REPUBLIC OF KENYA

MINISTRY OF HEALTH

PHARMACY AND POISONS BOARD

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GUIDELINES FOR EVALUATION AND ASSESSMENT

FOR REGISTRATION OF PHARMACISTS

2013

Published by the Pharmacy and Poisons Board
Lenana Road, P.O. Box 27663-00506, Nairobi, KENYA

First Edition 1999

Second Edition 2007

Third Edition 2013

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FOREWORD

The mission of the Pharmacy and Poisons Board is to ensure the availability of quality pharmaceutical services in Kenya. These services must satisfy the requirements of all for the prevention, diagnosis and treatment of diseases using safe, quality, efficacious, and cost effective pharmaceutical products.

The attainment of the mission and its objectives requires critical mass of well trained and ethical pharmaceutical personnel of whom Pharmacists form a significant group.

The "**Guidelines for Evaluation and Assessment for a Pharmacist**" was first published in 1999 by the Pharmacy and Poisons Board (PPB) to outline the criteria and prerequisite for registration as a Pharmacist in Kenya. However, a lot of changes have been seen in the legal, regulatory, training and practice environment over the years. These have necessitated the review of the guidelines and hence the publication of this version of the "**Guidelines for Assessment and Evaluation for Registration of Pharmacists**."

The development and review of these guidelines has been a big achievement for the Board in the implementation of assessing the competencies acquired by Pharmacists during training. They form part of the standards harmonization efforts. The achievement of success and quality in training and practice of Pharmacists as contemplated by the Board requires active participation of all stakeholders.

Dr. Kipkerich C. Koskei, OGW
REGISTRAR, PHARMACY AND POISONS BOARD

ACKNOWLEDGEMENT

The Pharmacy and Poisons Board acknowledges the pioneer members of Training and Assessment Committee of the Board for their hard work in the research and compilation of the earlier editions, namely; Prof Gichuru Muriuki, Dr Raju Vaghella, Dr Julius Ombogo, Dr Charles Kandie, Dr. K.A.M Kuria, Dr. James Ombega, Dr. E. F. Odhiambo, Dr. Julius Ombogo, Dr. A. Mohamed, Dr Nelly Rangara, Dr Obadiah Naikuni, Mr. G. M. Kitala, Mr. Alex Ochieng, Mr. Erastus Ndubi, Mrs. Dorcas Too and Mr. Joshua Plekwa.

Special gratitude is extended to the current Pharmacy and Poisons Board Training and Assessment Committee, the Training and Assessment Technical Committee as well as the members of the secretariat for the tireless work put in place in this edition.

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EXECUTIVE SUMMARY

These reviewed guidelines outline the prerequisite for registration of Pharmacists in Kenya. The Guidelines for Evaluation and Assessment for Registration of Pharmacists lists the basic academic requirements to be met by candidates before application. The documentation requirements are also listed herein.

The professional examination for the assessment of a pharmacist has been split into two parts; Stage I and Stage II. The Stage I examination examines the candidates in the basic medical and pharmaceutical sciences. This is administered before candidates proceed for a compulsory one year internship program. The Stage II examination is administered after the successful completion of internship and examines the candidate's knowledge of applied clinical and pharmaceutical sciences. The candidate is also examined on the relevant laws and ethics that govern the practice of pharmacy.

Upon successful completion of both stages of evaluation and assessment, the applicant will qualify to apply to be considered for registration as a pharmacist in Kenya.

LIST OF ABBREVIATIONS

CNS	Central Nervous System
CUE	Commission for University Education
FIP	International Pharmaceutical Federation
GCE	General Certificate of Education
GLP	Good Laboratory Practices
GMP	Good Manufacturing Practices
ICT	Information and Communication Technology
KCSE	Kenya Certificate of Secondary Education
KPA	Kenya Pharmaceutical Association
MCQ	Multiple Choice Question
PPB	Pharmacy and Poisons Board
PSK	Pharmaceutical Society of Kenya
QSAR	Quantitative Structure-Activity Relationship
SAQ	Short Answer Question
SAR	Structure-Activity Relationship
UV	Ultra-Violet

DEFINITION OF TERMS

Accreditation standards: The minimum requirements as outlined in the Pharmacy and Poisons Board Accreditation Framework for Institutions to offer Pharmacy Degree Programmes in Kenya.

Approved Preceptor: A pharmacist approved by the board to be responsible for supervision of a person undertaking internship as part of the process leading to registration as a pharmacist in Kenya.

Assessment: The measurement of an applicant's competencies and fitness to practice as a pharmacist in Kenya.

Attachment: The placement of a trainee in an area of practice to gain experience during the training period.

Candidate Status: A status awarded to a new Bachelor of Pharmacy programme that has taken into account the Board's accreditation standards, has students enrolled but has not had a graduating class.

Certified Document: A document that has been certified as true copy of the original by the issuing institution or any other legal authority.

Charter class: The first class that is enrolled into a new Bachelor of Pharmacy programme or its equivalent after Pre-candidate status.

Equivalent Degree: A degree that has essentially similar entry requirements, content and duration of training as that of the Bachelor of Pharmacy Degree curriculum recommended by the Board.

Evaluation: The scrutiny of an applicant's testimonials to determine if they meet the Board's eligibility criteria for assessment as a pharmacist.

Examiner: A person appointed by the board to set, administer and mark Board examinations.

Full accreditation status: A status awarded to a Bachelor of Pharmacy program which has gone through the pre-candidate and candidate statuses and demonstrated to the satisfaction of the Pharmacy and Poisons Board that the programme complies with accreditation standards and guidelines, including the appropriateness of program mission, the adequacy of resources and organization to meet its mission, the demonstration of training outcomes of the charter class which indicate that the mission is being met, and the reasonable assurance of the continued meeting of its mission.

Indexing: Issue of identifying number by PPB to students undertaking Bachelor of Pharmacy training in approved institutions.

Internship: A one year structured training program carried out under the supervision of a PPB approved preceptor, during which a graduate has an opportunity to consolidate his/her knowledge and skills to enable him/her to be a competent pharmacist in Kenya.

Pre-candidate Status: A status awarded to a new Bachelor of Pharmacy program that has has taken into account PPB standards and suggests reasonable assurances of compliance, but has no students enrolled.

Registration: The entry into the Register of Pharmacists of a person who has been certified as fit to practice as a pharmacist in Kenya.

The Board: The Pharmacy and Poisons Board (PPB).

1. ELIGIBILITY CRITERIA FOR ASSESSMENT AND EVALUATION

1.1 Academic Qualifications

The Pharmacy and Poisons Board (herein after referred to as "the Board" or PPB) recognizes holders of at least a Bachelor of Pharmacy degree (or its equivalent) from any university that the Board recognises. An acceptable Bachelor of Pharmacy programme should cover not less than 5850 contact hours (See annex III). Evaluation of applications will be carried out to confirm that all candidates applying for pre-registration examinations meet the above and the following minimum entry requirements:

1.2 Minimum Entry Requirements

Candidates applying to sit stage I of the pre-registration exams must have met the minimum university entry requirements for the Pharmacy degree course in Kenya or its equivalent which are:-

1.2.1 **8.4.4 System of Education (KCSE)**

Applicants must have obtained a minimum of a mean grade of C+ and an average cluster weight of B- in the subjects shown below provided that no subject in this cluster shall have a grade below C+:

Alternative A	**Alternative B**
Chemistry	Biological sciences
Biology	Physical sciences
Mathematics/ Physics	Mathematics
English/ Kiswahili	English / Kiswahili

1.2.2 **G.C.E/A-Level**

A minimum of two principal passes (in Biology and Chemistry) and a subsidiary pass or credit at 'O' level in Physics or Mathematics.

Subject	**Minimum Score**
Biology	Principal
Chemistry	Principal
Physics / Mathematics	Subsidiary pass
General paper	Subsidiary pass

1.2.3 **Diploma in:**

a. Pharmaceutical Technology
b. Laboratory Technology
c. Clinical Medicine
d. Imaging and Radiography
e. Nursing
f. Public Health / Environment Health
g. Dental Technology
h. Any other acceptable diploma in life sciences

Holders of the above diplomas must have met the following entry requirements:

I. A mean grade of C plain in KCSE with a minimum score of C plain in each of the cluster subjects below and a credit in KNEC qualifying examinations or its equivalent.

Alternative A	**Alternative B**
Chemistry	Biological sciences
Biology	Physical sciences
Mathematics/ Physics	Mathematics
English/ Kiswahili	English / Kiswahili

OR

II. A minimum of Division II in KCE (O-Level) with credit in the following:

Alternative A	**Alternative B**
Chemistry	Biological sciences
Biology	Physical sciences
Mathematics/ Physics	Mathematics
English/ Kiswahili	English / Kiswahili

1.2.4 **Holders of any degree in Biological and Life Sciences from an institution recognized by the Board so long as they meet the minimum entry requirements.**

1.3 Language Proficiency

Applicants from non-English speaking countries must have sat and passed an English language assessment examination set and administered by institutions recognized by the Board.

1.4 Indexing of candidates

In addition to the above, candidates should have been indexed as follows:

1.4.1 For Kenyan applicants: at the time of admission into the Pharmacy program at the training institution.
1.4.2 For non-Kenyan applicants: before application to sit the pre-registration examinations.

2. APPLICATION PROCEDURE

2.1 Application for Stage I examinations

Candidates who meet the above eligibility criteria may apply to sit for Stage I examinations

2.2 Exemption from Stage I examinations

The Board may exempt candidates from PPB accredited institutions which meet the following set criteria:

2.2.1 The institution shall have offered candidates to sit for Stage I Examinations for at least three calendar years consecutively from the date of full accreditation of its Bachelor of Pharmacy degree program by the Board.
2.2.2 The institution must meet the minimum accreditation standards for offering the course for at least three consecutive years.
2.2.3 The candidates from these institutions must have had an overall pass rate of at least 75% in stage I examinations for at least three consecutive years.
2.2.4 An institution that does not maintain an overall pass rate of at least 75% for **3** consecutive years in stage II examinations after exemption and / or fails to maintain the Board's minimum accreditation standards for three consecutive years will be liable to reversion to Stage I examinations.

2.3 Application for Stage II examinations

In addition to qualifying to sit for pre-registration examinations as for stage I above, candidates applying to sit for stage II examinations shall have;

2.3.1 Passed or have been exempted from stage I examinations as in Section 2.2 above.
2.3.2 Successfully completed the mandatory one (1) year supervised internship program as prescribed by the Board.

2.4 Mode of Application

A candidate who meets the eligibility criteria above should obtain the Application Form for Evaluation and Assessment for Registration of Pharmacists from the Registrar, Pharmacy and Poisons Board or download the same from www.pharmacyboardkenya.org and shall be required to:

i. Pay a prescribed non-refundable evaluation fee upon submission of the form to the Board.
ii. Submit a duly filled and completed Application Form at least three (3) months before the examinations date to:

The Registrar,
Pharmacy and Poisons Board,
Lenana Road,
P.O. Box 27663 -00506,
Nairobi.
Email: info@pharmacyboardkenya.org

2.5 Documentation Required for consideration Pre-Registration Evaluation

i. Duly filled and signed application form.
ii. PPB Index card.
iii. Certified copy of the National Identity card or Passport.
iv. Certified copy of the K.C.S.E certificate or its equivalent.
v. Certified copy of Degree in Bachelor of Pharmacy or its equivalent.
vi. Certified copies of academic transcripts for each academic year of training completed for the Degree in Bachelor of Pharmacy (or its equivalent), showing numbers of years, subjects, contact hours and examination results (marks, grades) obtained.
vii. Evidence of PPB supervised internship for Stage II applicants.
viii. Two current certified coloured passport size photographs.
ix. Evidence of registration as a pharmacist in the country of previous practice (where applicable).
x. Evidence of regularised immigration status for non-Kenyan citizens.
xi. Applicants who are nationals of non-English speaking countries need to provide a proof of proficiency in English as a language from a recognized institution.
xii. All certificates obtained from foreign institutions must be equated by
    a. The Ministry of Education for pre-university certificates and;
    b. Commission for University Education for university certificates.

NOTE:

- If documents are in a language other than English or Kiswahili, they must be translated and certified by an official translator or relevant authority.
- The original documents must be presented to the Board for verification.
- **Presentation of any fraudulent document is a criminal offence. This shall attract prosecution and barring from sitting the Board's professional examinations for life.**

2.6 Deadlines for Application

The applicant shall submit the application to the office of Registrar, Pharmacy and Poisons Board at least three (3) months before the examination date. Evaluations are done throughout the year. However,

if the applicant wishes to be considered for the next examinations series, all documents, applications and fee must be submitted on/before three months to scheduled examination date.

DEADLINE DATE:THREE (3) MONTHS BEFORE THE DATE OF THE EXAMINATION

3. EVALUATION OF DOCUMENTS

The application shall undergo evaluation by the Board for recommendation to sit for examinations and assign each of the applicants to the appropriate Stage of examination (Stage I or Stage II).

4. EXAMINATION FEES

Candidates whose documents have been evaluated and accepted will be required to pay a prescribed non-refundable examination fee at least one month before the examinations, upon which an examination card shall be issued.

For the currently applicable rates, the candidates should visit the Pharmacy and Poisons Board offices or website: www.pharmacyboardkenya.org.

5. RULES AND REGULATIONS FOR CANDIDATES

5.1 Verification of Candidates

Only candidates who meet the basic minimum eligibility criteria for assessment and evaluation will be allowed to sit for PPB examinations. All candidates must produce:

5.1.1 The examination card which must be displayed throughout the examinations.

5.1.2 For Kenyan nationals, a National Identity card or a valid Passport as an identification document.

5.1.3 For non-Kenyan nationals, a valid Passport

5.2 Conduct in the Examination Room

5.2.1 It is the responsibility of the candidate to confirm the dates and the venue of the Examination from the Pharmacy and Poisons Board offices or by visiting the Pharmacy and Poisons Board website: www.pharmacyboardkenya.org.

5.2.2 It is the responsibility of the candidate to avail themselves at the venue of the Examination on the set dates and time.

5.2.3 Candidates shall be required to be decently dressed.

5.2.4 All candidates should be seated in the examination room at least fifteen (**15**) minutes prior to the start of the examination. No candidate shall be allowed into the examination room thirty (**30**) minutes after the examination has started.

5.2.5 No candidate shall be allowed to leave the examination room thirty (**30**) minutes after the start and within the last thirty (**30**) minutes to the end of the examination.

5.2.6 Candidates shall sit as directed by the invigilators.

5.2.7 Silence and order shall be maintained throughout the examination session.

5.2.8 Communication shall NOT be allowed between candidates within the examination hall.

5.2.9 Mobile phones and any other electronic gadgets shall not be allowed into the examination room. Only scientific calculators will be allowed.

5.2.10 Any unauthorised written, reading or other materials including bags shall not be allowed in the examination room.

5.2.11 Candidates shall not start writing or opening the question paper until allowed by the invigilator.

5.2.12 Sharing of stationery, calculators and other items between candidates is prohibited.

5.2.13 Eating and smoking shall not be allowed in the examination room.

5.2.14 Drunkenness and disorderliness shall not be allowed in the examination room.

5.2.15 Appropriate language and mannerism shall be observed in the examination room.

5.2.16 All examination materials shall be left in the examination room.

5.3 Missing to sit for scheduled examination

5.3.1 Any candidate who misses all or part of the Board examinations shall be deemed not to have completed assessment for registration as a Pharmacist.

5.3.2 A candidate who has not completed assessment for registration shall be required to take the whole examination afresh upon payment of the prescribed fee.

5.4 Cheating in examinations

5.4.1 Cheating in examination is a serious offence punishable by expulsion from the examination room and for the rest of the examination period. Any candidate found guilty of cheating will not be allowed to sit for any Board Examinations.

5.4.2 Cheating includes but not limited to:

- Copying.
- Being in possession of unauthorized material/literature.
- Making reference to unauthorized material.
- Glancing at other candidates papers.
- Communicating with other candidates.

- Browsing the internet.
- Writing on body parts or attire.

5.5 Consequences of Misconduct

5.5.1 Any candidate who contravenes any of the above rules shall be liable to disqualification from the examination.

5.5.2 A candidate who fails to present himself/herself for the examinations, after paying the prescribed fee shall forfeit the fee.

5.5.3 Any aggrieved candidate may seek redress from the Registrar, PPB.

6. EXAMINATION OUTCOMES

6.1 The final mark for each stage shall be the average of the percentage scores in the individual examinations.

6.2 The pass mark shall be 50% of the aggregate mark.

6.3 Candidates will receive communication on the examination results from the Registrar, Pharmacy and Poisons Board.

6.4 Candidates who pass Stage I examinations will be allowed to proceed for the prescribed Supervised internship program.

6.5 Candidates who pass Stage II examinations will be eligible for registration as a Pharmacist.

6.6 A candidate who fails in Stage I examinations may be allowed to re-sit the examination up to a maximum of two (2) times within a period of five years. If the candidate is unsuccessful in the second re-sit, he/she shall be recommended for re-training in a selected PPB approved university before being allowed for two (2) further re-sits.

6.7 A candidate who fails in Stage II examinations shall be allowed to re-sit up to a maximum of two (2) times within a period of five years. If the candidate is unsuccessful in the second re-sit, he/she shall be recommended for a one (1) year re-training in a selected PPB approved internship site and under a specified preceptor(s) before being allowed for two (2) further re-sits.

6.8 A candidate who has undergone re-training shall provide documentary evidence that the re-training was completed successfully before being allowed to re-sit for the examination.

6.9 Any aggrieved candidate may seek redress from the Registrar.

7. STRUCTURE OF THE EXAMINATIONS

7.1 Stage I Examinations

Stage I examination shall consist of two written papers (paper I and paper II) and an Oral (viva voce) Examination.

It is important to note that the two written papers will be done on the same day. Paper I will be done in the morning and paper II in the afternoon, unless otherwise advised by the Pharmacy and Poisons Board.

7.1.1 **Paper I: Basic Sciences**

This shall be a 3 hour paper consisting of 100 multiple choice questions (MCQs), 15 short answer questions (SAQs) and 3 Essays.

The Examination shall cover both the theory, practical and laboratory aspects of the following subjects:

i. Human Anatomy
ii. Medical Physiology
iii. Pathology (General Pathology, Haematology, Immunology, Clinical Chemistry)
iv. Medical Microbiology and Parasitology
v. Biochemistry
vi. Organic Chemistry
vii. Physical and Inorganic Chemistry

7.1.2 **Paper II: Pharmaceutical Sciences**

This shall be a 3 hour paper consisting of 100 MCQs, 15 SAQs and 3 Essays.

The Examination shall cover both the theory, practical and laboratory aspects of the following subjects:

i. Pharmacology
ii. Clinical Pharmacy
iii. Pharmacognosy
iv. Pharmaceutical Chemistry
v. Pharmaceutics
vi. Epidemiology, Biostatistics and Research Methods

7.2 Stage II Examinations

Stage II examination shall consist of two written papers (paper I and paper II) and an oral (viva voce) examination.

It is important to note that the two written papers will be done on the same day. Paper I will be done in the morning and paper II in the afternoon, unless otherwise advised by the Pharmacy and Poisons Board.

7.2.1 **Paper I: Pharmacy Practice**

This shall be a 3 hour paper consisting of 100 multiple choice questions (MCQs), 15 short answers questions (SAQs) and 3 Essays.

The Examination shall cover both the theory, practical and laboratory aspects of the following subjects:

i. Hospital Pharmacy practice
ii. Community Pharmacy practice
iii. Therapeutics
iv. Industrial Pharmacy practice
v. Information and Communication Technology in Pharmacy
vi. Social and Behavioural Pharmacy

7.2.2 **Paper II: Pharmacy Management, Law and Ethics**

This shall be a 3 hour paper consisting of 100 MCQs, 15 SAQs and 3 Essays.

The Examination shall cover both the theory, practical and laboratory aspects of the following subjects:

i. Management Concepts
ii. Drug Supply Management
iii. Health Economics, Systems and Management
iv. Ethics and Jurisprudence
v. Pharmacy practice related laws and regulations

7.3 Oral Examination

There shall be oral examinations (viva voice) for candidates in both Stages I and II. The date, time and venue of the examination shall be notified during the written examination session.

The Pharmacy and Poisons Board reserves the right to change without notice any information or requirements contained herein.

STAGE 1

The papers in this stage shall examine the knowledge and competencies in the following subject areas

STAGE I: BASIC MEDICAL, CHEMICAL AND PHARMACEUTICAL SCIENCES

PAPER I: BASIC MEDICAL, CHEMICAL AND PHYSICAL SCIENCES

A. Medical Physiology

Introduction: Physiology of the cell; Physiology and Classification of the human organism; **Physiology of the body Systems**; circulatory, digestive, respiratory, urinary, skeletal, muscular, integumentary (hair, skin, nails), immune, nervous, endocrine, and reproductive. **Acid-base balance**. **Homeostasis** of the systems of the human body; includes disease prevention and cure, health, wellness, and nutrition. **Physiology of Specialized Tissues:** Excitable tissues & basics of electrical communications; Higher functions of the CNS; Reflex, Learning and Memory; Sensory organs. **Cellular Receptors:** Receptor mechanisms; signaling pathways including drug-receptor interactions; ligand and voltage-gated ion channels; G protein pathways; growth factor signaling; calcium signaling; nitric oxide signaling; apoptosis

B. Human Anatomy

Cell division; **Gametogenesis**; Female Reproductive Tract. **Embryonic development:** Teratology Embryonic Period; Differentiation; Tissue and organ development; Congenital defects; Tissue regeneration. **Microscopic and Gross Anatomy:** Scope and evolution of Microscopic anatomy and its relevance; Basic organization of Body tissues, organs and systems; Tissue preparation for microscopy and methods of study. **Cytology**: Cell functional specialization in various tissues/organs; Organization of tissues; Structure of the oral cavity.

C. Inorganic Chemistry

Standards for atomic weights and accurate atomic weight determination. **Structure of the atom**; constitution of the nucleas and extracellular electron arrangement. Magnetic and spin quantum numbers; **Periodic table**; general features and groups of periodic table, electrochemical series of elements, valency, types of bonds, coordination compounds. **Electrochemistry**; electrolysis, conductance. **Chemical kinetics**, reaction rate processes and rate laws; 1st, 2^{nd}, 3^{rd} and pseudo order reactions; Arrhenius equation. **Radiochemistry**: nuclear stability; radioactive decay; types, properties and interaction with matter of radiations. Detectors, production and biological effects of radionuclides. **Radiopharmacy**: radiopharmaceuticals, radio-diagnostics and radiopharmaceutical specialties. Radiation dosimetry and permissible levels of exposure.

D. Physical Chemistry

Gaseous state; kinetic theory of gases; properties of molecules and gas laws; **Gas liquid equilibrium**; **colligative properties** and Raoult's laws; solutions of gases in liquids; Henry's Law; chemical equilibrium; **Aqueous solutions of weak acids, bases and their salts**; Theory of acid-base indicators. **Liquifaction of gases**, van der waals equation; intermolecular forces and entropy of vaporization; **vapour pressure** versus liquid vapour composition, boiling point, azeotropes and distillation of miscible and immiscible liquids. **First law of thermodynamics**; heat and heat capacity, enthalpy; **thermochemistry**; various reaction enthalpies, Hess's law, calorimetric measurement of enthalpy and internal energy.

E. Organic Chemistry

Bonding in carbon compounds; hydrocarbon compounds, types, Nomenclature, physical properties, halogenations, chain reactions, basic concepts of organic reaction mechanisms; functional group interconversion concept. **Isomerism**:-conformational, stereoisomerism and enantiomerism. **Alkane, alkene,alkyne and aromatic compounds** structure, preparation, elimination and addition reactions. Benzene and polynuclear aromaticity; electrophilic aromatic substitution. Carbonyl, carboxylic and phenols, industrial sources, preparation, chemical properties and reactions. **Heterocyclic and polynuclear aromatic hydrocarbons**; nomenclature, synthesis, reactions and effect of heteroatom on physical and chemical properties. **Introduction to spectroscopy**; electromagnetic spectrum, UV, IR, AES. Beer Lambert law, use of spectroscopy in analysis.

F. Biochemistry and Molecular Biology

Structure and functions of **Biomolecules** including water, acids, bases. Structure and function of **Macromolecules**; Protein, Enzymes, Nucleic acids, Hormones, vitamins. **Membranous structures**; Sub cellular particles and cells; **Biological Metabolism and synthesis** of biomolecules and macromolecules. Regulations of substance metabolism and gene expression; Kreb's cycle; Inborn errors of metabolism; **Biochemistry of Specialized Tissues**; Liver, Muscle, Adipose, Brain, Red Blood Cell. **Enzymology**. Clinical enzymmology, drug metabolism, neurochemistry. **Cellular and Molecular Biology**: Cell multiplication and regulation; Cell differentiation and malignant cell; Apoptosis and Cell engineering. **The genome**; structure and function; DNA replication and transcription; regulation of gene; gene engineering. **Pharmaceutical Biotechnology:** An introduction to biological drugs. Vegetal cell engineering; SAR code engineering; Enzyme engineering; Microorganism fermentation. Biochemical basis of medicinal research.

G. Medical Microbiology, Parasitology and Immunology

Bacteriology: Bacterial classification, structure and function; Bacterial growth and metabolism; Bacterial genetics; Antibacterial agents; Identification techniques; Gram positive pyogenic cocci; Gram negative pyogenic bacteria; Enterobacteriaceae and associated bacteria; pseudomonadaceae; fungus like bacteria; zoonotic bacteria; Mycoplasma; Rickettsiae; Mycobacteria;Spirochetes; Legionellae; Toxigenic bacteria; Nonsporulating anaerobic bacteria. **Mycology**: Superficial and deep mycoses; Antifungal drugs. **Virology**: Classifcation and replication of viruses; Adenoviruses; Hepatitis viruses; Herpes viruses; Papovaviruses; Parvoviruses; Arenaviruses; Astroviruses; Bunyaviruses; Calciviruses; Flavoviruses; Orthomyxoviruses; Paramyxoviruses; Piconaviruses; Retroviruses; Rhabdoviruses; Togaviruse;Antiviral drugs. **Parasitology:** Helminths; nematodes, trematodes, cestodes. Tissue and Intestinal protozoa. **Entomolgy:** Mosquitoes; Tsetse fly; House fly; Sand fly; Chrysops; Fleas: Reduvid bug; Simulium; Snails**. Immunology:** Cells of the immune system; innate and adaptive immunity; organ transplantation; hypersensitivity reactions; immunological disorders.

H. General Pathology, Haematology, Clinical Chemistry

General Pathology: Types of cells; Inflammation, shock and oedema; Wound healing; Neoplasms; Introduction to diseases; Immunology of infective agents; Metabolic and pigmentation disorders **Haematology:** Introduction; Red Blood Cells; Leucocytes and their disorders; The primary lymphoreticular neoplasis; Haemostasis and haemostatic disorders; Blood Transfusion. **Clinical Chemistry:** Uses of clinical chemistry, laboratory, specimen collection preservation and storage; Source of result variability and interpretation of numerical results; Fluid Balance; Electrolyte Balance; Acid-Base Balance; Calcium and Phosphate metabolism; Carbohydrate metabolism; Protein metabolism.

PAPER II: PHARMACEUTICAL SCIENCES

A. Pharmacology

Basic principles; Autacoids and Inflammation; Analgesics; Steroids; **Systemic Pharmacology**: Respiratory system, Renal system, Nervous system, cardiovascular system, Gastrointestinal system, Musculo-skeletal system, Endocrine system. Nutritional supplements. **Chemotherapeutic Agents**: Antibacterials, Antiprotozoans, Antivirals, Antifungals, Antihelminthics. Antineoplastic agents. Drug use in special populations: Pregnant and lactating women, children and elderly. Dermatological pharmacology. Ocular and otic pharmacology. Toxicology. Anaesthetics. Hemostatics. Plasma expanders. Vaccines. Diagnostic agents. Veterinary pharmacology.

B. Clinical Pharmacy

Roles of a clinical pharmacist; Patient health assessment and consultation; Rational use of drugs; Pharmaceutical care plan; Elements of first aid and emergency care; Infectious diseases; Respiratory disorders; Renal disorders; Endocrine disorders; Haematopoietic disorders; Neurological disorders; Joint and connective tissue disorders; Psychiatric disorders; Skin diseases; Cardiovascular disorders; Gastrointestinal disorders; Nutritional disorders; cancer; Reproductive health; Child health; Geriatric health; Surgical care; Critical care; Pharmacovigilance; Drug information; Therapeutic drug monitoring; Palliative care; Substance abuse; Iatrogenic diseases.

C. Pharmacognosy

Natural sources of medicines; survey of plant kingdom; General morphological features of features of plant parts. Medicinal and poisonous plants: morphological, diagnostic and histological features of various groups of crude drugs. **Folkmedicine**, herbaria, plant extraction procedures. **Plant biochemistry**; secondary metabolites; plant genetics and biotechnology. **Phytochemistry**; sources, physical/chemical properties, general formulae, detection, extraction, isolation and uses of active principles. **Chemotaxonomy** and introduction to plant tissue and cell culture techniques. **Plant drugs of abuse**; **complementary medicine**, ethno-pharmacology, policy and legal framework; **Commerce and endangered medicinal plants**; **intellectual property** and associated rights; traditional knowledge, genetic resources and bio prospecting. **Practical aspects:** Qualitative and Quantitative extraction, isolation and determination of active constituents of medicinal plants.

D. Pharmaceutical Chemistry

Medicinal chemistry: Prostaglandins: nomenclature and stereochemistry, pharmacological actions and uses of prostaglandins. Leukotrienes, antihistamines and non steroidal anti-inflammatory drugs-common class structures, SAR, mechanism of action, physical chemical properties, analysis, metabolism and how these affect therapeutic application of various drug chemical classes. **Drug chemical classes**:

antibiotics, Adrenergic/cholinergic, CNS drugs, anticancer/ antiviral, antiparasitics, cardiovascular agents, vitamins, polypeptides/protein hormones, steroids and narcotic analgesics common class structures, SAR, mechanism of action, physical chemical properties, metabolism and analysis. **Drug synthesis**: Functional group approach to drug synthesis and general parallels in general organic chemistry; Introduction of different chemical groups and pharmaceutical examples. **Drug metabolism**: factors that determine metabolism; patterns, sites, types of reactions, end products and therapeutic implication of biotransformation. **Drug action**: types of bonds in drug receptor interactions; influence of ionization, pH/ pKa, steric factors, molecular shape, size, isomerism and specific chemical groups on drug molecule on drug action. General principles of drug design; drug design models and QSAR models. **Introduction to pharmaceutical analysis:** analytical laboratory and equipment, compendia, sources of impurities in pharmaceuticals, limit tests and tests for identity. **Titrimeric analytical methods, electrochemical and photometric analytical methods**, polarography and polarimetry, **Pharmaceutical applications of UV-visible and IR spectroscopy**; role in quantitative analysis. **Quality of pharmaceuticals**: GMP, GLP and drug quality control laboratory. Chromatography and spectroscopy; Types, materials, instrumentation, parameters and application in qualitative and quantitative evaluation of different types of pharmaceuticals. **Biological methods of analysis**: macro, microbiological techniques and immunoassays; types, advantages/ disadvantages and application in drug quality control.

E. Pharmaceutics

Unit processes and Equipment: Clarification; Granulation; Drying; Tablet compaction and coating. **Dissolution and solubility:** Solution and solubility: Expressions of concentration, States of matter, change of states, thermodynamics of the solution process; Dissolution of solids in liquids: Mechanisms, Partition coefficient, Factors affecting dissolution rates, measurement of dissolution rates, Intrinsic dissolution rate; Solubility: Methods of expression and Prediction; Solubility of solids in liquids, gases in liquids, liquids in liquids, and solids in solids; Types of pharmaceutical solvents. **Types and Properties of solutions:** Vapour pressures; Ionization of solutes; Practical applications of Colligative properties; Methods of increasing solubility of poorly soluble drugs. **Rheology:** Viscosity coefficients; Newtonian and non-Newtonian fluids; emulsions and suspensions; deflocculated and flocculated vehicles; General viscometer types. **Surface and interfacial phenomena:** Surface tension and surface free energy of interfacial systems; Measurements; Pharmaceutical applications. **Disperse systems:** Definitions and classification; Properties; Preparation and purification; Interactions between dispersion phases; Gels and types; Surfactants; Pharmaceutical applications. Coarse dispersions; Formulation of suspensions; Emulsion types and identification tests; Formation and breakdown of dispersed liquid droplets; Emulsifying agents; selection of emulsifying agents; Stability of emulsions. **Particles and powder technology:** Solid state: Particle size analysis; communition; Particle-size separation; Mixing

and demixing. **Kinetics and Stability:** Zero and 1st order kinetics; Degradation; Preservation; Stabilization; Packaging; Containers and closures; Stability testing and Shelf-life determination.

Control and regulation of pharmaceutical products: Good Manufacturing Practices and principles of Quality Assurance; Evaluation of starting materials and finished products; Regulatory requirements; Bioequivalence and bioavailability testing; Biopharmaceutics Classification System. **Pharmaceutical microbiology:** Aseptic techniques; Clean rooms: design, classification and evaluation; Disinfection and Sterilization principles, evaluation and testing methods. **Dispensing;** Weights and measures: Metric and imperial systems; weights, volumes, temperatures, density and specific gravity; measurements and devices; Prescription processing; Pharmaceutical calculations; Latin terms; Medical abbreviations. **Dosage forms: design and manufacture;** Pharmaceutical excipients or necessities; Extemporaneous preparations; Sterile products; **Pharmaceutical grade waters**: Types; preparation methods; properties, evaluation and tests; uses. **Biopharmaceutics**: Concepts of Bioavailability; Factors influencing bioavailability: Gastrointestinal tract physiology and drug absorption; Assessment of biopharmaceutical properties; Dosage regimens; modified release oral dosage forms.

F. Research Methodology, Biostatistics and Epidemiology

Introduction to research methodologies; types, sources and retrieval of information; formulation of research objectives; defining the research problem ; research designs; sampling designs and approaches; measurement scales; data collection; processing and analysis; use of graphical methods to display features of data; descriptive and Inferential statistics: computation of numerical summaries to summarize features of data, interpretation of graphical and numerical summaries to describe data; proposal and report writing and presentation. .Introduction to epidemiology; determinants, causes, distribution, and frequency of diseases, epidemics, mortality and morbidity.

STAGE II

For purposes of these examinations, the main emphasis shall be on the internship guidelines. However, candidates will also be examined on the practical and applied aspects of the Pharmaceutical Sciences outlined for Stage One Examinations.

The papers in this stage shall examine the knowledge and competencies in the following subject areas:

STAGE II: APPLIED PHARMACEUTICAL SCIENCES

PAPER I: PHARMACY PRACTICE

A. Social/ Behavioral Pharmacy

Characteristics of professions; Health models (health belief model, theory of planned behavior, trans theoretical model, social cognitive model); Stages of Illness, sick role, Sachmann's model; Drugs of addiction; Management of drug addicts (detoxification, rehabilitation, support groups); Factors affecting drug use (Political, Economic, Social, Cultural, Legal, Technological, Internal environment (competition, employees)); Factors affecting compliance, adherence, concordance; Ageing phenomenon (Psychological and pathological)

B. Hospital Pharmacy Practice

Patient history taking; Pharmaceutical care; Patient counseling; Adverse drug reaction monitoring; Drug interactions monitoring; Drug information; Pharmacy and Therapeutics committee; Health management teams; Prescription processing; Safe storage of medicines; Preparing and quality checking for sterile and extemporaneous preparations; Supply of medicines; Record keeping (various types of records – S11, S12, S13 etc); Interpretation and use of Laboratory results; Rational use of drugs; Patient education.

C. Therapeutics

Management of disorders of the following systems: Cardiovascular, Respiratory, Gastro-intenstinal tract, Renal, Nervous, Ocular, Reproductive, Endocrine, Dermatological, Ear, Nose and Throat, Musculoskeletal and Hematological; Management of Infectious diseases.

D. Community Pharmacy Practice

Processing of prescriptions; Provision of advice and/or medications in respond to signs and symptoms; Monitoring of drug utilization; Extemporaneous preparations and small scale manufacture of medicines; Supply of traditional / alternative medicines; Providing drug information to healthcare professionals and the public; Health promotion; Domiciliary services; Agricultural and veterinary services; Record keeping; Legislation; Care of patients; Vaccinations; Medical devices; First aid emergency care; Patient education.

E. Industrial Pharmacy Practice

Relevant legislation and its application to the pharmaceutical industry; Development of sterile and non sterile preparations; The principals and practice of good manufacturing practice, good laboratory practice; Manufacturing of sterile and non sterile preparations; Quality control of sterile and non sterile

preparations; Regulatory requirements appertaining to the conduct of clinical trials, licensing of products; Clinical trials supplies; Provision of information; Pharmaceutical marketing; Responsibilities of the qualified person (Superintendent Pharmacist, Quality Assurance and Pharmaceutical Analyst)

F. ICT in Pharmacy

Types of computers; Terminologies used in computing; Computer hardware; Computer software; Word processors, power point and spreadsheets; Databases and database management; Computer networks; Internet applications; Information and Cyber security.

PAPER II: PHARMACY MANAGEMENT, LAW AND ETHICS

A. Management concepts

Principles of management: Planning, leading, communicating, motivating, control; Marketing management: Promotion, price, product, place, research**;** Financial management in health care: Sources of finances, ratio analysis, budgeting, tools for controlling expenditure; Human resource management: Job Design (JD), Job Analysis, Human Resource Planning (HRP), Recruitment, Selection, Hiring, Induction, Performance Evaluation, Compensation Management, Training and Development, Employee Movements, Welfare Administration, Health and safety Administration, Discipline Administration, Grievance Handling, Labor Relations; Time management; Conflict resolution strategies; Managing teams

B. Drug Supply Management

Drug selection; Drug procurement; Drug distribution; Inventory management; Drug Use.

C. Introduction to Economics

Factors of production (land, labor, capital and entrepreneurship); Demand and supply; Concepts of elasticity; Money and banking; National income; Economic growth; Economic evaluation; Types of costs.

D. Health systems

Definitions of health systems; Goals of health systems; Functions of health systems; WHO system framework

E. Ethics / Jurisprudence

The Constitution of Kenya; Criminal and Civil offences; Ethical principles and practice applications

Professional organizations: Pharmaceutical Society of Kenya (PSK), Kenya pharmaceutical Association (KPA), FIP, commonwealth pharmaceutical association, Kenya Medical Association (KMA), roles affecting pharmacy and inter-professional interactions.

F. Pharmacy practice related laws and regulations

Pharmacy and Poisons Act cap 244, Narcotic drugs and psychotropic substances act of 1994, veterinary act, cap 366, Public Health Act, Medical Practitioners And Dentists Act, Pesticide Control Act, Companies Act, State Corporations Act, Factories Act, National Environmental Management Agency, Malaria Control Program, National Aids Control Council, Government Chemist, Kenya Medical Research Institute, National Campaign Against Drug Abuse, Kenya Medical Supplies Agency, Mental Health Act, World Health Organization, United Nations International Children Emergency Fund, United Nations Environmental Program, Habitat, International Narcotic Control Board, International Committee Of The Red Cross, Food And Agricultural Organizations, International Federation Of Red Cross And Red Crescent Society.

ANNEX I: SUGGESTED REFERENCE MATERIALS

1) Principles of Biochemistry, Lehninger, 5th Edition.
2) Biochemistry, Stryer,4thEdition/W. H. Freeman & Co.
3) Drug Stability: Principles and Practice: Castesen M. Dekke, 2nd Edition.
4) Communication skills in Pharmacy Practice, W. Tindall, R. Beardsley, C.Kimberlin, Williams & Wilkins.
5) Medical Terminology: A programmed Systems Approach /G. Smith,, et al / Delmar.
6) Modern Pharmaceuticals, Drugs & the Pharmaceutical Sciences; Banker & Rhodes M. Dekker.
7) Pharmaceuticals Principles of solid Dosage Forms; Cartensen Technomic.
8) Remington: The science and Practice of Pharmacy. Volume I & Volume II /A.R. Gennaro, 21st Edition/Wolters Kluwer Health (India) Pvt. Ltd., New Delhi.
9) Pharmaceutics: The Science of Dosage Design, edited by M. E. Aulton, 2nd Ed. 2002, Harcourt Publishers.
10) Pharmaceutical Practice; edited by A. J. Winfield & R. M. E. Richards, 3rd Ed. 2004, Publishers RDC Group Ltd., China.
11) Textbook of Dispensing for Pharmacy Students; edited by Cooper and Gunns.
12) Physical Pharmacy; edited by Martin et al.
13) Bentley's Textbook of Pharmaceutics.
14) Tutorial Pharmacy
15) Chemical Stability of Pharmaceuticals; Kenneth A. Connors, Gordon L. Amidon & Lloyd Kennon, John Wiley & Sons.
16) WHO guidelines on GMP; TRS 908-2003 &937: 37th & 40th Reports.
17) Review of Medical Physiology/Ganong/McGraw-Hill.
18) Goodman and Gilman's: The Pharmacological Basis of Therapeutics/Hanman, et al / McGraw-Hill.
19) Wilson and Grisvold's Textbook of Organic Medicinal and Pharmaceutical. Chemistry/Delgado & Remers/ Lippincott Williams and Wilkins.
20) Foyes Principles of Pharmaceutical Chemistry
21) Official Monographs: British Pharmacopoeia (B.P),, United States Pharmacopoeia (USP), European Pharmacopoeia (EP), International Pharmacopoeia.
22) Martindale: The extra Pharmacopeia.
23) Text book of Pharmacognosy /Trease & Evans.
24) The Pharmacy and Poisons Act. Cap 244.
25) Narcotics Drugs and Psychotropic substances (Control) Act No. 4 of 1994.
26) Food, Drugs and Chemical Substances Act. Cap 254.
27) The Public Health Act. Cap 242.
28) The State Corporations Act Cap 446.
29) The Kenya National Pharmaceutical Policy (KNPP).
30) The National Treatment Guidelines.

ANNEX II: APPLICATION FORM

PPB/EE/PT

REPUBLIC OF KENYA

MINISTRY OF HEALTH
PHARMACY AND POISONS BOARD

Application Form for Evaluation and Assessment for Registration as a Pharmacist

PLEASE READ THE ACCOMPANYING EXPLANATORY' NOTES BEFORE COMPLETING THIS FORM. MAKE SURE YOU PROVIDE ALL THE DOCUMENTS REQUIRED AND SIGN THE DECLARATION FORM.

I. **PERSONAL DETAILS**

a) Title: Dr. ( ) Mr. ( ) Mrs. ( ) Miss ( ) Ms. ( ) Other ( ){ Tick(√)where applicable}

b) Surname:.....

.....

First name: ..... Other names:.....

c) Sex: Male ( ) Female ( )

d) Date of Birth: Day: ……..... Month: ……..... Year: …….....

e) Country of birth: …….....

f) Nationality:…….....

g) County of residence: …….....

h) Address:

(i) Permanent Postal Address:

P.O. Box: …… Code: …… Town: ……..…….....

(ii) Physical Address: ……...

(iii) Personal Mobile No: …….Home Telephone No: …….....

(iv) Email address: …….

(v) Name of the next of Kin: ……..Telephone No.: …….

II. EDUCATION BACKGROUND:

Name of Primary School and Address:	Name of Secondary School and Address:
Start Date:	Start Date:
Finish Date:	Finish Date:
No. of Years:	No. of Years:
Qualification:	Qualification:
Country:	Country:

III. POST SECONDARY EDUCATION:

(Relevant to Pharmacy)

Name of Institution: ……

Contact Address of the Institution: …….....

County: …… Country: …….....

Qualification: ……..... Year qualification obtained: ….……

Duration of Training: Start: ……..... Finish: ……....

IV. OTHER RELEVANT TRAINING:

Name of Institution: ……

Contact Address of the Institution: …….....

County: …… Country: ……

Qualification: ……..... Year qualification obtained: ……

Duration of Training: Start: …… Finish: …….....

Application checklist

Documents that you must include with this application are:

- Duly filled application form for evaluation and assessment for registration for a Pharmacist. [ ]
- Pharmacy and Poisons Board student's Index card. [ ]
- Certified copy of National Identity card or Passport. [ ]
- Certified copy of the K.C.S.E certificate or its equivalent. [ ]
- Certified copy of Bachelor of Pharmacy or its equivalent. [ ]
- Certified academic transcripts for each academic year of training completed for the Bachelor of Pharmacy (or its equivalent), showing numbers of years, subjects, contact hours and examination results (marks, grades) obtained. [ ]
- Evidence of registration as a pharmacist in the country where the training was obtained (where Applicable). [ ]
- Evidence of supervised practical attachment (for Stage I) and internship (for Stage II). [ ]
- Two current coloured passport size photographs (indicate name & ID. No. behind). [ ]

Applicant's declaration form

This declaration must be read, understood and signed by the applicant.

I …….....

of P.O. Box ……. ..... ……do hereby declare that:

i. The information I have supplied on this form and any attachment is complete, correct and up to date.
ii. I undertake to inform the Pharmacy and Poisons Board (PPB) of any change to my circumstances (e.g. address) while my application is being considered.
iii. I authorize the Pharmacy and Poisons Board to make any inquires necessary to assist in the assessment of my qualifications and to use any information supplied in this application.
iv. I have read, understood and commit myself to abide with the rules and regulations in the guidelines.

Applicant's Signature: …….....

Date:…….....

Witnessed by: ……..... (For Pharmacy and Poisons Board)

**Signature: ……..... **

Date: ……....

How to lodge your application:

1. Detach or download the application form (Evaluation and Assessment for Registration as a Pharmacist).
2. Fill the said form completely and appropriately.
3. Submit in person the completed form to the Registrar, Pharmacy and Poisons Board together with the **original and copies** of the other required documents indicated in the checklist.

Any enquiries to be addressed to:

The Registrar
Pharmacy and Poisons Board
Lenana Road
P.O. Box 27663-00506
NAIROBI

Email Address: training@pharmacyboardkenya.org
info@pharmacyboardkenya.org

Website: www.pharmacyboardkenya.org

Telephone 020 2716905/6, 3562107 or if calling from overseas please telephone +254 0733-884411/0720608811

Working days: Monday-Friday.

ANNEX III: MODEL COURSE STRUCTURE FOR BACHELOR OF PHARMACY PROGRAMME

COURSE	MINIMUM CONTACT HOURS
BASIC MEDICAL SCIENCES	
• Medical Physiology	495
• Mathematics	135
• Chemistry	360
• Human Anatomy	225
• Biochemistry	495
• Communication Skills	45
• Sociology	45
• Community Health	45
• HIV / AIDS	45
• Introduction to Computers	45
• Medical Microbiology and Parasitology	225
• Pathology/Haematology/Clinical Chemistry	180
PHARMACEUTICAL SCIENCES	
• Pharmaceutical Chemistry	630
• Pharmaceutics	540
• Pharmacognosy	315
• Research Methodology and Biostatistics	90
• Pharmacology and Therapeutics	585
• Clinical Pharmacy	450
PHARMACY PRACTICE	
• Social & Behavioural Pharmacy	135
• Pharmacy Management	270
• Health Related Laws, Pharmacy Law and Professional Ethics	90
• Attachment	360
PROJECTS	180
TOTAL	**5985**