the success of the teaching/learning process of the Diploma in Pharmacy.

Aims of the Teacher's Guide for Diploma in Pharmacy

This Teacher's Guide aims to:

1. Introduce and guide you through the new concept of Competence Based Education and Training.
2. Support you with practical methodologies to equip learners with the skills required to solving the day to day pharmaceutical needs of society.
3. Empower you with creative and innovative teaching/learning methodologies to enhance learner's research and development.
4. Guide you to empower learners with knowledge and skills that will enable them upgrade to higher levels of education.
5. Direct you to foster an attitude change.
6. Guide you on the teaching/learning resources that aid the imparting of knowledge and skills to learners.
7. Guide you on the assessment of learners so as to consolidate the achievement of competences and update their performance record.

Introduction

How to use this Teacher's Guide

To effectively implement competence-based training, you should ensure that the related practical, knowledge, values and attitudes are integrated during the teaching/learning process.

As a teacher, you are expected to:

1. Carry out preparatory activities or create own approach of introducing the module unit
2. Actively participate and stand as a role model for the learners to appreciate their choice of joining the profession
3. Refer to the content of the outlined LWAs/PEXs/Sub-topics in the curriculum and extract the specific area to be learnt
4. Apply the suggested teaching/learning strategies and resources related to the content
5. Redistribute the total time allocated to each module unit to suite the content
6. Involve learners in the teaching and learning process
7. Assess learners using the assessment criterion or other effective assessment strategies related to the competences
8. Guide learners to effectively use the suggested teaching and learning resources to acquire the set competences
9. Innovatively create resources for teaching/learning other than the ones outlined;
10. Enforce health, safety, security and environment standards during the teaching/learning process

Components of the Teacher's Guide

This Teacher's Guide is composed of the following:

Module Unit: A part/component of a module. It has particular competences that learners are expected to acquire at various levels during the course of study.

Module Unit Contact Hours: The suggested time allocation for a given module unit within a specific academic year of study.

Module Unit Code: The unique module unit reference (code) which also pairs as the examination paper code applied on the transcript.

Learning Outcome: The general objective of the given content in the module unit, it generally clarifies what the learner should be able to do as a result of passing through the learning process.

Preparatory Activities: These are activities you undertake prior to teaching learners. The activities are meant to facilitate the process of learning.

Learning Working Assignments (LWAs): Learning clusters of a module that are related to work environment but used in training for acquiring competences.

Practical Exercises/Sub-topics: Presents a specific topic in relation with the module unit.

Competences to be gained by Learners: A set of specific skills, knowledge and attitude which the learner is expected to acquire and exhibit, during and after going through every specific module unit's content.

Content Outline: An outline of the subject matter to be learnt in a particular module unit and within a prescribed timeframe.

Introduction

Suggested Teaching Methods/Strategies: Methods to use to facilitate learning that suit a particular content and learners. They require the active participation both of the teacher and learners during the teaching/learning process.

Assessment: Assessment will be both progressive (30%) as well as summative/semester (70%). Progressive assessment will include assignments, group work and written tests, among others. Summative/semester final examinations will be done both in practical and written form.

Further Reading Materials: Reference lists for both you and learners for further reading.

Teaching/Learning Resources: These are the identified teaching aids used by both you and the learners during teaching/learning to clarify the concept or ideal situation being learnt.

Methodology: The teaching/learning methodologies in this Teacher's Guide are suggested. It is at your discretion to apply any methodologies deemed suitable to the lecture room setting. The type of methodology selected should be guided by the competences to be acquired by the learner. You are encouraged to use a variety of methodologies in a lecture to make it more interesting and practical. Examples of some of the teaching/learning methodologies include the following:

1. Discussion

A. Group discussions: Learners discuss issues in groups. The methodology enables knowledge/information to come from the learners rather than from you, the teacher. It promotes teamwork and allows all learners to have an opportunity to give their opinions and ideas and also stimulate their interest as they learn from each other.

Guidelines for using group discussion methodology

- i) Put together groups of learners
- ii) Give clear instructions to learners as to what each group should do
- iii) Assign task(s) to each group
- iv) Learners discuss issues raised in the task with the guidance of the teacher
- v) Learners agree on the issues to be presented
- vi) Group presentations and general discussion.
- vii) Summarise the agreed class points

B. Guided discussions

Guidelines for using guided discussion methodology

- i) Lead the discussion
- ii) Give clear instructions to learners as to what they should do
- iii) Learners discuss issues raised in the task with your guidance
- iv) Learners agree on the issues
- v) Summarise the session by drawing on the main points.

2. Case study: This methodology is where learners are given information about a situation and they have to come up with decisions or solutions to a problem. The purpose of case study is to:

1. Help learners to identify and solve problems in a typical situation
2. Provide learners with confidence in decision-making
3. Help learners develop analytical skills

Introduction

3. **Interactive lecture:** This methodology is where you, as a facilitator, presents concepts and procedures to learners and also engage them during the lecture. Making it interactive minimises the practice of only issuing lecture notes to learners.
4. **Brainstorming:** This is a way of obtaining as many views as possible from the learners in a short time. The learners should be guided to give as many ideas as they can on a particular issue/topic. It is recommended that all ideas are accepted without questioning. The ideas should be ranked according to their relevance to the issue being brainstormed.

Basic rules for brainstorming

1. Encourage as many ideas as possible
 2. Criticism of ideas should not be allowed
5. **Guided discovery:** This method is based on the notion that the learners know more than they think they know. The assumption is that they only need to be prompted to discover this knowledge for themselves. Your role is to organise the learning environment and present the content in such a way that the learners can discover more knowledge and ideas.
 6. **Demonstration:** This is the act of exhibiting, describing and explaining the operation or process by use of a device, machine, process or product to learners. A demonstration is usually done by you and is practical in nature.
 7. **Illustration:** This is a graphical depiction or representation of a subject matter, such a drawing, sketch, painting, photograph or other kind of image of things seen, remembered or imagined. This method is best used where words are not sufficient to clearly bring out a concept. It gives a visual impression to what is being taught.
 8. **Role play:** This methodology is where learners are presented with a situation they are expected to explore by acting out the roles of those represented in this situation. The role-play learners should be carefully selected and properly prepared for their roles. The remaining learners should be equally prepared for the role-play by briefing them on how they are to act during the presentation. The players should try to behave naturally during the presentation. You should:
 - A. Observe when the presentation is taking place.
 - B. Guide learners in the course of presentation to ensure that they focus on theme of the play.
 - C. Engage learners in a discussion or ask them questions about what they have learnt from the role-play with a view of finding out if it has provided sufficient information.
 9. **Study tour:** This is when learners are taken out to perform particular tasks with the aim of carrying out an observation, practice or witness the flow of events. It enables the learners to link the learning situation with the reality in communities or world of work.

Work Behaviour/Attitudes to be Instilled and Observed during Training

Work behaviour/attitude is key to the success of any practitioner. As training progresses, the learner will be expected to develop work behaviours such as being:

Introduction

- Responsible
 - Willing to learn
 - Committed to the programme
 - Possesses team spirit
 - Hard working
- Accurate
 - Social
 - Industrious
 - Time conscious
 - Cooperative
 - Ethical
 - Smart
- Accountable
 - Trustworthy
 - Results-oriented
 - Honest
 - Courteous
 - Humble

Summary of the Training Modules for Diploma in Pharmacy

Code	Training Modules	Training Duration	
		Hours (Total)	Credit Units
PHA 1.0	Foundation Sciences	435	29
PHA 2.0	Conducting Primary Health Care Activities	60	4
PHA 3.0	Compounding Pharmaceutical Products	330	22
PHA 4.0	Providing Pharmaceutical Care	435	29
PHA 5.0	Performing Analytical Procedures	165	11
PHA 6.0	Managing Medicines and Supply Chain	45	3
PHA 7.0	Extracting and Standardising Crude Drugs	165	11
PHA 8.0	Conducting Operational Research	60	4
PHA 9.0	Managing a Pharmaceutical Unit	150	10
PHA 10.0	Establishing a Pharmaceutical Enterprise	45	3
Summation	10 Training Modules (Covered in 3 Years)	1890	126

Module Unit Structure

Coding Nomenclature

PHA Programme Code

1st Digit Year of Study

2nd Digit Semester

3rd/4th Digit Module Unit Number/Paper Number

Example: PHA-1201 = Programme of Diploma in Pharmacy, Year 1, Semester 2, module unit /paper #1

Year One							
	Module Code Unit	Module Unit	LH	PH	TH	CH	CU
Semester 1	PHA - 1101	Anatomy and Physiology (I)	30		60	60	4
	PHA - 1102	Medical Microbiology and Parasitology (I)	30	30		45	3
	PHA - 1103	Biochemistry (I)	30		30	45	3
	PHA - 1104	First Aid and Nursing Care	30	60		60	4
	PHA - 1105	Medical Psychology	30		30	45	3
	PHA - 1106	ICT	15	30		30	2
	TOTAL						285
Semester 2	PHA - 1201	Anatomy and Physiology (II)	30		30	45	3
	PHA - 1202	Medical Microbiology and Parasitology (II)	30			30	2
	PHA - 1203	Biochemistry (II)	30		30	45	3
	PHA - 1204	PHC	45	30		60	4
	PHA - 1205	Pharmaceutics (I)	30	30	30	60	4
	PHA - 1206	Pharmaceutical Chemistry (I)	30	30	30	60	4
	TOTAL						30
Field Attachment	PHA - 12	Field Attachment (Hospital/Community)	-	120	-	60	4
	TOTAL						60

Introduction

Year Two							
	Module Code Unit	Module Unit	LH	PH	TH	CH	CU
Semester 1	PHA - 2101	Biostatistics	30			30	2
	PHA - 2102	Pharmaceutics (II)	60	60		90	6
	PHA - 2103	Pharmacology (I)	30			30	2
	PHA - 2104	Pharmaceutical Chemistry (II)	30	30	30	60	4
	PHA - 2105	Pharmacognosy (I)	30	30	30	60	4
	PHA - 2106	Research Methodology	30			30	2
	TOTAL						300
Semester 2	PHA - 2201	Pharmaceutics (III)	45	60	30	90	6
	PHA - 2202	Therapeutics (I)	30			30	2
	PHA - 2203	Pharmacy Practice (I)	45	30	30	75	5
	PHA - 2204	Pharmacology (II)	15	30	30	45	3
	PHA - 2205	Pharmaceutical Chemistry (III)	30	30		45	3
	PHA - 2206	Pharmacognosy (II)	30	30		45	3
	TOTAL						330
Field Attachment	PHA - 22	Field Attachment (Industrial/Hospital)		120		60	4
	TOTAL						60

Year Three							
	Module Code Unit	Module Unit	LH	PH	TH	CH	CU
Semester 1	PHA - 3101	Pharmaceutics (IV)	45	60	30	90	6
	PHA - 3102	Therapeutics (II)	45		30	60	4
	PHA - 3103	Pharmacology (III)	30	30	30	60	4
	PHA - 3104	Pharmacy Practice (II)	30	30		45	3
	PHA - 3105	Pharmacognosy (III)	30	30	30	60	4
	PHA - 3106	General Pharmacy Management	15	30		30	2
	TOTAL						345
Field Attachment	PHA - 31	Field attachment (Research Report)		120		60	4
	TOTAL						60
Semester 2	PHA - 3201	Therapeutics (III)	45		30	60	4
	PHA - 3202	Pharmacology (IV)	45	30	30	75	5
	PHA - 3203	Pharmacy Practice (III)	45	30	30	75	5
	PHA - 3204	Pharmacy Laws and Regulations	30	30		45	3
	PHA - 3205	Research Report	30			30	2
	PHA - 3206	Entrepreneurship	30	30		45	3
	TOTAL						330

YEAR ONE - SEMESTER ONE**PHA-1101 - ANATOMY AND PHYSIOLOGY (I)****Duration: 60 Contact Hours****Learning Outcome**

By the end of this module unit, the learner should be able to apply the understanding of anatomy and physiology of cell, cell membrane, excitable tissues, musculoskeletal system, nervous system, endocrine system, blood and body fluids.

Preparatory Activities

1. Develop and review lesson plans.
2. Prepare discussion points.
3. Prepare assessment and answer guides.
4. Prepare audio-visual materials (E-learning materials).
5. Prepare lecture notes.

1.1: Learning Working Assignment: Anatomy and Physiology (I)**Sub-topic 1.1.1: Introduction to Anatomy and Physiology**

Competence(s)
<ul style="list-style-type: none"> a) Understanding of anatomy and physiology b) Ability to conceptualise common terminologies used in anatomy and physiology c) Appreciation of the relevance of anatomy and physiology in the practice of pharmacy
Content Outline
<ul style="list-style-type: none"> a) Definition of physiology and anatomy b) Definition of common terminologies used in anatomy and physiology c) The relevance of anatomy and physiology
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Hold brainstorming sessions on the general understanding of anatomy and physiology b) Give interactive lecture sessions on the general understanding of anatomy and physiology c) Hold brainstorming sessions on the common terminologies used in anatomy and physiology d) Give an interactive lecture session on the common terminologies used in anatomy and physiology e) Hold brainstorming sessions on the relevance of anatomy and physiology f) Organise group work on the relevance of anatomy and physiology

Sub-topic 1.1.2: The Human Cell and Levels of Structural Organisation

Competence(s)
<ul style="list-style-type: none"> a) Understanding of a cell and its function b) Have ability to carry out gram staining of a cell c) Appreciate the relevance of the cell structure in relation to its functions d) Ability to classify tissues e) Ability to locate tissues
Content Outline
<ul style="list-style-type: none"> a) Definition of a cell b) Types of cells c) Structure of a cell

- d) Functions of parts of a cell and its organelles
- e) Description of levels of structural organisation
- f) Description of cell reproduction and differentiation-protein synthesis
- g) Definition of the electro-chemical gradient and description of its components
- h) Description/mechanisms of the transport processes across the cell membrane
- i) Definition of tissue
- j) Types, classification, location and functions of (epithelial, connective, muscular, nervous)

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on the general understanding of a cell.
- b) Illustrate the structure of a cell.
- c) Give interactive lectures on the general understanding on the cell/ cell membrane.
- d) Give an interactive lecture session on the transport processes across the cell membrane.
- e) Illustrate the structure of the cell membrane in relation to its functions.
- f) Conduct a practical on gram staining of a cell.
- g) Hold brainstorming sessions on the general understanding of tissues.
- h) Organise groups and task them to discuss the types, classification, location and functions of various tissues.
- i) Give interactive lecture sessions on the various types of tissues

Sub-topic 1.1.3: Anatomy and Physiology of Membranes

Competence(s)

- a) Understanding of anatomy and physiology of membranes
- b) Appreciation of the relevance of membranes in administration of drugs

Content Outline

- a) Description of a membrane and its functions
- b) Classification of epithelial (mucous, serous, cutaneous) and synovial membranes
- c) Transport mechanisms across membranes

Suggested Teaching or Learning Method

- a) Lead brainstorming sessions on the definition of epithelial and synovial membranes
- b) Hold brainstorming sessions on the general structure of membranes
- c) Give interactive lecture sessions on the description of epithelial and synovial membranes
- d) Guide group/plenary discussion of the different types of membranes
- e) Give interactive lectures on membranes

Sub-topic 1.1.4: Excitable Tissues

Competence(s)

- a) Understanding of excitable tissues
- b) Ability to explain the concept of electrical excitability
- c) Appreciation of the relevance of nerve transmission in drug development

Content Outline

- a) Definition of excitable tissues
- b) Classification of excitable tissue [membrane, nerve, muscle (skeletal, cardiac and smooth)]
- c) Electrical excitability
- d) Membrane potential
- e) Action potential
- f) Neuron action potential and synaptic transmission
- g) Structure of a neuron
- h) Neuro-muscular junction/ transmission
- i) Electrical activity of the heart

Suggested Teaching or Learning Method

- | |
|--|
| <ul style="list-style-type: none"> a) Give interactive lectures on the concept of excitable tissues. b) Give interactive lectures on the classifications of excitable tissues. c) Assign the groups to discuss and present the classification of excitable tissues. d) Give interactive lectures on the concept of electrical excitability. e) Organise group work and presentations on the concept of electrical excitability. |
|--|

Sub-topic 1.1.5: Anatomy & Physiology of the Musculo-Skeletal Systems

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the general physiology of smooth and skeletal muscles b) Understanding of the process of muscle contraction c) Understanding of the relationship between bones and skeletal muscles in producing body movements d) Appreciation of the relationship between the musculo and skeletal systems
Content Outline
<ul style="list-style-type: none"> a) Description of anatomy of the musculo-skeletal system (the muscles and the skeletal-bones of the body) b) General physiology of smooth and skeletal muscle c) Histological features of skeletal, cardiac and smooth muscle d) Muscle contraction (smooth, skeletal) e) Mechanical properties of smooth and skeletal muscle f) Features used in naming smooth and skeletal muscles g) Relationship between bones and skeletal muscles in producing body movements
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on the general physiology of smooth and skeletal muscle. b) Hold brainstorming sessions on the general physiology of smooth and skeletal muscle. c) Guide group discussions of the different features of the different types of muscles. d) Give interactive lectures on the process of muscle contraction and mechanical properties of skeletal muscle e) Illustrate the process of muscle contraction and guide learners as they practise. f) Hold brainstorming sessions on the features used in naming skeletal muscles. g) Lead brainstorming sessions on the relationship between bones and skeletal muscles in producing body movements h) Give interactive lecture sessions on the relationship between bones and skeletal muscles in producing body movements

Sub-topic 1.1.6: Anatomy and Physiology of Nervous System

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the organisation of the nervous system b) Understanding of how excitatory and inhibitory neurotransmitters act c) neurogenesis d) Understanding of the events involved in the damage and repair of peripheral nerves e) Understanding of the physiology of the motor and limbic system f) Appreciation of the mechanisms of action of the different drugs acting on the nervous system
Content Outline
<ul style="list-style-type: none"> a) Description of the anatomy of the nervous system b) Structures and basic functions of the nervous system c) Organisation of the nervous system: (CNS and peripheral; receptors and their locations; response generated when receptors are activated) d) Classes of neuro-transmitters e) Functions of neuro-transmitters

- f) Action of excitatory and inhibitory neuro-transmitters
- g) Types of neural circuits in the nervous system
- h) Definition of plasticity and neurogenesis
- i) Description of events involved in the damage and repair of peripheral nerves
- j) Description of the motor and limbic system physiology

Suggested Teaching or Learning Method

- a) Give interactive lectures on the organisation of the nervous system.
- b) Give interactive lectures on the structures, basic functions and anatomy of the nervous system
- c) Illustrate the receptors of the nervous system.
- d) Give interactive lectures on excitatory and inhibitory neurotransmitters.
- e) Lead brainstorming sessions on the classes and functions of neurotransmitters.
- f) Give interactive lectures on plasticity and neurogenesis.
- g) Give interactive lectures on the damage and repair of peripheral nerves.
- h) Hold group discussions on the events involved in damage and repair of peripheral nerves.
- i) Give interactive lectures on the motor and limbic system.
- j) Illustrate how limbic and motor systems work.
- k) Organise group work and presentations on the motor and limbic system.

Sub-topic 1.1.7: Anatomy and Physiology of Endocrine System

Competence(s)

- a) Understanding of the types of endocrine glands
- b) Understanding of how the hormones interact with target cell receptors
- c) Understanding of the general mechanism of hormone action
- d) Understanding of the location of and relationships between the hypothalamus and pituitary gland
- e) Understanding of the location, histology, hormones and functions of the endocrine system
- f) Understanding of the male and female reproductive systems
- g) Understanding of the hormones secreted by cells in tissues and organs other than the endocrine glands
- h) Appreciate the relevance of the endocrine system in drug development
- i) Appreciation of the effects of dysfunction of the endocrine system

Content Outline

- a) Definition of the endocrine system
- b) Description of the anatomy of the endocrine system
- c) Types of glands
- d) Distinction between exocrine and endocrine glands
- e) Description of how the hormones interact with target cell receptors
- f) Description of the general mechanisms of hormonal action
- g) Description of mechanisms of control of hormone secretion
- h) Description of the location of hypothalamus and pituitary gland
- i) Description of the physiological relationships between the hypothalamus and pituitary gland
- j) Description of the location, histology, hormones and functions of the anterior and posterior pituitary, thyroid, parathyroid gland, adrenal, pancreatic, pineal, and thymus
- k) Reproduction and hormonal functions of the male reproductive system
- l) Female physiology before pregnancy and the female hormones
- m) Pregnancy and lactation
- n) Fetal and neonatal physiology
- o) Hormones secreted by cells in tissues and their functions: prostaglandins, eicosanoids, leukotriens, arachnidonic acid, thromboxen

Suggested Teaching or Learning Method

- a) Give interactive lectures on definition of endocrine system.
- b) Give interactive lectures on the types of endocrine glands.

- c) Give interactive lectures of how the hormones interact with target cell receptors.
- d) Give interactive lectures on the mechanism of hormone action.
- e) Give interactive lectures on the location, structure, secretions and relationship of the hypothalamus and pituitary gland.
- f) Give interactive lectures on the location, histology, hormones and functions of the endocrine system.
- g) Give interactive lectures on the male and female reproductive systems.
- h) Give interactive lectures on the hormones secreted by cells in tissues and organs other than the endocrine glands.
- i) Hold brainstorming sessions on the functions of hormones secreted by cells in tissues and organs other than the endocrine glands.

Sub-topic 1.1.8: Anatomy and Physiology of Blood and Body Fluids

Competence(s)

- a) Understanding of the components and functions of blood
- b) Understanding of the process of hematopoiesis, homeostasis and blood coagulation
- c) Understanding of blood typing and transfusion
- d) Understanding of the different types of anaemia and their causes
- e) Understanding of the different body fluid compartments
- f) Ability to explain edema and its causes
- g) Appreciation of the relevance of blood grouping in blood transfusion

Content Outline

- a) Definition of blood
- b) Composition of blood
- c) Functions of blood cells
- d) Description of hematopoiesis, homeostasis, blood coagulation, fibrinolysis, blood typing and transfusion, different types of anemia and their causes
- e) Description of body fluid compartments/distribution:
- f) Extra cellular fluid (ECF)
- g) Intra cellular fluid(ICF)
- h) Interstitial fluid
- i) Donnan's equilibrium
- j) Edema and its causes

Suggested Teaching or Learning Method

- a) Give interactive lectures on homeostasis and blood coagulation, blood typing and transfusion, different types of anemia and their causes
- b) Group learners to discuss the different body fluid compartments.
- c) Give interactive lecture sessions on edema and its causes.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

- Textbooks
- Visual aids
- Models
- Stationery
- And internet

Additional Notes

- Put emphasis on the anatomy, physiology and pathophysiology of all the systems.
- Always review and update your work at least twice a year.

- Do continuous education to keep up to date in the dynamic academic world.

Further Reading Materials

Arthur, G. and John, H. (2005). *Textbook of Medical Physiology*. UK. (11th Ed.)

Rodnet, A. and George, A. (2003). *Medical Physiology Illustrated Physiology*. (2nd Ed.)
Lippincott Williams & Wilkins. (Paperback).

Sembulingam, K. and Sembulingam, P. (2006). *Essentials of Medical Physiology*. (6th Ed.)
Jaypee Brothers Medical Publishers (P) LTD. India.

Tortora, G. and Bray, D. (2005). *Principles of Anatomy and Physiology*. (11th ed.). Wiley and
Sons, Incorporated, John. US.

William, G. (2012). *Review of Medical Physiology*. (24th ed.). McGraw-Hill. New York.

PHA-1102: MEDICAL MICROBIOLOGY AND PARASITOLOGY (I)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, a learner shall be able to apply understanding of anatomy, physiology, medical microbiology, parasitology, biochemistry, medical psychology, first-aid and nursing.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

1.2: Learning Working Assessment: Medical Microbiology and Parasitology (I)

Sub- topic 1.2.1 Introduction to Microbiology and Parasitology

Competence(s)
<ol style="list-style-type: none"> a) Understanding of microbiology and parasitology. b) Differentiate between prokaryotes and eukaryotes. c) Ability to explain Koch's postulate in application of microbiology
Content Outline
<ol style="list-style-type: none"> a) Definition of microbiology and Parasitology b) Discussions of the history of microbiology c) Description of cells (Prokaryotes and Eukaryotes) d) Outline of branches of microbiology e) Koch's Postulate f) Discussion of application of microbiology
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Conduct a guided discussion on the history of microbiology. b) Facilitate group work and presentations on the differences between Prokaryotes and Eukaryotes c) Assign group work to discuss Koch's postulates and their application.

Further Reading Materials

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

Roberts, E., Nester, E., Anderson, G. and Pearsall, N. (2014). *Microbiology a human Perspective*. (8th Ed.). McGraw-Hill. New York.

Sub-topic 1.2.2: Bacteriology

Competence(s)
<ol style="list-style-type: none"> a) Understanding of <ul style="list-style-type: none"> • bacterial cell structure • bacteria classification • bacterial pathogens • Pathogenesis • bacterial transmission routes

b) Appreciation of the importance of bacterial reproduction in understanding the mechanisms of action of drugs on bacterial

Content Outline

- a) Definition of bacteriology
- b) Description of bacterial cell structure
- c) Energy requirements of bacterial cell
- d) Description of bacterial reproduction, bacteria classification, bacterial, pathogens,
- e) Factors that influence transmission and spread of bacterial infections, Bacterial growth requirements
- f) Pathogenesis, bacterial transmission routes
- d) Discussion of: Description of bacterial growth phases
- a) g) Discussion of bacterial normal flora

Suggested Teaching or Learning Method

- a) Illustrate the cell structure.
- b) Guide a group discussion on the areas of energy requirements, bacterial reproduction and classification.
- c) Give interactive lectures on bacterial pathogenesis, transmission routes, factors influencing transmission and spread of infections, growth requirements, bacterial growth phases and normal flora.

Sub-topic 1.2.3: Virology

Competence(s)

- a) Understanding of general characteristics of viruses and viral replication
- b) Ability to explain how viral diseases are transmitted (Human, Arbo, and Zoonotic viruses)
- c) Appreciation of diseases caused by viruses

Content Outline

- a) Definition of virology
- b) Description of general characteristics of viruses and the structure of viruses
- c) Discussion of infection of cells by viruses
- d) Viral replication
- e) Transmission routes of viruses
- f) Human viral diseases
- g) Viruses where humans are natural hosts
- h) Arbo viruses (Arthropod borne viruses)
- i) Zoonotic viruses
- j) Factors that influence transmission

Suggested Teaching or Learning Method

- a) Have interactive lectures on the general characteristic and structure of the viruses and the infection process of the cells.
- b) Facilitate group and plenary discussions on transmission of human viruses, Arbo viruses, Zoonotic viruses and factors that influence their transmission.

Materials for Further Reading

Roberts, Nester, Anderson & Pearsall. (2014). *Microbiology a Human Perspective*. (8th Ed)
 Vishal. (2007). *Medical Microbiology*. (27th Ed.). Jawetz, Melnick, & Adelberg's.

Sub-topic 1.2.4: Mycology

Competence(s)
a) Understanding of characteristics, structure and fungi of medical importance b) Appreciation of the different diseases caused by fungi
Content Outline
a) Definition of mycology b) Discussion of <ul style="list-style-type: none"> • general characteristics of fungi • structure of fungi • fungi of medical importance • different types of fungal infections
Suggested Teaching or Learning Method
a) Give interactive lectures on characteristics and structure of fungi. b) Guide group discussion on medical importance of fungi and the diseases they cause. c) Illustrate the structure of fungi.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Microscopes, models, charts, textbooks, Anatomy atlas, stationery

Materials for Further Reading

Cheesbrough, M. (2006). *District Laboratory Practice in Tropical Countries Part 2* (2nd Ed)

Roberts, Nester. *Microbiology: A Human Perspective*. (2nd Ed.). Anderson & Pearsall

Vishal (2007). *Medical Microbiology*. (27th Ed.). Jawetz, Melnick, & Adelberg's.

PHA-1103: BIOCHEMISTRY (I)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to apply understanding of introduction to biochemistry, chemical nature of cells, acids, bases, PH and buffers and their biomedical importance and amino acids, proteins and enzymology.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

1.3: Learning Working Assignment: Biochemistry (I)

Sub-topic 1.3.1: Introduction to Biochemistry

Competence(s)
a) Understanding of biochemistry b) Ability to distinguish between cell biology, molecular biology and molecular genetics c) Appreciation of the relevance of biochemistry to medicine
Content Outline
a) Definitions of biochemistry, molecular biology, and genetics b) Discussion of relevance of biochemistry to medicine c) Homeostasis d) Regulation of water balance e) PH, acid-base balance f) Body fluids g) Nutritional imbalances h) Major causes of disease in relation to biochemistry
Suggested Teaching or Learning Method
a) Brainstorm the general understanding of biochemistry. b) Give interactive lectures on biochemistry

Sub-topic 1.3.2: Chemical Nature of Cells

Competence(s)
a) Ability to give a concise account of the components of cells and chemical processes that go on inside the cell b) Ability to perform centrifugation and biochemical analysis c) Appreciation of the importance of components of cells and chemical processes that go on inside the cell
Content Outline
a) Introduction to chemical composition of the human body and its great variety of elements and molecules b) Chemical bonding c) DNA, RNA, proteins, carbohydrates and lipids d) Description of chemical structure and functions of the cell membrane, key components of the human body (protein, fat, carbohydrates, water minerals), membrane structure (fluid mosaic

- model), transport across membranes
- e) Illustration of the Schematic representation of the cell as a fundamental unit of the biologic activity and functions of specific parts of the body
- f) Experimental approach with regards to:
- Extraction
 - Homogenization
 - Centrifugation
 - Isolation of biomolecules
 - Determination of the structures of biomolecules
 - Analyses using various preparations of the function and metabolism of biomolecules

Suggested Teaching or Learning Method

- a) Give interactive lectures on the chemical nature of cells and membrane structure.
- b) Demonstrate and perform centrifugation and biochemical analysis.

Sub-topic 1.3.3: Acids, Bases, PH and Buffers & their Biochemical Importance

Competence(s)

- a) Understanding of the homeostatic mechanisms by which organisms maintain a relatively constant intracellular environment
- b) Ability to describe the biochemical importance of regulation of water balance, homeostasis, acid and bicarbonate buffer systems
- c) Ability to describe the influence of water in weak intermolecular forces such as hydrogen bonds, electrostatic forces and hydrophobic interactions
- d) Appreciation of (the relevance of biochemistry to medicine)

Content Outline

- a) Definition of acids, bases, PH, homeostasis
- b) Description of regulation of water balance and tonicity
- c) Disturbances of acid-base balance
- d) PH and bicarbonate buffer systems
- e) PH as a negative log of the hydrogen ion concentration
- f) Functional groups that are weak acids and their physiological importance
- g) Henderson-Hasselbalch equation
- h) Solutions of weak acids and their salts as buffers
- i) Biochemical importance of weak acids and bases and their role in metabolism

Suggested Teaching or Learning Method

- a) Brainstorm the definitions of acids, bases, PH and homeostasis.
- b) Guide group discussions and presentation on biochemical importance of regulation of water balance and tonicity

Sub-topic 1.3.4: Amino Acids, Proteins and Enzymology

Competence(s)

- a) Understanding of amino acids in relation to proteins
- b) Ability to describe the different properties of amino acids and the symbols commonly used for the different amino acids
- c) Understanding of the four different structures of proteins (primary and secondary)
- d) Ability to draw the structures of amino acids
- e) Ability to explain the principle underlying most functions of proteins
- f) Ability to discuss the factors affecting enzyme activity
- g) Ability to describe how enzymes work

- h) Ability to explain how enzyme activity can be controlled by reversible covalent modification
 i) Ability to explain what is meant by Allosteric control of enzyme activity
 j) Appreciation of the different properties of enzymes in relation to drug action

Content Outline

- a) Amino acids, amino acid side chain, amino acid residue, N-terminal, C-terminal, Polypeptide chain (definition and explanation)
 b) Drawing of a general structure for 20 amino acids
 c) Structure and classification of amino acids:
- Amino acids with non-polar side chains
 - Amino acids, with polar side chains
 - Amino acids with acidic side chains
 - Amino acids with basic side chains
 - Symbols for commonly occurring amino acids
 - Acid base properties of amino acids
- d) Protein structure:
- Primary structure of proteins:
 - Peptide bond
 - Determination of the amino acid composition of the polypeptide
 - Sequencing of the peptide from its N-terminal end
 - Cleavage of the polypeptide into smaller fragments
 - Secondary structure of proteins
 - X-Helix, B-Sheet
 - Tertiary structure of globular proteins
 - Quarter nary structure
- e) Functions of proteins
- oxygen binding proteins (hemoglobin & myosin)
 - globular and fibrous proteins
- f) Denaturation of proteins
- g) Enzymology
- Enzyme definition
 - Enzyme nomenclature
 - Chemical nature and properties of enzymes (How enzymes work, active sites, co-enzymes and prosthetic groups, catalytic efficiency and specificity)
 - Factors affecting enzyme activity (substrate concentration, temperature, PH)
 - Inhibition of enzyme activity (competitive inhibition, non-competitive inhibition)
 - Allosteric binding sites
 - Regulation of enzymes by covalent modification
 - Relevance of enzymes in clinical practice
- h) Examples of the wide range of proteins functions
 i) Definition of enzymes and the different names of the enzymes

Suggested Teaching or Learning Method

- a) Give interactive lectures on amino acids, proteins and enzymology.
 b) Illustrate how enzymes work

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Reference materials (textbooks, DVDs, CDs, etc.), stationery, audio/DVD equipment

Additional Notes

For purposes of helping learners to conceptualise specific models, video clips and PowerPoint illustrations are important.

Materials for Further Reading

You are advised to make reference to relevant and applicable reading materials that could be in form of textbooks, publications, video clips/demonstrations, authenticated Internet sites, and any other. Some of the suggested reference textbooks include:

Gilbert, H. (2008). *Basic Concepts in Biochemistry. A Learner's Survival Guide*. McGraw-Hill Medical, USA.

Lieberman, M., Marks, A. & Smith, C. (2006). *Marks' Essentials of Medical Biochemistry*. Williams and Wilkins, Philadelphia, USA.

Lubert, S., John, L. and Jeremy, B (2002). *Biochemistry Textbook*. (5th Ed.). W. Freeman.

Pamela, C., and Richard, H. (2014). *Lippincott's Illustrated Reviews –Biochemistry*. (6th Ed.). Lippincott, W and Wilkins.

Robert, K., Daryl, K., Peter, A., and Victor, R. (1998). *Harper's Biochemistry*. (24rd Ed.). Appleton and Lange.

PHA-1104: FIRST AID AND NURSING CARE

Duration: 60 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to offer first aid and nursing care.

Preparatory Activities

1. Prepare discussion points
2. Prepare assessment and answer guides
3. Formulate evaluation questions
4. Prepare lecture notes
5. Summarise lessons

1.4: Learning Working Assignment: First Aid and Nursing Care First Aid

Sub-topic 1.4.1: Introduction to First Aid

Competence(s)
<ul style="list-style-type: none"> a) Understanding of first aid scenarios in pharmacy practice b) Ability to demonstrate the use of equipment/ materials in first aid c) Ability to demonstrate empathy and unconditional positive regards to the patient/casualty d) Appreciation of the impact of first aid in saving lives
Content Outline
<ul style="list-style-type: none"> a) General overview of first aid b) Principles of first aid c) Aims and objectives of first aid d) Action at emergency in first aid e) Equipment/materials used in first aid
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Brainstorm on first aid. b) Guide group and plenary discussions on the principle of first aid. c) Demonstrate the use of equipment in first aid operations. d) Let learners practise how to use equipment used in first aid.

Sub-topic 1.4.2: First Aid Box and Personal Protective Equipment

Sub-topic 1.4.2.1: First Aid Box

Competence(s)
<ul style="list-style-type: none"> a) Ability to identify the contents of the first aid box b) Ability to demonstrate the use of contents of the first aid box
Content Outline
<ul style="list-style-type: none"> a) Definition of first aid box b) Contents of the first aid box c) Application of contents of first aid box d) Types of first aid boxes e) Labelling, handling and location of first aid box
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Guide a brainstorming session to assess the understanding of the contents of the first aid box b) Demonstrate the use and application of contents of the first aid box. c) Allow learners to practise how to use the content of the first aid box.

Sub-topic 1.4.2.2: Personal Protective Equipment

Competence(s)
<ul style="list-style-type: none"> a) Ability to describe personal protective equipment b) Ability to identify the personal protective equipment c) Appreciation of the need of personal protective equipment in pharmacy practice d) Ability to demonstrate use of personal protective equipment in the pharmacy practice
Content Outline
<ul style="list-style-type: none"> a) General overview of personal protective equipment b) Description of personal protective equipment c) Reasons for having personal protective equipment d) List of protective equipment - gloves (latex and non-latex), masks and gown, eye and face protection, arm covers, protective eye glasses, protective leg covers (gum boots) aprons, head gear-caps, helmets, overalls, reflective wears (jackets)
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on personal protective equipment. b) Lead the learner in the identification of personal protective equipment. c) Demonstrate the use of personal protective equipment. d) Let learners practise how to use personal protective equipment.

Sub-topic 1.4.3: Vital Signs

Competence(s)
<ul style="list-style-type: none"> a) Ability to outline and describe vital signs b) Ability to assess vital signs c) Ability to demonstrate empathy and unconditional positive in regards to the patient/casualty
Content Outline
<ul style="list-style-type: none"> a) Outline of the vital signs b) Description of vital signs c) Assessment of vital signs d) Drawing of an observation chart used in assessing vital signs e) Monitoring of the vital signs of the patients
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Facilitate interactive lectures on vital signs. b) Guide group and plenary discussions on vital signs. c) Demonstrate the use of equipment used in monitoring vital signs. d) Let learners practise how to monitor vital signs in patients/casualty. e) Allow learners to practise drawing an observation chart.

Sub-topic 1.4.4: Shock, Fainting and Unconsciousness

Competence(s)
<ul style="list-style-type: none"> a) Ability to outline and describe shock, fainting and unconsciousness situations b) Ability to manage shock, fainting and unconsciousness situations in a patient c) Demonstrating ability to resuscitate a patient/casualty in shock, fainting and unconscious situations
Content Outline
<ul style="list-style-type: none"> a) Definition of shock, fainting and unconsciousness situations b) Description of shock, fainting and unconsciousness situations c) Outline of the causes of shock, fainting and unconsciousness

- d) Management of shock, fainting and unconsciousness
- e) Observation charts used in monitoring of unconsciousness

Suggested Teaching or Learning Method

- a) Facilitate interactive lectures on shock, fainting and unconsciousness circumstances.
- b) Hold brainstorming sessions on causes of shock, fainting and unconsciousness.
- c) Guide group and plenary discussions on the first aid management of shock, fainting and unconsciousness.
- d) Demonstrate the use of observation chart of unconsciousness.
- e) Using role-plays, let learners perform return demonstrations on shock, fainting and unconsciousness situations.

Sub-topic 1.4.5: Artificial Respiration

Competence(s)

- a) Ability to describe the procedures of performing artificial respiration
- b) Ability to describe the types of artificial respiration
- c) Ability to perform artificial respiration
- d) Appreciation of the importance of artificial respiration in saving lives

Content Outline

- a) Definition of artificial respiration
- b) Description of types of artificial respiration
- c) Procedure of performing artificial respiration
- d) Challenges when conducting artificial respiration

Suggested Teaching or Learning Method

- a) Illustrate/demonstrate carrying out artificial respiration.
- b) Let learners role-play conducting artificial respiration.
- c) Use a video clip to show how to carry out artificial respiration.

Sub-topic 1.4.6: Poisoning

Competence(s)

- a) Ability to offer first aid to a patient who is poisoned
- b) Appreciation of the first aid management of poisoning in pharmacy practice

Content Outline

- a) General overview of poisoning
- b) Definition of poisoning
- c) Causes of poisoning
- d) Types of poisoning
- e) Prevention of poisoning
- f) First aid management of poisoning

Suggested Teaching or Learning Method

- a) Give interactive lectures on poisoning.
- b) Guide a brainstorming sessions on the causes of poisoning
- c) Guide group and plenary discussions on the first aid, prevention and treatment of poisoning.
- d) Let learners role-play first aid management of a person poisoned.

Sub-topic 1.4.7 Wounds and Bleeding

Competence(s)

- a) Understanding of wounds and bleeding
- b) Appreciation of first aid management of wounds and bleeding in the pharmacy practice

c) Demonstration of how to handle wounds and bleeding
Content Outline
a) General overview of wounds and bleeding b) Definition of wounds and bleeding c) Causes of wounds and bleeding d) Types of wounds and bleeding e) First aid management of wounds and bleeding f) Prevention of wounds and bleeding
Suggested Teaching or Learning Method
a) Give interactive lectures on wounds and bleeding b) Guide plenary and group discussions on wounds and bleeding c) Demonstrate the management of wounds and bleeding d) Allow learners to Practice management of wounds and bleeding

Sub-topic 1.4.8: Burns and Scalds

Competence(s)
a) Understanding of burns and scalds b) Demonstration of how to handle burns and scalds c) Appreciation of first aid management of burns and scalds in the pharmacy practice
Content Outline
a) General overview of burns and scalds b) Definition of burns and scalds c) Causes of burns and scalds d) Types of burns and scalds e) First aid management of burns and scalds f) Prevention of burns and scalds
Suggested Teaching or Learning Method
a) Give interactive lectures on burns and scalds. b) Guide plenary discussions of burns and scalds. c) Demonstrate the management of burns and scalds. d) Let learners role-play management of burns and scalds.

Sub-topic 1.4.9 Stings and Bites

Competence(s)
a) Understanding of stings and bites b) Demonstration of how to handle stings and bites c) Appreciation of first aid management of stings and bites in the pharmacy practice
Content Outline
Stings and Bites: <ul style="list-style-type: none"> • General Overview/ Definition • Causes • Types • Prevention
Suggested Teaching or Learning Method
a) Guide group plenary discussions on the types of stings and bites. b) Demonstrate the management of stings and bites. c) Let learners role-play the management of stings and bites. d) Facilitate interactive lectures on stings and bites.

Sub-topic 1.4.10 Fractures and Soft Tissue Injuries

Competence(s)
a) Understanding of fractures and soft tissue injuries b) Demonstration of how to handle fractures and soft tissue injuries c) Appreciation of first aid management of fractures and soft tissue injuries in the pharmacy practice
Content Outline
Fractures and Soft Tissue Injuries: <ul style="list-style-type: none"> • General Overview • Definition • Causes • Types • First aid management of fractures and soft tissues • Prevention
Suggested Teaching or Learning Method
a) Guide group/plenary discussions on the causes of fractures and soft tissue injuries. b) Demonstrate the management of fractures and soft tissue injuries. c) Let learners practise management of fractures and soft tissue injuries.

Sub-topic 1.4.11 Hypothermia and Hyperthermia

Competence(s)
a) Understanding of fractures and hypothermia and hyperthermia b) Demonstration of how to handle hypothermia and hyperthermia c) Appreciation of first aid management of hypothermia and hyperthermia in the pharmacy practice
Content Outline
a) Hypothermia and hyperthermia: <ul style="list-style-type: none"> • General Overview/ Definition • Causes • Types • Effects • First aid management of hypothermia and hyperthermia • Prevention
Suggested Teaching or Learning Method
a) Guide group/plenary discussions on the causes hypothermia and hyperthermia b) Demonstrate the management of hypothermia and hyperthermia. c) Let learners practise management of hypothermia and hyperthermia

Nursing Care

Sub-topic 1.4.12 Introduction to Nursing Care

Competence(s)
d) Understanding of nursing care e) Ability to demonstrate use of equipment in nursing care f) Appreciation of the relevance of nursing care in the pharmacy practice
Content Outline
g) General overview of nursing care h) Definition of nursing care i) Principles of nursing care j) Aims and objectives of nursing care k) Equipment used in nursing care

Suggested Teaching or Learning Method

- l) Give interactive lectures on nursing care.
- m) Guide group and plenary discussions of nursing care.
- n) Demonstrate use of equipment in nursing care.
- o) Let learners practise how to use equipment during nursing care.

Sub-topic 1.4.13 Personal Protective Equipment**Competence(s)**

- a) Understanding of personal protective equipment
- b) Demonstration of the use of personal protective equipment
- c) Appreciation of importance of personal protective equipment in the pharmacy practice

Content Outline

- a) General overview of personal protective equipment in
- b) Description of personal protective equipment
- c) Reasons for having personal protective equipment
- d) List of protective equipment: gloves (latex and non-latex), masks & gown, eye and face protection, arm covers, protective eye glasses, protective leg covers (gum boots), aprons, head gear (caps helmets), overalls, reflective wears (jackets), etc.
- e) Uses of personal protective equipment

Suggested Teaching or Learning Method

- a) Give interactive lectures on personal protective equipment.
- b) b) Lead the learners in identifying personal protective equipment.
- c) Demonstrate the use of personal protective equipment.
- d) Let learners practise how to use personal protective equipment.

Sub-topic 1.4.14 Vital Signs**Competence(s)**

- a) Understanding of vital signs
- b) Appreciation of the importance of vital signs in the pharmacy practice
- c) Demonstration of how to monitor vital signs

Content Outline

- d) Outline of the vital signs
- e) Description of vital signs
- f) Assessment of the vital signs
- g) Observation chart used in assessing vital signs: (temperature, pulse, blood pressure) Glasgow coma scale, (AVPU chart) skin
- h) Monitor the vital signs of the patient

Suggested Teaching or Learning Method

- i) Give interactive lectures on vital signs.
- j) Guide group and plenary discussions on vital signs.
- k) Demonstrate the use of equipment in monitoring vital signs.
- l) Allow learners to practise monitoring vital signs in patients/casualty.

Sub-topic 1.4.15 Positioning Patients**Competence(s)**

- a) Understanding of positioning patients
- b) Appreciation of the importance of patients positioning in the pharmacy practice
- c) Demonstration of the handling of patients

Content Outline
a) General overview of patients positioning used in nursing b) The different positions used in nursing (recumbent, semi recumbent, prone, semi prone, sitting up position, trendenburg) c) Advantages and disadvantages of each of the positions d) Requirements in positioning patients (beds and accessories, simulated patients/models)
Suggested Teaching or Learning Method
a) Give interactive discussions on positioning patients. b) Demonstrate the different positioning of patients. c) Let learners practise positioning patients.

Sub-topic 1.4.16 Prevention and Infection Control

Competence(s)
a) Understanding of prevention and infection control measures b) Appreciation of the importance of prevention and infection control in the pharmacy practice
Content Outline
a) Definition of terminologies used in prevention and infection control b) The different prevention and infection control measures applied (sterilization, biomedical waste disposal) c) Description of the types of biomedical waste d) Description of segregation of biomedical related waste e) Description of the methods of disposal of biomedical waste
Suggested Teaching or Learning Method
a) Give interactive lectures on prevention and infection control measures. b) Guide interactive discussions on prevention and infection control. c) Demonstrate the segregation and disposal of types of biomedical waste. d) Let learners practise segregation and disposal of biomedical waste.

Sub-topic 1.4.17 Hypothermia and Hyperthermia

Competence(s)
a) Understanding of nursing care of patients of hypothermia and hyperthermia b) Demonstration of how to handle: c) Hypothermia d) Hyperthermia e) Appreciation of the importance hypothermia and hyperthermia of nursing care in the pharmacy practice
Content Outline
Hypothermia and hyperthermia: <ul style="list-style-type: none"> • General overview/ Definition • Causes • Types • Effects • Nursing care of patients with hypothermia and hyperthermia • Prevention
Suggested Teaching or Learning Method
a) Hold brainstorming sessions of nursing care of patients with hypothermia and hyperthermia b) Interactive discussions of the causes of hypothermia and hyperthermia c) Demonstration management of hypothermia and hyperthermia d) Let learners practise handling hypothermia and hyperthermia

Sub-topic 1.4.18 Nursing Positions

Competence(s)
a) Understanding of nursing positions b) Appreciation of the importance of nursing position in the pharmacy practice
Content Outline
a) Importance of nursing positions to a patients in emergency b) Nursing positions
Suggested Teaching or Learning Method
a) Give interactive lectures on nursing positions. b) Guide interactive discussions on nursing positions. c) Demonstrate nursing positions. d) Let learners do role plays in carrying out nursing positions.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, models, patients and the Internet

Additional Notes

- Always review and update your work at least twice a year.
- Do continuous education to keep up to date in the dynamic academic world

Materials for Further Reading

Bumhaw, A. (1880). *A Textbook of First Aid and Emergency Treatment*. Philadelphia Lea and Febiger.US.

Clement, I. (2012). *Textbook on First Aid and Emergency Nursing*. Jaypee Brothers. India.

Tao, I. and Vikas, B. (2016). *First Aid for the USMLE Step1*. Mc Graw-Hill UK

PHA-1105: MEDICAL PSYCHOLOGY

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to apply understanding of the stages of human growth and development, hierarchy of human needs, attitudes, beliefs, values and norms, social stratification, health and health-seeking behaviours, stress-experiencing, measuring, coping with, managing and moderator of the stress experience, patient-provider relationship and communication. The learner should also be able to manage pain-experiencing, psychosocial issues, and offer counselling.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

1.5: Learning Working Assignment: Medical Psychology

Sub-topic 1.5.1: Introduction to Psychology and Sociology

Competence(s)
a) Understanding of psychology and sociology b) Appreciation of the relevancy of psychology and sociology
Content Outline
a) Definition of psychology b) An outline of branches of psychology e.g. sociology, socio-psychology, cognitive psychology c) Definition of terminologies used in socio-psychology d) Relevance of socio-psychology to health
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on general understanding of psychology. b) Give interactive lectures on the relevance of socio-psychology to health.

Sub-topic 1.5.2: Stages of Human Growth and Development

Competence(s)
a) Understanding of human growth and development b) Ability to address socio-psychological needs of people at each stage c) Ability to apply theories of personality development in patient's treatment plans d) Ability to assess personalities of patients e) Appreciation of the process of human growth and development
Content Outline
a) Definition of growth and development b) Outline of the principles of development c) The general stages of development from infancy to adulthood with their related socio-psychological needs d) Outline of personality types e) Outline of personality disorders f) Personality theories: <ul style="list-style-type: none"> • Personality structure by Sigmund • Psychosexual stages by Sigmund • Alfred Alder's personality theory

<ul style="list-style-type: none"> • Social learning theory <p>g) Alterations in personality due to illness h) Relevance of studying personalities in health</p>
Suggested Teaching or Learning Method
<p>a) Guide a brainstorming session on personality, human growth and development. b) Organise group discussions on personality theories. c) Give interactive lectures on personality types.</p>

Sub-topic 1.5.3: Hierarchy of Human Needs

Competence(s)
<p>a) Ability to satisfy psychological and physiological needs of patients b) Ability to establish cooperative relationship between the health care provider and the patient c) Appreciation of the different needs of a patient during treatment</p>
Content Outline
<p>a) The hierarchy of human needs according to Marslow</p>
Suggested Teaching or Learning Method
<p>a) Illustrate the pyramid of hierarch of human needs. b) Hold guided discussions on the pyramid of hierarchy of human needs.</p>

Sub-topic 1.5.4: Attitudes, Beliefs, Values and Norms

Competence(s)
<p>a) Understanding of attitude, beliefs, norms and values b) Ability to demonstrate professional attitude c) Ability to modify patient’s misbehaviour d) Appreciation of the different patient culture</p>
Content Outline
<p>a) Definition of attitude b) Outline of components of attitudes c) Outline of characteristics of attitudes d) Description of attitude formation and change e) The influence of attitude on behaviour f) Definition and examples of beliefs, values and norms g) The influence of beliefs, values and norms on one’s health</p>
Suggested Teaching or Learning Method
<p>a) Guide brainstorming sessions on understanding of attitudes, norms, beliefs and values. b) Organise group/plenary discussions on the influence of attitude on behaviour and influence of beliefs, values and norms on one’s health. c) Give interactive lectures about attitudes, beliefs, values and norms</p>

Sub-topic 1.5.5: Social Stratification

Competence(s)
<p>a) Ability to describe concepts of group dynamics b) Ability to explain the effects of social divisions on health c) Ability to work together as a group with other colleagues d) Appreciation of the effect of socialisation on health</p>
Content Outline
<p>a) Definition of:</p> <ul style="list-style-type: none"> • Class • Position

<ul style="list-style-type: none"> • Status • Group • Society • Group category • Social stratum • Social inequality <p>b) Definition of socialisation</p> <p>c) Types of socialisation</p> <p>d) Outline of the importance of socialisation</p> <p>e) Types of groups</p> <p>f) Relevance of groups in a society</p> <p>g) Definition of formal organisations</p> <p>h) The characteristics of formal organisations</p> <p>i) Definition of social stratification</p> <p>j) Description of the functions/perspectives of social stratification</p> <p>k) Definition of social mobility</p> <p>l) Types of social mobility</p> <p>m) The effects of social mobility on health</p>
Suggested Teaching or Learning Method
<p>a) Guide brainstorming sessions on the concepts of group dynamics.</p> <p>b) Guide group work presentations on stages of group formation, types of groups and characteristics of formal organisations.</p> <p>c) Give interactive lectures on the functions of social stratification and its principles.</p> <p>d) Hold guided discussions on social mobility, types of social mobility and the influence of social mobility on health.</p>

Sub-topic 1.5.6: Health and Health Seeking Behaviour

Competence(s)
<p>a) Understanding the concepts of health</p> <p>b) Understanding the responsibilities of a patient in patient care</p> <p>c) Appreciation of the difficulties a patient goes through to access health services</p> <p>d) Appreciation of the behaviour of a patient</p>
Content Outline
<p>a) Definitions of:</p> <ul style="list-style-type: none"> • Role • Sick role • Behaviour • Health • Health behaviour • Illness behaviour <p>b) Outline of components of sick role</p> <p>c) Outline of components of illness behaviour</p> <p>d) Factors influencing health-seeking behaviour</p>
Suggested Teaching or Learning Method
<p>a) Organise brainstorming sessions on the concepts of health and behaviour.</p> <p>b) Give interactive lectures on the components of sick role and illness behaviour as well as factors influencing health-seeking behaviour.</p>

Sub-topic 1.5.7: Stress-experiencing, Measuring, Coping with, Managing and Moderator of the Stress Experience

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concepts of stress experience b) Ability to help patients manage difficult situations c) Appreciation of the effect of stress in patient care
Content Outline
<ul style="list-style-type: none"> a) Definitions: <ul style="list-style-type: none"> • Stress • Stressor • Stress response b) The sources of stress c) The effects of stress d) The mechanisms of coping with stress
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on terminologies such as stress, stressor, stress response. b) Guide group/plenary discussions on the sources and effects of stress. c) Give interactive lectures on the mechanisms of coping with stress.

Sub-topic 1.5.8: Patient-provider Relationship and Communication

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concept of communication b) Appreciation of the value of effective communication in patient care
Content Outline
<ul style="list-style-type: none"> a) Definition of communication b) Types of communication c) The communication cycle d) Communication skills: <ul style="list-style-type: none"> • Verbal • Non-verbal e) Barriers to effective communication f) Relevance of effective communication in health
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on the definition of communication. b) Give interactive lectures on the types of communication, communication cycle and communication skills. c) Organise and conduct role-plays on communication skills. d) Hold group discussions on the barriers to effective communication. e) Organise and conduct role-plays on the barriers to effective communication. f) Hold interactive lectures on the relevance of effective communication in health.

Sub-topic 1.5.9: Pain-experiencing (Measuring, Coping with, Managing Pain)

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the psychological concepts of pain management b) Demonstration of ability to manage pain
Content Outline
<ul style="list-style-type: none"> a) Definition of pain and emotions b) Emotions associated with pain c) The psychological approach to pain management

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on the definitions of pain and emotions.
- b) Give interactive lectures on emotions associated with pain and psychological approach to pain management.

Sub-topic 1.5.10: Psychosocial Issues in Advancing, Chronic & Terminal Illness**Competence(s)**

- a) Understanding of the concepts of chronic and terminal illness
- b) Ability to provide effective care for the chronically ill, terminally ill and their families
- c) Have empathy on the chronically ill, terminally ill and their families

Content Outline

- a) Definitions of:
 - Terminal illness – advancing illness
 - Grief
 - Mourning
 - Bereavement
 - Psycho-social
 - Chronic illness
- b) Psychosocial experiences of the chronically ill, the terminally ill and their families
- c) Description of the psychosocial support that must be rendered to chronically and terminally ill individuals and their families

Suggested Teaching or Learning Method

- a) Brainstorm the concepts of chronic and terminal illness.
- b) Hold interactive lectures on the psychosocial experiences of chronically and terminally ill, and their families.
- c) Lead group/plenary discussions and presentations on the support that must be rendered to chronically and terminally ill individuals and their families.

Sub-topic 1.5.11: Social Influence**Competence(s)**

- a) Understanding of the concepts of social influence
- b) Appreciation of the ways of influencing change in one's behaviour

Content Outline

- a) Definitions of:
 - Social influence
 - Obedience
 - Compliance
 - Conformity
- b) Sources of obedience
- c) The principles of compliance
- d) The techniques of compliance
- e) Outline of the reasons why individuals conform
- f) Outline of reasons why individuals fail to conform
- g) Factors affecting conformity
- h) The social roots of conformity
- i) Factors which can facilitate /empower the minority to influence the majority

Suggested Teaching or Learning Method

- a) Brainstorm the stated terminologies.
- b) Hold group/plenary discussions on the sources of obedience.
- c) Give interactive lectures on principles and techniques of conformity.

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| <ul style="list-style-type: none"> d) Guide plenary discussions on the reasons why individuals conform and fail to conform. e) Hold group discussions on the factors affecting conformity and the social roots of conformity |
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Sub-topic 1.5.12: Counselling Skills

Competence(s)

- a) Understanding of the concept of counselling and guidance
- b) Ability to help patients solve their problems

Content Outline

- a) Definition of counselling and guidance
- b) The differences between counselling and guidance
- c) Outline of the individuals who can carry out counselling and those that require/can be counselled
- d) Types of counselling
- e) Approaches to counselling
- f) The counselling process
- g) Outline of the qualities of a good counsellor
- h) The relevance of counselling in health

Suggested Teaching or Learning Method

- a) Give interactive lectures on the relevance of counselling in health.
- b) Guide brainstorming sessions on the definition of guidance and counselling.
- c) Hold plenary discussions on the differences between counselling and guidance.
- d) Hold group discussions on the types of, approaches to and the counselling process.
- e) Organise role-plays on the counselling process.
- f) Organise role-plays on the qualities of a good counsellor

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Teaching/Learning Resources

- Charts and markers
- Role models

Materials for Further Reading

Anthony, G. (2006). *Sociology*. (5th ed.). Cambridge. Uk.

Claxton, G (1980). *Cognitive Psychology: New Directions*. Routledge & Kegan Paul. London

Rita, L., Richard, C., Edward, E., Daryl, J., and Susan, N. (1996). *Hilgard's Introduction to Psychology*. Harcourt Brace. (12th ed.)

PHA-1106 INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT)

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to produce quality documents using different computer applications.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

1.6: LWA: Processing a Document using Microsoft Word

PEX 1.6.1: Typing a Document

Competence(s)
<ul style="list-style-type: none"> a) Understanding of using a computer to type a Word document b) Ability to start and close a computer c) Ability to open and close a computer word program d) Ability to manipulate the computer to type a quality Word document e) Exhibit great care and caution when using computers and their accessories
Content Outline
<ul style="list-style-type: none"> a) Keyboard basics: function keys, numeric keys and navigation keys b) Starting and closing down the computer c) Letter and numerical buttons on the keyboard d) Computer menus (start menu, applications menu) e) Working with the desktop: background, screen saver f) Manipulating open Windows; resizing, maximising, minimising task pane, and tiling Windows, etc. g) Icons, files and folders h) Starting, creating and opening a Word window i) Working with text
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Lead guided discussions on the origin, types and uses of computers. b) Display computer software and hardware components and ask learners to identify and group the items to their correct order. c) Demonstrate the use of the keyboard, its buttons and other functions. d) Guide learners as they practise. e) Demonstrate the typing techniques applied when using computer keyboard. f) Demonstrate the procedure followed to open, change and close accounts and guide learners as they practise. g) Demonstrate how to work with text, manage files and guide them as they practise. h) Guide group/plenary discussions on care and safety precautions when working with computers.

PEX 1.6.2: Editing a Document

Competence(s)
<ul style="list-style-type: none"> a) Understanding of using a computer to edit a Word document b) Ability to use Word menus (cut, copy, paste) to edit a Word document

- c) Ability to manipulate the computer to edit a Word document

Content Outline

- a) Word menus for editing Word documents; e.g. cut, copy, paste
 b) Use of cut, copy, save, open, undo, re-do and paste short cuts
 c) Save a Word document
 d) Spell checks the Word document
 e) Punctuate the Word document

Suggested Teaching or Learning Method

- a) Give interactive lectures on editing a Word document.
 b) Demonstrate how to use Word menus for document editing, e.g. cut, copy, paste.
 c) Guide the learner as they practise.
 d) In groups, task learners to carry out copying, cutting and pasting the text on different documents.
 e) Demonstrate the correct use of cut, copy, save, open, undo, re-do and paste short cuts.

PEX 1.6.3: Formatting a Document

Competence(s)

- a) Understanding of using a computer to format a Word document
 b) Ability to select the correct font type, size and colour for suitable use on a document
 c) Ability to create tables, merge, resize or delete columns or rows to suit a given purpose
 d) Ability to correctly draw figures, pictures and clip chart
 e) Ability to manipulate the computer to format a Word document

Content Outline

- a) Formatting a page and documents: paper size, page orientation, document borders, page margins, document shading, background colours
 b) Font, font size, font style, font colour
 c) Indents and spacing (alignment, indentation, line spacing)
 d) Page breaks
 e) Bullet and numbering text
 f) Text direction/ orientation
 g) Footer and header
 h) Page numbers
 i) Table of contents
 j) Working with tables, rows and columns
 k) Working with drawings, clip charts, clip arts and pictures

Suggested Teaching or Learning Method

- a) Give interactive lectures on formatting a Word document.
 b) Demonstrate how to format a page and documents, laying emphasis on paper size, font type, font size, colour application, page margins, indents, spacing, page breaks, bullets, numbering, footers and headers.
 c) Guide the learners as they practise.
 d) Guide learners on the correct application of clip charts and arts, making of tables, merging and deleting of rows and columns to suit a given purpose and task them to practise.
 e) Group learners and task them to enter given raw data on tables using MS-Word and make presentations.

PEX 1.6.4: Saving a Document

Competence(s)

- a) Understanding of saving a Word document
 b) Ability to manipulate the computer to save a Word document

Content Outline

- a) Locations for saving documents, files and folders in a computer: desktop, my documents and hard disc space
- b) Storage devices: flash discs, compact discs, DVDs, memory cards
- c) Storage space on desktop, my documents, flash discs, compact discs, DVDs and memory cards
- d) Saving files on email address as a back up
- e) Saves files and folders on a designated location and settings
- f) Computer file protection: virus and antivirus
- g) Default computer save as formats settings: Word document, Word template, Word 1997-2003, Rich text format and pdf

Suggested Teaching or Learning Method

- a) Give interactive lectures on saving a Word document.
- b) Group learners and task them to discuss the difference between a computer file and folder.
- c) Guide the learners during group/plenary presentations on the various storage devices.
- d) Display various computer storage devices and accessories and task the learners to identify external computer storage devices.
- e) Demonstrate the procedure followed to save files and folders.
- f) Guide learners as they practise.
- g) Group learners and task them to discuss the various ways of protecting computers against virus and task them to make presentations.
- h) Demonstrate the procedure of saving files and folders in pdf, Word document, Word template, Word 1997-2003 and Rich text format.

PEX 1.6.5: Printing a Document

Competence(s)

- a) Understanding of printing a Word document
- b) Ability to manipulate the computer and printer to print a Word document

Content Outline

- a) Connecting and installing printers onto computers
- b) Paginating the document
- c) Printing menu; single page and double page
- d) Selection of paper sizes and particular section or pages to be printed
- e) Print preview
- f) Colour printing
- g) Binding a document
- h) Online printing using LAN

Suggested Teaching or Learning Method

- a) Give interactive lectures on printing a Word document.
- b) Demonstrate the procedure of paginating the document and selection of the heading levels.
- c) Let learners practise to connect a printer onto a computer.
- d) Group learners and task them to identify and present the printing menu, its properties and their applications.
- e) Demonstrate the selection of paper sizes, printable pages or area, black or coloured printing.
- f) Illustrate how online printing of documents is done using computers configured to LAN.
- g) Guide the learners as they practise.

1.7 LWA: Processing a Document using Microsoft Excel

Preparatory Activities

1. Prepare available computers ready for practical teaching and learning or ask learners to come with their personal computers to be used during the lessons.
2. Ensure that MS Excel is fully installed on the computers.

PEX 1.7.1: Typing a Document in MS Excel

Competence(s)
<ul style="list-style-type: none"> a) Understanding of typing an Excel (Spreadsheet) document b) Ability to manipulate the computer to type an Excel (Spreadsheet) document
Content Outline
<ul style="list-style-type: none"> a) Start menu b) Excel applications menu c) Starting, creating and opening an Excel window and document d) Working with Excel cells and tables e) Application of Excel arithmetic formulae
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on producing an Excel document. b) Demonstrate the procedure of opening new documents in Microsoft Excel. c) Guide plenary discussions on the care and safety precautions when working with computers and task them to write cautionary notices and pin/hang in the computer centre. d) Using default Excel grid, demonstrate the techniques applied to manipulate Excel cells and tables. e) Guide the learners as they practise.

PEX 1.7.2: Editing a Document in Microsoft Excel

Competence(s)
<ul style="list-style-type: none"> a) Understanding of editing an excel (spread sheet) document b) Ability to manipulate the computer to edit an excel (spread sheet) document
Content Outline
<ul style="list-style-type: none"> a) Excel menus for document editing; e.g. cut, copy, paste b) Use of cut, copy, save, open, undo, re-do and paste short cuts c) Shifting columns and rows in excel tables and documents d) Apply short cuts when working with text and editing a document. e) Creating/delete rows and columns in excel f) Create/delete sheets g) Move/copy sheets h) Replace text i) Working with graphs and pie charts
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on editing an excel document b) Demonstrate to the learners how to use excel menus for document editing, e.g. cut, copy, paste c) Issue group works on how to enter row data into excel tables and present the work d) Demonstrate the correct use of cut, copy, save, open, undo, re-do and paste short cuts. e) Demonstrate the techniques of shifting or creating rows/columns in excel f) Illustrate the application of graphs and pie charts in relation to data interpretation g) Guide the learners as they practise.

PEX 1.7.3: Formatting a Document in Microsoft Excel

Competence(s)
<ul style="list-style-type: none"> a) Understanding of formatting an Excel (Spreadsheet) document b) Ability to manipulate the computer to format an Excel (Spreadsheet) document
Content Outline
<ul style="list-style-type: none"> a) Formatting a page and documents: paper size, background colours b) Formatting cells, rows, columns

- c) Formatting sheets (renaming, hide, unhide)
- d) Table boundaries
- e) Working with drawings, clip charts, clip arts and pictures
- f) Creating Excel tables, merging or deleting columns, rows and re-sizing for a given purpose
- g) Creating Excel tables with boundaries

Suggested Teaching or Learning Method

- a) Give interactive lectures on formatting an Excel document.
- b) Demonstrate how to format Excel pages and documents, emphasising paper size, font type, font size and colour application.
- c) Guide group discussions on the application of clip charts and arts, making of tables, merging and deleting of rows and columns to suit a given purpose.
- d) Group learners and task them to format given rows/columns data on Excel tables and make presentations.
- e) Illustrate the techniques applied when creating table boundaries.
- f) Guide the learners as they practise.

PEX 1.7.4: Saving a Document in Excel

Competence(s)

- a) Understanding of saving an Excel (Spread sheet) document
- b) Ability to manipulate the computer to save an Excel (Spread sheet) document

Content Outline

- a) Excel files and folders
- b) Locations for saving documents, Excel files and folders in a computer: desktop, my documents and hard disc space
- c) Storage devices: flash discs, compact discs, DVDs, memory cards
- d) Saving files on email address as a back up
- e) Computer Excel file protection: virus and antivirus
- f) Default computer save as formats settings: Excel document, Excel template, Excel 1997-2003, Rich text format and pdf

Suggested Teaching or Learning Method

- a) Give interactive lectures on saving an Excel document.
- b) Group learners and task them to discuss the difference between a computer Excel file and folder and task them to make presentations.
- c) Display various computer storage devices and accessories and task learners to identify external computer storage devices.
- d) Demonstrate the procedure followed to save files and folders in flash discs/ DVDs/ memory cards.
- e) Group learners and task them to discuss the various ways of protecting computers against viruses and task them to make presentations.
- f) Demonstrate the procedure of saving files and folders in pdf, Excel document, Excel template, and Excel1997-2003 and Rich text format.
- g) Guide learners as they practice

PEX 1.7.5: Printing a Document in Excel

Competence(s)

- a) Understanding of printing an excel (spread sheet) document
- b) Ability to manipulate the computer and printer to print an Excel (Spreadsheet) document

Content Outline

- a) Connecting and installing printers onto computers
- b) Paginating an Excel document
- c) Printing menu; single page and double page

- d) Selection of paper sizes and particular sections (printable area) or pages to be printed
- e) Print preview
- f) Colour printing
- g) Binding a document
- h) Online printing using LAN

Suggested Teaching or Learning Method

- a) Give interactive lectures on printing an Excel document.
- b) Demonstrate connecting a printer to a computer.
- c) Guide group/plenary discussions of the procedure of paginating the document and selection of the heading levels.
- d) Group learners and task them to identify and present the printing menu, its properties and their applications.
- e) Guide the learners on the selection of paper sizes, printable pages or area, black or coloured printing and task them to practise.
- f) Illustrate how online printing of documents is done using computers configured to LAN.
- g) Guide the learners as they practise

1.8: LWA: Processing a Document using PowerPoint

Preparatory Assignment

- Prepare available computers ready for practical teaching and learning or ask learners to come with their personal computers to be used during the lessons.
- Ensure that MS PowerPoint is fully installed on the computers.

PEX 1.8.1: Creating PowerPoint Slides

Competence(s)

- a) Understanding of creating PowerPoint slides
- b) Ability to manipulate the computer to create PowerPoint slides

Content Outline

- a) Creating new slides and slides from templates
- b) Opening slides and recent slides
- c) Closing slides
- d) Deleting slides
- e) Slide layout
- f) Resetting slides
- g) Designing slides

Suggested Teaching or Learning Method

- a) Give interactive lectures on creating PowerPoint slides.
- b) Guide the learners on the procedure of creating new slides, opening slides, opening recent slides, closing slides and deleting unwanted slides and task them to practise.
- c) Demonstrate the techniques applied in making slide layouts, resetting slides, designing slides and guide them as they practise
- d) Guide learners to discuss and present the care and safety precautions when working with computers and task them to write cautionary notices and pin/hang in the computer centre.
- e) Guide the learners as they practise.

PEX 1.8.2: Typing Text onto the Slides

Competence(s)

- a) Understanding of typing a text onto the slides
- b) Ability to manipulate the computer to type a text onto the slides

Content Outline

- a) PowerPoint menus (start menu applications menu)
- b) Starting, creating and opening a PowerPoint window and document
- c) Animating slides
- d) Working with text and managing PowerPoint files

Suggested Teaching or Learning Method

- a) Demonstrate the procedure of opening a new document in Microsoft PowerPoint.
- b) Demonstrate how to work with PowerPoint text, manage PowerPoint files and guide the learners as they practise.
- c) Guide learners to discuss the care and safety precautions when working with computers and task them to write cautionary notices and pin/hang them in the computer centre.
- d) Demonstrate the techniques of animating worked out slides ready for the show.
- e) Guide the learners as they practise.

PEX 1.8.3: Editing and Formatting PowerPoint Documents

Competence(s)

- a) Understanding of editing and formatting PowerPoint documents
- b) Ability to manipulate the computer to edit and format PowerPoint documents

Content Outline

- a) PowerPoint menus for document editing; e.g. cut, copy, paste
- b) Use of cut, copy, save, open, undo, re-do and paste short cuts
- c) Saving a PowerPoint document
- d) Creating and shifting rows and columns in PowerPoint

Suggested Teaching or Learning Method

- a) Give interactive lectures on editing and formatting PowerPoint slides.
- b) Demonstrate how to use PowerPoint menus for document editing, e.g. cut, copy, paste and guide the learners as they practise.
- c) Give learners raw data and task them to correctly enter it on PowerPoint slide tables, edit it and present the work in groups.
- d) Demonstrate the correct use of cut, copy, save, open, undo, re-do and paste shortcuts and guide the learners as they practise.
- e) Demonstrate the techniques of shifting or creating tables in PowerPoint slides.
- f) Guide the learners as they practise.

PEX 1.8.4: Organising Slides

Competence(s)

- a) Understanding of organising slides
- b) Ability to manipulate the computer to organise slides

Content Outline

- a) Formatting slides and documents: slide size, background colours
- b) Working with drawings, clip charts, clip arts and pictures
- c) Slide shows and presentations

Suggested Teaching or Learning Method

- a) Demonstrate how to format slides and PowerPoint documents, laying emphasis on paper size, font type, font size, colour application and guide the learners as they practise.
- b) Guide learners on the correct application of clip charts and arts, making of tables, merging and deleting of rows and columns on slides to suit a given purpose and task learners to practise.
- c) Group learners and task them to enter given raw data on slide tables and make presentations.
- d) Demonstrate the techniques applied when activating and de-activating slide shows during presentation.

PEX 1.8.5: Saving Slides

Competence(s)
<ul style="list-style-type: none"> a) Understanding of saving slides b) Ability to manipulate the computer to save slides
Content Outline
<ul style="list-style-type: none"> a) PowerPoint files and folders b) Locations for saving PowerPoint files and folders in a computer: desktop, my documents and hard disc space c) Storage devices: flash discs, compact discs, DVDs, memory cards d) Storage space on desktop, my documents, flash discs, compact discs, DVDs and memory cards e) Computer PowerPoint file protection: virus and antivirus f) Default computer save as formats settings: PowerPoint show, PowerPoint presentation, PowerPoint 1997-2003, Rich text format and pdf
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Display various computer storage devices and accessories and task learners to identify external computer storage devices. b) Demonstrate the correct procedure followed to save files and folders in flash discs/ DVDs/ Memory cards and guide the learners as they practise. c) Group learners and task them to discuss the various ways of protecting computers against viruses and task them to make presentations. d) Demonstrate the procedure of saving files and folders in PowerPoint presentation, PowerPoint show, PowerPoint 1997-2003 and Rich text format. e) Guide the learners as they practise. f) Give guided discussions on storing documents on the computer for future use and referencing.

PEX 1.8.6: Printing Slides

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concept of printing documents b) Ability to manipulate the computer and printer to print slides
Content Outline
<ul style="list-style-type: none"> a) Connecting and installing printers onto computers b) Print slides c) Number of slides d) Printing slides as hand-outs (coloured and black and white) e) Printing slides as outline view f) Paper scale g) Binding a document h) Framing slides i) Online printing using LAN
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Task learners to connect a printer onto a computer and guide them as they connect. b) Demonstrate the procedure of printing slides, printing slides as handouts and guide the learners as they practise c) Group learners and task them to identify and present the printing menu, its properties and their applications. d) Guide the learners on the selection of paper sizes and scale, printable slides or handouts, black or coloured printing and task them to practise. e) Demonstrate binding documents by stapling or by using spiral clips. f) Guide the learners as they practise.

PEX 1.8.7: Uploading PowerPoint Presentations

Competence(s)
a) Understanding of uploading PowerPoint presentations b) Ability to manipulate the computer to upload PowerPoint presentations
Content Outline
a) Connecting and installing computers to internet network b) PowerPoint files and folders c) Uploading PowerPoint files as attachments on email address or online
Suggested Teaching or Learning Method
a) Give interactive lectures on uploading PowerPoint slides. b) Task learners to connect a computer to an available network and guide them as they connect. c) Demonstrate the procedure of saving PowerPoint files and folders in a predetermined location and guide the learners as they practise. d) Demonstrate the procedure of uploading PowerPoint files as attachments and task learners to upload their respective files on their email addresses. e) Guide learners as they practise.

PEX 1.8.8: Downloading PowerPoint Presentations from the Internet

Competence(s)
a) Understanding of down-loading documents from the Internet b) Ability to manipulate the computer to down-load documents from the Internet
Content Outline
a) Connecting and installing computers to a network b) Opening web addresses or ones' email address c) Opening the sent mails or attachment d) Downloading PowerPoint files and attachments on an email address or online web address or Google drive
Suggested Teaching or Learning Method
a) Give interactive lectures on downloading documents from the Internet considering copyrights. . b) Task learners to connect a computer to available network, download documents and guide them as they practise. c) Demonstrate the procedure of opening email addresses or web pages to check on the required attachments or files and guide the learners in opening their mails to download files. d) Demonstrate the procedure of downloading PowerPoint files attachments and task learners to download their respective files on their email addresses or web address or Google.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

- Computers/ laptops/ smart phones/ Ipads, keyboards, memory cards, mice, monitor/screen, USB cables, extension cables, printers, flash discs, DVDs and CDs, A4 and A3 printing paper, stapling pins, stapling machine, spiral binding machine and equipment
- Internet connection for LAN

Materials for Further Reading

Gary, B. (1980). *Introduction to Computers and Data Processing*. Anaheim Publishing Co. USA
Michael, M. (2009). *Absolute Beginners Guide to Computer Basics*. Portable Document. (10th ed.). Que Publishing.

YEAR ONE - SEMESTER TWO

PHA-120: ANATOMY AND PHYSIOLOGY (II)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to demonstrate understanding of anatomy and physiology of different systems, medical microbiology, parasitology and biochemistry.

Preparatory Activities

1. Prepare discussion points
2. Prepare assessment and answer guides
3. Prepare audio-visual materials
4. Prepare lecture notes
5. Develop and review lesson plans

2.1: Learning Working Assignment: Anatomy and Physiology (II)

Sub-topic 2.1.1: Anatomy and Physiology of Cardio-Vascular System

Competence(s)
<ol style="list-style-type: none"> a) Understanding of the anatomy and physiology cardiovascular system b) Understanding of the structure and function of the blood vessels
Content Outline
<ol style="list-style-type: none"> a) Description of anatomy cardiovascular system <ul style="list-style-type: none"> • heart • blood vessels b) External and internal anatomy of the heart chambers <ul style="list-style-type: none"> • Pericardium • Layers of the heart wall • Myocardial thickness and function c) Description of the flow of blood through the chambers of the heart and the coronary circulation d) Description of the cardiac cycle and electro-cardiogram e) The rhythmical excitation of the heart f) Contrasting the structure and function of the arteries, arterioles, capillaries, venules and veins g) Pressure cause movement of fluids between capillaries and interstitial spaces h) Description of the blood pressure regulation i) Description of the lymphatic system j) Description of the pathophysiology of the heart
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Give interactive lectures on the general understanding of the cardiovascular system. b) Guide brainstorming sessions on cardiovascular system. c) Illustrate the structure of the cardiovascular system. d) Give interactive lectures s on the structure and function of the blood vessels. e) Guide brainstorming sessions on general structure and function of the blood vessels. f) Illustrate the structure of the blood vessels.

Sub-topic 2.1.2: Anatomy and Physiology of the Respiratory System

Competence(s)
<ol style="list-style-type: none"> a) Understanding of the anatomy and physiology respiratory system
Content Outline

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| <p>a) Description of the anatomy functions and histology of :</p> <ul style="list-style-type: none"> • Nose • Pharynx • Larynx • Trachea • Bronchi • Lungs <p>b) Description of the pulmonary ventilation</p> <p>c) The difference between tidal volume, inspiratory reserve volume, expiratory reserve volume, residual volume</p> <p>d) Differences between inspiratory capacity, functional residual capacity, vital capacity and total lung capacity.</p> <p>e) The pulmonary circulation, pulmonary edema and pleural fluid</p> <p>f) Physical principles of gas exchange; diffusion of oxygen and carbon dioxide through the respiratory membrane</p> <p>g) Transport of oxygen and carbon dioxide in blood and tissue fluids</p> <p>h) Regulation of respiration respiratory insufficiency (pathophysiology, diagnosis, oxygen therapy)</p> <p>i) Control of respiration; respiration in unusual environment (e.g. high altitude, space, deep water etc.); pulmonary function tests</p> <p>j) The acid base balance by the respiratory system</p> |
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Suggested Teaching or Learning Method

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| <p>a) Brainstorm the anatomy and physiology respiratory system.</p> <p>b) Give interactive lectures on anatomy and physiology respiratory system.</p> <p>c) Give learners group work to make presentations of respiratory physiology.</p> |
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Sub-topic 2.1.3: Genital Urinary System

Competence(s)

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| <p>a) Understanding of the anatomy and physiology of the genital urinary system</p> |
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Content Outline

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| <p>a) Description of the function of the urinary system:</p> <ul style="list-style-type: none"> • Kidneys • Ureters • Urethra • Urinary bladder <p>b) Functions performed by the nephrons and where each occurs</p> <p>c) Filtration membrane</p> <p>d) Pressures that promote filtration</p> <p>e) Glomerular filtration</p> <p>f) Tubular re-absorption and secretion</p> <p>g) Production of dilute and concentrated urine</p> <p>h) Description of the urine formation by the kidney</p> <p>i) Glomerular filtration</p> <p>j) Renal blood flow and their control (regulation)</p> <p>k) Tubular secretion and re-absorption</p> <p>l) Micturition</p> <p>m) Description of the rennin angiotensin system, gluconeogenesis, erythropoietin, vitamin D3 activation</p> <p>n) The regional transport in the kidney</p> <p>o) Description of urinalysis and its importance</p> <p>p) Definition of the renal plasma clearance</p> <p>q) Description of the importance of renal plasma clearance</p> |
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- r) Description of the ways the body wastes are handled
- s) Description of the kidney regulation of acid base balance
- t) Description of the renal pathology

Suggested Teaching or Learning Method

- a) Brainstorm the anatomy and physiology of the genital urinary system.
- b) Give interactive lecture sessions on the anatomy and physiology of the genital urinary system.
- c) Brainstorm the overview of the renal physiology.
- d) Give interactive lectures on the overview of the renal physiology.
- e) Illustrate the renal physiology.
- f) Give learners group work to make presentations on renal physiology.
- g) Brainstorm the kidney functions.
- h) Illustrate the kidney nephron.
- i) Give interactive lectures on the kidney functions.
- j) Organise group work and presentations on the nephron.

Sub-topic 2.1.4: Anatomy and Physiology Digestive System

Competence(s)

- a) Understanding of the anatomy and physiology of the digestive system
- b) Understanding of the neuro innervations of the gastrointestinal tract
- c) Ability to describe the process of digestion

Content Outline

- a) Description of the anatomy and physiology, structure and function of the gastrointestinal tract
- b) Overview of the digestive system
- c) Description of the basic processes performed by the digestive system:
 - Mucosa
 - Submucosa
 - Muscularis
 - Serosa
- d) Description of the nerve supply of the GIT
- e) Enteric nervous system
- f) Autonomic nervous system
- g) Gastrointestinal reflex path way
- h) Description of the phases of digestion:
 - Cephalic phase
 - Gastric phase
 - Intestinal phase
- i) GIT motility; hormones of GIT; the liver and pancreas; endocrine and exocrine secretions, digestion, absorption; formation of faeces; biliary metabolism; assessment of GIT and mal-absorption

Suggested Teaching or Learning Method

- a) Brainstorm the general understanding of the anatomy and physiology of the digestive system.
- b) Illustrate the anatomy and physiology of the digestive system.
- c) Give interactive lectures on the general anatomy and physiology of the digestive system.
- d) Brainstorm the process of muscle contraction, neuro innervations of the gastrointestinal tract.
- e) Illustrate neuro innervations of the gastrointestinal tract.
- f) Give interactive lectures on the neuro innervations of the gastrointestinal tract.
- g) Organise brainstorming sessions on the process of digestion.
- h) Give interactive lectures on the process of digestion.

Sub-topic 2.1.5: Anatomy and Physiology of Special Senses

Competence(s)
a) Understanding of the anatomy and physiology of the sensory senses
Content Outline
a) anatomy and physiology of the sensory organs and their functions: <ul style="list-style-type: none"> • Olfactory receptors and process of olfaction • Eye • Three main regions of the ear • Receptor organ for equilibrium • Gustation (taste buds and papillae)
Suggested Teaching or Learning Method
a) Brainstorm the general understanding of the anatomy and physiology of the special senses. b) Give interactive lecture sessions on the anatomy and physiology of the special senses. c) Illustrate the anatomy and physiology of the special senses. d) Give learners group work to make presentations on the anatomy and physiology of the special senses

Sub-topic 2.1.6: Anatomy and Physiology of Integumentary System

Competence(s)
a) Understanding of integumentary system
Content Outline
a) Definition of the integumentary system b) Description of the layers of the epidermis and the cells that compose them c) The basis of different skin colour d) Contrasting the structure, distribution and functions of hair, skin, glands and nails e) Comparison of the structural and functional differences in thin and thick skin f) Description of how the skin contributes to: <ul style="list-style-type: none"> • Regulation of body temperature • Storage of blood • Protection • Sensation • Excretion and absorption • Synthesis of vitamin D
g) How epidermal wounds and deep wounds heal h) Description of the development of the epidermis, its accessory structures and the dermis
Suggested Teaching or Learning Method
a) Brainstorm the integumentary system. b) Facilitate interactive sessions on the anatomy and physiology of the integumentary system. c) Guide group work and presentations on the anatomy and physiology of the accessory structures of the skin.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, models/patients, the Internet

Additional Notes

Emphasise the anatomy, physiology and pathophysiology of all the systems. Always review and update your work at least twice a year. Do continuous education to keep up to date in the dynamic academic world.

Materials for Further Reading

Arthur, G. and John, H. (2005). *Textbook of Medical Physiology*. (11th ed.). UK.

Rodnet, A. and George, A. (2003). *Medical Physiology Illustrated Physiology*. (2nd Ed.).
Lippincott Williams & Wilkins. (Paperback).

Sembulingam, K. and Sembulingam, P. (2006). *Essentials of Medical Physiology*. (6th ed.).
Jaypee brothers medical publishers (P) LTD. India.

Tortora, G. and Bray, D. (2005). *Principles of Anatomy and Physiology*; (11th ed.). Wiley and
Sons, incorporated, John. US.

William, G. (2012). *Review of Medical Physiology*. (24th ed.). McGraw-Hill. New York.

PHA-1202: MEDICAL MICROBIOLOGY AND PARASITOLOGY (II)

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to demonstrate understanding of parasitology, immunology (immunity, immunization and vaccine), sterilization and disinfection, and drug sensitivity tests.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

2.2. Learning Working Assessment: Medical Microbiology and Parasitology (II)

Sub-topic 2.2.1 Parasitology

Competence(s)
<ol style="list-style-type: none"> a) Understanding of the life cycle of parasites and disease prevention b) Understanding of the life cycle of cestodes (<i>T. solium</i> & <i>T.saginata</i>) c) Understanding of the life cycle, distribution and prevention of <i>Shichistosomahaematobium</i> and <i>Schistosomamansoni</i>
Content Outline
<ol style="list-style-type: none"> a) Definition of parasitology and associated terms and adaptation of parasites b) The various groups of protozoa: <ul style="list-style-type: none"> • Amoebae (<i>Entamoebahystolitica</i>) • Flagellates (<i>Giardia lamblia</i>, <i>Trichomonasvaginalis</i>, <i>Trichomonashominis</i>, <i>Trypanosomagambiese</i> and <i>rhodesiense</i>) • Blood coccidia (<i>Plasmodium</i> spp) • Intestinalcoccidia (<i>Isospora belli</i>, <i>Cryptosporidium parvum</i>, <i>microsporidium</i>) c) Helminthes, Cestodes and trematodes.
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Give interactive lectures on introduction and adaptation of parasites. b) Guide discussions on life cycles of amoeba, flagellates and coccidian and their prevention. c) Facilitate group work on life cycles of cestodes and trematodes and their prevention.

Sub-topic 2.2.2 Immunology

Competence(s)
<ol style="list-style-type: none"> a) Understanding of different types of immunity (nonspecific, passive & specific) b) Understanding of different types of immunoglobulins (IgG, IgM, IgA, IgD and IgE). c) Understanding of immunization and vaccination d) Understanding about hypersensitivity (Type I, Type II, Type III and Type IV)
Content Outline
<ol style="list-style-type: none"> a) Definition of immunology b) The different types immunity c) Immunoglobulins d) Vaccination and immunisation

e) Immunologic disorders

Suggested Teaching or Learning Method

- Facilitate interactive lectures on different types of immunity, immunoglobulin and immunologic disorders.
- Guide discussions on immunization and vaccination.

Sub-topic 2.2.3: Sterilization and Disinfection

Competence(s)

- Understanding of sterilization and different methods of sterilization

Content Outline

- Definition of: sterilization, disinfectants, antiseptics, antibacterials, biocidals, biocides, biostacs, sporocidals, susceptibility and sensibility
- The methods of sterilization
- Sterility testing
- Description of filtration processes and different types of filters
- Different types of disinfectants, antiseptics, preservatives and factors that affect their actions
- Types of biocides and their classifications

Suggested Teaching or Learning Method

- Facilitate interactive lectures on methods of sterilization and different types of disinfectants.
- Demonstrate and practise how to use an autoclave, hot air oven and filtration.
- Demonstrate how to reconstitute disinfectants, anti-septics and preservatives to usable concentrations.
- Organise group discussions on disinfection, biocides and their classifications.

Sub-topic 2.2.4: Drug Sensitivity

Competence(s)

- Understanding of drug sensitivity tests (DST) and its importance
- Understanding of mechanisms and causes of drug resistance
- Understanding of disc diffusion technique and limitations of drug sensitivity tests

Content Outline

- Drug sensitivity tests and its importance
- Mechanisms and causes of resistance by micro organisms
- Limitation of drug sensitivity tests

Suggested Teaching or Learning Method

- Give an interactive lectures on drug sensitivity tests, mechanisms and causes of resistance.
- Organise group discussions on limitations of drug sensitivity tests.
- Demonstrate laboratory methods of DST.

Assessment

- Progressive (30%):** assignments, group work, written test, quick checks, etc.
- Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resource's

Textbooks, visual aids, models/patients, internet

Materials for Further Reading

Chiodini, P. Moody, D. and Manser, W. (2013). *Atlas of Medical Helminthology and Protozoology*. (4th Ed.).

Monica, C. (2009). *District Laboratory Practice in Tropical Countries*. (2nd Ed.).

PHA-1203: BIOCHEMISTRY (II)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to demonstrate understanding of carbohydrates, lipids, nucleic acids and vitamins, minerals and nutrition.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

2.3: Learning Working Assignment: Biochemistry (II)

Sub-topic 2.3.1: Carbohydrates

Competence(s)
a) Understanding of carbohydrates b) Appreciation of diseases associated with carbohydrate glucose: <ul style="list-style-type: none"> • Diabetes mellitus • Galactosemia • Glycogen storage disease • Lactose intolerance
Content Outline
a) Introduction to carbohydrates b) Examples of carbohydrates found in humans c) Classification and properties of carbohydrates <ul style="list-style-type: none"> • Monosaccharides <ul style="list-style-type: none"> ○ Aldose and Ketose ○ Isomers and epimers ○ Enantiomers ○ Cyclization on monosaccharides ○ Joining of monosaccharides • Complex carbohydrates <ul style="list-style-type: none"> ○ Disaccharides ○ Polysaccharides d) Digestion of carbohydrates: in the mouth, pancreas, small intestines and intestinal mucosal cells e) Absorption of monosaccharides by intestinal mucosal cells f) Carbohydrate metabolic pathways g) Abnormal degradation of disaccharides: <ul style="list-style-type: none"> • Digestive enzyme deficiencies • Lactose intolerance • Isomaltase-sucrase deficiency h) Biomedical importance of the physiologically significant carbohydrates in the economy of the mammalian organism
Suggested Teaching or Learning Method
a) Guide brainstorming sessions on examples of carbohydrates found in humans. b) Guide group discussions/ plenary presentations on carbohydrates metabolic pathways. c) Give interactive lectures on properties and digestion of carbohydrates.

Sub-topic 2.3.2: Lipids

Competence(s)

a) Understanding of lipids

Content Outline

- a) Description of lipids and their biomedical importance
- b) Classification of lipids:
- Structure of fatty acids
 - Saturation of fatty acids
 - Chain length of fatty acids
 - Essential fatty acids
- c) Digestion, absorption, secretion and utilisation of dietary lipids:
- Processing of dietary lipids in the stomach
 - Emulsification of dietary lipids in small intestines
 - Degradation of dietary lipids by pancreatic enzymes
 - Absorption of lipids by intestinal mucosal cells (enterocytes)
 - Resynthesis of TAG and cholesteryl esters
 - Lipid mal-absorptions
 - Secretion of lipids from enterocytes
 - Fatty acid and tri-acylglycerol metabolism
- d) De novo synthesis of fatty acids:
- Production of cytosolic acetyl CoA
 - Carboxylation of acetyl CoA to form malonyl- CoA
 - Fatty acid synthase a multifunctional enzyme in eukaryotes
 - Major sources of NAPH required for fatty acid synthesis
 - Storage of fatty acids as components of triacylglycerols
 - Different fates of TAG in the liver and adipose tissue
- e) Mobilisation of stored fats and oxidation of fatty acids:
- Release of fatty acids from TAGs
 - Ketone bodies
 - Oxidation of fatty acids
- f) Introduction to phospholipids:
- Structure of phospholipids
 - Glycerolphospholipids
 - Sphingophospholipids
 - Phospholipid synthesis
 - Synthesis of phosphatidic acid (PA)
 - Phosphatidylserine (PS)
 - Phosphatidylinositol (PI)
 - Synthesis of leukotrienes
 - Roles of prostaglandins in platelet homeostasis
- g) Cholesterol and steroid metabolism:
- Structure and biomedical importance of cholesterol
 - Sterol and cholesteryl esters
 - Synthesis of cholesterol and HMG CoA
 - Synthesis of mevalonic acid (mevalonate)
 - Regulation and degradation of cholesterol
 - Bile acids and bile salts:
 - Structure and synthesis of bile salts
 - Action of intestinal flora on bile salts
 - Enterohepatic circulation
 - Bile salt deficiency (Cholelithiasis)

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| h) Plasma lipoproteins: <ul style="list-style-type: none"> • Composition and metabolism • Metabolism of LDC, LDL and HDL • Roles of lipoprotein in heart disease i) Steroid hormones: <ul style="list-style-type: none"> • Synthesis and secretion of adrenal cortical steroid hormones • Mechanism of steroid hormone action |
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Suggested Teaching or Learning Method

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| a) Guide brainstorming sessions on lipids and their biomedical importance.
b) Guide small group discussions/ plenary presentations on saturation of fatty acids.
c) Present illustrations of structure of fatty acids.
d) Give interactive lectures on lipids. |
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Sub-topic 2.3.3: Nucleic Acids

Competence(s)

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| a) Understanding of nucleic acids
b) Appreciation of the role of DNA in drug development |
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Content Outline

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| a) Introduction to DNA/RNA and their relevance in molecular biology
b) Structure of DNA: <ul style="list-style-type: none"> • 3-5 phosphodiester bonds • Double helix • Circular DNA molecules c) DNA replication: <ul style="list-style-type: none"> • Separation of two complementary DNA strands • Formulation of replication fork • Direction of DNA replication d) RNA primer
e) Chain elongation
f) Excision of RNA primers and their replacement by DNA
g) DNA ligase
h) Nucleotide excision repair
i) Structure of RNA: <ul style="list-style-type: none"> • Ribosomal, transfer and messenger RNA • Transcription of Prokaryotic genes • Steps in RNA and eukaryotic genes synthesis • RNA polymerase • Mitochondrial RNA polymerase • Chromatin structure and gene expression j) Proteins synthesis: <ul style="list-style-type: none"> • Genetic code and its characteristics • Components required for translation: <ul style="list-style-type: none"> ○ Amino acids ○ Transfer RNA ○ Messenger RNA ○ Amino acyltransfer RNA synthases ○ Ribosomes and proteins factors • Steps in protein synthesis: <ul style="list-style-type: none"> ○ Initiation, elongation, termination • Polysomes • Protein targeting |
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- Regulation of translation
 - Priming
 - Regulation of gene expression
- k) Role of biotechnology and human disease:
- DNA cloning
 - DNA libraries
 - Antibodies

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on the relevance of DNA/RNA in molecular biology.
- b) Illustrate the structure of DNA/RNA.
- c) Guide group discussions/ plenary presentations on the structure of RNA.
- d) Provide a video illustration of DNA replication.
- e) Give interactive lectures on nucleic acids

Sub-topic 2.3.4: Vitamins and Minerals

Competence(s)

- a) Understanding of vitamins and minerals
- b) Appreciation of the role of vitamins and minerals in the body

Content Outline

- a) Nutrients as sources of energy that provide optimal health:
 - Dietary reference intakes
 - Energy requirements and content of food
 - How energy is used in body
 - Dietary fats and carbohydrates
 - Dietary blood glucose
 - Nitrogen balance
 - Requirement for protein in humans
- b) Vitamins:
 - Classification of vitamins (water soluble and fat soluble)
 - Water soluble:
 - non B-complex-vitamin C
 - B-complex vitamins
 - Thiamine
 - Riboflavin
 - Niacin
 - Biotin
 - Fat soluble A,D, K, E
 - Functions of folic acid
 - Nutritional anemia
 - Cobalamine and its distribution
 - Folate trap hypothesis
 - Clinical indications of vitamin B12
 - Pyridoxine and its clinical indications
 - Thiamine and its clinical indications
 - Vitamin D and E and their clinical indication
 - Clinical indications and toxicity of vitamin K
 - Biomedical importance of all vitamins
- c) Minerals required for both physiologic and biochemical reactions
- d) Classification of the minerals required:
 - Macro minerals
 - Micro minerals (trace elements)

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| <p>e) Elements (calcium, phosphorus, sodium potassium, chloride, magnesium, chromium, cobalt, copper, iodine, iron, manganese, molybdenum selenium, silicon, zinc, fluoride):</p> <ul style="list-style-type: none"> • Functions • Metabolism • Deficiency disease or symptoms • Toxicity disease or symptoms • Sources |
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Suggested Teaching or Learning Method
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| <p>a) Lead brainstorming sessions on nutrients as sources of energy.</p> <p>b) Guide group discussions on dietary reference intake, vitamins and minerals required for both physiologic and biochemical reactions.</p> <p>c) Give interactive lectures on vitamins and minerals.</p> |
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Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Reference materials (textbooks, DVDs, CDs, etc), stationery, audio/DVD equipment

Additional Notes

For purposes of helping learners to conceptualise specific models, video clips and PowerPoint illustrations are important.

Materials for Further Reading

You are advised to make reference to relevant and applicable reading materials that could be in form of textbooks, publications, video clips/demonstrations, authenticated Internet sites, and any other. Some of the suggested reference textbooks include:

- Gilbert, H. (2008). *Basic Concepts in Biochemistry. A Learner's Survival Guide*. McGraw-Hill Medical, USA.
- Lieberman, M., Marks, A. & Smith, C. (2006). *Marks' Essentials of Medical Biochemistry*. Williams and Wilkins, Philadelphia, USA.
- Lubert, S., John, L. and Jeremy, B (2002) *Biochemistry Textbook*. (5th Ed.). W. Freeman.
- Pamela, C., and Richard, Harvey. (2014) *Lippincott's Illustrated Reviews –Biochemistry*. (6th Ed.). Lippincott, W and Wilkins.
- Robert, K., Daryl, K., Peter, A., and Victor, R. (1998). *Harper's Biochemistry*. Appleton and Lange. (24rd Ed.).

PHA-1204: PRIMARY HEALTH CARE (PHC)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to communicate pharmaceutical information, conduct community pharmaceutical interventions and promote primary health care activities.

2.4. Learning Working Assignment: Communicating Pharmaceutical Information and Health Related Matters

Preparatory Activities

1. Prepare discussion notes
2. Prepare audio- visual materials
3. Prepare lecture notes
4. Prepare assessment and answer guides
5. Prepare field guides/check list
6. Prepare community entry

Sub-topic 2.4.1: Verbal Communication

Competence(s)
a) Understanding of verbal communication b) Appreciation of the need for effective verbal communication in pharmacy practice
Content Outline
a) Definition of verbal communication b) Limitations and benefits of verbal communication c) The meaning of effective communication d) Outline of barriers to effective verbal communication e) Description of the communication cycle
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on aspects of verbal communication. b) Organise role-plays on the communication cycle. c) Guide discussions on the communication cycle. d) Give interactive lectures on the communication cycle.

Sub-topic 2.4.2: Written Communication

Competence(s)
a) Knowledgeable on the aspects of written communication b) Ability to demonstrate effective writing skills
Content Outline
a) Definition of written communication b) Outline of forms of written communication c) Outline of characteristics of effective written communication d) Different forms of writing: <ul style="list-style-type: none"> • Letters • Reports • Notice board communications
Suggested Teaching or Learning Method
a) Guide brainstorming sessions on the aspects of written communication. b) Guide discussions on the characteristics of written communication.

Sub-topic 2.4.3: Non-Verbal Communication

Competence(s)
<ul style="list-style-type: none"> a) Basic understanding of non-verbal communication b) Ability to communicate pharmaceutical information and health-related matters using none verbal communication c) Appreciation of the need for non-verbal communication and situations where it is necessary
Content Outline
<ul style="list-style-type: none"> a) Definition of none verbal communication skills b) Components of none verbal communication c) Scenarios of utilisation of non-verbal communication
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Lead brainstorming sessions on aspects of nonverbal communication. b) Hold interactive lectures on the types of non-verbal communication. c) Organise role-plays on using nonverbal skills.

Sub-topic 2.4.4: Media Communication

Competence(s)
<ul style="list-style-type: none"> a) Basic understanding of media communication b) Ability to communicate pharmaceutical information and health-related matters using media
Content Outline
<ul style="list-style-type: none"> a) Definition of media communication b) Types of media communication c) Formulation of appropriate media messages d) Advantages and disadvantages of media communication
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Hold brainstorming sessions on aspects of media communication. b) Hold interactive lectures on formulating appropriate media messages.

Sub-topic 2.4.5: Conducting Seminars

Competence(s)
<ul style="list-style-type: none"> a) Basic knowledge on how to plan for a seminar b) Ability to conduct a seminar on pharmaceutical information and health-related matters
Content Outline
<ul style="list-style-type: none"> a) Definition of seminar b) Steps in planning for seminars c) Advantages and disadvantages of seminars d) Steps in organising seminars (seminar sessions)
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Hold interactive lectures on how to plan for a seminar. b) Hold discussions on advantages and disadvantages of seminars. c) Learners role play how to conduct a seminar.

Sub-topic 2.4.6: Conducting Meetings

Competence(s)
<ul style="list-style-type: none"> a) Basic knowledge on how to plan for a meeting b) Ability to conduct meetings c) Appreciation of the need for meetings in pharmacy practice
Content Outline

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| <ul style="list-style-type: none"> a) Definition of meetings b) Types of meetings c) Steps in planning for meetings d) Benefits and limitations of meetings e) Steps in conducting meetings f) Sitting arrangement for different types of meetings |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold interactive lectures on concepts of meetings. b) Organise group discussions on advantages and disadvantages of meeting. c) Hold interactive lectures on how to conduct meetings. d) Organise role-plays on steps in conducting meetings. |
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2.5. LWA: Conducting Community Pharmaceutical Intervention

Sub-topic 2.5.1: Assessing Community Pharmaceutical Needs

Competence(s)

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| <ul style="list-style-type: none"> a) Basic understanding of community needs assessment b) Ability to conduct community needs assessment c) Appreciation of the fact that the community understands needs d) Ability to write a report |
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Content Outline

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| <ul style="list-style-type: none"> a) Definition of needs assessment b) Importance of community needs assessment c) Steps followed in conducting community needs assessment d) Steps to develop assessment tools e) Using pharmaceutical needs assessment tools f) Importance of community needs assessment g) Limitations in community needs assessment h) Data collection methods i) Analysis of data and interpretation j) Presentation of data |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold interactive lectures on needs assessment concepts. b) Hold brainstorming sessions on steps followed in conducting community needs assessment. c) Demonstrate how to use assessment tools and let learners practise. d) Hold interactive lectures on collection of data. e) Hold discussions of data analysis and assessment tools. |
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Sub-topic 2.5.2: Mobilising Resources Required

Competence(s)

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| <ul style="list-style-type: none"> a) Basic understanding on community resource mobilisation b) Ability to carry out resource mobilisation c) Appreciation of the relevance of mobilising resources in pharmacy practice |
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Content Outline

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| <ul style="list-style-type: none"> a) The meaning of resources b) Identification of types of resources in the community c) The importance of identifying resources while planning for activities d) Methods used in identifying and mobilising resources e) Effective utilisation of resources |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on the concepts of resource mobilisation. b) Organise group discussions on identification of resources in a community. |
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Sub-topic 2.5.3: Implementing Community Pharmaceutical Interventions

Competence(s)

- a) Basic knowledge of implementing community pharmaceutical intervention
- b) Ability to implement community pharmaceutical interventions
- c) Appreciation of the importance of implementing community pharmaceutical interventions

Content Outline

- a) Definition of community pharmaceutical interventions
- b) Methods carried out in implementing community pharmaceutical intervention
- c) Personnel involved in implementing community pharmaceutical intervention
- d) Tools used in implementing community pharmaceutical interventions
- e) Guidelines on implementing community pharmaceutical interventions

Suggested Teaching or Learning Method

- a) Brainstorm the implementation of community pharmaceutical interventions.
- b) Organise group work on the tools used in implementing pharmaceutical interventions.
- c) Give interactive lectures on guidelines of implementing the community pharmaceutical intervention

Sub-topic 2.5.4: Evaluating the Impact of Interventions

Competence(s)

- a) Basic understanding on the concepts of evaluation
- b) Ability to carry out evaluation
- c) Appreciation of the importance of evaluating interventions in communities

Content Outline

- a) Definition of evaluation
- b) The importance of evaluation
- c) How evaluation is done
- d) When evaluation is carried out
- e) Tools used in evaluations
- f) Evaluation indicators

Suggested Teaching or Learning Method

- a) Give interactive lectures on concepts of evaluation.
- b) Organise discussions on tools used in evaluation.
- c) Demonstrate the use of tools and evaluation indicators.

2.6. Learning Working Assignment: Conducting Activities Promoting Health

Sub-topic 2.6.1: Educating the Community about Nutrition

Competence(s)

- a) Basic knowledge on nutrition
- b) Appreciation of the value of proper nutrition education to the community

Content Outline

- a) Definitions of nutrition, types of food, and food deficiencies
- b) Diet in special conditions
- c) Factors that influence nutrition
- d) Food storage
- e) Food hygiene
- f) Methods of nutrition rehabilitation

- g) Causes and management of malnutrition
- h) Breastfeeding
- i) Weaning
- j) Normal nutrition
- k) Different food preparations
- l) Relevance of nutrition education to pharmacy practice

Suggested Teaching or Learning Method

- a) Give interactive lectures on nutrition education.
- b) Brainstorm on food storage and food hygiene.
- c) Organise group discussions on the relevance of nutrition education.

Sub-topic 2.6.2: Educating the Community about Sanitation

Competence(s)

- a) Understanding on sanitation
- b) Ability to educate communities on aspects of sanitation
- c) Appreciation of the importance of proper sanitation

Content Outline

- a) Definition of sanitation
- b) Effects of poor sanitation
- c) Benefits of improved sanitation
- d) Improvement of sanitation behaviour

Suggested Teaching or Learning Method

- a) Give interactive lectures on aspects of sanitation.
- b) Brainstorm on sanitation.

Sub-topic 2.6.3: Educating the Community on Rational Drug Use (Pharmacovigilance)

Competence(s)

- a) Ability to educate the community on rational use of drugs

Content Outline

- a) Definition of rational use of drugs
- b) Methods of rational use of drugs
- c) Methods of irrational use of drugs
- d) Effects of irrational use of drugs

Suggested Teaching or Learning Method

- a) Lead discussions on rational and irrational use of drugs.

2.7. Learning Working Assignment: Participating in Infection Prevention and Control Activities

Sub-topic 2.7.1: Performing Hygiene Precautions

Competence(s)

- a) Basic understanding of hygiene
- b) Appreciation of the importance of maintaining hygiene

Content Outline

- a) Definition of hygiene
- b) Roles of different key actors in improving hygiene
- c) Effects of poor personnel and environment hygiene
- d) Benefits of improved personnel and environmental hygiene

- e) Methods of personnel and environmental hygiene
- f) Tools and materials used in personnel and environmental hygiene

Suggested Teaching or Learning Method

- a) Brainstorm aspects of hygiene.
- b) Lead plenary discussions on the roles of key actors.
- c) Give interactive lectures on the effects and benefits of personnel and environment hygiene.

Sub-topic 2.7.2: Carrying Out Disinfection

Competence(s)

- a) Basic understanding on concepts of disinfection
- b) Ability to carry out disinfection
- c) Appreciation of the importance of disinfection in the pharmacy practice

Content Outline

- a) Definition of disinfection
- b) Methods of disinfection
- c) Guidelines to follow on use of disinfectant and antiseptics
- d) Principles of hand washing
- e) Practicing hand washing
- f) Practicing disinfection

Suggested Teaching or Learning Method

- a) Give interactive lectures on methods of disinfection
- b) Give interactive lectures on the principles of hand washing.
- c) Demonstrate hand washing.
- d) Demonstrate how to disinfect.

Sub-topic 2.7.3: Sterilizing Equipment, Tools, Linen, Pharmaceutical Products

Competence(s)

- a) Basic understanding on concepts of sterilisation
- b) Ability to carry out sterilisation
- c) Appreciation of the importance of sterilisation

Content Outline

- a) Definition of sterilisation
- b) Methods of sterilisation
- c) Guidelines to follow in sterilisation

Suggested Teaching or Learning Method

- a) Give interactive lectures on the principles of sterilisation.
- b) Organise unit attachment to practice sterilisation of equipment, tools, linen.
- c) Demonstrate how to sterilise equipment, tools and linen and let learners practise.

Sub-topic 2.7.4: Using Personal Protective Equipment

Competence(s)

- a) Basic understanding on the use of personal protective equipment
- b) Ability to use personal protective equipment
- c) Appreciation of the importance of personal protection

Content Outline

- a) Definition of personal protective equipment
- b) Types of personal protective equipment
- c) Importance of personal protective equipment
- d) Procedure of using personal protective equipment

Suggested Teaching or Learning Method

- Give interactive lectures on the importance of personal protective equipment.
- Brainstorm the types of personal protective equipment.
- Demonstrate how to use personal protective equipment and let learners practise.

Sub-topic 2.7.5: Managing Health Care Waste**Competence(s)**

- Basic understanding on management of health care waste
- Ability to manage health care waste
- Appreciation of the importance of management of health care waste

Content Outline

- Definition of health care waste
- Types of health care waste and their property/characteristics
- Methods of health care waste disposal
- Management of health care waste disposal

Suggested Teaching or Learning Method

- Give interactive lectures on management of health care waste.
- Organise discussions on methods of health care waste disposal.
- Demonstrate how to manage health care waste disposal and let learners practise.

Sub-topic 2.7.6: Providing Post Exposure Prophylaxis**Competence(s)**

- Basic understanding of post exposure prophylaxis
- Ability to provide post exposure prophylaxis

Content Outline

- Definition of post exposure prophylaxis
- Importance of post exposure prophylaxis
- Methods of post exposure prophylaxis
- Guidelines /procedures on post exposure prophylaxis
- Providing post exposure prophylaxis

Suggested Teaching or Learning Method

- Give interactive lectures on post exposure prophylaxis.
- Brainstorm the methods of post exposure prophylaxis.
- Lead discussions on methods of post exposure prophylaxis.
- Demonstrate provision of post exposure prophylaxis.
- Organise clinical attachments.

Assessment

- Progressive (30%):** assignments, group work, written test, quick checks, etc.
- Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Radio, television, newspapers, communication aids, e.g. drums, public address system, banners, funds, stationery, ICT, computers, protective gear e.g. boots, umbrella, means of transport, textbooks, video clips/tapes, projector

Additional Notes

Emphasis should be put on health education. Field visits and attachment should be encouraged. Continuously update resources and notes.

Material for Further Reading

Chris, W. (2008). *Community Health*. (3rd ed.). Nairobi, Kenya.

PHA-1205: PHARMACEUTICS (I)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to prepare stable oral liquid dosage forms.

Preparatory Activities

1. Prepare discussion notes
2. Prepare lecture notes
3. Prepare examples for demonstration
4. Prepare assessments and answer guides
5. Prepare e-learning materials

2.8: Learning Working Assignment: Preparing Oral Liquid Dosage Forms

PEX 2.8.1: Preparing Simple Solutions

Competence(s)
a) Understanding of preparing simple solutions b) Ability to prepare different types of quality simple solutions c) Appreciation of the importance and relevance of simple solutions as medicines
Content Outline
d) Definitions of: Solution, Solvent, Vehicle, Solutes, Solubility a) Expression of concentration: <ul style="list-style-type: none"> • Percentage • Parts • Molarity • Molality • Milliequivalents and normal solutions b) Advantages and disadvantages of solutions c) Factors affecting solubility d) Methods to enhance solubility e) Excipients used in oral pharmaceutical solutions f) Types of simple solutions: <ul style="list-style-type: none"> • Syrups (Definition, Formation, Method of preparation Packaging and labelling) • Elixirs (Definition, Formation, Method of preparation Packaging and labelling)
Suggested Teaching or Learning Method
a) Give interactive lectures on simple solutions. b) Brainstorm the factors affecting solubility. c) Guide group/plenary discussions on methods of enhance solubility. d) Demonstrate how to formulate and prepare simple solutions. e) Let learners practise how to formulate and prepare simple solutions

PEX 2.8.2: Preparing Complex Solutions

Competence(s)
a) Understanding of preparing complex solutions b) Ability to prepare quality gentian violet solution and Lugol's solution c) Appreciation of the biomedical importance of gentian violet and Lugol's solution
Content Outline
a) Definition of compound pharmaceutical solutions b) Types of compound pharmaceutical solutions:

<ul style="list-style-type: none"> • Gentian violet: <ul style="list-style-type: none"> ○ Description ○ Formulation ○ Methods of preparation ○ Packing and labelling ○ Biomedical importance • Lugol's solution: <ul style="list-style-type: none"> ○ Description ○ Formulation ○ Methods of preparation ○ Packing and labelling ○ Biomedical importance • Linctuses: <ul style="list-style-type: none"> ○ Description ○ Formulation ○ Methods of preparation ○ Packing and labelling • Miscellaneous solutions: <ul style="list-style-type: none"> ○ Mouth washes and gargles ○ Mixtures and draughts ○ Enemas • Stability of solution <ul style="list-style-type: none"> ○ Clarity ○ Colour ○ Viscosity ○ Flavours and perfumes <p>c) The different stability states of solutions and their instabilities</p>
Suggested Teaching or Learning Method
<p>a) Give interactive lectures on complex solutions.</p> <p>b) Brainstorm the types of compound pharmaceutical solutions.</p> <p>c) Guide group/plenary discussions on stability of solutions.</p> <p>d) Demonstrate how to formulate and prepare complex solutions.</p> <p>e) Let learners practise how to formulate and prepare complex solutions.</p>

PEX 2.8.3: Preparing Suspensions Containing Diffusible Solids

Competence(s)
<p>a) Understanding of the preparation of suspensions containing diffusible solids</p> <p>b) Ability to prepare quality suspensions containing diffusible solid</p> <p>c) Appreciation of the importance and relevance of suspensions containing diffusible solids as medicine</p>
Content Outline
<p>a) Introduction to suspensions:</p> <ul style="list-style-type: none"> • Definition of suspensions • Types of suspensions • Qualities of a good suspension • General methods of preparing suspensions <p>b) Definition of diffusible solids:</p> <ul style="list-style-type: none"> • Formulation of suspensions containing diffusible solids • Methods of preparation • Packaging and labelling
Suggested Teaching or Learning Method

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| <ul style="list-style-type: none"> a) Give interactive lectures on suspensions containing diffusible solids. b) Guide brainstorming sessions on types of suspensions containing diffusible solids. c) Demonstrate how to formulate and prepare suspensions containing diffusible solids. d) Let learners practise how to formulate and prepare suspensions containing diffusible solids. |
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Sub-topic 2.8.4: Suspensions Containing In-Diffusible Solids

Competence(s)

- a) Understanding of suspensions containing in-diffusible solids
- b) Ability to prepare quality suspensions containing in-diffusible solids
- c) Appreciation of the importance and relevance of suspensions containing in-diffusible solids as medicine

Content Outline

- a) Definition of in-diffusible solids and suspending agents
- b) Precipitate-forming liquids
- c) Types of suspension agents
- d) Qualities of a good suspending agent
- e) Examples of in-diffusible solids
- f) Formulation of suspensions containing in-diffusible solids
- g) Methods of preparation of suspensions containing in-diffusible solids
- h) Packaging and labelling

Suggested Teaching or Learning Method

- a) Give interactive lectures on suspensions containing in-diffusible solids.
- b) Guide brainstorming sessions on the qualities of a good suspending agent.
- c) Guide group/plenary discussions of methods of preparation of suspensions containing in-diffusible solids.
- d) Demonstrate how to formulate and prepare suspensions containing in-diffusible solids.
- e) Let learners practise how to formulate and prepare suspensions containing in-diffusible solids.

Sub-topic 2.8.5: Suspensions Containing Precipitate Forming Liquids

Competence(s)

- a) Understanding of suspensions containing precipitate forming liquids
- b) Ability to prepare quality suspensions containing precipitate forming liquids
- c) Appreciation of the importance and relevance of suspensions containing precipitate forming liquids as medicine

Content Outline

- a) Definition of precipitate forming liquids
- b) Examples of precipitate forming liquids
- c) Formulation of suspensions containing precipitate forming liquids
- d) Methods of preparation of precipitate forming liquids
- e) Packaging and labelling

Suggested Teaching or Learning Method

- a) Give interactive lectures on suspensions containing precipitate forming liquids.
- b) Guide brainstorming sessions on examples of precipitate forming liquids.
- c) Guide group/plenary discussions of methods of preparation of precipitate forming liquids.
- d) Demonstrate how to formulate and prepare suspensions containing precipitate forming liquids.
- e) Let learners practise how to formulate and prepare suspensions containing precipitate forming liquids.

Sub-topic 2.8.6: Suspensions Containing Insoluble Liquids

Competence(s)
a) Understanding of suspensions containing insoluble liquids b) Ability to prepare quality suspensions containing insoluble liquids c) Appreciation of the importance and relevance of suspensions containing insoluble liquids as medicine
Content Outline
a) Description of insoluble liquids b) Methods of preparing suspension containing insoluble liquids c) Packaging and labelling
Suggested Teaching or Learning Method
a) Give interactive lectures on suspensions containing insoluble liquids. b) Guide group/plenary discussions on methods of preparation of suspensions containing insoluble liquids. c) Demonstrate how to formulate and prepare suspensions containing insoluble liquids. d) Let learners practise how to formulate and prepare suspensions containing insoluble liquids.

Sub-topic 2.8.7: Preparation of Emulsions Containing Fixed Oils

Competence(s)
a) Understanding of the preparation of emulsions containing fixed oils b) Ability to prepare quality emulsions c) Ability to pack and label emulsions d) Appreciation of the relevance of emulsions containing fixed oils to medicine
Content Outline
a) Definition of emulsions b) Emulsion types c) Tests for identification of emulsion types d) Classification of the emulsifying agents: <ul style="list-style-type: none"> • Synthetic • Semi-synthetic • Naturally occurring e) Other formulation additives (e.g. anti-oxidants, humectants, preservatives) f) Formulation of emulsions containing fixed oils using HLB method g) Preparation of emulsions containing fixed oils (e.g. arachis oil, sesame, cotton seed and maize oils): <ul style="list-style-type: none"> • Stability (creaming, cracking, phase inversion) h) Biomedical importance of emulsions containing fixed oils: <ul style="list-style-type: none"> • Use internal • Use external • Advantages • Disadvantages
Suggested Teaching or Learning Method
a) Give interactive lectures on emulsions containing fixed oils. b) Guide brainstorming sessions on biomedical importance of emulsions containing fixed oils. c) Guide group/plenary discussions of the classification of emulsifying agents. d) Demonstrate how to formulate and prepare emulsions containing fixed oils. e) Let learners practise how to formulate and prepare emulsions containing fixed oils.

Sub-topic 2.8.8: Emulsions Containing Volatile Oils

Competence(s)
a) Understanding of the preparation of emulsions containing volatile oils b) Ability to prepare quality emulsions containing volatile oils c) Appreciation of the importance and relevance of emulsions containing volatile oils as medicine
Content Outline
a) Definition of volatile oils b) Application of emulsions containing volatile oils c) Phase of volatile oils d) Calculations for the amount of emulsifying agent to be used in preparations e) General methods for preparation of emulsions containing volatile oils: <ul style="list-style-type: none"> • Continental methods • Dry gum method
Suggested Teaching or Learning Method
a) Give interactive lectures on emulsions containing volatile oils. b) Guide brainstorming sessions on application of emulsions containing volatile oils. c) Demonstrate how to formulate and prepare emulsions containing volatile oils. d) Let learners practise how to formulate and prepare emulsions containing volatile oils.

Sub-topic 2.8.9: Preparation of Emulsions Containing Mineral Oils

Competence(s)
a) Understanding of the preparation of emulsions containing mineral oils b) Ability to prepare quality emulsions containing mineral oils c) Appreciation of the importance and relevance of emulsions containing mineral oils as medicine to humans
Content Outline
a) Definition of mineral oils b) Application/uses of emulsions containing mineral oils c) General methods for preparation of emulsions containing mineral oils: <ul style="list-style-type: none"> • Dry gum method • Wet gum method d) Quality control tests for emulsions: <ul style="list-style-type: none"> • Determination of viscosity • Determination of phase separation e) Preservation of emulsions: <ul style="list-style-type: none"> • Preservation from micro-organism • Preservations form oxidation f) Packaging and labelling of emulsions
Suggested Teaching or Learning Method
a) Give interactive lectures on emulsions containing mineral oils. b) Guide brainstorming sessions on application/uses of emulsions containing mineral oils. c) Guide group/plenary discussions on the quality control tests for emulsions. d) Demonstrate how to formulate and prepare emulsions containing mineral oils. e) Let earners practise how to formulate and prepare emulsions containing mineral oils.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Weighing scale, beakers, conical flasks, measuring cylinders, pipettes, stirring rods, porcelain mortar and pestle, glass mortar and pestle, distiller, hot plate, water bath, Bunsen burner, gas cylinder, sintered glass filter, filter paper, containers for packaging, glass slab, spatulas, spoons, funnels, homogeniser, evaporating dish, thermometers, powder sieves, tabulating machine, trays, mould, gelatine empty capsules, autoclave, ampoule cutter, capping machine, hot air oven.

Additional Notes

For purposes of helping learners to conceptualise specific models, video clips and PowerPoint illustrations are important.

Materials for Further Reading

You are advised to make reference to relevant and applicable reading materials that could be in form of textbooks, publications, video clips/demonstrations, authenticated Internet sites, and any other. Some of the suggested reference textbooks include:

Lieberman M, Marks A. D. and, Smith C. (2006). *Marks' Essentials of Medical Biochemistry. A Clinical Approach*, Lippincott Williams and Wilkins, Philadelphia, USA.

Gilbert H F. (2008). *Basic Concepts in Biochemistry. A Learner's Survival Guide*. McGraw-Hill Medical, USA.

LubertStryer, John L. Tymoczko and Jeremy Berg Biochemistry Textbook. (5th Ed.).

Robert K. Murray, Daryl K. Granner, Peter A.Mayes, Victor W.Rodwell. *Harper's Biochemistry*. (23rd Ed.)

Pamela C. Champe, Richard A. Harvey Lippincott's Illustrated Reviews –Biochemistry. (6th Ed.).

PHA-1206: PHARMACEUTICAL CHEMISTRY (I)

Duration: 60 Contact Hours

Learning Outcome

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

1. Analyse pharmaceutical products using different analytical methods.
2. Determine organoleptic characteristics of pharmaceutical products.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

2.9: LWA: Determining Organoleptic Characteristics of Pharmaceutical Products

PEX 2.9.1: Determining Texture of Pharmaceutical Products

Competence(s)
a) Understanding of the different textures of pharmaceutical products b) Appreciation of the importance of determination of texture in the pharmacy practices c) Ability to determine the textures of pharmaceutical products
Content Outline
a) Introduction of the different textures of pharmaceutical products b) Determination of texture of powdered crude drugs
Suggested Teaching or Learning Method
a) Hold guided discussions on the introduction and determination of texture of pharmaceutical products (crude drugs). b) Plan and oversee practice of determining of the texture of pharmaceutical products (crude drugs). c) Give an interactive lecture on texture of pharmaceutical products. d) Demonstrate determination of texture of pharmaceutical products.

PEX 2.9.2: Identifying Colour of Pharmaceutical Products

Competence(s)
a) Understanding of the different colours of pharmaceutical products b) Appreciation of the importance of colour and its determination in the pharmacy practices c) Ability to determine the colour of pharmaceutical products
Content Outline
Introduction and determination of the colour of powdered, golenicals, tinctures and the different plant parts used as crude drugs
Suggested Teaching or Learning Method
a) Organise guided discussions on the determination of colour of pharmaceutical products (crude drugs). b) Plan and oversee practice of determining the colour of pharmaceutical products (crude drugs). c) Give interactive lectures on colour of pharmaceutical products. d) Demonstrate determination of colour of pharmaceutical products.

PEX 2.9.3: Identifying Smell of Pharmaceutical Products

Competence(s)
a) Understanding of the different smells of pharmaceutical products b) Appreciation of the importance of the different smells and their determination in the pharmacy practices c) Ability to determine the smell of pharmaceutical products
Content Outline
Introduction and determination of the smell of crude drugs and plant parts used as crude drugs
Suggested Teaching or Learning Method
a) Organise guided discussions on the determination of smell of pharmaceutical products (crude drugs). b) Plan and oversee practise of determining the smell of pharmaceutical products (crude drugs). c) Give interactive lectures on smells of pharmaceutical products. d) Demonstrate identification of pharmaceutical products smells.

PEX 2.9.4: Determine Shape of Pharmaceutical Products

Competence(s)
a) Understanding of the different structures/shapes of pharmaceutical products b) Ability to determine the structure/shape of pharmaceutical products c) Appreciation of the importance of the different structures/shapes and their determination in the pharmacy practices
Content Outline
The structure/shape of the different crude drugs and plant parts
Suggested Teaching or Learning Method
a) Organise guided discussions on the determination of structure/shape of pharmaceutical products (crude drugs). b) Plan and oversee practice of determining of the structure/shape of pharmaceutical products (crude drugs). c) Give interactive lectures on shape/structure of pharmaceutical products. d) Demonstrate determination of shape/structure of pharmaceutical products.

2.10. LWA: Carryout Qualitative Analysis of Pharmaceuticals

PEX 2.10.1: Qualitatively Analysing Pharmaceutical Containing Organic Drugs

Sub-topic: 2.10.1.1: Introduction to Pharmaceutical Chemistry

Competence(s)
a) Understanding of the introductory principles of organic chemistry b) Basic understanding of the structural configuration of organic compounds c) Basic understanding of the methods used in purification and separation of organic compounds d) Ability to apply separation methods in purifying organic compounds
Content Outline
a) Introduction to organic chemistry: Definition, scope, properties of carbon b) Bonding and hybridization in organic compounds: <ul style="list-style-type: none"> • Electronic configuration • Orbitals • Hybridization c) Bond polarity, charged carbon fragments and conventions for organic reactions d) Methods used in purification/separation of organic compounds: <ul style="list-style-type: none"> • Distillation • Filtration

- Chromatography
- Sublimation
- Solvent extraction
- Crystallization

Suggested Teaching or Learning Method

- a) Plan and facilitate group/plenary discussions.
- b) Plan and oversee practical work done by learners e.g. using separation techniques.
- c) Demonstrate bonding structures using the ball and stick models.
- d) Use questions and answer approach.

Sub-topic: 2.10.1.2: Hydrocarbons

Competence(s)

- a) Understanding of hydrocarbons
- b) Ability to perform practical on reactions of hydrocarbons

Content Outline

- a) Classification of hydrocarbons (aliphatic, aromatic and alicyclic)
- b) Aliphatics; types and general formulae:- alkanes, alkenes, alkynes
- c) Alkanes nomenclature, preparation
 - Physical properties
 - Chemical properties
 - Official preparations: Liquid paraffin, soft paraffin and hard paraffin
- d) Alkenes nomenclature, preparation:
 - Geometric isomerism
 - Physical properties
 - Chemical properties:-
 - Halogenations
 - Addition of hydrogen bromide
 - Hydroxylation
 - Ozonolysis
 - Hydration
 - Addition of concentrated sulphuric acid
 - Stability of alkenes
 - Official preparation (thalidomide)
- e) Alkynes nomenclature, preparation:
 - Chemical behaviour
 - Addition of hydrogen
 - Addition of hydrogen halides
 - Hydration
 - Addition of hydrogen cyanide
 - Reaction with metals (group one elements)
 - Reaction of solution copper (1) salts and ammonical silver nitrate

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions e.g. on classes of hydrocarbons.
- b) Plan and guide group/plenary discussions on classes of hydrocarbons.
- c) Arrange and perform practical on saturated and unsaturated hydrocarbons.
- d) Give interactive lectures on hydrocarbons.

Sub-topic: 2.10.1.3: Halogens Compounds

Competence(s)

- a) Understanding of halogen compounds

- b) Ability to perform practical work on reactions of halogen compounds
 c) Appreciation of the value of halogen compounds in preparation of other organic compounds

Content Outline

- a) Classification of halogen compounds
 b) Preparation of halogen compounds
 c) Importance of halogen compounds in preparation of other organic compounds
 d) Official halogen compounds:
- Chloroform
 - Iodoform
 - Halothane
 - Carbon tetrachloride
 - Trichloroethene
 - Tetrachloroethene

Suggested Teaching or Learning Method

- a) Give interactive lectures on halogen compounds.
 b) Ask questions and get feedback on classes of halogen compounds.
 c) Plan and facilitate group/plenary discussions on preparation of halogen compounds.
 d) Arrange and supervise practical work on reactions of halogen compounds.

Sub-topic: 2.10.1.4: Alcohols

Competence(s)

- a) Understanding of alcohols
 b) Appreciate the value of alcoholic compounds in practice of pharmacy
 c) Ability to prepare as well as demonstrate the chemical and physical behaviour of alcohols

Content Outline

- a) Classification and types of alcohols
 b) Preparation of alcohols
 c) Physical properties of alcohols
 d) Chemical reactions of alcohols:
- With hydrogen halides
 - Dehydration
 - Esterification
 - With metals
 - Oxidation
 - With mineral acids (conversion to ethers and alkyl hydrogen sulphates and alkenes)
- e) Official preparations of alcohols:
- Rectified spirit
 - Absolute alcohol
 - Industrial methylated spirits
 - Chlorbutol
 - Ethylchlorvynol
 - Glycerol
 - Menthol

Suggested Teaching or Learning Method

- a) Give interactive lectures on alcohols.
 b) Organise brainstorming sessions on classes and properties of alcohols.
 c) Plan and guide discussions on classes and properties of alcohols.
 d) Plan and supervise practical work on preparation of alcohols done by learners.

Sub-topic: 2.10.1.5: Ethers

Competence(s)
a) Understanding of the preparation, properties and medical uses of ethers b) Appreciation of the importance of ethers in the pharmacy practices c) Perform demonstration on chemical reactions of ethers
Content Outline
a) Definition and types of ethers b) Preparation of ethers c) Physical properties of ethers d) Chemical reactions of ethers with: <ul style="list-style-type: none"> • Hydrogen halides • Grignard reagents e) Official preparations: <ul style="list-style-type: none"> • Anesthetic ether • Methoxyflurane • Diphenhydramine
Suggested Teaching or Learning Method
a) Ask questions and obtain feedback on definition, reactions and types of ethers. b) Plan and guide group/plenary discussions on definitions, reactions and types of ethers. c) Arrange and supervise practical work on reactions and preparation of ethers done by learners. d) Organise interactive lectures on ethers.

Sub-topic: 2.10.1.6: Carbonyl Compounds

Competence(s)
a) Understanding of the reactions, preparation, properties and medical uses of carbonyl compound b) Appreciation of the importance of carbonyl compounds in the pharmacy practice c) Perform demonstration on preparation and reactions of carbonyl compounds
Content Outline
a) Definition, general formula, nomenclature, classes and physical properties of carbonyl compounds b) Preparation of aldehydes and ketones c) Reactions of aldehydes and ketones: <ul style="list-style-type: none"> • Nucleophilic addition reactions (addition of hydrogen cyanide, addition of alcohols, addition of sodium hydrogen sulphite) • Condensation reactions with hydroxylamine, hydrazine, phenyl hydrazine, Brady's reagent and semi carbazide (Haloform reaction, Aldol condensation, Cannizaro reaction, Oxidation and reduction) d) Identification tests (distinguishing aldehydes from ketones): <ul style="list-style-type: none"> • Schiff's test • Fehling's test • Silver mirror test e) Official carbonyl compounds: <ul style="list-style-type: none"> • Formaldehyde • Choral hydrate • Paraldehyde • Hexamine • Dichlorophenazone
Suggested Teaching or Learning Method
a) Asks questions and obtain feedback on definition, classes, general formulae and properties of carbonyl carbon.

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| b) Plan and guide discussions on definition, classes, general formulae and properties of carbonyl carbon.
c) Organise and supervise practical work on preparations and reactions of carbonyl compounds.
d) Give interactive lectures on carbonyl compounds. |
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Sub-topic: 2.10.1.7: Aliphatic Carboxylic Acids

Competence(s)
a) Understanding of aliphatic carboxylic acids b) Ability to prepare and demonstrate the reactions of aliphatic carboxylic acids c) Appreciation of the important of aliphatic carboxylic acids in pharmacy practice
Content Outline
a) Nomenclature of aliphatic carboxylic acids b) Structure and hydrogen bonding of aliphatic carboxylic acid c) Physical properties of aliphatic carboxylic acid d) Preparation of aliphatic carboxylic acid e) Reactions of: <ul style="list-style-type: none"> • Acidity and factors influencing acidity • Esterification • Halogenation • Conversion to carboxylic acid derivatives: amides, acid chlorides, acid anhydrides • Reduction • Decarboxylation f) Official preparations of carboxylic acid: <ul style="list-style-type: none"> • Acetic acid • Trichloroacetic acid • Lactic acid • Oleic acid • Citric acid
Suggested Teaching or Learning Method
a) Use question and answer technique. b) Plan and guide group and general class discussion. c) Plan, facilitate and oversee practical work on reactions and preparations of carboxylic acid done by learners. d) Give interactive lectures on aliphatic carboxylic acids.

Sub-topic: 2.10.1.8: Aromatic Compounds

Competence(s)
a) Understanding of the properties of aromatic compounds b) Ability to prepare and demonstrate the reactions of aromatic compounds c) Appreciation of the importance of aromatic compounds in pharmacy practice
Content Outline
a) Benzene <ul style="list-style-type: none"> • Structure, sources, physical properties, chemical reactions (electrophilic substitution, reduction) b) Methyl benzene <ul style="list-style-type: none"> • Preparation, physical properties, chemical reactions (electrophilic substitution, reduction, reactions of the methyl group) c) Official preparations of benzene and related compounds: <ul style="list-style-type: none"> • DDT (Dichlorodiphenylmethane) • Lindane (gamma benzene hexachloride)

<ul style="list-style-type: none"> • Chlorpropamide • Saccharin • Tolbutamide • Chloramine <p>d) Phenols (monohydric):</p> <ul style="list-style-type: none"> • Physical properties of phenols • Preparation of phenols • Chemical reactions (illustration of the alcoholic and non-alcoholic features of monohydric phenols) • Reduction and substitution with electrophilic reagents) • Official preparations of phenols (paracetamol, phenacetin) <p>e) Aromatic amines and diazonium compounds:</p> <ul style="list-style-type: none"> • Aniline: preparations, reactions • Acetanilide: properties and pharmaceutical uses • Benzene Diazonium salts: preparation, reactions (replacement of the diazonium group and coupling reactions) <p>f) Aromatic carboxylic acids:</p> <ul style="list-style-type: none"> • Benzoic acid: preparation of benzoic acid, official preparation (pharmacopoeial benzoic acid): <ul style="list-style-type: none"> - Salicylic acid - Methyl salicylate - Acetyl salicylic acid - Cinnamic acid - Balsams <p>g) Heterocyclic compounds: introduction to heterocyclic:</p> <ul style="list-style-type: none"> • Five membered rings (furan, pyrrole, thiophene and imidazole): sources, reactions and official preparations (nitrofurantoin, metronidazole) • Six membered rings: examples <p>h) Pyridine and derivatives:-sources, chemical reactions and official preparations (nicotinic acid, nikethamide, isoniazid and ethionamide)</p>
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Suggested Teaching or Learning Method

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| <p>a) Use question and answer technique.</p> <p>b) Plan and guide group and general class discussions.</p> <p>c) Plan, facilitate and oversee practical work on reactions and preparations of aromatic compounds.</p> <p>d) Give interactive lectures on aromatic compounds</p> |
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PEX 2.10.2: Qualitatively Analysing Pharmaceuticals Containing Inorganic Drugs

Sub-topic: 2.10.2.1. Group VII Derived Drugs

Competence(s)

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| <p>a) Understanding of the properties, preparations and uses of group VII derived drugs</p> <p>b) Appreciation of the importance of group VII derived drugs in the pharmacy practices</p> <p>c) Ability to prepare HCl</p> |
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Content Outline

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| <p>a) Halogens:</p> <ul style="list-style-type: none"> • Introduction to halogens • Atomic structure, physical and chemical properties of halogens <p>b) Halogen compounds: Hydrogen halides (HCl, HBr, HI)</p> <ul style="list-style-type: none"> • Hydrochloric acid • Preparations of hydrochloric acid • Properties of hydrochloric acid • Qualitative analysis, assay and uses of hydrochloric acid |
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| c) Chlorinated lime: <ul style="list-style-type: none"> • Structure of chlorinated lime • Action and application of chlorinated lime d) Alkali metal halides (NaCl, KCl, KI, NaI, NaBr, KBr): <ul style="list-style-type: none"> • Sources, preparations, identification, assay and medical applications of alkali metal halides e) Iodine: <ul style="list-style-type: none"> • Sources, extraction, physical and chemical properties, identification, assay, preparations (5 and 10 % alcohol solutions and Lugols' solution) and uses |
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Suggested Teaching or Learning Method
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| a) Guide discussions on properties, preparations and uses of group VII derived drugs.
b) Conduct practical demonstrations on preparation of HCl.
c) Give interactive lectures on group VII derived drugs. |
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Sub-topic: 2.10.2.2. Group VI Derived Drugs

Competence(s)

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| a) Understanding of group VI derived drugs
b) Appreciation of the importance of group VI derived drugs in the pharmacy practice
c) Ability to conduct quality control test on distilled water |
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Content Outline

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| a) Introduction to group VI elements
b) Oxygen and its compounds (Sources, preparation, properties, impurities, assay, storage and uses)
c) Distilled water (Properties, quality control and storage)
d) Hydrogen peroxide (Production, preparations, chemical behaviour (oxidizing, reducing and acidic properties), identification, assay, uses and storage)
e) Sulphur compounds <ul style="list-style-type: none"> • Precipitated sulphur • Properties and uses • Sodium thiosulphate • Preparation, physical and chemical properties, identification tests, assay, uses and storage |
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Suggested Teaching or Learning Method
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| a) Give interactive lectures on group VI derived drugs.
b) Guide discussions on properties, preparations and uses of group VI derived drugs.
c) Conduct quality control test on distilled water. |
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Sub-topic: 2.10.2.3. Group V Derived Drugs

Competence(s)

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| a) Understanding of group V derived drugs
b) Appreciation of the importance of group V drugs in the pharmacy practice |
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Content Outline

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| a) Group V derived drugs:
b) Introduction to group V elements
c) Nitrous oxide:
d) Preparation, properties, quality control, identification, uses and storage
e) Sodium nitrate
f) Preparation, physical and chemical properties, identification, assay, uses and storage
g) Arsenic antidote: management of arsenic poisoning |
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Suggested Teaching or Learning Method
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| a) Organise guided discussions on properties, preparations and uses of group V derived drugs.
b) Give interactive lectures on group V derived drugs |
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Sub-topic: 2.10.2.4: Group III Derived Drugs

Competence(s)
a) Understanding of group III derived drugs b) Appreciation of the importance of group III drugs in the pharmacy practice
Content Outline
a) Group III derived drugs (Introduction to group III elements, Boron compounds) b) Boric acid (Preparation, properties, assay and uses of boric acid) c) Aluminum (Preparation, properties, assay and uses of aluminium)
Suggested Teaching or Learning Method
a) Organise guided discussions on properties, preparations and uses of group III derived drugs. b) Give interactive lectures on group (III) derived drugs

Sub-topic: 2.10.2.5: Group II Derived Drugs

Competence(s)
a) Understanding of group II derived drugs b) Appreciation of the importance of group II drugs in the pharmacy practice
Content Outline
a) Group II derived drugs - Introduction to group II elements b) Magnesium (Sources, physiological actions and preparations) c) Magnesium sulphates (Natural sources, preparation, identification, purity requirements, assay, uses) d) Magnesium trisicate (Natural sources, preparation, identification, purity requirements, assay and uses) e) Calcium (Natural sources, physiological roles, pharmacopoeias, preparations) f) Calcium chloride (Preparation, properties, identification, assay and uses) g) Barium compounds (Barium sulphate, Preparation, properties, identification, assay and uses) h) Zinc compounds (Zinc sulphates, Preparation, properties, identification, assay and uses) i) Zinc oxide (Properties and uses, Mercury antidotes)
Suggested Teaching or Learning Method
a) Organise guided discussions on properties, preparations and uses of group II derived drugs. b) Give interactive lectures about group II derived drugs.

Sub-topic: 2.10.2.6: Group I Elements

Competence(s)
a) Understanding of group I derived drugs b) Appreciation of the importance of group I drugs in the pharmacy practice
Content Outline
a) Introduction to group I elements <ul style="list-style-type: none"> • Silver nitrate • Preparation, properties, identification tests, assay, uses and storage
Suggested Teaching or Learning Method
a) Organise guided discussions on properties, preparations and uses of group I derived drugs. b) Give interactive lectures about group I elements.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning resources:

Spectrophotometer, colourimeter, beakers, pipettes, conical flasks, measuring cylinders, racks, stand, test tubes and test tube holders, Bunsen burner/heating apparatus, spatula, slimming rods, funnels, flasks, TLC plates, filter paper, glassware, HPLC machine, PH meter, polarimeter, refractometer, chromatography drums/beakers, weighing scale, inspection light, soxhlet extraction apparatus, bio-safety cabins, chemical raw material, labels, protective gear, eluents, fresh distilled water, sonicator, reagents

Materials for Further Reading

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

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

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

YEAR TWO – SEMESTER ONE

PHA-2101: BIOSTATISTICS

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to apply understanding of biostatistics to manage their research projects as well as inventory.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

3.1: Learning-Working Assignment: Biostatistics

Sub-topic 3.1.1: Introduction to Biostatistics

Competence(s)
<ol style="list-style-type: none"> a) Basic understanding of biostatistics b) Appreciation of the applicability of statistical concepts to health care delivery
Content Outline
<ol style="list-style-type: none"> a) Definition of statistics, biostatistics b) Types of statistics c) Relevance of statistics to health care delivery
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Organise brainstorming sessions on definitions of biostatistics. b) Give interactive lectures on types of statistics. c) Organise group work and plenary discussions on the relevance of statistics to health care delivery.

Sub-topic 3.1.2: Measures of Central Tendency

Competence(s)
<ol style="list-style-type: none"> a) Understanding of the concepts of mean, mode and median b) Calculation of measures of central tendency c) Appreciation of the application of measures of central tendency in health care delivery
Content Outline
<ol style="list-style-type: none"> a) Definition of "measure of central tendency". b) Measures of central tendency (mean, mode, median) c) Computation of the measures of central tendency d) Uses of the measures of central tendency e) Reliability of the measures of central tendency f) Measures of central tendency (Quartiles, Deciles, Percentiles)
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Hold a brainstorming session on definition of measure of central tendency. b) Give interactive lectures on measures of central tendency. c) Organise group work and plenary discussions on reliability of the measure of central tendency. d) Give assignments

Sub-topic 3.1.3: Inferences from Samples

Competence(s)
a) Basic understanding of tests of inference
Content Outline
a) Definition and explanation of "tests of inference" b) The three major tests of inference (normal curve, variance ratio test and learners T-test) c) Application of the three major tests of inference
Suggested Teaching or Learning Method
e) Hold brainstorming sessions on inferences from samples. a) Give interactive lectures on inferences from samples. b) Organise group work and plenary discussions on the application of major tests of inference. c) Issue assignments on calculations.

Sub-topic 3.1.4: Correlation and Regression

Competence(s)
a) Basic understanding of the principles of correlation and regression b) Appreciation of the applicability of correlation and regression to health related variables
Content Outline
a) Definition and explanation of correlation and regression b) Types of correlation and regression c) Positive and negative correlation d) Simple partial and multiple correlation e) Linear and non-linear correlation f) Calculation of correlation coefficient i.e. Pearson correlation coefficient g) Spearman rank correlation coefficient h) Scatter diagrams i) Linear regression j) Method of least squares, slope and intercept k) Relationship between correlation and regression
Suggested Teaching or Learning Method
a) Hold a brainstorming session on correlation and regression. b) Give interactive lectures on correlation and regression. c) Group work and plenary discussions on linear and non-linear correlation. d) Issue assignments on calculations.

Sub-topic 3.1.5: Descriptive and Inferential Statistics

Competence(s)
a) Understanding of inferential and descriptive statistics
Content Outline
a) Definitions of "descriptive statistics" and "inferential statistics" b) Application of descriptive and inferential statistics in health care delivery
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on definitions of descriptive and inferential statistics. e) Give interactive lectures on descriptive and inferential statistics.

Sub-topic 3.1.6: Measures of Dispersion/Variability

Competence(s)

a) Understanding of range, variance and standard deviation b) Appreciate the application of measures of central tendency in health care delivery
Content Outline
a) Definition of "measure of dispersion/ variability" b) Types of measures of dispersion (range, variance and standard deviation) c) Definitions of range, variance and standard deviation d) Computation of the measures of dispersion e) Uses of the measures of dispersion f) Reliability of the measures of dispersion
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on types of measures of dispersion. b) Give interactive lectures on measures of dispersion/variability. c) Organise group work and plenary discussions on uses of the measures of dispersion.

Sub-topic 3.1.7: Hypothesis Testing

Competence(s)
a) Understanding of hypothesis testing b) Conduct hypothesis testing during operational research
Content Outline
a) Definition of hypothesis, theory, hypothesis testing b) Null hypothesis and the alternative c) Hypothesis testing process d) Application of hypothesis testing
Suggested Teaching or Learning Method
a) Hold brainstorming session on hypothesis testing. b) Give interactive lectures on hypothesis testing. c) Give assignments.

Sub-topic 3.1.8: Probability and Probability Distribution

Competence(s)
a) Understanding of the concept of probability b) Ability to apply principles of probability to health related situations
Content Outline
a) Definition of terms (probability, probability distribution) b) Definition of events (independent and non-independent mutually exclusive) c) Explanation and application of probability laws d) Application of probability in health
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on definitions of probability, probability distribution and events. b) Give interactive lectures on probability and probability distribution. c) Give assignments.

Sub-topic 3.1.9: Permutations and Combinations

Competence(s)
a) Understanding of permutations and combinations b) Arrange items in accordance to the principles of combinations and permutations
Content Outline
a) The terms permutation and combination

- b) Computation of permutation and combination
- c) Relevance of permutation and combinations in health care

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on permutations.
- b) Give interactive lectures on combinations.
- c) Organise group work and plenary discussions on relevance of permutation and combinations in health care.

Sub-topic 3.1.10: Data Summarisation and Presentation

Competence(s)

- a) Understanding of data summarisation and presentation
- b) Ability to apply summarisation and presentation methods in operational research

Content Outline

- a) Definitions: Datum/data, statistic population, sample, sample size, study, research, bias, error, data analysis
- b) Types of data (Ordinal scale, Nominal, Raw data, Primary and secondary)
- c) Sources of data
- d) Choice of source of data
- e) Study designs (Cohort, Case studies, Retrospective, Prospective, Experimental, Survey)
- f) Choice of study
- g) Study design
- h) Determination of sample size
- i) Data presentation (pie charts, bar charts, line graphs and tables, histograms, pictograms)
- j) Normal distribution (Changes in the mean, median and mode in normal and skewed distributions)
- k) Kurtosis
- l) What makes a distribution skewed (Positive and negative skewness)
- m) Binominal distribution

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on definitions of statistic population.
- b) Give interactive lectures on data summarisation.
- c) c) organise group work and plenary discussions on types of data.

Sub-topic 3.1.11: Variables

Competence(s)

- a) Ability to distinguish the different types of variables

Content Outline

- a) Definition of variations
- b) Definition of variable
- c) Types, definitions and examples of variables

Suggested Teaching or Learning Method

- a) Hold a brainstorming session on definition of variables.
- b) Give interactive lectures on variables.
- c) Organise group work and plenary discussions on types of variables.

Sub-topic 3.1.12: Populations and Sampling

Competence(s)

- a) Understanding of the various sampling methods
- b) Ability to apply the various sampling methods

Content Outline

- | |
|---|
| <ul style="list-style-type: none"> a) Definition of population, sampling and samples b) Sampling methods: <ul style="list-style-type: none"> • Probability sampling: <ul style="list-style-type: none"> ○ Simple random sampling ○ Systematic sampling ○ Stratified sampling ○ Cluster sampling ○ Multi-stage sampling • Non-probability sampling methods: <ul style="list-style-type: none"> ○ Purposive sampling ○ Convenience sampling ○ Judgment sampling ○ Snow ball sampling c) Outline the merits and demerits of each method |
|---|

Suggested Teaching or Learning Method
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- | |
|---|
| <ul style="list-style-type: none"> a) Hold brainstorming sessions on sampling and samples. b) Give interactive lectures on probability sampling. c) Issue assignments. |
|---|

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Chalk boards, white boards, projector and screen, textbooks (references), flip chart paper and stand

Additional Notes

The learning experiences used should be from the health profession. A variety of teaching/learning approaches should be employed.

Materials for Further Reading

K.Visweswara Raoetal, Biostatistics

T.D.V. Swinscow and M.J. Campbell. *Statistics at Square One*.

PHA-2102: PHARMACEUTICS (II)

Duration: 90 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to prepare powder dosage forms for internal use and topical products.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

3.2: Learning-Working Assignment: Preparing Powders for Internal Use

PEX 3.2.1: Preparing Simple Powders

Competence(s)
<ol style="list-style-type: none"> a) Understanding of the principles of formulation and preparation of simple powders b) Ability to prepare simple powders c) Appreciation of importance of following methods and steps during the preparation of simple powders in pharmacy practice
Content Outline
<ol style="list-style-type: none"> a) Definition of powders b) Types of powders: <ul style="list-style-type: none"> • Simple powders • Compound powders c) Formulation of powders d) Methods of preparation e) Packaging and labelling of powders
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Hold a brainstorming session types of powders. b) Give interactive lectures on simple powders. c) Issue assignments. d) Organise laboratory practical.

PEX 3.2.2: Preparing Compound Powders in Bulk and PEX 3.2.3: Preparing Compound Powders in Single Doses

Competence(s)
<ol style="list-style-type: none"> a) Understanding of formulation and preparation of compound powders in bulk and single doses b) Ability to prepare and package compound powders in bulk single doses c) Appreciation of the importance of following appropriate steps during the preparation and packaging of compound powders in pharmacy practice
Content Outline
<ol style="list-style-type: none"> a) Definition of powders b) Types of powders c) Formulation of powders d) Methods of preparation e) Packaging and labelling of powders
Suggested Teaching or Learning Method

- | |
|--|
| <ul style="list-style-type: none"> a) Hold brainstorming sessions on types of powders. b) Give interactive lectures on preparation of compound powders. c) Issue assignments. |
|--|

3.3: Learning-Working Assignment: Preparing Topical Products

PEX 3.3.1/3.3.2: Preparing Ointments

PEX 3.3.1.1: Preparing Ointments Using Fusion Method

Competence(s)

- | |
|--|
| <ul style="list-style-type: none"> a) Understanding of the principles of formulation and preparation of ointments b) Ability to prepare ointments using different methods c) Ability to pack and label ointments d) Appreciation of the importance of following appropriate steps during the preparation and packaging of ointments in pharmacy practice |
|--|

Content Outline

- | |
|---|
| <ul style="list-style-type: none"> a) A review of the anatomy and physiology of the skin b) Definition of the term ointment c) Classification of ointment bases: <ul style="list-style-type: none"> • Definition, properties and examples of : <ul style="list-style-type: none"> ○ Hydrocarbon bases ○ Fats and fixed oil bases: • Definition, examples, properties, and uses of: <ul style="list-style-type: none"> ○ Silicones ○ Absorption bases: ○ Emulsifying bases: ○ Water soluble bases: d) Methods of preparing ointments <ul style="list-style-type: none"> • Trituration method <ul style="list-style-type: none"> ○ Definition of the term trituration ○ Equipment required ○ Description of the method ○ Application of the method • Fusion method: <ul style="list-style-type: none"> ○ Definition of the term fusion ○ Equipment required ○ Description of the method ○ Application of the method |
|---|

Suggested Teaching or Learning Method

- | |
|---|
| <ul style="list-style-type: none"> a) Hold brainstorming sessions on classifications of ointments. b) Guided group discussions on hydrocarbon bases. c) Give interactive lectures on preparation of ointments. d) Give assignments. e) Organise group work and plenary discussions on fats and fixed oil bases. f) Organise laboratory practical. |
|---|

PEX 3.3.3: Preparing Creams

Competence(s)

- | |
|---|
| <ul style="list-style-type: none"> a) Understanding of principles of formulation and preparation of creams b) Ability to prepare, pack and label creams c) Appreciation of the importance of following steps and precautionary measures during the preparation of creams |
|---|

Content Outline

- a) Definition of creams
- b) Ingredients for preparing creams (W/O versus O/W)
- c) Apparatus for the preparation of creams
- d) The different functions of the cream
- e) Advantages and disadvantages of the types of creams (O/W creams; W/O creams)
- f) Ideal formulation properties:
 - Emollient effect
 - Shine
 - Lubricity
 - Spread ability
 - Solvency
 - Drying
- g) Other ingredients other than the API:
 - Emulsifiers
 - Viscosity modifier
 - Anti-oxidants
 - Preservatives
 - UV absorbers
- h) Methods of preparation
- i) Packaging, labelling and storage

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on definition of creams.
- b) Give interactive lectures on preparation of creams.
- c) Organise group presentations on advantages and disadvantages of creams.
- d) Organise demonstrations and laboratory practical.

PEX 3.3.4: Preparing Pastes**Competence(s)**

- a) Understanding of the principals of formulation and preparation of pastes
- b) Ability to prepare, pack and label pastes
- c) Appreciation of the importance of following steps and precautionary measures during the preparation of pastes

Content Outline

- a) Definition of pastes
- b) Types of pastes:
 - Anhydrous (liquid or soft paraffin)
 - Water soluble (glycerol or mucilage)
- c) Uses of pastes
- d) Preparation of pastes:
 - General method of preparation
 - Pastes made from a single phase aqueous gel (e.g. Carboxymethyl cellulose sodium paste)
 - Pastes made from fatty base e.g. zinc oxide paste
 - Packaging of pastes
 - Labelling of pastes
 - Storage of pastes
- e) Quality control tests applied to pastes:
 - Rheological properties – consistency
 - Particle size distribution of the dispersed phase

Suggested Teaching or Learning Method

- | |
|---|
| a) Hold brainstorming sessions on types of pastes.
b) Give interactive lectures on preparation of pastes.
c) Organise demonstrations.
d) Organise laboratory practical |
|---|

PEX 3.3.5: Preparing Gels/Jellies

Competence(s)

- | |
|---|
| a) Understanding of the principals of formulation and preparation of gels/jellies
b) Ability to formulate and prepare gels/jellies
c) Appreciation of the relevance of following the methods and precautions during the preparation of gels/jellies |
|---|

Content Outline

- | |
|--|
| a) Gels/Jellies: <ul style="list-style-type: none"> • Definition • Types • Advantages and disadvantages • Application • Formulation • Preparation • Packaging and labelling |
|--|

Suggested Teaching or Learning Method

- | |
|--|
| a) Hold brainstorming sessions on types of gels/jellies.
b) Organise group discussions on advantages and disadvantages of gels/jellies.
c) Give interactive lectures on preparation of gels/jellies.
d) Organise demonstrations.
e) Organise laboratory practical. |
|--|

PEX 3.3.6: Preparing Lotions

Competence(s)

- | |
|--|
| a) Understanding of the principals of formulation and preparation of lotions
b) Ability to prepare lotions (form of solutions, suspension and emulsions)
c) Appreciation of the relevance of following the methods and precautions during preparation and packaging of lotions |
|--|

Content Outline

- | |
|---|
| a) Definition of lotions
b) Types of lotions
c) Advantages and disadvantages of lotions as dosage forms
d) Application of lotions
e) Formulation of lotions
f) Methods of preparation of lotions in form of solutions, suspensions and emulsions
g) Packaging and labelling of lotions
h) Preparation of lotions in form of solutions, suspensions and emulsions |
|---|

Suggested Teaching or Learning Method

- | |
|---|
| a) Hold a brainstorming session on definition of lotions.
b) Give interactive lectures on preparation of lotions.
c) Hold group and plenary discussions on application of lotions.
d) Organise demonstration and laboratory practical. |
|---|

PEX 3.3.7: Preparing Liniments

Competence(s)
a) Understanding of the principles of formulation and preparation of liniments b) Ability to prepare, pack and label liniments c) Appreciation of the relevance of following the methods and precautions during preparation and packaging of liniments
Content Outline
a) Definition of liniments b) Types of liniments c) Advantages and disadvantages of liniments as dosage form d) Applications of liniments e) Formulation of liniments f) Methods of preparation of liniments in form of solutions, suspensions and emulsions g) Packaging and labelling of liniments h) Preparation of liniments in form of Solutions, Suspensions, Emulsions i) Dispensing liniments
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on types of liniments b) Give interactive lectures on preparation of liniments c) Hold group and plenary discussions on application of liniments d) Organise demonstrations and laboratory practical.

PEX 3.3.8: Preparing Paints

Competence(s)
d) Understanding of the preparation of paints e) Ability to formulate, prepare and package paints f) Appreciation of the relevance of following the methods and precautions during preparation of paints.
Content Outline
j) Definition of paints k) Types of paints l) Applications of paints m) Formulation of paints n) Preparation, packaging and labelling of paints
Suggested Teaching or Learning Method
e) Hold a brainstorming session on definition of paints. f) Give interactive lectures on preparation of paints. g) Hold group and plenary discussions on preparing paints. h) Organise demonstrations and laboratory practical on paint preparation.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Weighing scale, beakers, conical flasks, measuring cylinders, pipettes, stirring rods, porcelain mortar and pestle, glass mortar and pestle, distiller, hot plate, greased paper, water bath, Bunsen burner, gas cylinder, sintered glass filter, filter paper, containers for packaging, glass

slab, spatulas, spoons, funnels, homogenizer, evaporating dish, thermometers, powder sieves, tabulating machine, trays, mould, gelatine empty capsules, autoclave, ampoule cutter, capping machine, hot air oven

Materials for Further Reading

Ansel, H. C. (2012). *Pharmaceutical Calculations*. USA, Springhouse Publishing Company.

Aulton, M. E. (1988). *Pharmaceutics: The Science of Dosage Form and Design*. London, Churchill Livingstone.

Jones, D. (2008). *Pharmaceutics: Dosage Form and Design*. London, Pharmaceutical Press.

Langely, C. and Belcher, D. (2007). *Pharmaceutical Compounding and Dispensing*. London, Pharmaceutical Press.

PHA-2103: PHARMACOLOGY (I)

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to apply the knowledge of the principles of pharmacology in the practice of pharmacy.

Preparatory Activities

1. Prepare discussion points
2. Prepare lecture notes
3. Prepare assessment and answer guides
4. Prepare audio-visual materials
5. Develop and review lesson plans

3.4: Learning-Working Assignment: Pharmacology (I)

Sub-topic 3.4.1: Introduction to Principles of Pharmacology

Competence(s)

- a) Understanding overview of pharmacology
- b) Appreciation of the applicability of pharmacology in therapeutics
- c) Understanding of pharmacodynamics
- d) Understanding of pharmacokinetics
- e) Understanding of the process of drug discovery, development and registration

Content Outline

PHARMACOLOGY

- a) Definition of the term pharmacology
- b) Description of the history of pharmacology
- c) Branches of pharmacology
- d) Fields related to pharmacology
- e) Definition of the following terms:
 - Drug
 - Medicine
 - Prodrug
 - Prototype
 - Placebo
 - Pharmacogenomics
 - Therapeutics

PHARMACODYNAMICS

- a) Definition of the term pharmacodynamics
- b) Description of drug targets (receptors, enzymes, carrier proteins, ion channels)
- c) Drug receptors:
 - Definition of receptors
 - Description of drug receptors.
 - Receptor-drug coupling (receptor theory, forces of bonding)
 - Classification and description of receptors
 - Ion channels
 - G-Protein coupled receptors
 - Cytokine receptors
 - Nuclear receptors
- d) Mechanisms of drug action
- e) Description of factors influencing drug action (receptor regulation, resistance, tolerance and habituation)

- f) Description of agonism/intrinsic activity:
 - Full agonist
 - Partial agonist
 - Inverse agonist
 - g) Description of antagonism:
 - Receptor/pharmacological antagonism (competitive and non-competitive)
 - Chemical antagonism
 - Physiological antagonism
 - h) Description of dose- response curves (DRCs):
 - Graded dose response curve
 - Quantal dose response curve
 - i) Description of measures of drug safety:
 - Therapeutic index (T.I)
 - Therapeutic window (TW)
 - Margin of safety (MOS)
 - j) Drug interactions:
 - Drug-drug interactions
 - Drug-food interactions
 - Drug-herb interactions
 - k) Description of drug effects:
 - Beneficial effects (cure, diagnostic and prophylactic)
 - Harmful effects
 - Classification of adverse effects
 - Predisposing factors
 - Management of adverse effects
 - Nature of drug effects (rapid, slow, altered, delayed and cumulative)
 - l) Description of how drug effects can be enhanced:
 - Synergism
 - Additive
 - Potentiation
- PHARMACOKINETICS**
- a) Definition of the term pharmacokinetics
 - b) Classification of the routes of drug administration
 - c) The advantages and disadvantages of various routes of drug administration
 - d) Description of dosing of drugs (loading dose, maintenance dose), determinants of dose and dosing intervals (age, weight, severity of disease, sex, genetics, organ function)
 - e) Description of the principles of pharmacokinetics:
 - Absorption
 - Distribution
 - Metabolism
 - Excretion
 - f) Drug absorption:
 - Definition and description of absorption of drugs
 - Factors that affect absorption of drugs
 - Mechanisms of movement of drugs across biological membranes (passive diffusion, facilitated diffusion, active transport and osmosis)
 - Definition of bioavailability
 - Factors that influence bioavailability
 - Definition of bioequivalence and therapeutic equivalence
 - Definition and description of first pass metabolism/ effect/ elimination
 - g) Drug distribution:
 - Definition and description of drug distribution

- Factors that affect/determine drug distribution
 - Definition and description of volume of distribution and compartments
 - Binding of drugs to plasma proteins:
 - Albumin
 - Lipoproteins
 - Alpha acid glycoprotein
 - Selective accumulation of drugs in the following parts of the body:
 - Kidney
 - Eye
 - Fat
 - Lungs
 - Bone
 - Physiological barriers:
 - Blood brain barrier
 - Placental barrier
 - Blood testis barrier
 - Drug metabolism:
 - Definition of drug metabolism and biotransformation
 - Factors that affect drug metabolism
 - Description of the phases of metabolism (Phase I, Oxidation, Reduction, Hydrolysis, Phase II (conjugation reactions))
- h) Drug excretion/elimination:
- Definition of drug excretion
 - Routes of excretion (renal, biliary, pulmonary, salivary, fecal route, sweat, skin, ex-halation, tears, and mammary)
 - Factors that affect drug excretion/elimination
- i) Description of orders of kinetics (zero and first order kinetics)
- j) Description of pharmacokinetic parameters (half life, clearance, volume of distribution, bioavailability)
- DRUG DISCOVERY, DEVELOPMENT AND REGISTRATION**
- a) Definition of drug discovery and drug development
- b) Sources of drugs
- c) Preclinical trials (animal studies)
- Description of studies for proof of principle (MIC, MBC, FIC, FBC, isolated tissue experiments)
 - Toxicity studies (acute, sub-acute, sub-chronic and chronic)
 - Description of formulation studies/posology
- d) Clinical trials
- Phase, I, II, III, and IV:
 - New drug application and registration (NDA and FDA)

Suggested Teaching or Learning Method

PHARMACOLOGY

- a) Hold brainstorming sessions on the history of pharmacology.
- b) Give interactive lectures on the principles of pharmacology.
- c) Hold group and plenary discussions on the fields related to pharmacology.

PHARMACODYNAMICS

- a) Give interactive lectures on pharmacodynamics.
- b) Hold group and plenary discussions on drug targets.
- c) Give assignments

PHARMACOKINETICS

- a) Give interactive lectures on pharmacokinetics.
- b) Hold group and plenary discussions on the various routes of drug administration.

DRUG DISCOVERY, DEVELOPMENT AND REGISTRATION

- | |
|---|
| <ul style="list-style-type: none"> a) Hold brainstorming sessions on the process of drug discovery. b) Give interactive lectures on drug development and registration. c) Hold group and plenary discussions on preclinical trials |
|---|

Sub-topic 3.4.2: Autonomic Nervous System Drugs (ANS)

Competence(s)

- a) Understanding of the autonomic nervous system pharmacology
- b) Understanding of drugs acting on the sympathetic nervous system
- c) Appreciation of the effect of drugs on the sympathetic nervous system in patient care
- d) Understanding of drugs acting on the parasympathetic nervous system
- e) Appreciation of the effect of drugs on the parasympathetic nervous system in patient care
- f)

Content Outline

NERVOUS SYSTEM PHARMACOLOGY

- a) Overview of the autonomic nervous system, definition of the CNS and peripheral nervous system
- b) Description of the anatomy, organisation, division, innervation and function of the autonomic nervous system (ANS)

SYMPATHETIC DRUGS

- a) Neurotransmitter (synthesis, storage, release and termination of effect)
- b) Sympathomimetics and sympatholytics
- c) Adrenergic neurotransmission and receptors
- d) Classification of drugs:
 - Adrenergic agonists:
 - Directly acting (catecholamines and non catecholamines)
 - Indirectly acting
 - Directly and indirectly acting (mixed action)
 - Adrenergic antagonists:
 - Alpha adrenergic antagonist (selective and non selective)
 - Beta adrenergic antagonists (selective and non selective)
- e) Drugs that affect neurotransmitter release and reuptake:
 - Pharmacokinetics and pharmacodynamics (mechanism of action, indication, adverse effects and contraindications) of all the above classes of drugs

PARASYMPATHETIC NERVOUS SYSTEM

- a) Parasympathetic drugs:
 - Neurotransmitter (synthesis, storage, release and termination of effect)
 - Receptors (classification, innervations, location)
- b) Parasympathomimetics and parasympatholytics
- c) Cholinergic neurotransmission and receptors
- d) Classification of drugs:
 - Parasympathomimetic drugs
 - Direct-acting cholinergic agonists
 - Indirect-acting cholinergic agonists (reversible and irreversible)
- e) Include the pharmacokinetics and pharmacodynamics (mechanism of action, indication, adverse effects, toxicity and contraindications) of all the above classes of drugs
- f) Parasympatholytic drug:
 - Muscarinic blockers
 - Neuromuscular junction blockers (depolarizing and non-depolarizing)

Suggested Teaching or Learning Method

NERVOUS SYSTEM PHARMACOLOGY

- a) Hold brainstorming sessions on the autonomic nervous system.
- b) Give interactive lectures on autonomic nervous systems.
- c) Organise group and plenary discussions on the organisation of ANS.

SYMPATHETIC DRUGS

- a) Hold brainstorming sessions on sympathetic nervous system.
- b) Give interactive lectures on sympathetic nervous system.
- c) Hold group and plenary discussions on classification of drugs.

PARASYMPATHETIC NERVOUS SYSTEM

- a) Brainstorming sessions
- b) Give interactive lectures on the parasympathetic nervous system
- c) Group and plenary discussions on mechanisms of action, adverse effects of classes of drugs

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Formulary manuals, textbooks e.g. Lippincott, BP machines, thermometers

Materials for Further Reading

Green, R. J. & Harris, N. D. (2008). *Pathology and Therapeutics for Pharmacists. A Basic of Clinical Pharmacy Practice*. London, Pharmaceutical Press.

Katzung, B. G. (2012). *Basic and Clinical Pharmacology*. USA, McGraw-hill Medical.

Rang, P. H. (2011). *Rang and Dale's Pharmacology*. London, Churchill Livingstone.

PHA-2104: PHARMACEUTICAL CHEMISTRY (II)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module, the learner should be able to analyse pharmaceutical products using physico-chemical analytical methods.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

3.5: Learning-Working Assignment: Carrying Out Physico-chemical Analytical Methods on Pharmaceutical Products

PEX 3.5.1: Analysing Pharmaceutical Products Using Spectrometry

Competence(s)
a) Understanding of spectrometry as a method of analysing pharmaceutical products b) Ability to apply spectrometry to analyse pharmaceutical products c) Appreciation of the importance of spectrometry in pharmaceutical analysis
Content Outline
a) Terminologies in spectrometry b) Principles of UV and IR spectroscopy c) Beer-Lambert's law d) Instrumentation in spectrometry e) Application of UV/Visible spectrophotometry in pharmaceutical quantitative analysis f) Application of UV/Visible spectrophotometry in preformulation and formulation of pharmaceuticals g) Application of IR spectrometry in structure elucidation
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on the terminologies in spectrometry. b) Give interactive lectures on principles of UV and IR spectroscopy. c) Group and plenary discussions on application of UV. d) Organise laboratory practical.

PEX 3.5.2 Analysing Pharmaceutical Products Using Chromatographic Techniques

Competence(s)
a) Understanding of chromatographic techniques as methods of analysing pharmaceutical products b) Ability to apply chromatographic techniques in quantitative and qualitative analysis of pharmaceutical products c) Appreciation of the importance of chromatographic techniques in the pharmaceutical analysis practice
Content Outline
a) Introduction to chromatography b) Definition of chromatographic techniques c) Terminologies used in chromatography d) Principles of chromatography e) Types of chromatography

- f) Applications of chromatographic techniques in quantitative and qualitative analysis (TLC, HPTLC, HPLC, GC, column chromatography)

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on chromatography.
 b) Give interactive lectures on principles of chromatography.
 c) Hold group and plenary discussions on types of chromatography.
 d) Hold demonstrations and laboratory practical.

PEX 3.5.3 Analysing Pharmaceutical Products Using PH Measurements

Competence(s)

- a) Understanding analysis of pharmaceutical products using PH measurements
 b) Appreciation of the importance of PH measurements in the pharmaceutical analysis
 c) Ability to observe safety precautions while taking PH measurements

Content Outline

- a) Introduction to PH measurements
 b) Acidic and basic strength and pKa
 c) Henderson- Hesselbalch equation
 d) Ionization of drug molecules
 e) Buffers
 f) PH measurements

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on analysis of pharmaceutical products using PH measurements.
 b) Give interactive lectures on acidic and basic strength of pka.
 c) Hold group and plenary discussions on buffers.
 d) Organise demonstrations and laboratory practical.

PEX 3.5.4 Analysing Pharmaceutical Products Using Refractometry

Competence(s)

- a) Understanding of refractometry as a method of analyzing pharmaceutical products
 b) Ability to apply refractometry in the analysis of pharmaceutical products
 c) Appreciation of the importance of refractometry in pharmaceutical analysis

Content Outline

- a) Definition of refractometry
 b) Methods of use
 c) Importance of refractometry
 d) Procedure of how to use a refractometer
 e) Application of refractometry

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on refractometry.
 b) Give interactive lectures on the procedure of using refractometry.
 c) Hold group and plenary discussions on the importance of refractometry.
 d) Organise demonstrations and laboratory practical.

PEX 3.5.5 Analysing Pharmaceutical Products Using Specific Gravity and Density

Competence(s)

- a) Understanding the concepts of specific gravity and density
 b) Appreciation of the importance of specific gravity and density in the pharmacy practice
 c) Ability to determine specific gravity and density and apply the concepts in the analysis of

pharmaceutical products
Content Outline
a) Definition of specific gravity and density b) Identification of specific gravity and density c) Uses of specific gravity and density d) Importance of measurements of specific gravity and density in pharmaceuticals e) Procedure of measuring specific gravity and density f) Application of specific gravity and density
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on the definition of specific density. b) Give interactive lectures on identification of specific gravity and density. c) Organise group and plenary discussions. d) Organise a demonstration and laboratory practical.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Spectrophotometer, colourimeter, beakers, pipettes, conical flasks, measuring cylinders, racks, stand, test tubes and test tube holders, Bunsen burner/heating apparatus, spatula, slimming rods, funnels, flasks, TLC plates, filter paper, glassware, HPLC machine, PH meter, polarimeter, refractometer, chromatography drums/beakers, weighing scale, inspection light, soxhlet extraction apparatus, bio-safety cabins, chemical raw material, labels, protective gear, eluents, fresh distilled water, sonicator, reagents

Materials for Further Reading

Graham, S. T. W. and Fryhle, G. B. (2007). *Organic Chemistry*. USA, John Wiley and Sons.

House, J. E. (2012). *Inorganic Chemistry*. USA, Academic Press.

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

PHA-2105: PHARMACOGNOSY (I)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module, the learner should be able to extract and standardise crude drugs from plants and animals.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

3.6: Learning-Working Assignment: Extracting and Standardising Crude Drugs from Animal Sources

PEX 3.6.1: Extracting Wax

Sub-topic 3.6.1.1 Introduction to Pharmacognosy

Competence(s)
<ul style="list-style-type: none"> a) Understanding of classification, naming and the natural sources of drugs b) Ability to apply techniques of preparing an herbarium c) Appreciation of the importance of pharmacognosy in health care
Content Outline
<ul style="list-style-type: none"> a) Definition of pharmacognosy b) Origin of pharmacognosy c) Scope and practice of pharmacognosy: classification of vegetable drugs d) Relevance of pharmacognosy in the pharmacy practice e) Terminologies used in pharmacognosy f) Plant nomenclature and taxonomy (botanical nomenclature, subdivision of the phyla, botanical systems of classification, taxonomic characters, chemical plant taxonomy) g) Natural sources of drugs
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Hold brainstorming sessions on definition of pharmacognosy. b) Give interactive lectures on origin of pharmacognosy. c) Organise group and plenary discussions on the relevance of pharmacognosy. d) Organise demonstrations and laboratory practical.

Sub-topic: 3.6.1.2 Extracting Wax

Competence(s)
<ul style="list-style-type: none"> a) Knowledgeable about various types and sources of wax b) Ability to extract various waxes from various sources c) Ability to use soxhlet apparatus in extraction of wax d) Appreciation of the importance of wax in the preparation of pharmaceuticals
Content Outline
<ul style="list-style-type: none"> a) Definition of extraction b) Choice of solvent c) Types of wax

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| <ul style="list-style-type: none"> d) Sources of wax e) Pharmaceutical importance of wax f) Extraction methods of wax g) Instrumentation of soxhlet apparatus |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Organise brainstorming sessions on the importance of wax. b) Give interactive lectures on sources of wax. c) Hold group and plenary discussions on extraction methods of wax. d) Organise demonstrations and laboratory practical. |
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PEX 3.6.2: Extracting Gelatine

Competence(s)

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| <ul style="list-style-type: none"> • Knowledgeable about sources of gelatin and processes of extraction of gelatin <ul style="list-style-type: none"> a) Ability to extract gelatin b) Appreciation of the importance of gelatin in the preparation of pharmaceuticals |
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Content Outline

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| <ul style="list-style-type: none"> a) Uses of gelatin b) Sources of gelatin c) Process of extraction d) Pre-treatment of raw materials (to remove impurities) e) Extraction with water/acid solution f) Recovery (filtration, evaporation, drying, sifting and grinding) g) Quality control |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold brainstorming sessions on sources of gelatin b) Give interactive lectures on extraction of gelatine. c) Organise group and plenary discussions on quality control. d) Organise demonstrations and laboratory practical. |
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PEX 3.6.3 Standardising Extracts

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding of standardisation of plant extracts b) Ability to extract and standardise crude drugs c) Appreciation of the importance of standardisation of crude drugs in the pharmacy practice |
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Content Outline

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| <ul style="list-style-type: none"> a) Definition of Quality, Purity, Standardisation b) Quality control of crude drugs, volatile and fixed oils c) Importance of standardisation of extracts d) Methods of standardisation: <ul style="list-style-type: none"> • To a marker compound • To an active compound • Variation of extract ratios |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Organise brainstorming sessions on definition of quality, purity and standardisation. b) Give interactive lectures on quality control of crude drugs. c) Hold group and plenary discussions. d) Organise demonstrations and laboratory practical |
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3.7: LWA: Extracting and Standardising Crude Drugs from Plants

Sub-topic: Plant Sources of Drugs

Competence(s)
<ul style="list-style-type: none"> a) Knowledgeable about plant parts used as sources of plant drugs and optimum condition for cultivation of medicinal plants b) Ability to set up a medicinal plant garden c) Appreciate the importance of plants as sources of drugs
Content Outline
<ul style="list-style-type: none"> a) Plant description, morphology and anatomy b) Plant cell c) Cell differentiation and ergastic cell contents d) Introduction to techniques in microscopy e) Biological and geographical sources of drugs f) Commerce in crude drugs g) Production of crude drugs h) Plant growth regulators i) Plant cell and tissue culture j) Phytochemical variation within species k) Definition of active principles l) List of the different active principles of medicinal plants of pharmaceutical importance
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on plant cell. b) Give interactive lectures on commerce in crude drugs. c) Hold group and plenary discussions on ergastic cell content. d) Organise field visits.

PEX 3.7.1.Maceration Method

Competence(s)
<ul style="list-style-type: none"> a) Knowledgeable about maceration as a method of extraction of crude drugs b) Ability to extract crude drugs using maceration method c) Appreciation of the importance of maceration methods in the extraction of crude drugs
Content Outline
<ul style="list-style-type: none"> a) Definition of maceration b) Instrumentation c) Advantages and disadvantages of maceration d) Application of maceration
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on instrumentation b) Give interactive lectures on application of maceration. c) Hold group and plenary discussions on the advantages and disadvantages of maceration. d) Organise demonstrations and laboratory practical

PEX 3.7.2: Distillation and Fusion Method

Competence(s)
<ul style="list-style-type: none"> a) Knowledgeable about distillation process and various methods of distillation b) Ability to carry out distillation using various method c) Appreciation of the importance of distillation in the preparation of crude drugs
Content Outline
<ul style="list-style-type: none"> a) Definition of distillation

- b) Types of distillation
- c) Choices of solvents used in distillation
- d) Application of distillation methods in extraction of crude drugs
- e) Instrumentation
- f) Advantages and disadvantages of the different types
- g) Procedures of distillation methods
- h) Definition of fusion as an extraction method
- i) Procedures of fusion as an extraction method

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on types of distillation.
- b) Give interactive lectures on application of distillation method in extraction of crude drugs.
- c) Hold group and plenary discussions procedure of fusion.
- d) Organise demonstrations and laboratory practical.

PEX 3.7.3: Decoction

Competence(s)

- a) Knowledgeable about decoction as a method of extraction of crude drugs
- b) Ability to extract drugs by decoction
- c) Appreciation of the importance of decoction as a method of extraction of crude drugs

Content Outline

- a) Definition of decoction
- b) Procedure of decoction as an extraction procedures
- c) Advantages and disadvantages of decoction
- d) Applications of decoction

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on decoction.
- b) Give interactive lectures on application of decoction.
- c) Hold group and plenary discussions.
- d) Organise demonstrations and laboratory practical.
- e) Organise brainstorming sessions on decoction.
- f) Give interactive lectures on application of decoction.
- g) Hold group and plenary discussions.
- h) Organise demonstrations and laboratory practical.

PEX 3.7.4: Percolation

Competence(s)

- a) Knowledgeable about percolation as a method of extraction of crude drugs
- b) Ability to extract crude drugs using percolation method
- c) Appreciation of the importance of percolation as a method for extraction of crude drugs

Content Outline

- a) Definition of percolation
- b) Procedure of conducting percolation extraction
- c) Advantages and disadvantages of percolation
- d) Applications of percolation

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on the definition of percolation.
- b) Give interactive lectures on percolation.
- c) Hold group and plenary discussions.
- d) Organise demonstrations and laboratory practical.

PEX 3.7.5: Digestion

Competence(s)
a) Knowledgeable about digestion as a method of extraction of crude drugs b) Ability to extract crude drugs using digestion method c) Appreciation of the importance of digestion as a method of extracting crude drugs
Content Outline
a) Definition of digestion b) Procedure of conducting digestion extraction c) Advantages and disadvantages of digestion d) Applications of digestion
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on definition of digestion b) Give interactive lectures on digestion. c) Hold group and plenary discussions on application of digestion. d) Organise demonstrations and laboratory practical.

3.7.6: Soxhlet Method

Competence(s)
a) Knowledgeable about soxhlet method for extraction of crude drugs b) Ability to extract crude drugs using soxhlet method c) Appreciate the importance of soxhlet method in the extraction of crude drugs
Content Outline
a) Instrumentation of soxhlet machine b) Procedure of carrying out extraction by soxhlet method c) Advantages and disadvantages of soxhlet method of extraction d) Applications of soxhlet method
Suggested Teaching or Learning Method
a) Hold Brainstorming sessions on advantages of soxhlet method of extraction b) Give interactive lectures on soxhlet method. c) Organise group and plenary discussions on application of soxhlet method. d) Organise demonstrations and laboratory practical.

3.7.7: Standardising Extracts

Competence(s)
a) Knowledgeable about various methods of standardisation of crude drugs b) Ability to standardise crude drug extracts c) Appreciate the importance of standardisation of crude drugs
Content Outline
a) Procedures of standardising extracts obtained by maceration, distillation, fusion, decoction, percolation, digestion and soxhlet methods: <ul style="list-style-type: none"> • Visual • Viscosity • Adulteration • Moisture content • PH • Specific gravity • Extraction ratio b) Advantages of standardisation

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on advantages of standardisation
- b) Give interactive lectures on standardising extracts.
- c) Hold group and plenary discussions.
- d) Organise demonstrations and laboratory practical.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Pipettes, mortars, pestles, spatula, jars, measuring cylinder, furniture, shelves, cabins, pallets, fire extinguishers, stock containers, protective gear, soxhlet, microwave, flasks, evaporating dishes, conical flasks, funnels, filters, slabs, hot water bath, distiller, filter equipment, calculators, hot plate, weighing scale, computers, printer (ordinary, label), thermometer, refrigerator, bio-safety cabin, inspection light, percolator, capping machine, mixers

Further Reading

Evans, W. C. (2009). *Trease and Evans Pharmacognosy*. Saunders Ltd. Philadelphia, USA
Houghton, P. and Mukherjee, P. K. (2009). *Evaluation of Herbal Medicinal Products*. London, Pharmaceutical Press.

PHA-2106: RESEARCH METHODOLOGY

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to write a research proposal.

Preparatory Activities

1. Prepare discussion points
2. Prepare assessment and answer guides
3. Prepare discussion notes
4. Prepare lecturer notes
5. Develop and review lesson plans
6. Prepare visual and audiovisual materials
7. Organise field visits
8. Prepare case studies

3.8. Learning-Working Assignment: Developing an Operational Research Proposal

PEX 3.8.1: Identifying a Research Topic

Competence(s)	
a) General understanding of research and its application b) Ability to identify and formulate a research problem	c) Ability to perform various laboratory research techniques d) Appreciation of the importance of following SOPs and observance of safety measures in lab setting while carrying out various laboratory research techniques
Content Outline	
a) Introduction to research b) Uses /application of research c) Basic research and applied research d) Types of laboratory basic experimental research designs e.g. Experimental & quasi experimental design e) Formulation of a research problem: <ul style="list-style-type: none"> • Characteristics and sources of a research problem • Prioritisation of problems for research • Research variables, hypothesis, theoretical and conceptual framework f) Formulation of laboratory standard operating procedures g) Review of literature on research topic: <ul style="list-style-type: none"> • Sources of information • Organisation of information h) Significance and justification of a research i) Formulation of research objectives, hypothesis, questions	j) Laboratory settings and basic laboratory equipment for pharmaceutical research e.g. rotary evaporator, HPLC, GC-MS, AAS, etc. <ul style="list-style-type: none"> • Experimental laboratory sample handling • Quality assurance in laboratory research methods • Good laboratory management practices • Laboratory safety measures and types of laboratory protective wear • Laboratory waste management
Suggested Teaching or Learning Method	
a) Guide brainstorming sessions on uses and application of research. b) Give interactive lectures on basic and applied	e) Guide brainstorming sessions on .good laboratory management practices f) Give interactive lectures on quality

<p>research.</p> <p>c) Guide discussions on formulation of a research problem.</p> <p>d) Organise field visits.</p>	<p>assurance in laboratory research methods.</p> <p>g) Guide discussions on quality assurance in laboratory research methods</p> <p>h) Organise demonstrations and laboratory practical.</p>
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PEX 3.8.2: Developing Research Proposal

Competence(s)
<p>a) General knowledge of a research proposal and its development</p> <p>b) Understanding of the various components or elements of a good research proposal</p> <p>c) Ability to develop a research proposal</p>
Content Outline
<p>a) Introduction to research proposal development</p> <p>b) Types of research proposal</p> <p>c) Elements of a research proposal:</p> <ul style="list-style-type: none"> • Outline of research proposal • Title and preliminary pages <p>Chapter 1</p> <ul style="list-style-type: none"> • Introduction • Background • Statement of the problem • Objectives • Hypothesis • Justification and significance • Scope • Theoretical conceptual framework <p>Chapter 2</p> <ul style="list-style-type: none"> • Literature review • Definition of literature • Reason for literature • How to review literature • Sources of literature • Presentation of literature • Referencing (in-text) • Academic writing <p>Chapter 3</p> <ul style="list-style-type: none"> • Study setting/area • Research design • Study population • Sample and sample size development • Sampling methods and procedures • Work plan and budgeting • Referencing
Suggested Teaching or Learning Method
<p>a) Give interactive lectures on research proposal.</p> <p>b) Hold guided group discussions on developing statement of the problem</p> <p>c) Organise practical and tutorials.</p> <p>d) Organise field visits to places where research will be undertaken</p> <p>e) Organise audio-visual on referencing</p>

PEX 3.8.3: Collecting Research Data

Competence(s)
a) Understanding of the various techniques of research data collection b) Ability to collect data c) Appreciation of the importance of data collection
Content Outline
a) Introduction to research data collection b) Types of data collection methods qualitative and quantitative: <ul style="list-style-type: none"> • Laboratory experiments • Questionnaire interviews • Focus groups discussion • Observations • Literature reviews c) Identification and development of appropriate data collection tools: <ul style="list-style-type: none"> • Laboratory log books • Questionnaires • Forms • Research interview guides d) Equipment for data collection <ul style="list-style-type: none"> • Lab equipment • Field equipment like GPS e) Training research assistants f) Quality control in data collection g) Observation of ethical issues during data collection
Suggested Teaching or Learning Method
a) Give interactive lectures on research data collection. b) Organise tutorials. c) Guide group discussions.

PEX 3.8.4: Research Data Analysis

Competence(s)
a) Understanding of the data analysis techniques b) Ability to develop a data summary c) Ability to analyse data d) Appreciation of the importance of data analysis
Content Outline
a) Introduction to data analysis b) Data cleaning, entry, editing and coding c) Data storage d) Statistical data analysis e) Manual tools of analysis f) Software programs for data analysis (MS Excel, STATA, SPSS etc.) g) Data storage h) Mastering data analysis using statistical analysis tools e.g. MS Excel, STATA, and SPSS, etc. i) Presentation of findings
Suggested Teaching or Learning Method
a) Give interactive lectures on research data analysis. b) Organise tutorials on research data analysis. c) Organise assignments on how to analyze research data.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Calculators, computers, printers, stationery, reference materials

Material for Further Reading

ESTC-EPHA/CDC PROJECT. (2004). *Training Modules on Health Research*.

Mathers, Nigel, Howe, Amanda, and Hunn Amanda, (1998). *Trend Focus for Research and Development in Primary Health Care. Ethical Considerations in Research*.

YEAR TWO – SEMESTER TWO**PHA-2201:PHARMACEUTICS (III)**

Duration: 90 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to prepare pessaries, suppositories and oral solid dosage forms.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

4.1: Learning Working Assignment: Preparing Topical Products**Sub-topic 4.1.1: Preparing Pessaries and Suppositories**

Competence(s)
a) Understanding of pessaries and suppositories and their uses b) Ability to prepare pessaries and suppositories c) Appreciation of the precautionary measures observed during preparation and storage of pessaries and suppositories
Content Outline
a) Definition of suppositories and pessaries b) Application of suppositories and pessaries c) Formulation of suppositories and pessaries d) Types of bases e) Methods of preparation packaging, labelling and storage of pessaries and suppositories.
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on application of suppositories. b) Give interactive lectures on formulation of pessaries. c) Organise demonstrations and laboratory practical.

4.2: Learning-Working Assignment: Preparing Oral Solid Dosage Forms**PEX 4.2.1: Preparing Tablets Using Direct Compression Method**

Competence(s)
a) General understanding of tablets as a dosage formulation and methods of preparing them b) Knowledgeable about direct compression as a method of preparing tablets c) Ability to prepare tablets using direct compression methods d) Appreciation of the importance of proper procedures of handling ingredients and prepared tablets
Content Outline
a) Definition of tablets and tableting b) Types of tablets: <ul style="list-style-type: none"> • Conventional compressed tablets • Multiple compressed tablets • Enteric coated tablets • Sugar coated tablets • Film coated tablets

- Chewable tablets
 - Effervescent tablets
 - Buccal and sublingual tablets
 - Vaginal tablets
- c) Advantages and disadvantages of tablets as dosage forms
- d) Formulation of tablets
- Excipients:
 - Diluents/fillers
 - Binders
 - Disintegrants
 - Lubricants soluble, insoluble
 - Glidants
 - Absorbents
- e) Factors to consider in the preparation of tablets using direct compression:
- Choice of direct compression and factors that determine choice
 - Particle size of therapeutic agent
 - Particle size of excipients
 - Stability of therapeutic agent
- f) Steps in the preparation of tablets by direct compression:
- Preparation of excipients
 - Mixing of the therapeutic agent with the powdered excipients
 - Compression of the mixed powders into tablets
- g) Specific excipients used in the preparation of tablets by direct compression:
- Diluent
 - Compression aid
 - Disintegrants
 - Lubricants and glidants
- h) Advantages and disadvantages of direct compression as a method of preparing tablets

Suggested Teaching or Learning Method

- a) Lead a brainstorming session on the definition of direct compression and tablets.
- b) Give interactive lectures on types of tablets
- c) Lead a demonstration on the mixing of therapeutic agents with excipients as a unit of manufacture.
- d) Let learners do practical exercises.

PEX 4.2.2: Preparing Tablets Using Dry Granulation Method

Competence(s)

- a) Knowledgeable about dry granulation as a method of preparing tablets
- b) Ability to prepare tablets by dry granulation
- c) Appreciation of the importance of dry granulation as a method of preparing tablets

Content Outline

- a) Factors that favour the choice of dry granulation as a method of preparation of tablets
- b) Formation and preparation of granules:
- Slugging
 - Roller compaction
- c) Excipients used in dry granulation:
- Diluents
 - Disintegrants
 - Lubricants
 - Glidants
 - Miscellaneous excipients (colours, sweetening agents)

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| d) Stages of dry granulation
e) Particle-particle interactions in dry granulation : <ul style="list-style-type: none"> • Electrostatic forces • Vanderwaals- interactions • Melting of components within powder mix f) Advantages and disadvantages of dry granulation |
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Suggested Teaching or Learning Method
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| a) Lead a brainstorming session on the definition of dry granulation.
b) Give interactive lectures preparation of tablets.
c) Organise demonstrations and laboratory practical.
d) Organise field visits. |
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PEX 4.2.3: Preparing Lozenges

Competence(s)

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| d) General knowledge of lozenges as a dosage form
e) Ability to formulate lozenges
f) Ability to prepare lozenges |
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Content Outline

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| g) Definition of the term lozenge
h) Types of lozenges: <ul style="list-style-type: none"> • Those intended to produce a local effect in the mouth or throat • Those intended to produce a systemic effect i) Examples of medicines presented in this dosage form
j) Formulation of lozenges
k) Preparation, packaging and labelling of lozenges |
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Suggested Teaching or Learning Method
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| e) Lead a brainstorming session on types of lozenges.
f) Give interactive lectures on formulation of lozenges.
g) Organise demonstrations and laboratory practical. |
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PEX 4.2.4: Preparing Hard Capsules

PEX 4.2.5: Preparing Soft Capsules

Competence(s)

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| a) Understanding of capsules as a dosage form
b) Ability to prepare hard and soft capsules
c) Appreciation of the importance of proper handling and storage of capsules |
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Content Outline

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| a) Definition of capsule
b) Components of a capsule shell
c) Application of capsules as a dosage form
d) Main forms of capsules (hard and soft shelled, advantages and disadvantages of each)
e) Formulation of capsules (capsule shell content, Active ingredient and excipient formulations)
f) Methods of preparation and storage of capsules |
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Suggested Teaching or Learning Method
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| a) Hold brainstorming sessions on components of a capsule shell.
b) Give interactive lectures on formulation of capsules.
c) Organise demonstrations and laboratory practical.
d) Organise field attachment. |
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PEX 4.2.6: Preparing Tablets Using Wet Granulation Methods

Competence(s)
a) Knowledgeable about wet granulation as a method of preparing tablets b) Ability to prepare tablets using wet-granulation method c) Appreciation of the factors that necessitate the use of wet-granulation as a method of preparation of tablets
Content Outline
a) Definition of wet-granulation b) Factors governing the choice of wet granulation as a method of preparing tablets c) Formulation of tablets to be prepared by wet-granulation d) Steps involved in the preparation of tablets by wet granulation e) Equipment used for the preparation of tablets by wet-granulation: <ul style="list-style-type: none"> • Planetary mixers • Rotating drum mixers • High-speed mixers • Ribbon/trough mixers f) Wet granulation of the powder mix: <ul style="list-style-type: none"> • Oscillating granulator • High-speed mixers/granulators • Fluidized bed granulation • Extrusion g) Processing granules into tablets: <ul style="list-style-type: none"> • Drying of granules (tray driers, fluidized bed drier) • Milling of granules (reduction in granule size) • Mixing of granules with lubricants • Compression of the formulation into tablets h) Advantages and disadvantages of wet granulation
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on definition of wet- granulation. b) Give interactive lectures on wet granulation method. c) Demonstrate the mixing of therapeutic agent with powdered excipients as a unit of manufacture. d) Give practical exercises on processing granules into tablets.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Weighing scale, beakers, conical flasks, measuring cylinders, pipettes, stirring rods, porcelain mortar and pestle, glass mortar and pestle, distiller, hot plate, water bath, Bunsen burner, gas cylinder, sintered glass filter, filter paper, containers for packaging, glass slab, spatulas, spoons, funnels, homogenizer, evaporating dish, thermometers, powder sieves, tabulating machine, trays, mould, gelatine empty capsules, autoclave, ampoule cutter, capping machine, hot air oven

Further Reading

Ansel, H. C. (2012). *Pharmaceutical Calculations*. USA, Springhouse Publishing Company.

Aulton, M. E. (1988). *Pharmaceutics: The Science of Dosage Form and Design*. London, Churchill Livingstone

Jones, D. (2008). *Pharmaceutics: Dosage Form and Design*. London, Pharmaceutical Press.

Langely, C. and Belcher, D. (2007). *Pharmaceutical Compounding and Dispensing*. London, Pharmaceutical Press.

PHA-2202: THERAPEUTICS (I)

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to provide therapy in a caring and competent manner in the practice of pharmaceutical care.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

4.3: Learning Working Assignment: Therapeutics (I)

Sub-Topic: Introduction to Therapeutics

Competence(s)
a) Understanding of therapeutics as a science b) Appreciation of the: <ul style="list-style-type: none"> • Role and importance of a pharmacy practitioner in health care • Impact of drug interactions and adverse drug reactions on therapeutic outcome
Content Outline
a) Introduction to therapeutics b) Roles of a pharmacy practitioner in the health care team c) Drug interactions (Definition, Clinical relevance, Types) d) Adverse drug reactions (Definition, Clinical relevance, Types) e) Factors predisposing to drug interactions and adverse reactions f) Impact of drug reactions and adverse drug reactions
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on adverse drug reactions. b) Give interactive lectures on therapeutics. c) Organise field attachment.

Sub-Topic 4.3.1: Management of Musculoskeletal Diseases

Competence(s)
a) Understanding of therapeutics of muscular skeletal diseases b) Appreciation of the correlation between drugs and choice of treatment in patient care
Content Outline
a) Introduction to therapeutics of musculo-skeletal diseases: <ul style="list-style-type: none"> • Rheumatoid arthritis • Osteoarthritis • Gout and gouty arthritis • Osteoporosis and Osteomalacia • Spondylosis
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on musculo-skeletal diseases b) Give interactive lectures on musculoskeletal diseases. c) Organise field attachment

Sub-Topic 4.3.2: Management of GIT Diseases

Competence(s)
a) Understanding of therapeutics of the GIT diseases b) Appreciation of the choice of treatment for various GIT conditions
Content Outline
a) Peptic ulcer disease b) Gastro-esophageal reflux: <ul style="list-style-type: none"> • Inflammatory bowel disease c) Nausea and vomiting d) Constipation
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on gastro-esophageal reflux b) Give interactive lectures on management of GIT diseases. c) Organise field attachment.

Sub-Topic 4.3.3: Management of Skin Diseases

Competence(s)
a) Understanding of therapeutics of skin diseases b) Appreciation of the choice of treatment for various skin conditions
Content Outline
a) Allergic disorders: <ul style="list-style-type: none"> • Eczema • Seborrhoeic • Psoriasis b) Vitiligo c) Acne vulgaris d) Keloids e) Burns f) Drug induced skin conditions
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on allergic disorders. b) Give interactive lectures on management of skin diseases. c) Organise field attachment.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, internet, formulary manuals, BP machines, thermometers

Materials for Further Reading

Bertran G. Katzung et al, Basic and Clinical Pharmacology, 11th Ed.

Richard, A. Helms, et al. Textbook of Therapeutics, Drug and Disease Management, 8th edition

Roger, W. And Cate, W. Clinical Pharmacology and Therapeutics. 4th ed.

PHA-2203: PHARMACY PRACTICE (I)

Duration: 75 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to provide therapy in a caring and competent manner in the practice of pharmaceutical care.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

4.4: Learning Working Assessment: Introduction to Pharmacy Practice

Sub-topic 4.4.1 History of Pharmacy Practice in Uganda

Competence(s)
a) Knowledgeable about the history of pharmacy practice in Uganda b) Appreciation of pharmacy practice and its relevance
Content Outline
a) Definition of the words pharmacy and practice b) History of pharmacy practice in Uganda c) Scope of pharmacy practice d) The role of a pharmacy professionals in health care
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on the scope of pharmacy practice. b) Give interactive lectures on the history of pharmacy practice in Uganda

Sub-topic 4.4.2: Trends of Pharmacy Practice

Competence(s)
a) Knowledgeable about current practices in pharmacy
Content Outline
a) Definition and scope of clinical pharmacy b) Definition of pharmacovigilance c) Effects of self medication d) Pharmaceutical care e) Acute and chronic patient care f) Quality assurance in pharmacy practice g) Regulatory policies in pharmacy practice
Suggested Teaching or Learning Method
a) Lead a brainstorming session on the definition of pharmacovigilance b) Give interactive lectures on the trends of pharmacy practice.

Sub-topic 4.4.3: Challenges in Pharmacy Practice

Competence(s)
a) Understanding of the existing gaps in the pharmacy practice
Content Outline
a) Perception of pharmacy professionals by the community

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| <ul style="list-style-type: none"> b) How clinical pharmacy practice is exclusively inpatient hospital setting rather than as a primary care practice c) Effects of inadequate training of monitoring prescribers and dispensers d) Improper medicine management systems like in storage and distributions e) The policies on importation and registration f) Awareness of drug information |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold brainstorming sessions on .clinical pharmacy practice b) Give interactive lectures on the challenges in pharmacy practice. c) Organise field attachment. |
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Sub-topic 4.4.4: Medical Ethics

Competence(s)

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| <ul style="list-style-type: none"> a) General understanding of medical ethics |
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Content Outline

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|---|
| <ul style="list-style-type: none"> a) Definition of medical ethics: <ul style="list-style-type: none"> • Code of conduct • Ethical dilemmas • Obligations • Law • Morals • Values • Rights • Customs b) Key concepts and principles in ethics: <ul style="list-style-type: none"> • Autonomy • Justice • Beneficence • Nonmalecence • Veracity • Fidelity c) Professional code of conduct: <ul style="list-style-type: none"> • Personal conduct • Clients • Colleagues • Agency • Profession • Society |
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Suggested Teaching or Learning Method
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|---|
| <ul style="list-style-type: none"> a) Brainstorm the principles of ethics. b) Give interactive lectures on medical ethics. c) Organise field attachment. |
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Sub-topic 4.4.5: Pharmaceutical Work Environment

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding of the pharmaceutical work environment b) Appreciation of the different work environment |
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Content Outline

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| <ul style="list-style-type: none"> a) Description of the different pharmaceutical work environments b) Standard operating procedures (SOPs) for different tasks in different pharmacy practice settings |
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Suggested Teaching or Learning Method

- a) Lead brainstorming sessions on pharmaceutical work environment
- b) Give interactive lectures on pharmaceutical work environment.
- c) Organise field attachment.

Sub-topic 4.4.6: Drug and Pharmaceutical Industry**Competence(s)**

- a) General understanding of the functioning of a pharmaceutical industry

Content Outline

- a) Drug and pharmaceutical industry
- b) Description of the context of drug and pharmaceutical industry
- c) Manufacturers of pharmaceuticals
- d) Importers/exporters
- e) Warehousing
- f) Distribution
- g) Consumers

Suggested Teaching or Learning Method

- a) Lead a brainstorming session on the pharmaceutical industry.
- b) Give interactive lectures on drug and pharmaceutical industry.
- c) Organise field attachment.

4.5: Learning Working Assignment: Dispensing Medicines**PEX 4.5.1: Receiving Prescription****Competence(s)**

- a) General knowledge of the dispensing process

Content Outline

- a) Definition of a prescription
- b) Prescription writing
- c) Types of prescriptions
- d) Features of a valid prescription

Suggested Teaching or Learning Method

- a) Lead brainstorming sessions on types of prescriptions.
- b) Give interactive lectures on receiving prescription

PEX 4.5.2: Validating Prescription**Competence(s)**

- a) Ability to process prescriptions

Content Outline

- a) Validation of prescriptions
- b) Parts/components of a prescription
- c) Types of prescriptions
- d) Origin of a prescription
- e) Suitability of prescribed medicine to the condition of the patient

Suggested Teaching or Learning Method

- a) Lead brainstorming sessions on parts of a prescription.
- b) Give interactive lectures on validating prescriptions.

PEX 4.5.3: Preparing Medicines for Issue

Competence(s)
a) Ability to prepare medicines for issue
Content Outline
a) Selection of the medicines from the shelves b) Cross matching prescription medicines with medicines at hand c) Checking for expiry date and quality of the drugs
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on cross matching prescriptions b) Give interactive lectures on preparing medicines.

PEX 4.5.4: Packaging Medicines

Competence(s)
a) Ability to pack medicines as per standards
Content Outline
a) Packaging of medicine b) Materials for packaging medicines c) Equipment for handling and counting medicines d) Re-packaging medicines e) Quantity of medicines dispensed
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on packaging of medicines b) Give interactive lectures on packaging medicines.

PEX 4.5.5: Labelling Medicine

Competence(s)
a) Ability to label medicines in accordance with the required standards
Content Outline
a) Introduction to labelling of medicines b) Writing labels: <ul style="list-style-type: none"> • Clarity/legibility • Parts of a label • Cautionary and advisory labels c) Use of generic names of medicines d) Materials for labelling (paper and indelible ink)
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on labelling medicines b) Give interactive lectures on labelling medicines

PEX 4.5.6: Preparing a Medicines Record

Competence(s)
a) General knowledge of types of medicine records b) Ability to generate and keep good medicine records
Content Outline
a) Introduction to medicines records b) Types of medical records c) Forms of records (hard or soft copy)

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| <ul style="list-style-type: none"> d) Record keeping practices e) Software for medicine record keeping and tracking f) Analysis of medicine records g) Significance of keeping medicine records |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Lead brainstorming sessions on medical records b) Give interactive lectures on medicine records. |
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PEX 4.5.7: Issuing Medicines with Appropriate Information

Competence(s)

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| <ul style="list-style-type: none"> a) Knowledgeable about necessary information to be provided to the clients/patients b) Ability to issue medicines with appropriate information |
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Content Outline

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| <ul style="list-style-type: none"> a) Information on: <ul style="list-style-type: none"> • Name of the medicine to be taken • Dose to be taken • Frequency • Duration of the treatment • Storage • Side effects • Contraindications • Interactions b) Identification and communication of relevant cautions for the medication |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold brainstorming sessions on issuing medicines b) Give interactive lectures on issuing medicines. |
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4.6. LWA: Liaising With other Health Care Team Members

PEX 4.6.1: Roles of the Different Health Care Professionals

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding of the roles of the different health care professionals |
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Content Outline

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| <ul style="list-style-type: none"> a) Roles of different health care professionals |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Brainstorm the roles of health care professionals. |
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PEX 4.6.2/4.6.3: Sharing Drug Information with the Prescribers and Nurses

Competence(s)

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| <ul style="list-style-type: none"> a) Knowledgeable about drug information b) Ability to communicate and share information with other health care team members |
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Content Outline

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| <ul style="list-style-type: none"> a) Prescriptions of medicines in relation to the patient condition b) Referral systems c) Sources of drug information d) Process of conducting meetings |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Guide a brainstorming session on sharing drug information |
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4.7: LWA: Counselling Patients on Medicine Use

PEX 4.7.1: Providing Information on Drug Interactions

Competence(s)
a) Knowledgeable about general counselling procedure b) Ability to counsel clients and patients on drug use
Content Outline
a) Definition of counselling b) Review of counselling skills c) Issues requiring counselling on drug use: <ul style="list-style-type: none"> • Effects of drug interaction • What drugs can interact with (drug-drug, drug-food, drug-herb) • Risk factors for drug interactions • Reduction of the risk of drug interaction
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on providing information b) Give interactive lectures on drug interactions. c) Organise role plays. On providing information on drug interaction

PEX 4.7.2: Providing Information on Adverse Drug Effects

Competence(s)
a) Ability to provide information on adverse drug effects
Content Outline
a) The various adverse drug effects b) Identification of common adverse effects of the drugs dispensed c) Warnings to the patient on the likely adverse effects d) Management of the specific adverse effects of the drugs being dispensed
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on adverse drug effect b) Give interactive lectures on adverse drug effects. c) Organise role-plays on providing information of adverse drug effects

PEX 4.7.3: Providing Information in Order to Promote Adherence to Treatment

Competence(s)
a) Ability to provide information in order to promote adherence to treatment
Content Outline
a) The meaning and significance of adherence to treatment b) The risks of non-adherence to treatment c) Measurement of adherence to treatment
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on adhering to treatment b) Give interactive lectures on adherence to treatment.

PEX 4.7.4: Providing Information on Proper Medication Storage

Competence(s)
a) Ability to advise clients and patients on proper medicine storage
Content Outline
a) The relevance of proper medicine storage b) Aspects of proper medicine storage

- c) Risks of improper medicine storage
- d) Medicine disposal

Suggested Teaching or Learning Method

- a) Lead brainstorming sessions on proper medication storage
- b) Give interactive lectures on proper medication storage

4.8: LWA: Managing Simple and Self-Limiting Conditions

PEX 4.8.1: Evaluating Signs and Symptoms of Self-Limiting Conditions

Competence(s)

- a) Knowledgeable about signs and symptoms of self-limiting conditions

Content Outline

- a) Definition of self-limiting conditions
- b) Description of self-limiting conditions (include examples)
- c) Signs and symptoms of various self-limiting conditions

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on signs and symptoms of self-limiting conditions
- b) Give interactive lectures on signs and symptoms of self-limiting conditions .
- c) Organise role-plays on evaluating signs and symptoms of self limiting conditions

PEX 4.8.2: Treating Simple Self-Limiting Conditions

Competence(s)

- a) Knowledgeable about management of self-limiting conditions
- b) Ability to assess and manage self-limiting conditions

Content Outline

- a) Simple and self-limiting conditions
- b) Management of simple and self-limiting conditions
- c) Factors to consider during management of self-limiting conditions

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on simple self limiting conditions
- b) Give interactive lectures on treating simple self-limiting conditions.
- c) Organise role-plays on treating simple self limiting conditions

PEX 4.8.3: Supplying Medication

Competence(s)

- a) Knowledgeable about procedures for supply of medicines
- b) Ability to supply medication

Content Outline

- a) Selection of the medicines for supply
- b) Dispensing of medicines to patients
- c) Counselling and monitoring of patients

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on selection of medicines
- b) Give interactive lectures on medication supply.

PEX 4.8.4: Providing First Aid to Clients

Competence(s)

- a) Ability to provide first aid to clients

Content Outline

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| <ul style="list-style-type: none"> a) Definition of first aid b) Description of first aid and its importance c) Forms of first aid and when to give first aid |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on providing first aid to clients. b) Organise role-plays on providing first aid to clients/patients |
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PEX 4.8.5: Performing Simple Tests (Malaria, HCG, BP, RBS)

Competence(s)

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| <ul style="list-style-type: none"> a) Ability to perform simple tests during diagnosis of some conditions |
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Content Outline

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| <ul style="list-style-type: none"> a) Description of simple tests and their examples b) Taking patient information (history) c) Selection of a test to carry out d) Giving results to the patient e) Management basing on the test results |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold brainstorming sessions on performing simple tests b) Give interactive lectures on conducting simple medical tests. c) Organise role-plays about performing simple test |
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Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required teaching/learning resources

Textbooks, visual aids, internet, stationery, patients

Materials for Further Reading

Management Sciences for Health by WHO,(2014).

Stone, P. and Curtis. J.S. (1989). *Pharmacy Practice*.

Winfred, A.J. and Richards, M.E. (2005). *Pharmaceutical Practice*. 3rd Ed.

PHA-2204: PHARMACOLOGY (II)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to understand the pharmacology of cardiovascular, renal, respiratory, central nervous and GIT systems as well as how the drugs affect them.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

4.9: Learning Working Assignment: Pharmacology (II)

Sub-Topic 4.9.1: Cardiovascular and Renal Drugs

Competence(s)
a) Understanding of the cardiovascular system (CVS) pharmacology b) Understanding of drugs acting on the cardiovascular and renal systems c) Appreciation of the effect of drugs on the CVS and the renal system
Content Outline
a) Overview of the of the CVS b) Drugs acting on the CVS <ol style="list-style-type: none"> 1. Heart failure <ul style="list-style-type: none"> - Overview of heart failure: (description, types, symptoms, symptom classification, risk factors and causes; include medications that cause heart failure) - Drugs used in management of heart failure: <ul style="list-style-type: none"> • Renin angiotensin system blocker: ACE-inhibitors; ART1 receptor blockers; Renin blockers • Beta-blockers (carvedilol, bisoprolol, metoprolol and atenolol) • Diuretics • Direct vasodilators • Inotropic agents (digoxin and B1 receptor agonists) • Aldosterone antagonists • Anti lipidemics - The pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above <ul style="list-style-type: none"> • Class IV (Ca²⁺ channel blockers) - Pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above - Pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above 2. Antiarrhythmic drugs <ul style="list-style-type: none"> - Overview (description, types, symptoms, symptom classification, risk factors and causes; include medications that cause arrhythmias) - Drugs used in management of arrhythmia: <ul style="list-style-type: none"> • Class I (Na⁺ channel blockers) • Class II (Beta-adrenoreceptor blockers) • Class III (K⁺ channel blocker) 3. Drugs used in Ischemic heart diseases

<ul style="list-style-type: none"> - Overview (description, types, symptoms, symptom classification, risk factors and causes) - Drugs used in management of angina: <ul style="list-style-type: none"> • Organic nitrates • Beta-blockers • Ca²⁺ channel blockers • Anti lipidemics-HMG CoA reductase inhibitors only. • Anti platelets agents(cardiac aspirin) <p>4. Antihypertensives</p> <ul style="list-style-type: none"> - Overview - Drugs used in management of hypertension: <ul style="list-style-type: none"> • Diuretics • Beta-receptor blockers • ACE inhibitors • Angiotensin II receptor antagonist • Renin inhibitors • Ca²⁺ channel blockers • Alpha receptor blockers • Anti lipidemics • Pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above <p>5. Diuretics</p> <ul style="list-style-type: none"> - Overview (brief description of the process of urine formation by the nephrons) - Diuretic drugs: <ul style="list-style-type: none"> • Thiazide diuretics • Loop diuretics • Potassium sparing diuretics • Carbonic anhydrase inhibitors • Osmotic diuretics • Loop diuretics
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on cardiovascular and renal drugs b) Give interactive lectures on cardiovascular and renal drugs.

Sub-Topic 4.9.2: Respiratory System Drugs

Competence(s)
<ul style="list-style-type: none"> a) Understanding drugs acting on the respiratory system b) Appreciation of the effect of drugs used to treat conditions of the respiratory system in patient care
Content Outline
<ul style="list-style-type: none"> a) Overview of the of the respiratory system b) Drugs used in management of cough c) Drugs used in management of chronic obstructive pulmonary diseases (COPD) d) Drugs used in the management of asthma
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on respiratory system drugs b) Give interactive lectures on respiratory system drugs.

Sub-Topic 4.9.3: Central Nervous System Drugs

Competence(s)
a) Understanding the central nervous system (CNS) pharmacology b) Appreciation of the effect of drugs acting on the CNS in patient care
Content Outline
a) Overview of the physiology of the CNS b) Overview of the pathophysiology of CNS disorders c) Drugs acting on the CNS: - Anti-Parkinsonian drugs - Sedative-anxiolytic-hypnotic drugs - Alcohol - Psycho-active drugs (stimulants, hallucinogens, psychedelic) - Anti-depressants - General anesthetics - Anti-psychotic drugs - Anti-convulsants - Opioid analgesics
Suggested Teaching or Learning Method
a) Hold brainstorm sessions on central nervous system drugs Give interactive lectures on CNS drugs

Sub-Topic 4.9.4: GIT Pharmacology

Competence(s)
a) Understanding of the drugs that act on the GIT system
Content Outline
a) Overview of GIT system (composition and functions) b) Drugs acting on the GIT: - Emetic and anti-emetic drugs - Anti-ulcer drugs - Spasmolytic and anti-spasmolytic agents - Purgatives and carthartic agents - Anti-flatulent and digestive agents
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on GIT pharmacology b) Give interactive lectures on GIT pharmacology.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Visual aids, the Internet, formulary manuals, BP machines, thermometers and textbooks e.g. Lippincott

Materials for Further Reading

Rang. and Dale's. *Pharmacology*. (6th Ed.).

Bertram, K. *Basic and Clinical Pharmacology*. (10th Ed.).

Richard, H. & Pamela, C. *Pharmacology*. (4th Ed.). Lippincott's Illustrated Reviews.

PHA-2205: PHARMACEUTICAL CHEMISTRY (III)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module, the learner should be able to analyse pharmaceutical products using chemical analytical methods.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

4.10. Learning Working Assignment: Analysing Pharmaceutical Products by Chemical Methods

PEX 4.10.1: Analysis of Pharmaceutical Products Using Argentimetric Titration

Competence(s)
a) Understanding of argentimetric titration as a method of analysing pharmaceutical products b) Ability to analyse pharmaceutical products using argentimetric titration c) Appreciation of the importance of argentimetric titration in pharmaceutical analysis
Content Outline
a) Principle of argentimetric titration b) Application of argentimetric titration on group I salts
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on argentimetric titration b) Give interactive lectures on principles of argentimetric titration. c) Organise demonstrations and laboratory practical

PEX: 4.10.2: Analysis of Pharmaceutical Products Using Redox Titrations

Competence(s)
a) Understanding of redox titration as a method of analysing pharmaceutical products b) Ability to analyse pharmaceutical products using redox titration c) Appreciation of the importance of redox titration in pharmaceutical analysis
Content Outline
a) Introduction of redox titration b) Principle of redox titration c) Application of redox titration
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on redox titration b) Give interactive lectures on principles of redox titration. c) Organise demonstrations and laboratory practical.

PEX: 4.10.3: Analysing Pharmaceutical Products Using Iodometric titration

Competence(s)
a) Understanding of Iodometric titration as a method of analysing pharmaceutical products b) Ability to analyse pharmaceutical products Iodometric titration

c) Appreciation of the importance of iodometric titration in pharmaceutical analysis
Content Outline
a) Introduction of iodometric titration b) Types of iodometric assay c) Application of iodometric titration
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on iodometric titration b) Give interactive lectures on iodometric titration. c) Organise demonstrations and laboratory practical.

PEX: 4.10.4: Analysing Pharmaceutical Products Using Complexometric Titration

Competence(s)
a) Understanding of complexometric titration as a method of analysing pharmaceutical products b) Ability to analyse pharmaceutical products using complexometric titration c) Appreciation of the importance of complexometric titration in pharmaceutical analysis
Content Outline
a) Introduction of complexometric titration b) Application of complexometric titration
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on complexometric titration b) Give interactive lectures on analysing pharmaceutical products using complexometric titration. c) Organise demonstrations and laboratory practical

PEX: 4.10.5: Analysing Pharmaceutical Products Using Non-Aqueous Titration

Competence(s)
a) Understanding of non-aqueous titration as a method of analysing pharmaceutical products b) Ability to analyse pharmaceutical products using non-aqueous titration c) Appreciation of the importance of non-aqueous titration in pharmaceutical analysis
Content Outline
a) Introduction of non-aqueous titration b) Theory of non-aqueous titration c) Non aqueous titration of weak bases and weak acids d) Application of non- aqueous titration
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on non aqueous titration b) Give interactive lectures on theory of non-aqueous titration. c) Organise demonstrations and laboratory practical

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required teaching/learning resources

Spectrophotometer, colourimeter, beakers, pipettes, conical flasks, measuring cylinders, racks, stand, test tubes and test tube holders, Bunsen burner/heating apparatus, spatula, slimming rods, funnels, flasks, TLC plates, filter paper, glassware, HPLC machine, PH meter, polarimeter, refractometer, chromatography drums/beakers, weighing scale, inspection light,

soxhlet extraction apparatus, bio-safety cabins, chemical raw material, labels, protective gear, eluents, fresh distilled water, sonicator, reagents

Materials for Further Reading

Graham, S. T. W. and Fryhle, G. B. (2007). *Organic Chemistry*. USA, John Wiley and Sons.

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

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

PHA-2206: PHARMACOGNOSY (II)

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to extract volatile oils.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

4.11: Learning Working Assignment: Extracting Volatile Oils Using:

PEX 4.11.1: Steam Distillation

Sub-topic 4.11.1.1: Metabolic Pathways

Competence(s)
a) Knowledgeable about the various metabolic pathways b) Appreciation of the importance of secondary metabolites in the pharmacy practice
Content Outline
a) Definition of metabolite and primary and secondary metabolic pathways b) Processes of basic metabolic pathways and origin of secondary metabolites: <ul style="list-style-type: none"> - Photosynthesis - Respiration - Carbon fixation c) Derivatives of shikimic pathway d) Derivatives of Mevanolate pathway/ acetate pathway
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on steam distillation. b) Give interactive lectures on metabolic pathways. c) Organise demonstrations and laboratory practical.

Sub-topic 4.11.1.2: Active Principles: Carbohydrates

Competence(s)
a) Knowledgeable about carbohydrates as active principles b) Ability to carry out tests on carbohydrates and starch preparations c) Appreciation of the importance of carbohydrates in the pharmacy practice
Content Outline
a) Sugars (saccharides) <ul style="list-style-type: none"> - monosaccharides - di-, tri- and tetra saccharides - polysaccharides - tests of carbohydrates b) Commercial plant derived fibres and products: <ul style="list-style-type: none"> - Absorbent cotton wool - Starch - Starch application - Sources of starch - Preparation of starch - Sources, composition, uses of starch (dextrose, mannitol, sorbitol and lactulose)

<ul style="list-style-type: none"> - Fructans - Inulin - Algal gelling agents - Gums and mucilage - Collection, preparation and pharmaceutical uses of honey
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on active principles –carbohydrates. b) Organise demonstrations and laboratory practical

Sub-topic 4.11.1.3: Active Principles - Phenols and Phenolic Glycosides

Competence(s)
<ul style="list-style-type: none"> a) Basic understanding of phenols and phenolic compounds b) Ability to carry out tests on phenols and phenolic compounds c) Appreciation of the importance of phenols and phenolic compounds in pharmacy practice
Content Outline
<ul style="list-style-type: none"> a) Simple phenolic compounds: <ul style="list-style-type: none"> - Simple phenolic compounds and their plant origin - Parent structures b) Tannins: <ul style="list-style-type: none"> - Parent structure - Hydrolysable and condensed - Plant origin - Properties and test of tannins - Medicinal and biological uses of tannins - Coumarins and glycosides - Uses and test c) Anthraquinones and Glycosides: <ul style="list-style-type: none"> - Parent structure - Derivatives of Anthraquinones: <ul style="list-style-type: none"> • Anthranols and anthrones • Oxanthrones - Dianthrones - Plant origin - Collection and preparation - Uses and test d) Naphthoquinones and Glycosides: <ul style="list-style-type: none"> - Parent structure - Plant origin - Uses and test e) Flavone and related flavonoid glycosides: <ul style="list-style-type: none"> - Parent structure - Derivatives - Plant origin - Uses and test f) Anthocyanides and glycosides: <ul style="list-style-type: none"> - Parent structure - Plant origin - Biological importance and test g) Lignans and lignin: <ul style="list-style-type: none"> - Parent structure - Plant origin

- Biological importance and test
Suggested Teaching or Learning Method
a) Give interactive lectures on active principles-phenols and phenolicglycosides. b) Organise demonstrations and laboratory practical

Sub-topic 4.11.1.4: Active Principles - Volatile Oils and Resins

Competence(s)
a) Understanding of volatile oils as active constituents b) Ability to extract volatile oils c) Appreciate importance of proper extraction and storage of volatile oils.
Content Outline
a) Compositions, Properties, and Preparation of volatile oils b) Extraction of oils used in perfumery c) Uses of volatile: <ul style="list-style-type: none"> • Lavender oil • Rosemary oil • Caraway and caraway oil • Coriander and coriander oil • Eucalyptus oil • Lemon oil • Lemon grass oil • Peppermint oil • Cinnamon oil • Spearmint oil • Camphor oil • Ginger oil • Turmeric oil • Anise oil
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on properties of volatile oils b) Give interactive lectures on active principles - volatile oils and resins. c) Organise demonstrations and laboratory practical.

Sub-topic 4.11.1.5: Steam Distillation Process

Competence(s)
a) Understanding of steam distillation process b) Ability to extract oils using steam distillation process c) Appreciation of importance of proper extraction and storage of volatile oils
Content Outline
a) Solvents used in steam distillation of volatile oils b) Methods used in extraction of volatile oils c) Instrumentation d) Rectification e) Advantages and disadvantages of the different types of steam distillation f) Procedures of steam distillation methods
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on Give interactive lectures on steam distillation process. b) Organise demonstrations and laboratory practical

PEX 4.11.2: Enfleurage**Sub-topic 4.11.2.1: Active Principles - Saponins, cardioactive Drugs and other Steroids**

Competence(s)
a) Understanding of saponins as active b) Appreciation of the importance of saponins
Content Outline
a) Steroidal Saponins: - Parent structure - Examples of steroidal saponins - Plant origin - Biological importance and test b) Pentacyclitriterpenoids: - Parent structure - Examples of pentacyclitriterpenoids - Plant origin - Biological importance and test c) Cardioactive drugs: - Examples of cardioactive drugs • Cardienolides • Bufadienolides - Parent structure - Plant origin - Biological importance and test
Suggested Teaching or Learning Method
a) Lead brainstorming sessions on steroidal saponins b) Give interactive lectures on steroidal saponins. c) Organise demonstrations and laboratory practical.

Sub-topic 4.11.2.2: Active Principles - Isoprenoid Compounds

Competence(s)
a) Understanding of isoprenoids as active principles b) Appreciation of the importance of isoprenoid compounds in the pharmacy practice
Content Outline
Parent structure, Nomenclature, Plant origin, and Pharmacologic importance of: a) Monoterpenes b) Sesquiterpenes c) Diterpenoids d) Triterpenoids e) Tetraterpenes f) Polyterpenoids
Suggested Teaching or Learning Method
a) Hold brainstorming sessions on parent structure b) Give interactive lectures on sesquiterpenes. c) Organise demonstrations and laboratory practical.

Sub-topic 4.11.2.3: Extraction active principles by Enfleurage process.

Competence(s)
a) Understanding of the process of enfleurage

- b) Ability to extract active principles by enflourage process
- c) Appreciation of the importance of processes involved in enflourage

Content Outline

- a) Instrumentation used in enflourage
- b) Advantages and disadvantages of the different types of enflourage
- c) Procedures of enflourage
- d) List of drugs extracted using enflourage

Suggested Teaching or Learning Method

- a) Give interactive lectures enflourage process.
- b) Organise demonstrations and laboratory practical

PEX 4.11.3: Sponge Extraction**Competence(s)**

- a) Understanding of the process of sponge extraction
- b) Ability to extract active principles by sponge extraction
- c) Appreciation of the importance of processes involved in sponge extraction

Content Outline

- a) Procedures of sponge extraction
- b) Advantages and disadvantages of the different types of sponge extraction
- c) Drugs extracted using sponge extraction

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on sponge extraction
- b) Give interactive lectures on sponge extraction.
- c) Organise demonstrations and laboratory practical.

PEX 4.11.4: Cold Expression**Competence(s)**

- a) Understanding of the process of cold expression
- b) Ability to extract active principles by cold expression
- c) Appreciation of the importance of processes involved in cold expression

Content Outline

- a) Procedures of cold expression
- b) Advantages and disadvantages of the different types of cold expression
- c) Drugs extracted using cold expression

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on cold expression
- b) Give interactive lectures on cold expression.
- c) Organise demonstrations and laboratory practical

PEX 4.11.5: Ecuelle A Piquer**Competence(s)**

- a) Understanding of the process of ecuelle a piquer
- b) Ability to extract active principles by ecuelle a piquer
- c) Appreciation of the importance of processes involved in ecuelle a piquer.

Content Outline

- a) Procedures of ecuelle a piquer
- b) Advantages and disadvantages of the different types of ecuelle a piquer
- c) Drugs extracted using ecuelle a piquer

Suggested Teaching or Learning Method

- a) Hold brainstorming sessions on eucelle a piquer
- b) Give interactive lectures on eucelle a piquer.
- c) Organise demonstrations and laboratory practical.

PEX 4.11.6: Machine Abrasion**Competence(s)**

- a) Understanding of the process of machine abrasion
- b) Ability to extract active principles by machine abrasion
- c) Appreciation of the importance of processes involved in machine abrasion

Content Outline

- a) Procedures of machine abrasion
- b) Advantages and disadvantages of the different types of machine abrasion
- c) Drugs extracted by machine abrasion

Suggested Teaching or Learning Method

- a) Lead brainstorming sessions on machine abrasion
- b) Give interactive lectures on machine abrasion.
- c) Organise demonstrations and laboratory practical.

PEX 4.11.7: Standardising Extracts**Competence(s)**

- a) Understanding of the process of standardising extracts
- b) Ability to standardise extracts
- c) Appreciation of the importance of standardising extracts

Content Outline

- a) Procedures of standardising extracts obtained by steam distillation, enfleurage, sponge extraction, cold expression, eucelle a piquer and machine abrasion:
 - Viscosity
 - Adulteration
 - Moisture content
 - PH
 - Specific gravity
 - Extraction ratio
- b) Advantages of standardisation

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on standardising extracts
- b) Give interactive lectures on standardising extracts.
- c) Organise demonstrations and laboratory practical.

Sub-topic: 4.12 Traditional Medicine Practices**Competence(s)**

- a) Knowledgeable about locally used plant medicines
- b) Knowledgeable about various distillation processes for extraction of plant actives
- c) Appreciation of the importance of traditional medicine practices

Content Outline

- a) Locally used plant medicines
- b) Different practices of traditional medicines/ alternative medicine:
 - Homeopathic medicine and aromatherapy
 - Plants in African traditional medicine

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| <ul style="list-style-type: none"> c) Regulation of traditional/ herbal medicine in Uganda d) Deterioration of stored drugs |
| Suggested Teaching or Learning Method |
| <ul style="list-style-type: none"> a) Organise brainstorming sessions on different practices of traditional medicines in Uganda b) Give interactive lectures on traditional medical practices. c) Organise demonstrations and laboratory practical |

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Pipettes, mortars, pestles, spatula, jars, measuring cylinder, furniture, shelves, cabins, pallets, fire extinguishers, stock containers, protective gear, soxhlet, microwave, flasks, evaporating dishes, conical flasks, funnels, filters, slabs, hot water bath, distiller, filter equipment, calculators, hot plate, weighing scale, computers, printer (ordinary, label), thermometer, refrigerator, bio-safety cabin, inspection light, percolator, capping machine, mixers

Materials for Further Reading

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

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

YEAR THREE – SEMESTER ONE**PHA-3101:PHARMACEUTICS (IV)****Duration: 90 Contact Hours****Learning Outcome**

By the end of this module unit, the learner should be able to prepare dosage forms that include topical products (eye, ear and nasal drops, eye ointments, inhalations), and parenteral products.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

5.1: Learning Working Assignment: Preparing Topical Products**PEX 5.1.1: Preparing Eye, Ear and Nasal Drops**

Competence(s)
<ul style="list-style-type: none"> a) Understanding of preparing eye, ear and nasal drops b) Ability to formulate and prepare eye, ear and nasal drops c) Appreciation of the value of eye, ear and nasal drops
Content Outline
<ul style="list-style-type: none"> a) Definition of eye, ear and nasal drops b) Application of eye, ear and nasal drops c) Advantages and disadvantages of eye, ear and nasal drops d) Formulation of: <ul style="list-style-type: none"> - Eye, ear and nasal drops - Adjustment to isotonicity e) Methods of preparation f) Sterilisation methods g) Packaging and labelling h) Practicum: <ul style="list-style-type: none"> - Formulation - Preparation - Packaging - Labelling
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Lead brainstorming sessions on application of eye, ear and nasal drops b) Give interactive lectures on formulation of eye, ear and nasal drops. c) Organise demonstrations and practical exercises. d) Give assignments.

PEX 5.1.2a: Preparing Eye Ointments

Competence(s)
<ul style="list-style-type: none"> a) Understanding of preparing eye ointments b) Ability to formulate, prepare, pack and label eye ointments c) Appreciation of the relevance of eye ointments as dosage forms

Content Outline
a) Definition of eye ointments b) Applications of eye ointments c) Advantages and disadvantages of eye ointments d) Formulation of eye ointments e) Eye ointment bases f) Preparation of eye ointments: - Methods - Packaging - Sterilisation g) Practicum: - Formulation - Preparation - Packaging - Labelling
Suggested Teaching or Learning Method
a) Organise brainstorming e.g. on definition of eye ointment. b) Give interactive lectures on formulation of eye ointments. c) Guide discussions e.g. on preparation of eye ointments. d) Demonstration e.g. preparation of eye ointments. e) Learners practise preparing and labelling of eye ointments.

PEX 5.1.2b: Preparing Eye Lotions

Competence(s)
a) Understanding of preparing eye lotions b) Ability to formulate, prepare, sterilise, pack and label eye lotions c) Appreciation of the relevance of eye lotions as dosage forms
Content Outline
a) Definition of eye lotions b) Applications of eye lotions c) Advantages and disadvantages of eye lotions d) Formulation of eye lotions e) Isotonicity f) Sterilization of eye lotions g) Practicum: - Formulation - Preparation - Packaging - Labelling
Suggested Teaching or Learning Method
a) Brainstorm on the application of eye lotions. b) Guide discussions on sterilisation. c) Guide learners to make presentations e.g., on formulation. d) Demonstrate preparation of eye lotions. e) Learners practise preparing, packaging and labelling eye lotions.

PEX 5.1.3: Preparing Inhalations

Competence(s)
a) Understanding of preparing different inhalations b) Ability to formulate, prepare, pack, and label inhalations

c) Appreciation of the relevance of inhalations in medicine
Content Outline
<ul style="list-style-type: none"> a) Definition of inhalations b) Types of medical inhalation preparation c) Materials for preparation d) Formulations of inhalations e) Conditions for preparation, storage, packing and labelling inhalations f) Methods of preparation of inhalations g) Practicum: <ul style="list-style-type: none"> - Formulation - Preparation - Packaging - Labelling
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Guide brainstorming sessions on types of inhalation preparation b) Give interactive interactions lectures formulation of inhalations c) Hold demonstrations e.g. packing and labelling. d) Organise industrial attachment. e) Organize practical exercises for learners e.g. in preparation of inhalations

5.2: Learning Working Assignment: Preparing Parenteral Products

PEX 5.2.1: Sterilisation by Moist Heat

Sub-topic 5.2.1.1: Introduction to Injections

Competence(s)
<ul style="list-style-type: none"> a) Understanding of injections b) Appreciation of the importance and application of injections
Content Outline
<ul style="list-style-type: none"> a) General description of injections b) Routes of parenteral administration: <ul style="list-style-type: none"> - Intravenous route - Intramuscular route - Subcutaneous route - Intradural - Intra-arterial - Intrathecal - Intradural - Intra cardiac c) Advantages and disadvantages of parenteral formulations d) Formulation considerations for parenteral formulations: <ul style="list-style-type: none"> - Types of preparations - Solubility of the therapeutic agent - Preferred route of administration - Volume of dose to be administered - Onset/duration of action - Solid state properties - Physical properties of the therapeutic agent - Solubility of salt forms - Vehicles (aqueous and non-aqueous vehicles) - Inclusion of co-solvents - Surface active agents e) Use of buffers

- f) Modification of viscosity
- g) Use of preservatives and bactericides
- h) Agents to modify the osmolarity of injection
- i) Anti-oxidants
- j) Parenteral emulsions
- k) Step by step procedures followed in manufacture of injections

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on e.g. routes of parenteral products.
- b) Give interactive lectures on e.g. formulation of injections.
- c) Group discussions (plenary) e.g. on parenteral emulsions.
- d) Demonstration on preparation of injections.
- e) Give learners practise exercises.

Sub-topic 5.2.1.2: Bio-Pharmaceutics of injections

Competence(s)

- a) Understanding of bio-pharmaceutics
- b) Appreciation of the relevance of bio-pharmaceutics in formulation of parenteral products

Content Outline

- a) Definition of bio-pharmaceutics
- b) Body surface area:
 - Definition and relevance in medicine
 - Calculating body surface area (BSA) in relation to dose
- c) Milliequivalents:
 - Definition and relevance in medicine
 - Calculations involving milliequivalent/ vs weighable quantities
- d) Moles and millimoles:
 - Definition and relevance in medicine
 - Calculations involving millimoles vs weighable quantities
- e) Osmolarity:
 - Definition of osmolarity and osmolality
 - Osmotic pressure as a colligative property
 - Gram molecular concentration
 - Calculations on how to produce isotonic solutions
 - Freezing point depression considerations
- f) Milliosmoles:
 - Definition and relevance in medicine
 - Calculations involving milliosmoles vs weighable quantities
- g) Practicum on formulating sterile parenteral formulation
- h) Practicum on controlling the osmotic properties of parenteral formulations:
 - Labelling of parenteral formulations
 - Packaging of parenteral formulations
 - Storage of prepared parenteral formulations
- i) Chemotherapy prescriptions:
 - Definition of chemotherapy
 - Dosing considerations in chemotherapy
 - Calculating doses required as per chemotherapy prescriptions

Suggested Teaching or Learning Method

- a) Give interactive lectures on bio-pharmaceutics on injections.
- b) Organise demonstrations on preparation of injections

Sub-topic 5.2.1.3: Process of Sterilisation by Moist Heat

Competence(s)
a) Understanding of sterilisation by moist heat b) Ability to: <ul style="list-style-type: none"> - Operate an autoclave - Carry out sterilisation using an autoclave c) Appreciation of the relevance of sterilisation in medicine
Content Outline
a) Definition of sterilisation b) General introduction on different forms of sterilisation: <ul style="list-style-type: none"> - Moist heat - Dry heat - Filtration - Exposure to ionising radiation - Gas c) Specific standards required for complete sterilisation d) Step by step procedure of moist heat sterilisation: <ul style="list-style-type: none"> - Autoclave operation - Mode of action - Pressure and temperature conditions - Types of materials sterilised by moist heat - Time period for moist heat sterilisation e) Advantages and disadvantages of moist heat sterilisation in relation to other forms of sterilisation f) Practicum on operation of the autoclave and process of sterilisation by moist heat
Suggested Teaching or Learning Method
a) Give interactive lectures on the process of sterilisation by moist heat. b) Organise group discussions on forms of sterilisation. c) Demonstrate how to operate an autoclave. d) Let learners practise the procedure followed when sterilising by moist heat

PEX 5.2.2: Sterilisation by Filtration Method

PEX 5.2.3: Sterilisation using Aseptic Techniques

Competence(s)
a) Understanding of sterilising using filtration and aseptic techniques b) Ability to carry out sterilisation by filtration c) Ability to deduce the need for aseptic technique d) Ability to exhibit accuracy, cleanliness and elegance while carrying out filtration procedure
Content Outline
a) Definition of aseptic techniques b) Types of parenteral products that require aseptic preparation c) Specific manufacturing requirements for aseptic processing: <ul style="list-style-type: none"> - Aseptic dispensing area (jacketed vessels) - Air flow – laminar air flow - HEPA (high efficiency particulate air filters) - Sterilisation of raw materials - Operators with in the unit: <ul style="list-style-type: none"> • Clothing • Hygiene • Health - Equipment sterilisation

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| d) Sterilisation by filtration:
- Filters
- Types of products that undergo filtration sterilisation
- Practicum on filtration
e) Quality assurance:
- Good manufacturing practice
- Quality control |
| Suggested Teaching or Learning Method |
| a) Brainstorm the aseptic technique of sterilisation.
b) Give interactive lectures on sterilisation by filtration.
c) Organise demonstrations on filtration technique.
d) Organise practical exercises. |

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Weighing scale, beakers, conical flasks, measuring cylinders, pipettes, stirring rods, porcelain mortar and pestle, glass mortar and pestle, distiller, hot plate, water bath, Bunsen burner, gas cylinder, sintered glass filter, filter paper, containers for packaging, glass slab, spatulas, spoons, funnels, homogenizer, evaporating dish, thermometers, powder sieves, tabulating machine, trays, mould, gelatine empty capsules, autoclave, ampoule cutter, capping machine, hot air oven, reference text books, projector, computer

Materials for Further Reading

- Ansel, H. C., Popovich, N. G., & Allen, L. V. (1995). *Pharmaceutical Dosage Forms and Drug Delivery Systems*: Lippincott Williams & Wilkins.
- Aulton, M. E. (2002). *Pharmaceutics: The science of Dosage Form Design*: Churchill Livingstone.
- British Pharmaceutical Codex (1973)
- British Pharmacopoeia (2016)
- Carter S.J. (2008). *Cooper and Gunn's Dispensing for Pharmaceutical Learners*. (12th ed.). CBS Publishers & Distributors.
- Extra Pharmacopoeia (Martindale) 31st ed. (2016)
- Jones, D. (2008). *Pharmaceutics Dosage Form And Design*.
- Langley, C. A., & Belcher, D. (2012). *Pharmaceutical Compounding and Dispensing*: Pharmaceutical Press.
- Marriott, J. F. (2010). *Pharmaceutical Compounding and Dispensing*: Pharmaceutical Press.
- Uganda Clinical Guidelines (2016)

PHA-3102: THERAPEUTICS (II)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to provide therapy in a caring and competent manner in the practice of pharmaceutical care.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

5.3: Learning Working Assignment: Therapeutics (II)

Sub-topic 5.3.1: Management of Diseases of the Nervous System

Competence(s)
a) Understanding of therapeutics of musculoskeletal disorders b) Appreciation of the correlation between knowledge of drugs & choice of treatment in patient care
Content Outline
a) Peripheral neuropathy b) Myasthenia gravis c) Cholinergic crisis d) Lower motor neuron palsy
Suggested Teaching or Learning Method
a) Guide learners in brainstorming sessions on musculoskeletal system disorders and their presentations b) Guide discussions on the management of musculoskeletal disorders. c) Give interactive lectures on the management of diseases of the nervous system.

Sub-Topic 5.3.2: Management of Respiratory System Diseases

Competence(s)
a) Understanding of therapeutics of respiratory system diseases b) Appreciation of the correlation between drugs and choice of treatment in patient care
Content Outline
a) Bronchial asthma b) Chronic obstructive pulmonary disease c) Cystic fibrosis d) Drug induced pulmonary disease
Suggested Teaching or Learning Method
a) Guide learners to brainstorm the respiratory diseases and their presentations. b) Organise guided discussion on the management of therapeutics of respiratory system diseases. c) Give interactive lectures on the management of respiratory system diseases.

Sub-Topic 5.3.3: Management of Blood Disorders

Competence(s)
a) Understanding of therapeutics of blood disorders b) Appreciation of the correlation between drugs and choice of treatment in patient care
Content Outline

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| <ul style="list-style-type: none"> a) Anemia (Megaloblastic, Hemolytic, Microcystic, Aplastic) b) Coagulation disorders (Bleeding and Blood clots) |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Guide learners in brainstorming the blood disorders and their presentations. b) Guide group/plenary discussions on the management of therapeutics of blood disorders. c) Give interactive lectures on the management of blood disorders. |
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Sub-Topic 5.3.4: Management of Infectious Diseases

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding of therapeutics of infectious diseases b) Appreciation of the correlation between drugs and choice of treatment in patient care |
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Content Outline

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| <ul style="list-style-type: none"> a) Introduction to infections b) Respiratory tract infections c) URTIs: Common cold, sinusitis, rhinitis, otitis media, pharyngitis, acute epiglottitis d) LRTIs: Tuberculosis, bronchitis, pneumonia e) Urinary tract infections f) Gastro-intestinal infections (helminthes, amoebiasis, giardiasis, salmonellosis, shigellosis, campylobacteriosis, infectious diarrhea, pseudomembranous colitis) g) Infective endocarditis h) Central nervous system infections (meningitis and encephalitis) i) Bone and joint infections (osteomyelitis and infectious arthritis) j) Sexually transmitted infections (gonorrhea, syphilis, lympho granuloma venereum, chancroid, trichomoniasis, genital herpes-HSV-2) k) HIV/AIDs and opportunistic infections l) Mycotic infections (superficial and systemic mycoses) m) Parasitic infections (malaria, trypanosomiasis, schistosomiasis, leishmaniasis) n) Skin and soft tissue infections |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Guide learners to brainstorm the infectious diseases and their presentations. b) Lead guided discussions on the management of therapeutics of infectious diseases. c) Give interactive lectures on the management of infectious diseases. |
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Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, models, internet, formulary manuals, BP machines, thermometers

Materials for Further Reading

Howland, R. D., Mycek, M. J., Harvey, R. A., & Champe, P. C. (2006). *Lippincott's Illustrated Reviews: Pharmacology*. Lippincott Williams & Wilkins Philadelphia.

Katzung, B. G., Masters, S. B., & Trevor, A. J. (2004). *Basic & Clinical Pharmacology* (Vol. 8): Lange Medical Books/McGraw-Hill New York, NY, USA:.

Rang, H. P., Ritter, J. M., Flower, R. J., & Henderson, G. (2014). *Rang & Dale's Pharmacology: With Learner Consult Online Access*: Elsevier Health Sciences.

PHA-3103: PHARMACOLOGY (III)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to apply the knowledge of chemotherapy pharmacology in the practice of pharmacy.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

5.4: Learning Working Assignment: Pharmacology (III)

Sub-Topic 5.4.1: Chemotherapy (Anti-Infectives and Anti-Neoplastics) Pharmacology

Competence(s)
a) Understanding of the chemotherapeutic agents b) Appreciation of the correlation between drugs and choice of treatment in patient care
Content Outline
a) Chemotherapy pharmacology b) Key characteristics of microorganisms, their classification and key definitions c) Principles of chemotherapy, drug resistance and combination therapy d) Anti-bacterial agents: <ul style="list-style-type: none"> - Cell wall synthesis inhibitors - Protein synthesis inhibitors - Nucleic acid synthesis inhibitors e) Anti-viral agents f) Anti-retroviral agents g) Anti-fungal agents h) Anti-protozoa (anti-malarial, anti-trypanosomiasis, anti-leishmania, anti-trichomoniasis, anti-amoeba/giardia/cryptosporidium and toxoplasma) i) Anti-helminthic agents j) Anti-mycobacterial agents (tuberculosis, leprosy and brucellosis) k) Anti-neoplastic agents l) Overview of the cell cycle m) Classification of anti-neoplastic agents n) Principles of cancer chemotherapy o) Anti-cancer agents: <ul style="list-style-type: none"> - Cell cycle specific agents - Cell cycle non-specific agents - Biological p) The pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above
Suggested Teaching or Learning Method
a) Guide group/plenary discussions on characteristics of microorganisms, their classification and key definitions. b) Give interactive lectures on pharmacology of chemotherapeutic agents.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Formulary manuals, BP machines, thermometers, visual aids, models, internet and computers, textbooks e.g. Lippincott

Materials for Further Reading

Howland, R. D., Mycek, M. J., Harvey, R. A., & Champe, P. C. (2006). *Lippincott's Illustrated Reviews: Pharmacology*. Lippincott Williams & Wilkins Philadelphia.

Katzung, B. G., Masters, S. B., & Trevor, A. J. (2004). *Basic & Clinical Pharmacology* (Vol. 8): Lange Medical Books/McGraw-Hill New York, NY, USA:.

Rang, H. P., Ritter, J. M., Flower, R. J., & Henderson, G. (2014). *Rang & Dale's Pharmacology: With Learner Consult Online Access*: Elsevier Health Sciences.

PHA-3104: PHARMACY PRACTICE (II)

Duration: 45 Contact Hours

Learning Outcome

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

1. Select, quantify, procure, receive, store, distribute and dispose of medicines and supplies.
2. Maintain medicines and supplies records.

Preparatory Activities

3. Develop and review lesson plans
4. Prepare lecture notes
5. Prepare discussion points
6. Prepare assessment and answer guides
7. Prepare audio-visual materials (e-learning material)

5.5: Learning Working Assignment: Selecting Medicines and Supplies Using:

Sub-topic 5.5.1: Treatment Guidelines

Sub-topic 5.5.2: Essential Medicines List

Sub-topic 5.5.3: Formulary Manuals

Competence(s)
a) Understanding of the selection of medicines and supplies using treatment guidelines, essential medicines list and formulary manuals b) Ability to: <ul style="list-style-type: none"> - Develop and use the essential medicines list - Use formulary manuals and treatment guidelines c) Ability to appreciate the importance of use of treatment guidelines, essential medicines list and formulary manual in health care
Content Outline
a) Definition of: <ul style="list-style-type: none"> - Selection of medicine - Essential medicines - Treatment guidelines - Formulary manuals b) Criteria for selection of medicines c) Prioritisation of selection of medicines <ul style="list-style-type: none"> - ABC analysis - VEN analysis - Therapeutic category analysis d) Medicines selection tools e) Levels of selection (who selects medicines) f) Importance of medicines selection g) Essential medicines concept h) Practical implications of essential medicines concept i) Benefits of essential medicines list j) Description of: <ul style="list-style-type: none"> - Formulary manual - Essential drugs list - Standard treatment guidelines k) Approaches to developing essential medicines list, formularies and treatment guidelines

l) Developing an essential medicines list, formulary and treatment guidelines

Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on selection criterion of medicines. b) Guide brainstorming sessions on definitions. c) Demonstrate use of essential medicines list, formulary manuals and treatment guidelines |
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5.6: LWAs: Quantifying Medicines and Supplies Using:

PEX 5.6.1: Consumption Method

PEX 5.6.2: Morbidity Method

PEX 5.6.3: Adjusted Consumption Method

PEX 5.6.4: Service Level Projection of Budget Requirements

PEX 5.6.5: Vital Essential Non-Essential (VEN) System

PEX 5.6.6: ABC Analysis

PEX 5.6.7: Therapeutics Category Method

PEX 5.6.8: Price Comparison Analysis

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding of the concept of quantifying medicines and supplies b) Ability to quantify medicines and supplies c) Appreciation of the importance of medicines and supplies quantification |
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Content Outline

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| <ul style="list-style-type: none"> a) Definition of: <ul style="list-style-type: none"> - Quantification - Forecasting b) Methods used in quantification c) Description of each method used in quantification d) Outline the steps used in every quantification method used e) Factors to consider in quantification f) The methods used g) Outline of situations where quantification is applied h) Situations where quantification is applied i) Terminologies; VEN, ABC, analysis and therapeutic price comparison analysis j) Description of when to apply VEN, ABC analysis, therapeutic category analysis, conduct price analysis |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on quantifying medicines and supplies. b) Hold interactive discussions on methods used in quantification c) Demonstrate the use and application of the methods of quantification. d) Assign learners in groups to discuss drug quantification methods and let them present to the plenary. e) Illustrate to the learners how to use VEN, ABC, analysis therapeutic category and how to conduct price analysis. f) Demonstrate how to conduct price comparison analysis, VEN,ABC analysis therapeutic category analysis, conduct price analysis |
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5.7: LWA: Procuring Medicines and Supplies Using:

PEX 5.7.1: Open Tender

PEX 5.7.2: Restricted Tender

PEX 5.7.3: Competitive Negotiation

PEX 5.7.4: Direct Procurement

Competence(s)
<ul style="list-style-type: none"> a) Understanding of procurement of medicines and supplies b) Ability to procure medicines and supplies using open tender, restricted tender, competitive negotiation and direct procurement c) Appreciation of the importance of procurement of medicines and supplies using different methods
Content Outline
<ul style="list-style-type: none"> a) Definition of procurement b) Description of procurement cycle c) Principles of a good procurement practice d) Factors influencing pharmaceutical process and total costs e) Description of: <ul style="list-style-type: none"> - Open tender - Restricted tender - Competitive negotiation - Direct procurement f) Procurement of medicines and supplies using: <ul style="list-style-type: none"> - Open tender - Restricted tender - Competitive negotiation - Direct procurement
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on procurement of medicines and supplies using the various modes. b) Guide brainstorming sessions on description facts influencing pharmaceutical process and total costs. c) Organise role-plays in procuring medicine and supplies using open tender.

5.8: LWA: Receiving Medicines and Supplies

PEX 5.8.1: Tablets and Capsules, Oral Liquid Dosage Topical Preparations

PEX 5.8.2: Cold Chain Products

PEX 5.8.3: Corrosives and Flammables

PEX 5.8.4: Controlled Medicines, Pharmaceuticals and Health Supplies

PEX 5.8.5: Glass Wares and other Equipment

Competence(s)
<ul style="list-style-type: none"> a) Understanding of how to receive medicine and supplies b) Ability to: <ul style="list-style-type: none"> - receive medicines and supplies - utilise the tools used on recovering medicines and supplies c) Appreciation of the need for vigilance and accuracy when recovering medicines and supplies
Content Outline
<ul style="list-style-type: none"> a) Definition of: <ul style="list-style-type: none"> - A receiving cycle - Quarantine - Check documents

<ul style="list-style-type: none"> - Description of different documents involved - Sample - Inspect - Report - Release into stock <p>b) Inspection checklists for medicine receipts:</p> <ul style="list-style-type: none"> - Tablets and capsules, oral liquid dosage, topical preparations - Cold chain products - Corrosives and flammables - Controlled medicines, pharmaceuticals and health supplies - Glass wares and other equipment
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Suggested Teaching or Learning Method

<ul style="list-style-type: none"> a) Guide brainstorming sessions on receiving cycles. b) Give interactive lectures on receiving cycle and inspection checklist. c) Organise field attachments e.g. on receiving medicines and supplies. d) Illustrate the receiving cycle

5.9. Learning Working Assignment 6.5: Storing Medicines and Supplies

PEX 5.9.1: Labelling Storage Area Based on Use/Application, Type of Drug/Medicine

PEX 5.9.2: Storing Cold Chain Products

PEX 5.9.3: Storing Corrosives and Flammables

PEX 5.9.4: Storing Controlled Medicines e.g. Class A and B Medicines

PEX 5.9.5: Applying FIFO/FEFO on Stock Rotation

Competence(s)

<ul style="list-style-type: none"> a) Understanding about storage of medicines and supplies b) Ability to store medicines and supplies c) Appreciation of the importance of good storage of medicines and supplies

Content Outline

<ul style="list-style-type: none"> a) Flow of stock and information: <ul style="list-style-type: none"> - FIFO - FEFO - Stock receipts - Stock storage - Stock control - Order allocation - Order picking - Order assembly - Order dispatch and delivery - Inventory taking b) Zoning stock within the store: <ul style="list-style-type: none"> - Storage at uncontrolled temperature and humidity - Cold storage - Secure storage - Flammables c) Stock location within O zone: <ul style="list-style-type: none"> - Fixed location - Fluid location - Semi fluid location d) Stock classification:

- Therapeutic or pharmacological category
- Alphabetical order
- Dosage form
- Random bin
- Commodity code
- e) Stock storage and handling:
 - Packaging specifications
 - Shelving
 - Flow pallets
 - Block stacked pallet
 - Pallet racking
 - Load handling

Suggested Teaching or Learning Method

- a) Give interactive lectures on flow of stock and information.
- b) Guide discussion sessions on:
 - Zoning stock within the store
 - Store location within the zone
 - Stock classification
 - Stock storage and handling
- c) Organise field attachments to observe:
 - FIFO on stock rotation.
 - FEFO on stock rotation.
 - Label storage area based on use/application, type of drug/medicine.
 - Storage of cold chain products.
 - Storage of corrosive and flammables.
 - Storage of controlled medicines e.g. class A and B medicines.

5.10: Learning Working Assignment: Distributing Medicines and Supplies using;

PEX 5.10.1: Delivery and Collection Systems of Transport

PEX 5.10.2: Pull System

PEX 5.10.3: Push System

PEX 5.10.4: Ward Stock System

PEX 5.10.5: Individual Drug Orders

PEX 5.10.6: Unit Dose System

Competence(s)

- a) Understanding about the distribution of medicines and supplies
- b) Ability to distribute medicines and supplies using the distribution system designs
- c) Appreciation of the importance of distribution of medicines and supplies using different methods

Content Outline

- a) Goals of distribution management
- b) Description of the distribution cycle
- c) The distribution system designs:
 - Delivery and collection systems of transport
 - Pull system
 - Push system
 - Ward stock system
 - Individual drug orders
 - Unit dose system
- d) Resources for distribution management:
 - Logistics managers

<ul style="list-style-type: none"> - Staffing levels - Information systems - Communication <p>e) Cost analysis and performance monitoring:</p> <ul style="list-style-type: none"> - Calculating costs - Collecting and analysis costs - Performance data <p>f) Considering improvement and replacement:</p> <ul style="list-style-type: none"> - Poor administration - Season variations - Major transport problems
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Suggested Teaching or Learning Method

<p>a) Guide brainstorming sessions on goals of distribution.</p> <p>b) Give interactive lectures on distribution cycle.</p> <p>c) Illustrate the distribution cycle.</p>
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5.11: LWA: Maintaining Medicines and Supplies Records

PEX 5.11.1: Establishing and Maintaining Stock Book

Competence(s)

<p>a) Understanding about establishing and maintaining stock book.</p> <p>b) Ability to generate and utilise information on stock book to generate orders for timely delivery of supplies.</p> <p>c) Appreciation of the importance of maintaining medicines and supplies records</p>

Content Outline

<p>a) Introduction to stock management:</p> <ul style="list-style-type: none"> - Definition of stock management - Principles of stock management systems - Benefits of keeping good records <p>b) Description of a stock book</p> <p>c) Advantages of a stock book</p> <p>d) Preparation of stock book</p> <p>e) Using a stock book to analyse consumption trends</p> <p>f) Filling a stock book:</p> <ul style="list-style-type: none"> - Calculating average monthly consumption - Calculating maximum and minimum stock levels - Calculating months of stock

Suggested Teaching or Learning Method

<p>a) Guided discussion of stock management and its importance in pharmacy practice.</p> <p>b) Guide learners in stock management related calculations and provide homework.</p> <p>c) Organise and supervise guided attachments of learners to recall settings.</p> <p>d) Demonstrate how stock books can be maintained and guide return demonstrations.</p> <p>e) Guide learners as they practise maintaining records.</p>
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PEX 5.11.2: Establishing and Maintaining Stock Cards

Competence(s)

<p>a) Understanding about establishing and maintaining stock cards</p> <p>b) Ability to generate and utilise information on stock cards to generate orders for timely delivery of supplies</p>
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Content Outline

<p>a) Definition of stock card</p>

- b) Advantages of stock cards
- c) Preparation of stock cards
- d) Using stock cards
- e) Physical count
- f) How to conduct a physical count

Suggested Teaching or Learning Method

- a) Give interactive lectures on maintaining stock cards.
- b) Demonstrate/illustrate and guide return demonstrations on preparation and utilisation of stock cards.
- c) Organise and supervise attachment of learners in real setting.

PEX 5.11.3: Establishing and Maintaining Ledger Book

Competence(s)

- a) Understanding about establishing and maintaining a ledger book
- b) Ability to generate and utilise information in a ledger book to generate orders for timely delivery of supplies

Content Outline

- a) Definition of ledgers and ledger systems
- b) Advantages of ledger system
- c) Establishment of a ledger system
- d) Filling a ledger

Suggested Teaching or Learning Method

- a) Demonstrate and illustrate the use of ledgers and guide return demonstrations

PEX 5.11.4: Applying Electronic Inventory Management System

Competence(s)

- a) Ability to use computers to manage information and data generated during inventory management
- b) Ability to manage electronic information
- c) Appreciation of the role of information technology in the practice of pharmacy

Content Outline

- a) Use of computers in pharmaceutical inventory management
- b) Commonly used software packages
- c) Electronic communications:
 - Forms
 - Advantages and limitations
 - Precautions
- d) Web-based reporting

Suggested Teaching or Learning Method

- a) Arrange and supervise practical exercises on computer

5.12: LWA: Disposing of Pharmaceutical Waste

PEX 5.12.1: Incineration (Combustion or Burning)

Competence(s)

- a) Understanding on incineration as a method of disposing pharmaceutical waste
- b) Ability to dispose of pharmaceutical waste by incineration

Content Outline

- a) Definition of incineration

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| <ul style="list-style-type: none"> b) National Drug Authority (NDA) guidelines for disposal of pharmaceutical waste c) Constituents of pharmaceutical waste to be disposed of by incineration d) Advantages and disadvantages of incineration method e) Methods of incineration: <ul style="list-style-type: none"> - Burning in open containers - Medium temperature incineration - Novel high temperature incineration |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> f) Give interactive lectures on disposal of pharmaceutical waste by incineration. a) Guide brainstorming sessions on advantages and disadvantages of incineration. b) Illustrate disposing of waste by incineration method. c) Let learners practise disposing of pharmaceutical waste by incineration. |
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PEX 5.12.2: Chemical Methods

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding on chemical methods for disposing of pharmaceutical waste b) Ability to dispose of pharmaceutical waste by chemical method |
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Content Outline

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| <ul style="list-style-type: none"> a) Definition of chemical decomposition of pharmaceutical waste b) Identification of chemicals used in chemical decomposition c) Types of pharmaceuticals waste disposed of by chemical methods d) Advantages and disadvantages of chemical methods |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on types of pharmaceutical waste disposed of by chemical methods. b) Guide brainstorming sessions on chemicals used in chemical decomposition. c) Illustrate disposing of waste by chemical method. d) Learners practise disposing of pharmaceutical waste by chemical method. |
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PEX 5.12.3: Land-fill (Controlled Tipping)

Competence(s)

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| <ul style="list-style-type: none"> a) Understanding on land-fills b) Ability to dispose of pharmaceutical waste by land-fill method |
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Content Outline

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| <ul style="list-style-type: none"> a) Definition of landfills/controlled tipping b) Criteria for site selection for land-fill c) Operation of land-fill (controlled tipping) d) Methods of land-fill disposal: <ul style="list-style-type: none"> - Highly engineered sanitary land-fill - Engineered land-fill - Open uncontrolled non-engineered e) Types of pharmaceuticals disposed of by land-fill f) Advantages and disadvantages of land-fill |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on land-fill. b) Organise field visits on land-fill sites. c) Guide discussions on the operation of land-fill. d) Illustrate disposing of waste by land-fill method. e) Let learners practise disposing of pharmaceutical waste by land-fill method. |
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PEX 5.12.4: Encapsulation

Competence(s)
a) Understanding on disposal of pharmaceutical waste by encapsulation method b) Ability to dispose of pharmaceutical waste by encapsulation method
Content Outline
a) Definition of encapsulation b) Different types of encapsulation techniques c) Types of pharmaceutical waste disposed of by encapsulation d) Advantages and disadvantages of encapsulation
Suggested Teaching or Learning Method
a) Give interactive lectures on types of encapsulation. b) Guide brainstorming sessions on pharmaceutical waste disposed of by encapsulation. c) Guide discussions on advantages and disadvantages of encapsulation. d) Illustrate disposing of waste by encapsulation. e) Let learners practise disposing of pharmaceutical waste by encapsulation method.

PEX 5.12.5: Soak Pit

Competence(s)
a) Understanding on disposal of pharmaceutical waste using soak pit b) Ability to dispose of pharmaceutical waste by soak pit method
Content Outline
a) Definition of soak pit b) Types of pharmaceutical waste to be disposed of by soak pit c) Advantages and disadvantages of soak pit d) Description of the process of disposal by soak pit
Suggested Teaching or Learning Method
a) Guide brainstorming sessions on definitions. b) Give interactive lectures on types of pharmaceutical waste to be disposed of by soak pit. c) Illustrate disposing of waste by soak pit method. d) Learners practise disposing of pharmaceutical waste by soak pit method.

PEX 5.12.6: Recycling

Competence(s)
a) Understanding on disposal of pharmaceutical waste by recycling method b) Ability to dispose of pharmaceutical waste by recycling method
Content Outline
a) The meaning of recycling b) Types of pharmaceutical waste to be recycled c) Methods of recycling d) Advantages and disadvantages of recycling
Suggested Teaching or Learning Method
a) Give interactive lectures on methods of recycling. b) Guide brainstorming sessions on advantages and disadvantages of recycling. c) Illustrate disposing of pharmaceutical waste by recycling method. d) Learners practise disposing of pharmaceutical waste by recycling method.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.

- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Treatment guidelines, formulary manuals, essential drug list, stock card, bin cards, ledger books, Kardex, stock book, patient attendance registers, purchase order book, inventory book, prescription book, classified drug book, batch manufacturing records and SOPs, computers, issue vouchers and requisitions, dispensing log, textbook MSH Pt 1, Pt II and Pt III, charts, projector, calculators

Additional notes

1. Emphasis should be put on health education
2. Field visits and attachment should be organised
3. Continuously update of resources and notes

Materials for Further Reading

AMREF. (1995). *Training Guidelines Primary Health Care and Community Based Health Care*. Nairobi, Kenya

Bikiika, C.S. (2006). *Implementation of Primary Health Care through Community Based Health Care and Importance of Community Participation in Health*.

British National Formulary (BNF), British Medical Association And The Pharmaceutical Society of Great Britain

Chris, W. AMREF. (2008). *Community Health*. (3rd ed.). Nairobi Kenya.

DSE and AMREF. (1993). *A Guide for Training Teachers of Health Workers*. Nairobi Kenya

J Tiers. Boerma. (1991). *Health Information for Primary Health Care*.

Management Sciences for Health 2014.

Managing Access to Medicines And Health Technologies

- Essential Medicines and Health Supplies List for Uganda 2012 (MoH)
- Management of Medicines and Health Supplies Manual 2012 (MoH)

Ministry of Health. (2005). *Infection Control Policies and Procedures*. Department of Quality Assurance. Kampala-Uganda.

Ojaki, Mikloth. (2014). *Management: A Technical Approach*, (2nd ed.).

Tarimo, E.G .Webster (1996). *Community Health Care Concepts and Challenges in a Changing World*. WHO/ARA/97.1

Uganda Community Based Health Care Association. Training of Trainer's Manual. Uganda

PHA-3105: PHARMACOGNOSY (III)

Duration: 60 Contact Hours

Learning Outcome

By the end of this module unit, a learner should be able to carry out specific methods of analysis on pharmaceutical products.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials (e-learning material)

5.13: LWA: Extract Volatile Oils Using (Content same as in 4.11)

5.14: Learning Working Assignment: Carrying Out Specific Methods of Analysis on Pharmaceutical Products

Sub-topic: Active principles – Alkaloids

Competence(s)
a) Ability to test alkaloids
b) Appreciation of the importance of alkaloids in the pharmacy practice
Content Outline
a) Definition of alkaloids b) Properties of alkaloids c) Naming of alkaloids d) Structure and classification of alkaloids e) Tests for alkaloids f) Extraction of alkaloids g) Functions of alkaloids in plants h) Tropane alkaloids: - Parent structure - List of plants containing tropane alkaloids - Tropane alkaloidal drugs and their pharmacologic importance i) Pyrrolizidine alkaloids: - Parent structure - List of plants containing pyrrolizidine alkaloids - Pyrrolizidine alkaloidal drugs and their pharmacologic importance j) Phenylalanine derived alkaloids: - Parent of structure - List plants containing phenylalanine alkaloids - Phenylalanine alkaloidal drugs and their pharmacologic importance k) Protoalkaloids: - Parent of structure - List plants containing protoalkaloids - Protoalkaloids alkaloidal drugs and their pharmacologic importance l) Benzyloquinone derivatives: - Parent of structure - List plants containing benzyloquinone alkaloids - Benzyloquinone alkaloidal drugs and their pharmacologic importance

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| <p>m) Pseudo alkaloids:</p> <ul style="list-style-type: none"> - List of plants containing pseudo alkaloids - Pseudo alkaloidal drugs and their pharmacologic importance <p>n) Tryptophan derived alkaloids:</p> <ul style="list-style-type: none"> - Parent of structure - List plants containing tryptophan derived alkaloids - Tryptophan derived alkaloidal drugs and their pharmacologic importance <p>o) Ergot alkaloids:</p> <ul style="list-style-type: none"> - Parent structure - List of plants containing Ergot alkaloids - Ergot alkaloidal drugs and their pharmacologic importance <p>p) Quinoline alkaloids:</p> <ul style="list-style-type: none"> - Parent structure - List of plants containing Quinoline alkaloids - Quinoline alkaloidal drugs and their pharmacologic importance <p>q) Indolizidine alkaloids:</p> <ul style="list-style-type: none"> - Parent structure - List of plants containing Indolizidine alkaloids - Indolizidine alkaloidal drugs and their pharmacologic importance <p>r) Imidazole alkaloids:</p> <ul style="list-style-type: none"> - Parent structure - List of plants containing Imidazole alkaloids - Imidazole alkaloidal drugs and their pharmacologic importance <p>s) Purine:</p> <ul style="list-style-type: none"> - Parent structure - List of plants containing purine alkaloids - Purine alkaloidal drugs and their pharmacologic importance <p>t) Steroidal alkaloids:</p> <ul style="list-style-type: none"> - Parent structure - List of plants containing steroidal alkaloids - Alkaloidal drugs and their pharmacologic importance |
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Suggested Teaching or Learning Method

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| <p>a) Give interactive lectures on active principles of alkaloids.</p> <p>b) Organise brainstorming sessions on definition, properties and naming of alkaloids.</p> <p>c) Organise guided discussions on alkaloids.</p> <p>d) Give practical demonstration of tests of alkaloids.</p> |
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Sub-topic: Active Principles - Miscellaneous Actives

Competence(s)

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| <p>a) Understanding of miscellaneous actives</p> <p>b) Appreciation of the importance of miscellaneous actives in the pharmacy practice</p> |
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Content Outline

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| <p>a) List of drugs of plant origin having anti-tumor activity</p> <p>b) List of drugs of plant origin with antiprotozoal activity</p> <p>c) List of drugs of plant origin with antihepatotoxic and oral hypoglycemic activity</p> <p>d) List of drugs of plant origin with vitamins and hormones</p> <p>e) List of drugs of plant origin with antibacterial and antiviral activity</p> <p>f) List of additives of plant origin used as colouring and flavouring agents</p> <p>g) List of drugs of biologically active compounds from marine organisms</p> <p>h) List of drugs of plant origin with hallucinogenic, allergenic, teratogenic and other toxic plants</p> <p>i) List of pesticides of natural origin</p> |
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Suggested Teaching or Learning Method

- a) Give interactive lectures on active principles of miscellaneous actives.
- b) Organise brainstorming sessions on miscellaneous actives.
- c) Organise guided discussions on miscellaneous actives.

PEX 5.14.1: Determining Ash Values of Crude Drugs**Competence(s)**

- a) Understanding of determination of ash values of crude drugs
- b) Demonstrate determination of ash value of crude drugs
- c) Appreciation of the importance of determination of ash value of crude drugs in the pharmacy practice

Content Outline

- a) Principles of ash value
- b) Determination of total ash
- c) Determination of sulphated ash
- d) Determination of acid insoluble ash
- e) Determination of water soluble ash
- f) The results of ash value

Suggested Teaching or Learning Method

- a) Give interactive lectures on determining ash value of crude drugs.
- b) Organise brainstorming sessions on the determination of ash values of crude drugs.
- c) Organise guided discussions on determination of ash values of crude drugs.
- d) Give practical demonstrations of water soluble and sulphated ash.

PEX 5.14.2: Determining Water Content of Crude Drugs**Competence(s)**

- a) Understanding of water content of crude drugs
- b) Demonstrate determination of water content of crude drugs
- c) Appreciation of the importance of determination of water content of crude drugs in the pharmacy practice

Content Outline

- a) Methods of determining water content of crude drugs
- b) Loss on drying
- c) Separation and measurement of moisture using distillation
- d) Chemical method using distillation
- e) Spectroscopic method
- f) Electrometric methods
- g) Results of determining water content of crude drugs

Suggested Teaching or Learning Method

- a) Give interactive lectures on determining water content of crude drugs.
- b) Organise brainstorming sessions on water content of crude drugs.
- c) Organise guided discussions on water content of crude drugs.
- d) Give practical demonstration on determining water content of crude drugs

PEX 5.14.3: Determining Extractive Values**Competence(s)**

- a) Understand extractive values
- b) Demonstrate determination of extractive values
- c) Appreciation of the importance of determination of extractive values in the pharmacy practice

Content Outline
a) Determination of: <ul style="list-style-type: none"> - Water soluble extractives - Ethanol soluble extractives using soxhlet method
Suggested Teaching or Learning Method
a) Give interactive lectures on determining extractive values. b) Organise brainstorming sessions on extractive values. c) Organise guided discussions on extractive values. d) Give practical demonstration of extractive values

PEX 5.14.4: Determining Crude Fibre Content of Crude Drugs

Competence(s)
a) Understanding crude fibre content of crude drugs b) Demonstrate determination of crude fibre content of crude drugs c) Appreciation of the importance of determination of crude fibre content of crude drugs in the pharmacy practice
Content Outline
a) Defatting of the raw materials b) Observation under a microscope c) Carry out quantitative determination of the fibre content of crude drugs d) Discussion of results
Suggested Teaching or Learning Method
a) Give interactive lectures on determining crude fibre content of crude drugs b) Organise brainstorming sessions on crude fibre content of crude drugs c) Organise guided discussions on crude fibre content of crude drugs d) Give practical demonstration on determination of crude fibre content of crude drugs

5.15: Learning Working Assignment: Packing and Labelling Crude Drugs

PEX 5.15.1: Packing and Labelling Solid Crude Drugs

Sub-topic 5.15.1.1: Crude Drug Development

Competence(s)
a) Understanding of crude drug development b) Demonstrate primary processing of crude drugs and crude drug development c) Appreciation of the importance of crude drug development in the pharmacy practice
Content Outline
a) Collection of raw materials b) Cleaning c) Grating d) Washing e) Drying f) Grinding g) Preservation h) Packaging i) Labelling j) Storage
Suggested Teaching or Learning Method
a) Brainstorm the drug development process. b) Lead guided discussions on drug development process. c) Give practical demonstration of primary processing of crude drugs and crude drug development.

Sub-topic 5.15.1.2: Packaging of Solid Crude Drugs

Competence(s)
<ul style="list-style-type: none"> a) Demonstrate packaging of solid crude drugs b) Appreciation of the importance of packaging of solid crude drugs in the pharmacy practice
Content Outline
<ul style="list-style-type: none"> a) Types of packages b) Suitable choice of packages: <ul style="list-style-type: none"> - Re-absorption of moisture - Sunlight - Compatibility - Temperature/humidity - Air - Microbial/pest infestation c) Cleaning and sterilisation of packaging materials and crude drugs d) Packaging of solid crude drugs
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on packaging of solid crude drugs b) Organise brainstorming sessions on types of packages, advantages and disadvantages c) Organise guided discussions on types, advantages and disadvantages of packages d) Give practical demonstration on packaging of crude drugs

Sub-topic 5.15.1.3: Labelling of Solid Crude Drugs

Competence(s)
<ul style="list-style-type: none"> a) Understanding labelling of solid crude drugs b) Demonstrate labelling of solid crude drugs c) Appreciation of the importance of labelling of crude drugs in the pharmacy practice
Content Outline
<ul style="list-style-type: none"> a) Requirements of a standard label b) Presentation of a standard label c) Regulatory recommendations of solid crude drugs
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on labelling solid crude drugs. b) Organise brainstorming sessions on labelling of solid crude drugs. c) Organise guided discussions on labelling of solid crude drugs. d) Give practical demonstration on labelling of crude drugs.

PEX 5.15.2: Packing and Labelling Liquid Crude Drugs

Sub-topic 5.15.2.1: Crude Drug Development

Competence(s)
<ul style="list-style-type: none"> a) Understanding crude drug development b) Demonstrate development of crude drugs c) Appreciation of the importance of development of crude drugs in the pharmacy practice
Content Outline
<ul style="list-style-type: none"> a) Collection of raw materials b) Cleaning c) Grating d) Washing e) Drying f) Grinding

- g) Extraction techniques
- h) Filtering/rectifying
- i) Preservation
- j) Packaging
- k) Labelling
- l) Storage

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on crude drug development.
- b) Organise guided discussions on crude drug development.
- c) Give practical demonstrations of crude drug development

Sub-topic 5.15.2.2: Packaging of Liquid Crude Drugs

Competence(s)

- a) Understanding packaging of liquid crude drugs
- b) Demonstrate packaging of liquid crude drugs
- c) Appreciation of the importance of packaging of liquid crude drugs in the pharmacy practice

Content Outline

- a) Types of packages
- b) Suitable choice of packages:
 - Re-absorption of moisture
 - Sunlight
 - Compatibility
 - Temperature/ humidity
 - Air
 - Microbial/pest infestation
- c) Cleaning and sterilisation of packaging materials and crude drugs
- d) Packaging of liquid crude drugs

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on packaging of liquid crude drugs.
- b) Organise guided discussions on packaging of liquid crude drugs.
- c) Give practical demonstration on packaging of liquid crude drugs.

Sub-topic 5.15.2.3: Labelling of Liquid Crude Drugs

Competence(s)

- a) Understanding labelling of liquid crude drugs
- b) Demonstrate labelling of liquid crude drugs
- c) Appreciation of the importance of labelling of liquid crude drugs in the pharmacy practice

Content Outline

- a) Requirements of a standard label
- b) Presentation of a standard label
- c) Regulatory recommendations of liquid crude drugs

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on labelling of liquid crude drugs.
- b) Organise guided discussions on labelling of liquid crude drugs.
- c) Give practical demonstration on labelling of crude drugs.

PEX 5.15.3 Storing Crude Drugs

Competence(s)

- a) Understanding storage of crude drugs

b) Demonstrate storage of crude drugs c) Appreciation of the importance of storage of crude drugs in the pharmacy practice
Content Outline
a) Conditions for storage of crude drugs b) Types of storage containers c) Choice of storage containers d) Factors that affect storage of crude drugs
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on storage of crude drugs. b) Organise guided discussions on storage of crude drugs. c) Give practical demonstration on storage of crude drugs.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Practical equipment and apparatus, projector, pipettes, spatula, jars, measuring cylinder, furniture, shelves, cabins, pallets, fire extinguishers, stock containers, protective gear, soxhlet, microwave, flasks, evaporating dishes, conical flasks, funnels, filters, slabs, hot water bath, distiller, filter equipment, calculators, hot plate, weighing scale, computers, printer (ordinary, label), thermometer, refrigerator, bio-safety cabin, inspection light, percolator, capping machine, mixers, illustration materials e.g. plants and animal medicinal materials

Materials for Further Reading

Evans, W. C. (2009). *Trease and Evans Pharmacognosy* (16th ed.) Saunders, USA
Houghton, P. J. (2009). *Synergy and Polyvalence: Paradigms to Explain the Activity of Herbal Products. Evaluation of Herbal Medicinal Products*, 85-94.

PHA-3106: GENERAL PHARMACY MANAGEMENT

Duration: 30 Contact Hours

Learning Outcome

By the end of module unit, the learner should be able to manage and organise a pharmaceutical unit within the jurisdiction as per legal requirement and develop SOPs.

Preparatory Activities

1. Prepare discussion points
2. Prepare lecture notes
3. Prepare assessment and answer guides
4. Prepare audio-visual materials
5. Develop and review lesson plans

5.16: LWA: Carrying Out Management Functions (General Pharmacy Management)

PEX 5.16.1: Mobilising Resources

Competence(s)
a) Ability to define terms listed b) Ability to name the following: <ul style="list-style-type: none"> - Types of resources - Types of health units in Uganda - Catchment areas of the health units - Types of services designated to be provided by each type of health unit in Uganda c) Ability to explain the referral system of the health care services in Uganda d) Ability to mobilise resources e) Appreciation of the health care referral system
Content Outline
a) Definitions of the following terms b) Health <ul style="list-style-type: none"> - Health unit - Pharmaceutical unit - Management - Resources/ mobilization - Effectiveness and efficiency - Administration - Planning - Monitoring - Evaluation c) Types and examples of resources d) Levels and types of health units in Uganda e) Catchment areas of each type of the health unit f) Types of health care services provided by different health units g) Description of the referral system of the healthcare h) Methods of resources mobilisation i) Methods of: <ul style="list-style-type: none"> - Selecting - Procuring - Distributing and - Utilising resources

Suggested Teaching or Learning Method

- a) Give interactive lectures on mobilising resources
- b) Guide discussions on types of resources
- c) Organise field visits

PEX 5.16.2: Developing Work Schedules**Competence(s)**

- a) Ability to set a minimum output
- b) Ability to develop work schedule
- c) Appreciation of the use for a work schedule

Content Outline

- a) Definition of schedules
- b) Name the types of schedule
- c) Minimum output of health unit personnel
- d) Methods of developing a work schedule

Suggested Teaching or Learning Method

- a) Give interactive lectures on key terms.
- b) Illustrate schedules.
- c) Organise discussions.

PEX 5.16.3: Organising Schedules and Chairing Meetings**Competence(s)**

- a) Ability to describe, organise and chair meetings

Content Outline

- a) Defining of the terms (meetings, agenda, voting, consensus, proceedings, minutes)
- b) Types of meetings
- c) Types of task committees in a meeting
- d) Description of the roles of the chairperson
- e) Method of writing minutes of the meeting

Suggested Teaching or Learning Method

- a) Give interactive lectures on chairing a meeting.
- b) Guide discussions on chairing a meeting.
- c) Organise role-plays

PEX 5.16.4: Scheduling Continued Professional Development**Competence(s)**

- a) Ability to conduct CPD for self and others

Content Outline

- a) Definition of CPD and medical education
- b) Types of CPD
- c) Need for CPD

Suggested Teaching or Learning Method

- a) Organise group discussions on the need of CPD.

PEX 5.16.5: Promoting Socialisation Culture**Competence(s)**

- a) Understanding of key terms of socialisation

- b) Ability to sensitise the community about health-seeking behaviour
- c) Appreciation of the importance of health-seeking behaviour

Content Outline

- a) Definition of the following:
 - Culture
 - Socialisation
- b) Impact of socialisation on health of a human being
- c) Description of health-seeking behaviour
- d) Importance of health-seeking behaviour

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on key terms.
- b) Guide discussions.
- c) Give interactive lectures on socialisation culture

PEX 5.16.6: Supervising Staff

Competence(s)

- a) Understanding of the key concepts of supervision
- b) Ability to:
 - Set performance objectives
 - Check performance problems
 - Set contact supervisory systems
 - Set performance schedule
 - Give guidance
 - Provide technical and moral support

Content Outline

- a) Definition of terms:
 - Supervision
 - Staff
 - Supervisor
 - Supervision process
 - Need for supervision
 - Role/functions of supervisory
 - Supervisory skills

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on the importance of supervising staff.
- b) Guide discussions on the need for supervision and roles of supervisor.
- c) Give interactive lectures on supervisory skills

PEX 5.16.7: Appraisal of Staff

Competence(s)

- a) Understanding of the concepts of appraisal
- b) Ability to appraise the staff
- c) Ability to carry out self appraisal
- d) Appreciation of importance of staff appraisal

Content Outline

- a) Definition of:
 - Staff
 - Appraise
 - Types of staff/performance appraisal

- Importance of staff appraisal
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Guide brainstorming sessions on appraisal of staff b) Give interactive lectures on principles of staff appraisal. c) Guide group discussions on importance of staff appraisal

PEX 5.16.8: Coaching and Mentoring Staff

Competence(s)
<ul style="list-style-type: none"> a) Have an understanding of the concept of coaching and mentoring b) Ability to coach staff c) Ability to mentor staff d) Appreciation of the impact of coaching and mentoring of staff
Content Outline
<ul style="list-style-type: none"> a) Definition of the following terms: <ul style="list-style-type: none"> - Coaching - Mentoring b) Methods of coaching c) Methods of mentoring d) Importance of coaching and mentoring
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Guide brainstorming sessions on methods of coaching b) Give interactive lectures on principles of coaching and mentoring.

PEX 5.16.9: Counselling Staff

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the principles of counselling b) Ability to counsel staff c) Appreciation of the importance of staff counselling
Content Outline
<ul style="list-style-type: none"> a) Definition of counselling b) Types of counselling c) Counselling process d) Importance of counselling
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Guide brainstorming sessions on types of counselling b) Give interactive lectures on counselling. c) Organise role-plays on counselling

PEX 5.16.10: Motivating Staff

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the principles of motivation b) Ability to motivate staff c) Appreciation importance of motivating staff
Content Outline
<ul style="list-style-type: none"> a) Definition of motivation, job satisfaction b) Types of motivation c) Methods of motivation d) Importance of motivation

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on types of motivation
- b) Give interactive lectures on motivation.
- c) Guide discussions on methods of motivation.

5.17: LWA: Organising Pharmaceutical Unit (General Pharmacy Management)**PEX 5.17.1: Cleaning Pharmaceutical Unit****Competence(s)**

- a) Understanding of cleaning pharmaceutical units
- b) Ability to clean pharmaceutical unit
- c) Appreciation of the importance of cleaning a pharmaceutical unit

Content Outline

- a) Methods of cleaning pharmaceutical unit
- b) Schedule for cleaning pharmaceutical unit
- c) Importance of cleanliness in a pharmaceutical unit

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on methods of cleaning pharmaceutical unit
- b) Give interactive lectures on general management of a pharmaceutical unit.

PEX 5.17.2: Disposing Waste**Competence(s)**

- a) Understanding of waste disposal
- b) Ability to dispose pharmaceutical waste appropriately
- c) Appreciation of the need for appropriate disposal of pharmaceutical waste

Content Outline

- a) Definition of:
 - Dispose
 - Waste
 - Pharmaceutical waste
- b) Types of waste generated in pharmaceutical unit
- c) Methods of disposal of pharmaceutical wastes
- d) Importance of proper disposal of pharmaceutical waste

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions
- b) Guide discussions on disposal methods
- c) Organise learner practise sessions
- d) Conduct demonstrations
- e) Organise field visits to health units

PEX 5.17.3: Arranging the Pharmaceutical Unit**Competence(s)**

- a) Understanding of arranging a pharmaceutical unit
- b) Ability to arrange a pharmaceutical unit
- c) Appreciation of the need for appropriate arrangement of a pharmaceutical unit

Content Outline

- a) Classification of pharmaceutical products
- b) Types/methods of arrangement
- c) Importance of proper arrangement of pharmaceutical unit

Suggested Teaching or Learning Method

- | |
|---|
| <ul style="list-style-type: none"> a) Guide brainstorming sessions on classifications of pharmaceutical products b) Conduct demonstrations on arrangements c) Guide discussions on types/methods of arrangement. d) Organise learner practise sessions. e) Organise field visits to health units |
|---|

PEX 5.17.4: Labelling Pharmaceutical Unit

Competence(s)

- | |
|---|
| <ul style="list-style-type: none"> a) Understanding of labelling pharmaceutical units b) Ability to label pharmaceutical unit c) Appreciation of the need for appropriate labelling of a pharmaceutical unit |
|---|

Content Outline

- | |
|---|
| <ul style="list-style-type: none"> a) Elements of a label b) Characteristics of a good label c) Location of a label for a pharmaceutical unit d) Types of label for a pharmaceutical unit |
|---|

Suggested Teaching or Learning Method

- | |
|---|
| <ul style="list-style-type: none"> a) Guide brainstorming sessions on characteristics of a good label b) Give interactive lectures on labelling pharmaceutical unit. c) Guide discussions on types of labels. d) Organise illustrations. e) Organise learner practise sessions |
|---|

PEX 5.17.5: Maintaining Hygiene in a Pharmaceutical Unit

Competence(s)

- | |
|---|
| <ul style="list-style-type: none"> a) Understanding of maintaining hygiene in a pharmaceutical unit b) Appreciation of relevance of maintaining hygiene in the provision of pharmaceutical services |
|---|

Content Outline

- | |
|--|
| <ul style="list-style-type: none"> a) Definition of the term hygiene b) Types of hygiene c) Importance of hygiene in a pharmaceutical unit d) Methods of ensuring hygienic conditions in a pharmaceutical unit |
|--|

Suggested Teaching or Learning Method

- | |
|---|
| <ul style="list-style-type: none"> a) Guide brainstorming sessions on types of hygiene b) Guide discussions on importance of maintaining hygiene in a pharmaceutical unit. c) Give interactive lectures on hygiene in a pharmaceutical unit. d) Organise learner practise sessions. |
|---|

PEX 5.17.6: Disinfecting/Fumigating Pharmaceutical Unit

Competence(s)

- | |
|--|
| <ul style="list-style-type: none"> a) Have an understanding of disinfecting/ fumigating pharmaceutical units b) Ability to fumigate/disinfect a pharmaceutical unit c) Appreciate the relevance of disinfect/fumigate pharmaceutical unit |
|--|

Content Outline

- | |
|--|
| <ul style="list-style-type: none"> a) Definition of the following terms: <ul style="list-style-type: none"> - Disinfect - Fumigate b) Types of disinfectant |
|--|

- c) Types of fumigator
- d) Methods of:
 - Disinfecting
 - Fumigating
- e) Importance of disinfecting
- f) Importance of fumigating
- g) Schedule for disinfection activities
- h) Schedule of fumigating activities

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on types of disinfectants
- b) Give interactive lectures on disinfecting/ fumigation of a pharmaceutical unit.
- c) Guide discussions on types of disinfectants.
- d) Organise demonstrations on disinfecting the unit
- e) Organise learner practise sessions

PEX 5.17.7: Extinguishing Fire

Competence(s)

- a) Ability to extinguish fire

Content Outline

- a) Definition of the term extinguish
- b) Types of fire extinguishers
- c) Causes of fire
- d) Methods of extinguishing fire
- e) Precautions to be taken while extinguishing fire

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on causes of fire
- b) Give interactive lectures on fighting fires.
- c) Organise field visits to:
 - Fire extinguishing units
 - Health units
- d) Organise demonstrations.

5.18: LWA: Developing Standard Operating Procedures (SOPs)

PEX 5.18.1: Developing SOPs on Manufacturing Practices

Competence(s)

- a) Ability to classify SOPs
- b) Ability to describe SOPs
- c) Ability to develop SOPs
- d) Ability to use SOPs
- e) Appreciation of having in place different SOPs in a pharmaceutical unit

Content Outline

- a) Definition of the following terms:
 - Standard
 - Procedure
 - Operation
- b) Types of SOPs
- c) Importance of having different types of SOPs
- d) Methods of developing SOPs
- e) Steps of each SOP
- f) Methods of updating SOPs

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on types of SOPs
- b) Give interactive lectures on manufacturing practices.
- c) Guide discussions on importance of SOPs
- d) Guide learners in field visits to pharmaceutical units.

PEX 5.18.2: Developing SOPs on Dispensing**Competence(s)**

- a) Ability to develop SOPs on dispensing

Content Outline

- a) Definition of the terms:
 - Dispensing
 - A prescription
 - Rational prescription writing
- b) Types of dispensing procedures:
 - Procedures for extemporaneous dispensing
 - Procedure for dispensing a prescription
- c) Methods of developing SOPs for dispensing
- d) Steps of each of the SOPs for dispensing
- e) Importance of developing and using SOPs for dispensing

Suggested Teaching or Learning Method

- a) Give interactive lectures on SOPs- dispensing.
- b) Guide discussions on types of dispensing
- c) Do field visits to health units.

PEX 5.18.3: Developing SOPs on Storage and Supplies**Competence(s)**

- a) Ability to develop SOPs on storage and supplies

Content Outline

- a) Definition of the following:
 - Medicine
 - Supplies
- b) Types of medicine
- c) Types of medical supplies
- d) Methods of storage for medicines
- e) Methods of storage for supplies
- f) Record of stored medicine and supplies
- g) Importance of developing SOPs on storage and supplies

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on types of medical supplies
- b) Guide discussions on methods of storage
- c) Give interactive lectures on SOPs- storage and supplies.
- d) Hold field visits to health units.

PEX 5.18.4: Developing SOPs on Compounding**Competence(s)**

- a) Ability to develop SOPs on compounding

Content Outline

- a) Definition of compounding

- b) Types of dosage forms prepared extemporaneously
- c) SOPs for each dosage form
- d) Importance of having and following SOPs on compounding

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on types of dosage forms
- b) Give interactive lectures on SOPs – compounding.
- c) Make field visits to health units.

PEX 5.18.5: Developing SOPs on Extraction

Competence(s)

- a) Ability to develop SOPs on extraction

Content Outline

- a) Definition of extraction
- b) Natural sources of drugs (animals, plants, minerals)
- c) Types of drugs of plant origin
- d) Parts of plants containing drugs
- e) Methods of extraction of drugs of plant origin
- f) Types of SOPs on extraction
- g) Steps for each SOP
- h) Importance of having and following SOPs

Suggested Teaching or Learning Method

- a) Give interactive lectures on SOPs – extraction.
- b) Make field visits to health units.

PEX 5.18.6: Developing SOPs on Pharmaceutical Disposal

Competence(s)

- a) Ability to develop SOPs on pharmaceutical disposal

Content Outline

- a) Definition of:
 - Disposal sites
 - Pharmaceutical waste
- b) Types of pharmaceutical waste
- c) Methods of disposing pharmaceutical waste
- d) Standard operational procedures of disposal of pharmaceutical waste
- e) Steps of each SOPs
- f) Importance of having and using SOPs on pharmaceutical disposal

Suggested Teaching or Learning Method

- a) Give interactive lectures on SOP – disposal.
- b) Make field visits to health units.

PEX 5.18.7: Developing SOPs on Receiving Medicines and Supplies

Competence(s)

- a) Ability to develop SOPs on receiving pharmaceutical supplies

Content Outline

- a) Definition of the term receiving
- b) Reasons for ordering
- c) Methods of ordering
- d) Items to be ordered
- e) Quantities of items to be ordered

- | |
|--|
| f) Procedure of receiving supplies
g) Steps of each procedure
h) Importance of having and following SOPs on receiving
i) Record of items received |
| Suggested Teaching or Learning Method |
| a) Give interactive lectures on SOP- receiving medicines and supplies.
b) Make field visits to health units. |

Suggested Teaching or Learning Method

- a) Give interactive lectures on SOP- receiving medicines and supplies.
 b) Make field visits to health units.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Computers, printers, cabinets, shelves, furniture, fire extinguishers, ointment packing materials, labels, stock containers, stationery, protective gear, text books

Further Reading

- Brunton, L. L., Chabner, B., & Knollmann, B. C. (Eds.). (2011). *Goodman & Gilman's the Pharmacological Basis of Therapeutics* (Vol. 12). New York: McGraw-Hill Medical.
- Chisholm-Burns, M. A., Vaillancourt, A. M., & Shepherd, M. (2012). *Pharmacy Management, Leadership, Marketing and Finance*. Jones & Bartlett Publishers.
- Desselle, S., Zgarrick, D., & Alston, G. (2012). *Pharmacy Management*. McGraw Hill Professional.
- Grabowski, H., & Mullins, C. D. (1997). *Pharmacy Benefit Management, Cost-Effectiveness Analysis and Drug Formulary Decisions*. *Social Science & Medicine*, 45(4), 535-544.
- Hill, A. & Hill, T. (2012). *Operations Management*. Palgrave Macmillan.
- Kayne, S. B. (2005). *Pharmacy Business Management*. Pharmaceutical Press
- Tootelian, D. H., Wertheimer, A. I., & Mikhailitchenko, A. (2012). *Essentials of Pharmacy Management*. Pharmaceutical Press.

YEAR THREE – SEMESTER TWO**PHA-3201: THERAPEUTICS (III)****Duration: 60 Contact Hours****Learning Outcome**

By the end of this module unit, the learner should be to provide rational drug therapy in a caring and competent manner.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare discussion points
3. Prepare lecture notes
4. Prepare assessment and answer guides
5. Prepare audio-visual materials

6.1: Learning Working Assignment: Therapeutics (III)**Sub-Topic 6.1.1: Management Cardiovascular and Renal Diseases.**

Competence(s)
<ol style="list-style-type: none"> a) Understanding of therapeutics of cardiovascular and renal diseases b) Appreciation of the correlation between knowledge of drugs and choice of treatment in patient care
Content Outline
<ol style="list-style-type: none"> a) Introduction to cardiovascular diseases: <ul style="list-style-type: none"> - Hypertension - Ischaemic heart disease - Heart failure - Cardiac arrhythmias b) Introduction to renal diseases: <ul style="list-style-type: none"> - Acute renal disease - Chronic kidney disease c) Renal replacement therapy
Suggested Teaching or Learning Method
<ol style="list-style-type: none"> a) Guide brainstorming sessions on cardiovascular and renal diseases and their presentations. b) Guide group/plenary discussions on the management of cardiovascular and renal diseases. c) Give interactive lectures on the management of cardiovascular and renal diseases.

Sub-Topic 6.1.2: Management of Central Nervous System Diseases

Competence(s)
<ol style="list-style-type: none"> a) Understanding of therapeutics of central nervous system disorders b) Appreciation of the correlation between knowledge of drugs and choice of treatment in patient care
Content Outline
<ol style="list-style-type: none"> d) Introduction of central nervous system disorders: <ul style="list-style-type: none"> - Headache (mild, moderate, severe/migraine) - Seizures - Parkinsonism - Mental illnesses (psychotic illness)
Suggested Teaching or Learning Method

- | |
|---|
| <ul style="list-style-type: none"> a) Guide brainstorming sessions on central nervous system disorders and their presentations. b) Guide group/plenary discussions on the management of therapeutics of central nervous system disorders. c) Give interactive lectures on the management of central nervous system diseases. |
|---|

Sub-Topic 6.1.3: Management of Endocrine and Reproductive Diseases.

Competence(s)

- a) Understanding of therapeutics of endocrine and reproductive disorders.
- b) Appreciation of the correlation between knowledge of drugs and choice of treatment in patient care.

Content Outline

- a) Introduction to endocrine diseases:
 - Diabetes mellitus
 - Thyroid disorders
 - Adrenal gland disorders
 - Pituitary gland disorders
- b) Introduction to reproductive diseases:
 - Fertility disorders (male and female)
 - Uterine tumours (fibroids)
 - Endometriosis
 - Erectile dysfunction
 - Contraception (male and female)
 - Pregnancy and lactation

Suggested Teaching or Learning Method

- a) Guide brainstorming sessions on endocrine and reproductive disorders and their presentations.
- b) Guide group/plenary discussions on the management of therapeutics endocrine and reproductive disorders.
- c) Give interactive lectures on the management of endocrine and reproductive diseases.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, the Internet, formulary manuals, BP machines, thermometers

Materials for Further Reading

Greene, R. J., & Harris, N. D. (2008). *Pathology and Therapeutics for Pharmacists*. Pharmaceutical Press,

Harvey, R. A., Clark, M. A., Finkel, R., Rey, J. A., & Whalen, K. (2012). *Lippincott's Illustrated Reviews: Pharmacology* (Vol. 526, pp. 530-541). Philadelphia: Wolters Kluwer.

Katzung, B. G., Masters, S. B., & Trevor, A. J. (Eds.). (2004). *Basic & clinical pharmacology* (Vol. 8). New York, NY, USA: Lange Medical Books/McGraw-Hill.

PHA- 3202: PHARMACOLOGY (IV)

Duration: 75 Contact Hours

Learning Outcome

By the end of module unit, the learner should be able to understand the pharmacology of blood, inflammation, gout drugs, endocrine and reproductive systems.

Preparatory Activities

1. Develop and review lesson plans
2. Prepare lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials

6.2: Learning Working Assignment: Pharmacology (IV)

Sub-Topic 6.2.1: Blood, Inflammation and Gout Drugs

Competence(s)
a) Understanding of the drugs that act on blood. b) Appreciation of the effect of drugs used in management of blood disorders c) Understanding of drugs used in management of inflammation and gout d) Appreciation of the effect of drugs used in management of inflammation and gout
Content Outline
a) Blood drugs b) Overview of blood formation, composition and function (coagulation): <ul style="list-style-type: none"> - Anti-coagulants (oral and parenteral) - Anti-platelets - Fibrinolytic agents - Anti-fibrinolytic agents - Thrombolytic agents - Anti-thrombolytic agents - Erythropoietin, Vitamin B12 c) Pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above d) Inflammation and gout e) Overview of inflammation (classification, process and mediators) <ul style="list-style-type: none"> - Acute inflammation - Anti-histamines (H1-receptor blockers) - Autacoids - NSAIDS - Glucocorticoids - Chronic inflammation - Gold - Enzymes (rasburicase) - Glucocorticoids - Uricosuric agents - Anti-metabolites (allopurinol) - Amino acids f) Discussion of pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above
Suggested Teaching or Learning Method
a) Guide brainstorming sessions on; blood formation, composition and function (coagulation). b) Give interactive lectures on pharmacology of blood acting drugs

Sub-topic 6.2.2: Endocrine and Reproductive System Pharmacology

Competence(s)
a) Understanding of the pharmacology of the endocrine and reproductive system b) Appreciation of the effect and importance of the pharmacology of drugs of the endocrine and reproductive systems
Content Outline
a) Endocrine and reproductive system b) Overview of the endocrine system (glands, hormones including their classification, release, regulation and effects in the body) c) Anterior pituitary and hypothalamic hormone pharmacology d) Thyroid hormone pharmacology e) Pancreatic hormone pharmacology f) Gonadal hormone pharmacology g) Adrenal hormone pharmacology h) Posterior pituitary hormone (Oxytocin and Vasopressin) pharmacology: i) Drugs that affect hormone release, act on hormone receptors (agonists and antagonists) and enzymatic synthesis or breakdown of the hormones j) Pharmacodynamics, pharmacokinetics and adverse effects of each class of the drugs above
Suggested Teaching or Learning Method
a) Give interactive lectures on pharmacology of endocrine and reproductive systems. b) Guide group/plenary discussions on the composition and function of the endocrine and reproductive system. c) Give interactive lectures on pharmacology of the endocrine and reproductive system.

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, the Internet, formulary manuals, BP machines, thermometers

Materials for Further Reading

Greene, R. J., & Harris, N. D. (2008). *Pathology and Therapeutics for Pharmacists*. Pharmaceutical Press.

Harvey, R. A., Clark, M. A., Finkel, R., Rey, J. A., & Whalen, K. (2012). *Lippincott's Illustrated Reviews: Pharmacology* (Vol. 526, pp. 530-541). Philadelphia: Wolters Kluwer.

Katzung, B. G., Masters, S. B., & Trevor, A. J. (Eds.). (2004). *Basic & Clinical Pharmacology* (Vol. 8). New York, NY, USA: Lange Medical Books/McGraw-Hill.

Rang, H. P., Ritter, J. M., Flower, R. J., & Henderson, G. (2014). *Rang & Dale's Pharmacology: With Learner Consult Online Access*. Elsevier Health Sciences.

PHA-3203: PHARMACY PRACTICE (III)

Duration: 75 Contact Hours

Learning Outcome

By the end of module unit, the learner should be able to dispense medicines extemporaneously.

Preparatory Activities

1. Develop and review lesson plans
2. Develop lecture notes
3. Prepare discussion points
4. Prepare assessment and answer guides
5. Prepare audio-visual materials

6.3: Learning-Working Assignment: Dispensing Medicines Extemporaneously

PEX 6.3.1: Receiving Prescription

Competence(s)
a) Understanding prescriptions
Content Outline
a) Description of prescriptions b) Key components/parts of a prescription c) Types of prescriptions
Suggested Teaching or Learning Method
a) Brainstorming sessions on types of prescription b) Guided discussion on key components of a prescription c) Organise practical

PEX 6.3.2: Validating Prescription

Competence(s)
a) Understanding validation of prescriptions b) Ability to validate prescriptions
Content Outline
a) Valid prescription b) Procedure of validation prescriptions
Suggested Teaching or Learning Method
a) Organise guided discussions on validating prescriptions b) Organise practical.

PEX 6.3.3: Preparing Extemporaneous Medicines for Issue

Competence(s)
a) Understanding extemporaneous medicines b) Ability to prepare extemporaneous medicines
Content Outline
a) Methods of preparation of extemporaneous medicines b) Procedure of preparing extemporaneous medicines c) Condition of preparation
Suggested Teaching or Learning Method

- | |
|--|
| <ul style="list-style-type: none"> a) Hold brainstorming sessions on methods of preparations b) Guide learners in a discussion on procedure of preparation c) Organise illustrations on preparation for issue d) Organise practical. |
|--|

PEX 6.3.4: Packing Extemporaneous Medicines

Competence(s)

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|---|
| <ul style="list-style-type: none"> a) Ability to pack extemporaneous medicines b) Appreciate the importance and process of packing extemporaneous medicines |
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Content Outline

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|--|
| <ul style="list-style-type: none"> a) Types of packing materials for extemporaneous medicines b) Package conditions for extemporaneous medicines c) Procedures for packing extemporaneous medicines |
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Suggested Teaching or Learning Method

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| <ul style="list-style-type: none"> a) Organise brainstorming sessions on packaging conditions b) Hold guided discussions on types of packaging c) Organise illustrations on packing d) Organise practical. |
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PEX 6.3.5: Labelling Extemporaneous Medicines

Competence(s)

- | |
|---|
| <ul style="list-style-type: none"> a) Ability to name the contents of labels of containers for various extemporaneous medicines b) Ability to design appropriate labels for containers of various extemporaneous medicines c) Ability to write labels for containers of various extemporaneous medicines d) Appreciation of the need for correct and elegant labelling of containers for various extemporaneous medicines |
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Content Outline

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|---|
| <ul style="list-style-type: none"> a) Content of labels of containers for extemporaneous medicines b) Design of labels for containers of contemporaneous medicines c) Importance of elegant labelling of containers of contemporaneous medicines |
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Suggested Teaching or Learning Method

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|---|
| <ul style="list-style-type: none"> a) Hold brainstorming sessions on content of labels b) Give interactive lectures on labelling extemporaneous medicines c) Give practical exercises on labelling |
|---|

PEX 6.3.6: Recording Extemporaneous Medicines

Competence(s)

- | |
|---|
| <ul style="list-style-type: none"> a) Ability to classify records of extemporaneous medicines b) Ability to write records for extemporaneous medicines c) Appreciation of the need for keeping records |
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Content Outline

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|---|
| <ul style="list-style-type: none"> a) Types of records of extemporaneous medicines b) Period of keeping records c) Rationale of keeping records of extemporaneous medicines d) Safe custody of the records for extemporaneous medicines |
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Suggested Teaching or Learning Method

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| <ul style="list-style-type: none"> a) Organise brainstorming sessions on types of records b) Hold guided discussion safe custody of records c) Organise practical exercises |
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PEX 6.3.7: Issuing Extemporaneous Medicines with Appropriate Information

Competence(s)
a) Ability to issue extemporaneous medicines with appropriate information
Content Outline
a) Types of issues to out-patient and to in-patient b) Procedure and manner of issuing extemporaneous medicines: - To an out-patient - To an in-patient c) Importance of humanity and accuracy in issuing extemporaneous medicines d) Accuracy of information relating to the medicines issued
Suggested Teaching or Learning Method
a) Organise brainstorming sessions on issuing of medicines b) Hold guided discussions on manner of issuing c) Organise field visits to health units on

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/ Learning Resources

Textbooks, visual aids, models, internet, computers

Further Reading

- Baird, R. M., Hodges, N. A., & Denyer, S. P. (Eds.). (2003). *Handbook of Microbiological Quality Control in Pharmaceuticals and Medical Devices*. CRC Press.
- Hatson, D. G. (2012). *Pharmaceutical Analysis, A Textbook for Pharmacy Learners and Pharmaceutical Chemists, 3: Pharmaceutical Analysis*. Elsevier Health Sciences.
- Stone, P., & Curtis, S. J. (2002). *Pharmacy Practice*. London: Pharmaceutical Press.
- Thompson, J. E., & Davidow, L. W. (2004). *A Practical Guide to Contemporary Pharmacy Practice* (Vol. 1). Lippincott Williams & Wilkins.
- Wichtl, M. (2004). *Herbal Drugs and Phytopharmaceuticals: A Handbook for Practice on a Scientific Basis*. CRC press.
- Winfield, A. J., Rees, J., & Smith, I. (Eds.). (2009). *Pharmaceutical Practice*. Elsevier health sciences.

PHA-3204: PHARMACY LAWS AND REGULATIONS

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to manage a pharmaceutical outlet in accordance with established regulations (pharmacy laws and regulations).

Preparatory Activities

1. Prepare discussion points
2. Prepare lecture notes
3. Prepare assessment and answer guides
4. Prepare audio-visual materials
5. Develop and review lesson plans

6.4: LWA: Managing Pharmaceutical Outlets in Accordance with Established Regulations (Pharmacy Laws and Regulations)

PEX 6.4.1: Introduction to Pharmaceutical Law and Regulations

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the pharmacy laws and regulations in the practice of pharmacy b) Ability to implement pharmacy laws and regulations c) Demonstrate respect of pharmacy laws and regulations
Content Outline
<ul style="list-style-type: none"> a) Definition of: <ul style="list-style-type: none"> - Pharmacy - Law - Regulations b) Types of pharmacy laws and regulations c) Classification of drugs d) Description of pharmacy law and regulations relating to each class of drugs e) Importance of having different laws relating to each class of drug f) Law enforcement
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Organise brainstorming sessions on classification of drugs b) Hold interactive lectures on pharmacy laws c) Organise discussions on law enforcement d) Make field visits to pharmaceutical units.

PEX 6.4.2: Establishing Suitability of Premises and Locations

Competence(s)
<ul style="list-style-type: none"> a) Understanding of how to establish suitability of premises and locations b) Ability to identify a suitable location for a pharmaceutical premise c) Ability to establish a suitable pharmaceutical premise d) Appreciation of the importance of having suitable pharmaceutical premises and locations
Content Outline
<ul style="list-style-type: none"> a) Definition of the terms: <ul style="list-style-type: none"> - Location - Suitability b) Criteria for choosing a location for a pharmaceutical premise

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| <ul style="list-style-type: none"> c) Types of pharmaceutical premises d) Characteristics of a good pharmaceutical premise e) Importance of having: <ul style="list-style-type: none"> - Suitable location for a pharmaceutical premise - A suitable pharmaceutical premise |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Hold brainstorming sessions on types of pharmaceutical premises b) Give interactive lectures on establishment of pharmacy premises c) Organise discussions on characteristics of good pharmacy premises d) Make field visits to health units. |
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6.5 LWA: Starting a Pharmacy Business (Project)

PEX 6.5.1: Preparing Premises for a Pharmacy Business

Competence(s)

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|---|
| <ul style="list-style-type: none"> a) Understanding of the setting up of a pharmacy business premise b) Ability to prepare premises for a pharmaceutical business c) Appreciation of the importance of preparing premises for a pharmaceutical business. |
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Content Outline

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| <ul style="list-style-type: none"> a) Dispensing area b) Cleanliness c) Worktops and front desks d) Storage space/ cold rooms e) Ambience f) Locking provisions g) Labelling h) Disposal containers i) Well lit, air and temperature controlled store j) Pharmacy furniture |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on pharmacy premise. b) Brainstorming sessions on identifying a suitable pharmacy premise. c) Hold group discussions on cleanliness of pharmacy premise |
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PEX 6.5.2: Compiling Documentation for a Pharmacy Business

Competence(s)

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|---|
| <ul style="list-style-type: none"> a) Understanding of the documentation in pharmaceutical business b) Ability to compile documents for a pharmaceutical business c) Appreciation of the importance of compiling documents for a pharmaceutical business |
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Content Outline

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| <ul style="list-style-type: none"> a) Qualification certificates b) Registration certificates c) Certificates of suitability of premises d) Trading license e) Tax clearance certificate f) Stock inventory g) Sales record h) Bank accounts' and statements i) Audited accounts record j) Reward certificates |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on documentation of a pharmacy business. b) Organise brainstorming session on the types of documents needed for running a pharmacy business. c) Hold group discussions on stock inventory |
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PEX 6.5.3: Stocking a Pharmacy Business

Competence(s)

- a) Understanding of the concept of stocking a pharmaceutical unit
- b) Ability to stock a pharmaceutical business
- c) Appreciation of stocking pharmacies

Content Outline

- a) Stock rotation
- b) Stock outs
- c) Survey of regular needs of the clients
- d) Consulting with pharmaceutical manufacturers
- e) Making specifications
- f) Placing purchase orders
- g) Receiving and verifying products
- h) Storing products
- i) Promoting new products

Suggested Teaching or Learning Method

- a) Give interactive lectures on stocking a pharmacy business.
- b) Organise brainstorming sessions on making drug/medication specifications.
- c) Hold group discussions on stock rotation.

PEX 6.5.4: Serving Customers in a Pharmacy Business

Competence(s)

- a) Understanding of concept of customer service
- b) Ability to serve customers satisfactorily
- c) Appreciation of the value of serving customers satisfactorily

Content Outline

- a) Advertising new products
- b) Positive talking notices
- c) Customer language
- d) Use of gifts
- e) Discounts
- f) Professional ethics

Suggested Teaching or Learning Method

- a) Give interactive lectures on customer service.
- b) Hold brainstorming sessions on customer language
- c) Organise group discussions on profession ethics
- d) Organise role-plays on serving customers

PEX 6.5.5: Providing Feedback to Customer

Competence(s)

- a) Understanding of the concept of customer feedback
- b) Ability to offer feedback to a customer
- c) Appreciation of the importance of providing customer feedback

Content Outline

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|--|
| a) Messages of appreciation
b) Concept of feedback
c) Provision of video testimonies on the successful undertakings
d) Process of providing feedback |
| Suggested Teaching or Learning Method |
| a) Give interactive lectures on the concept of feedback.
b) Organise group discussions on the importance of providing feedback to customers.
c) Organise role-plays on providing feedback to customers |

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, models, internet, computers, stationery, printer, laws

Further Reading

Fisher, J. (2006). *Pharmacy Law and Practice*. Elsevier Science & Technology.

Merrills, J., & Fisher, J. (2013). *Pharmacy Law and Practice*. Academic Press

Uganda Allied Professional Act (1996)

Uganda National Policy and Drug Act (1993)

PHA-3205: RESEARCH REPORT

Duration: 30 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to write a research report.

Preparatory Activities

1. Prepare discussion points
2. Prepare assessment and answer guides
3. Prepare discussion notes
4. Prepare lecturer notes
5. Develop and review lesson plans
6. Prepare visual and audiovisual materials
7. Organise field visits
8. Prepare case studies

6.6: Learning Working Assignment: Writing a Research Report

PEX 6.6.1: Writing a Research Report

Competence(s)
a) Understanding of the outline of the research report b) Ability to communicate orally and graphically c) Appreciation of the importance of research report writing d) Understanding of how to publish a research report e) Appreciation of the importance of research publication
Content Outline
a) Introduction to research report writing b) Content of a research report c) Presentation of research data (e.g. narrative, tabular, graphics) d) Interpretation of research data (graphic, statistical, pictorial, etc.) e) Discussion of research data f) Conclusion and recommendation of a research report g) Referencing of research reports (listing and format APA, Harvard, etc.) h) Appendices/annexes (tools, letters maps/pictures etc.) i) Formatting and editing a research report (heading/sub-heading, spell check, paging, tabulating) j) Writing a publication of a research for thesis, journal, book etc.) k) Introduction to research publication l) Importance of publishing a research m) Identification of a publisher of a research (journal, book, etc.) n) Preparation of a research for publication for thesis, newspaper, journal, magazine, etc.)
Suggested Teaching or Learning Method
a) Give interactive lectures on research report writing. b) Organise tutorials on research report writing. c) Organise assignments on how to write research report.

PEX 6.6.2: Presenting/Defending a Research Report

Competence(s)
a) Understanding of presenting a research report b) Ability to present a research report c) Appreciation of the importance of presentation/ defence of a research report
Content Outline

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|---|
| <ul style="list-style-type: none"> a) Introduction to research presentation and defending b) Presentation of research reports e.g. using PowerPoint, poster, etc. c) Presentation skills of a research report d) Preparation of a research presentation for defence, conference, workshop, etc. e) PowerPoint presentation of a research report f) Evaluation of a research presentation g) Presenting a research report |
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Suggested Teaching or Learning Method
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| <ul style="list-style-type: none"> a) Give interactive lectures on presenting a research report. b) Organise tutorials on presenting a research report. c) Organise role plays of presenting a research report. |
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Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

Textbooks, visual aids, stationery, calculator, computer, printer, the Internet

Materials for Further Reading

ESTC -EPHA/CDC PROJECT (2004). *Development in Primary Health Care* (1998). Ethical Considerations in Research Focus Training Modules on Health Research.

Mathers, N. J., Howe, A., & Hunn, A. (1998). *Ethical Considerations in Research*. NHS Executive, Trent.

Walker, D. M. (2014). *An Introduction to Health Services Research: A Practical Guide*. Sage.

PHA-3206: ENTREPRENEURSHIP

Duration: 45 Contact Hours

Learning Outcome

By the end of this module unit, the learner should be able to establish and run a pharmaceutical enterprise (business) as per legal requirements.

Preparatory Activities

1. Prepare case studies
2. Organise enterprise visits
3. Develop and review lesson plans
4. Prepare lecture notes
5. Prepare e-learning material

6.7: Learning Working Assignment: Developing Enterprise Plans

PEX 6.7.1: Developing a Business Plan

Competence(s)
<ul style="list-style-type: none"> a) Understanding of a business plan b) Ability to develop a business plan c) Identify the types of entrepreneurs d) Exhibit qualities of a good entrepreneur
Content Outline
<ul style="list-style-type: none"> a) Developing an entrepreneurial attitude <ul style="list-style-type: none"> - Meaning of entrepreneurship - Qualities of an entrepreneur - Entrepreneurial ethics b) Registering a business enterprise: <ul style="list-style-type: none"> - Process of registering a pharmaceutical business - Requirements for registering of a pharmaceutical business c) Laws and guidelines of registering d) Forms of small business ownership (sole proprietorship and partnership) e) Uses of a business plan f) Components of a business plan g) Writing a simple business plan
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on developing a business plan. b) Organise brainstorming sessions on qualities of an entrepreneur. c) Hold group discussions on registering a business.

PEX 6.7.2: Developing a Marketing Plan

Competence(s)
<ul style="list-style-type: none"> a) Understanding of a marketing plan b) Ability to develop a marketing plan
Content Outline
<ul style="list-style-type: none"> a) Market survey b) Marketing mix (price, place, people, product -4Ps) c) Sales promotion d) Uses of a marketing plan e) Components of a marketing plan f) Writing a simple marketing plan

Suggested Teaching or Learning Method

- a) Give interactive lectures on developing a marketing plan.
- b) Organise brainstorming sessions on sales promotion.
- c) Hold group discussions on marketing mix.

PEX 6.7.3: Developing a Resource Mobilization Plan**Competence(s)**

- a) Understanding of a resource mobilisation plan
- b) Ability to develop a resource mobilisation plan

Content Outline

- a) Sources of funds
- b) Reporting in resource mobilisation
- c) Dealing with funders
- d) Institution/enterprise integrity
- e) Donor search
- f) Mobilising business resources
- g) Financial resources
- h) Human resources
- i) Plant, machinery and equipment
- j) Saving culture, trustworthiness and investment from small to big

Suggested Teaching or Learning Method

- a) Give interactive lectures on dealing with funders.
- b) Hold brainstorming sessions on types of resources.
- c) Organise group discussions on the process of mobilising resources.

PEX 6.7.4: Developing a Procurement Plan**Competence(s)**

- a) Understanding of a procurement plan
- b) Ability to develop a procurement plan

Content Outline

- a) Procurement planning
- b) Defining requirements and specifications
- c) Developing budget, guaranteeing funding and making requisitions
- d) Procurement process
- e) Plan procurement
- f) Developing bidding documents and invitation offers
- g) Selecting suppliers and signing contract
- h) Procurement performance
- i) Monitoring supply performance
- j) Conducting meetings with suppliers and sealing the difference/resolving on problems faced
- k) Issuing payment certificates and paying
- l) Reviewing the performance
- m) Resolving conflicts/ misunderstandings
- n) Payment certificates
- o) Reporting

Suggested Teaching or Learning Method

- a) Give interactive lectures on developing a procurement plan.
- b) Organise brainstorming sessions on the procurement process.
- c) Hold group discussions on procurement performance

PEX 6.7.5: Developing a Recruitment Plan

Competence(s)
a) Understanding of a recruitment plan b) Ability to develop a recruitment plan
Content Outline
a) Analysis of enterprise personnel demands and planned expansions b) Equal employment opportunity c) Staff performance evaluations/ appraisals d) Analysis of job descriptions
Suggested Teaching or Learning Method
a) Give interactive lectures on recruitment planning. b) Hold brainstorming sessions on analysing personnel demands. c) Organise group discussions on analysing job description

6.8: LWA: Generating Financial Documents**PEX 6.8.1: Generating a Budget**

Competence(s)
a) Understanding of a budget b) Ability to develop a budget
Content Outline
a) Summarising a business plan b) Enterprise vision, mission and objectives c) Outline of basic strategies d) Outline of action plan e) Choosing a fiscal year f) Budgeting g) Keeping costs for materials, labour and operations as low as possible h) Providing an amount for uncertainties i) Predetermining a realistic profitability period j) Taxes and other legal obligations k) Licences, registration and other taxes l) Limiting running costs as much as possible m) Keeping business money different from personal finance n) Generating total amount for the enterprise and implementing budget
Suggested Teaching or Learning Method
a) Give interactive lectures on budgeting. b) Organise brainstorming sessions on components of a budget. c) Hold group discussions on enterprise vision, mission and objectives d) Organise practice on budgeting

PEX 6.8.2: Generating Books of Accounts (Journals and Cash Books)

Competence(s)
a) Understanding of books of accounts b) Ability to generate books of accounts
Content Outline
a) Recording transactions b) Journals c) Cash books
Suggested Teaching or Learning Method

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|---|
| <ul style="list-style-type: none"> a) Give interactive lectures books of accounts b) Organise brainstorming sessions on types of books of accounts c) Hold group discussions on uses of cash books |
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PEX 6.8.3: Generating Source Documents (Invoice, Vouchers, Receipts, LPOs, Petty Cash and Ledgers)

Competence(s)
<ul style="list-style-type: none"> a) Understanding of source documents b) Ability to generate source documents
Content Outline
<ul style="list-style-type: none"> a) Types of source documents: <ul style="list-style-type: none"> - Invoices - Vouchers - Receipts - LPOs - Petty cash books - Ledger books b) Components of each source document c) Function and application of each type of source document d) Correlation among the source documents
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on source documents. b) Organise a brainstorming session on types of source documents c) Hold group discussions on the relevance of the different types of source documents

PEX 6.8.4: Generating Accounting Statements (Income Statements, Balance Sheets and Bank Reconciliations)

Competence(s)
<ul style="list-style-type: none"> a) Understanding of accounting statements b) Ability to generate accounting statement
Content Outline
<ul style="list-style-type: none"> a) Simple income statement b) Simple balance sheet c) Simple cash flows d) Bank reconciliations e) Accounting statements
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on .generation of accounting statement b) Organise brainstorming sessions on balance sheet c) Hold group discussions on generating bank reconciliations

6.9: LWA: Conducting Marketing Operations

PEX 6.9.1: Conducting Market Research

Competence(s)
<ul style="list-style-type: none"> a) Understanding of methods used in conducting market research b) Ability to develop survey tools, guides and plan, analyse and interpret market survey data c) Ability to conduct market, product, security, row material and labour survey d) Appreciation of the need for conducting market research

Content Outline
<ul style="list-style-type: none"> a) Market, product, security survey b) Raw materials and environmental survey c) Skilled and unskilled labour survey d) Product cultural conformity survey
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on market research b) Hold brainstorming sessions on product surveys

PEX 6.9.2: Marketing Pharmaceutical Products

Competence(s)
<ul style="list-style-type: none"> a) Knowledgeable about marketing processes and procedures b) Ability to carry out marketing of products c) Appreciation of the importance of marketing products
Content Outline
<ul style="list-style-type: none"> a) Marketing mix (price, place, people, product -4Ps) b) Sales promotion c) Product distribution d) Feed back
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on marketing pharmaceutical products. b) Hold brainstorming sessions on sales promotion. c) Organise group discussions on product distribution

PEX 6.9.3: Advertising Pharmaceutical Products

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concepts, procedures and processes undertaken in advertising. b) Ability to advertise pharmaceutical products c) Appreciation of the impact of advertisement in the marketing of products.
Content Outline
<ul style="list-style-type: none"> a) Brochures/flyers b) Radio and TV announcements and displays c) Product promotions d) Ethical concerns
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on the concept of advertising. b) Organise brainstorming sessions on product promotions. c) Organise role-plays on advertising products

PEX 6.9.4: Branding Products

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concept of branding products b) Ability to brand pharmaceutical products c) Appreciation of the relevancy and impact of branding products
Content Outline
<ul style="list-style-type: none"> a) Product stickers b) Product seals c) Trademarks and logos

d) Contacts and correspondences

Suggested Teaching or Learning Method

- a) Give interactive lectures on the concept of branding.
- b) Hold brainstorming sessions on product seals
- c) Organise group discussions on trademarks and logos

PEX 6.9.5: Observing Good Customer Care Operations

Competence(s)

- a) Understanding of the concept of customer care
- b) Ability to offer good customer care
- c) Appreciation of the relevancy and importance of observing customer care operations in business

Content Outline

- a) Customer language
- b) Use of gifts
- c) Discounts

Suggested Teaching or Learning Method

- a) Give interactive lectures on customer care.
- b) Hold brainstorming sessions on customer language
- c) Organise group discussions on use of gifts

6.10. LWA: Communicating with Others

PEX 6.10.1: Writing Curriculum Vitae

Competence(s)

- a) Knowledgeable about the constituents of a curriculum vitae (CV)
- b) Ability to write curriculum vitae
- c) Appreciation of the information provided on a curriculum vitae and its relevance

Content Outline

- a) Parts of a curriculum vitae
- b) Formatting a curriculum vitae

Suggested Teaching or Learning Method

- a) Give interactive lectures on writing a CV
- b) Hold brainstorming sessions on the key components of a CV.

PEX 6.10.2: Writing Minutes of a Meeting

Competence(s)

- a) Understanding of writing minutes
- b) Ability to writes minutes of a meeting
- c) Appreciation of the importance and requirements of writing minutes of a meeting

Content Outline

- a) Agenda of the meeting
- b) Types of minutes:
 - Official minutes
 - Loose minutes
- c) Minutes format

Suggested Teaching or Learning Method

- a) Give interactive lectures on writing minutes of a meeting.
- b) Hold brainstorming sessions on the challenges in writing minutes.

PEX 6.10.3: Writing Technical Reports

Competence(s)
<ul style="list-style-type: none"> a) Understanding of writing technical reports b) Ability to write technical reports c) Appreciation of the relevance of writing technical reports
Content Outline
<ul style="list-style-type: none"> a) Types of reports (Field vs. Activity) b) Parts of a report c) Language used in report writing d) Binding and sending a report
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on writing a technical report. b) Hold brainstorming sessions on the key components of a technical report. c) Organise practice sessions.

PEX 6.10.4: Writing Business Letters

Competence(s)
<ul style="list-style-type: none"> a) Understanding of writing business letters b) Ability to write a business letter c) Appreciation of the importance of writing business letters
Content Outline
<ul style="list-style-type: none"> a) Types of business letters b) Parts of a business letter c) Format of business letters d) Language used when writing business letters
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on writing a business letters. b) Hold brainstorming sessions on composition of a business letter.

PEX 6.10.5: Writing Seminar/Conference/Workshop Papers

Competence(s)
<ul style="list-style-type: none"> a) Understanding of writing seminar/conference papers b) Ability to write seminar/conference/ workshop papers c) Appreciation of the importance of writing seminar/ conference papers
Content Outline
<ul style="list-style-type: none"> a) Types of seminar papers b) Formats for seminar papers c) Ethical concerns
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on presenting conference/ workshop papers. b) Hold group discussions on the format of conference/ workshop papers. c) Organise practise sessions.

PEX 6.10.6: Presenting Papers in Conferences/Seminars

Competence(s)
<ul style="list-style-type: none"> a) Understanding of presenting seminar/ conference papers b) Ability to make paper presentations at seminars/ conferences c) Observes the ethical code of conduct before and during seminar paper presentations

Content Outline
<ul style="list-style-type: none"> a) Edit seminar papers b) Materials and equipment for paper presentations c) Presentation styles d) Ethical code observed
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on presenting conference papers. b) Organise role-plays on presenting conference papers

PEX 6.10.7: Chairing Meetings

Competence(s)
<ul style="list-style-type: none"> a) Understanding of chairing meetings b) Ability to chair and guide a meeting c) Appreciation of the role of other members/ stakeholders in a meeting
Content Outline
<ul style="list-style-type: none"> a) Executive membership b) Role of chairperson c) Roles of members d) Agenda e) Invitation for meetings f) Types of meetings
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on chairing a meeting. b) Organise role-plays on chairing a meeting

PEX 6.10.8: Building Rapport

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concept of building rapport b) Ability to create rapport c) Appreciation of the relevancy of creating rapport
Content Outline
<ul style="list-style-type: none"> a) Conduct while in public b) Language used when communicating to teammates, general public, superiors, peers, children and elderly c) Ethical behaviour d) Gender consideration in day-to-day life e) Motivation f) Outreach g) Support contribution h) Teamwork
Suggested Teaching or Learning Method
<ul style="list-style-type: none"> a) Give interactive lectures on the concept of building rapport. b) Hold brainstorming sessions on the importance of building rapport. c) Organise group discussions on challenges in building rapport.

PEX 6.10.9: Providing Empathy

Competence(s)
<ul style="list-style-type: none"> a) Understanding of the concept of empathy

- b) Ability to offer empathy to others
- c) Appreciation of the importance of offering empathy

Content Outline

- a) Support contributions
- b) Volunteer counselling
- c) Effects/impact of providing empathy

Suggested Teaching or Learning Method

- a) Give interactive lecture on the concept of empathy.
- b) Hold brainstorming sessions on volunteer counselling
- c) Organise role-plays on providing empathy

PEX 6.10.10: Speaking Eloquently**Competence(s)**

- a) Have an understanding of public speaking
- b) Ability to speak eloquently to a given group.
- c) Appreciate the importance of selecting words and sentences to be used when speaking and making presentations

Content Outline

- a) Selection of words and sentences for a particular group
- b) Public speaking and presentations
- c) Debates
- d) Ethical behaviour

Suggested Teaching or Learning Method

- a) Organise brainstorming sessions on how to speak eloquently.
- b) Hold group discussions on ethical behaviour
- c) Organise role-plays on speaking eloquently

PEX 6.10.11: Presenting Self**Competence(s)**

- a) Ability to present self
- b) Appreciation of the impact of presenting self positively

Content Outline

- a) Dressing code and make up
- b) The role of self-introduction
- c) Approaches applied during self-introduction
- d) Communication medium or materials
- e) Phrases used during introduction

Suggested Teaching or Learning Method

- a) Hold demonstrations on presenting self
- b) Organise role-plays on presenting self

PEX 6.10.12: Creating a Work Friendly Environment**Competence(s)**

- a) Understanding of creating work friendly environment
- b) Ability to create work friendly environment
- c) Appreciation of the importance of creating work friendly environment

Content Outline

- a) Regular meetings

- | |
|---|
| <ul style="list-style-type: none"> b) Limiting the reporting hierarchy c) Providing feedback and accountability d) Rewarding teammates for good work e) Supporting teammates when in need (teamwork) f) Equal treatment of all workers |
| Suggested Teaching or Learning Method |
| <ul style="list-style-type: none"> a) Hold brainstorming session on creating work friendly environment. b) Organise group discussions on indicators of a friendly work environment |

Assessment

- **Progressive (30%):** assignments, group work, written test, quick checks, etc.
- **Summative/Semester (70%):** final examination (practical and written)

Required Teaching/Learning Resources

The Internet, computer and projector, sample suggestion box, sample appreciation messages, stationery, calculator

Materials for Further Reading

Bessant, J. & Tidd, J. (2007). *Innovation and Entrepreneurship*. John Wiley & Sons.

Chisholm-Burns, M. A., Vaillancourt, A. M., & Shepherd, M. (2012). *Pharmacy Management, Leadership, Marketing and Finance*. Jones & Bartlett Publishers.

Drucker, P. (2014). *Innovation and entrepreneurship*. Routledge.

Tootelian, D. H., Wertheimer, A. I., & Mikhailitchenko, A. (2012). *Essentials of Pharmacy Management*. Pharmaceutical Press.

Zhao, F. (Ed.). (2006). *Entrepreneurship and Innovations in E-Business: An Integrative Perspective*. IGI Global.

Zimmerer, T., Scarborough, N. M., & Wilson, D. (2005). *Essentials of Entrepreneurship and Small Business Management*. Pearson/Prentice Hall.

List of Participants and Resource Persons

TEACHERS' GUIDE DEVELOPMENT WORKSHOPS

Occupation : Diploma in Pharmacy

Venue : Sports View Hotel, Kireka (18 July – 23 September 2016)

Facilitators : Mr Joshua Kunya, Ms Deborah Asikeit Tumusiime, Rapporteur: Ms C. Nekesa

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