BAYERO UNIVERSITY, KANO
FACULTY OF PHARMACEUTICAL SCIENCES

DOCTOR OF PHARMACY (PHARM.D)

STUDENTS' HANDBOOK

MESSAGE FROM THE DEAN

The Dean, Faculty of Pharmaceutical Sciences, Bayero University, Kano welcome new entrants into the Faculty for the Doctor of Pharmacy career. This is a programme in the University that is known for excellence. Your choice of this University is a welcome idea, and both the Faculty and the University Management are poised to be instrumental to the realization of your dream.

The Handbook introduces you to the objectives and the general regulations governing Pharmacy education in the University. These include examination and graduation requirements, clearly outlined list and description of courses from 100 Level through 600 Level in the six major Departments in the Faculty namely: Pharmaceutical and Medicinal Chemistry, Pharmaceutics and Pharmaceutical Technology, Pharmacognosy and Herbal Medicines, Pharmacology and Therapeutics, Clinical Pharmacy and Practice and Pharmaceutical Microbiology and Biotechnology. Students should pay particular attention to all the provisions in the Handbook including specifications on conduct and discipline.

Freshers (100 Level) normally receive lectures in the Faculties of Life and Physical Science before moving into 200 Level in the Faculty for the professional component after fulfilling all the Faculty requirements for 100 Level, The Faculty of Basic Medical Science services Anatomy, Biochemistry and Physiology courses, while Faculty of Allied Health Sciences services Pathology course. However, particular attention should be paid to these outside Faculty courses as failure in these courses could lead to either repeating the whole year or even withdrawal from the programme at early stage. Hence, right from onset of the programme, students are advised to pay particular attention and seriousness to pass all the courses at first sitting in order successfully graduate.

The Pharm.D curriculum will enable us to produce graduates with 21st Century skills, clinical and ethical competence for Pharmacy education and practice. The University has provided the enabling environment and first class facilities to run the programme. It is our vision to offer academic excellence to students in an environment oriented towards scholarship, practical and clinical skills.

You will be exposed to knowledge, technical and communication skills that are required for the practice of Pharmacy Profession. Therefore, the Pharmacy Programme has been designed to expose you to all aspects of professional requirements which guarantee you a Doctor of Pharmacy degree within a minimum of six years as a 100 Level entrant.

The Faculty remains grateful to the Faculties of Life and Physical Science and Basic Medical Science for the sacrificial support in terms of provision lecture rooms and laboratories to accommodate the Pharmacy students. We appreciate the immeasurable support and commitment from the Vice Chancellor- Professor Sagir Adamu Abbas, the Director of Academic Planning- Professor Yusuf Garba and a host of stakeholders within and outside the University like Pharmacy Council of Nigeria, Pharmaceutical Society of Nigeria (PSN) and others.

We hope you would find the Handbook as insightful as we anticipated.

Thank you and wish you fruitful stay in Bayero University, Kano.

Professor Ibrahim Adamu Yakasai
Dean

PRINCIPAL OFFICERS OF THE FACULTY

Prof Ibrahim Adamu Yakasai
Dean

Dr Aisha Mohammed
Deputy Dean

Dr Suleiman Danladi
Sub-Dean Academics

Hajiya Bilkisu Muhammad Yusuf
Faculty Officer

Dr Sa'adatu Muhammad Julde
Sub-Dean Facilities

Dr Hauwa Kawu Bala
Faculty Examinations Officer

Heads of Departments

.

S/N	Name	Department
1.	Prof Sani Malami	Clinical Pharmacy and Pharmacy Administration
2.	Prof Sani S. Bello	Pharamceutical and Medicinal Chemistry
3.	Prof M.D Mukhtar	Pharmaceutical Microbiology and Biotechnology
4.	Prof M.S. Gwarzo	Pharmaceutics and Pharmaceutical Technology
5.	Prof S.Y. Mudi	Pharmacognosy and Herbal Medicine
6.	Dr Ibrahim Salahuddeen Muhammad	Pharmacology and Therapeutics

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BAYERO UNIVERSITY, KANO (BUK)

"University that acts as a symbol of the spirit of its community, the guardian of its morals, the formulator of its hopes and aspirations"

The seed of Bayero University Kano was the Ahmadu Bello College set up in 1960, located within the School for Arabic Studies (SAS), in the old city of Kano. With the establishment of Ahmadu Bello University, Zaria, in 1962, it was renamed Abdullahi Bayero College. In 1964 it moved to a temporary site at the old Kano Airport Hotel, admitting its first set of ten undergraduate students for a B.A. degree programme of Ahmadu Bello University (ABU). This first set graduated in 1966 but it continued as a faculty of ABU until 1980. Before then, the temporary site moved to its permanent site (present old campus) in the vicinity of Kabuga and Dukawuya gates on the Kano-Gwarzoroad.

The next phase of development occurred in 1975, when Abdullahi Bayero College was raised to the status of a University College with the right to award degrees on behalf of ABU and was renamed Abdullahi Bayero University College. All University Colleges in the country were raised to the status of full-fledged universities in 1977 and Abdullahi Bayero University College became Bayero University, Kano (BUK).

Due to rapid growth and expansion, BUK acquired another site (present new campus) in the neighbourhood of Rimingata and Janguza along the same Kano-Gwarzo road. The office of the Vice Chancellor, administrative arm of the University and some faculties were moved to the new campus in 1988. From one faculty at inception, BUK now has seventeen faculties, eleven centres, four schools and two colleges. The faculties are that of Agriculture, Allied Health Sciences, Arts and Islamic Studies, Basic Medical Sciences, Clinical Sciences, Communication, Computer Science & Information Technology, Dentistry, Earth and Environmental Studies, Education, Engineering, Dentistry, Law, Life Sciences, Pharmaceutical Sciences, Physical Sciences, Social Sciences and Management Sciences. Research Centers include: Centre for Dry land Agriculture, Centre for Biotechnology Research, Centre for Renewable Energy, Centre for Infectious Disease and Centre for Advanced Medical Research among others.

ABOUT PHARMACY

"Without medicines, healthcare is without credibility and substance"

Pharmacy is the health profession that links the health sciences with the chemical sciences and is charged with ensuring the safe and effective use of medication. The scope of pharmacy practice includes compounding and dispensing medications, clinical services related to patient care, reviewing medications for safety and efficacy, and providing drug information. Pharmacists are therefore, the experts on drug therapy and are the primary health professionals who optimize medication use to provide patients with positive health outcomes.

Pharmacy as a dynamic, information-driven, patient orientated profession, through its infrastructure, competence and skills, is committed to fulfill the healthcare needs of people by being the:

a) formulator, manufacturer, distributor and controller of safe, effective and quality medicine;
b) adviser on the safe, rational and appropriate use of medicine;
c) provider of pharmaceutical care by taking responsibility for the therapeutic outcome of therapy and by being actively involved in the design, implementation and monitoring of effective pharmaceutical services;
d) profession committed to competency and professionalism; and
e) profession committed to co-operation with other members of the healthcare team in the interest of the patient.

Philosophy

The Philosophy of the programme is to produce Pharmacists that can be leaders and innovators in pharmacy practice, policy and science as well as life-long experts in the safe and effective use of medicines.

Objectives

a) Provide students with a broad and balanced foundation in all the areas of pharmaceutical knowledge
b) Develop in the students the ability to apply pharmaceutical knowledge in Healthcare Delivery System
c) Instill in the students the dynamic value of the pharmacy profession, which makes life-long learning a necessity
d) Provide students with adequate knowledge and appropriate skill base from which they can proceed for further studies in specialized areas of Pharmacy
e) Develop an ability to observe and analyze the symptomatology of various disease states with emphasis on monitoring drug therapy
f) Provide students with pharmaceutical knowledge and professional skills to identify and solve drug and drug related problems.
g) Develop an ability to expand an adequate database from the patient, client and other health practitioners.

h) Develop an ability to independently use patients profile to evaluate and assess outcome of drug therapy.
i) To prepare the students for individual and/or collaborative research

Career Opportunities

Pharmacists are trusted and valued members of the community. The majority of pharmacists work as community pharmacists supplying and distributing medicinal products, giving information, advice and counseling to the community. Their role is continuously evolving and pharmacists are now involved in reviewing medication and advising medical practitioners about optimal drug therapy.

Pharmacists also play a leading role in other sectors. Hospital pharmacists work in multi-disciplinary teams with medical staff and allied health professionals to provide optimal patient care. They distribute and review medications, educate patients and health professionals to achieve quality use of medicines, and can perform clinical and applied research, including clinical drug trials.

Pharmacy graduates are highly sought after by the pharmaceutical industry in product development, manufacturing, medical, sales and marketing roles. They can also seek full time research work or pursue a research based higher degree.

Pharmacists are also employed by various government agencies, both federal and state, generally in positions concerned with the control, manufacture, supply and distribution of medicines.

DOCTOR OF PHARMACY (PHARMD) PROGRAMME AT BUK

The Doctor of Pharmacy (PharmD) programme at Bayero University, Kano (BUK) commenced in 2015/16 Session and first set of students were admitted.

Vision

To be a world-class Faculty renowned for its excellence in teaching & research and quality of its products

Mission

a) To provide world-class academic and professional training, community services and conduct research for the advancement of the society.
b) To produce high quality human resource with the requisite skills for the development of the host community, the nation and humanity.

Nomenclature

The name of the Degree to be awarded under the programme shall be Doctor of Pharmacy (PharmD). The degree shall also be non-classified degree. However, candidates with CGPA equivalent to first class shall qualify for distinction. Others outside this category will receive Pass degree.

Duration

The first degree curriculum leads to a Doctor of Pharmacy degree. The minimum time required for such a qualification, is five or six years after matriculation depending on the mode of entry.

Curriculum

The first year of the PharmD programme is a foundation year in which Biology, Chemistry, Mathematics, Physics, General Studies and Introduction to Pharmacy courses are studied. The remaining years are devoted to higher levels of Biomedical and Pharmaceutical sciences.

Because of the professional nature of the programme, candidates may not proceed to higher level until they passed all relevant courses of the preceding year. Based on that, courses are categorized into core (compulsory) or required.

i. Core Course: A course which a student must take and pass before proceeding to next level. Failure such of such course(s) may result to resit, repeat or withdrawal as the case maybe.
ii. Required Course: A course which a student must take and but not necessarily pass before proceeding to next level. Failure such of such course(s) may result to carry over but must be passed before graduation below.

FIRST YEAR COURSES (100 LEVEL)

S/N	Course Code	Course Title	Credit Units	Status
FIRST SEMESTER				
1.	GST111	Communication in English	2	Core
2.	COS101	Introduction to Computer	3	Core
3.	BIO101	General Biology I	2	Core
4.	BIO107	General Biology Practical I	1	Core
5.	CHM101	General Chemistry I	2	Core
6.	CHM107	General Practical Chemistry I	1	Core
7.	MTH101	Elementary Mathematics I	2	Core
8.	PHY101	General Physics I	2	Core
9.	PHY107	General Practical Physics I	1	Core
SUB-TOTAL			**16**	
SECOND SEMESTER				
1.	GST112	Nigerian Peoples and Culture	2	Core
2.	BIO102	General Biology II	2	Core
3.	BIO108	General Biology Practical II	1	Core
4.	CHM102	General Chemistry II	2	Core
5.	CHM108	General Practical Chemistry II	1	Core
6.	MTH102	Elementary Mathematics II	2	Core
7.	PHY102	General Physics II	2	Core
8.	PHY108	General Practical Physics II	1	Core
9.	PCY101	Introduction to Pharmacy	1	Core
SUB-TOTAL			**14**	
TOTAL			**30**	

SECOND YEAR COURSES (200 LEVEL)

NB: For this and subsequent list of courses, credit units are written as lecture + practical.

Code	Title	Credit Units	Total	Status
First Semester				
ANA2361	General Anatomy	3 + 0	3	Core
BCH2261	General Biochemistry	2 + 0	2	Core
GSP2206	Peace & Conflict Resolution	2 + 0	2	Required
PCG2201	Introduction to Pharmacognosy	2 + 0	2	Core
PCH2201	Introduction to Pharmaceutical Chemistry	2 + 0	2	Core
PCT2101	Pharmaceutical Calculations	1 + 0	1	Core
PCT2303	Introduction to Pharmaceutics & Pharmaceutical Technology	2 + 1	3	Core
PMB2301	Introduction to Pharmaceutical Microbiology	2 + 1	3	Core
PYS2265	General Principle & Blood Physiology	2 + 0	2	Core
PYS2267	Gastrointestinal& Renal Physiology	2 + 0	2	Core
PYS2269	Cardio-Respiratory Physiology	2 + 0	2	Core
Sub-Total			**24**	
Second Semester				
ANA2362	Histology	2 + 1	3	Core
BCH2362	Bioenergetics	2 + 1	3	Core
GSP2204	Foundation of Nigerian Culture, Government and Economy	2 + 0	2	Required
GSP2205	Philosophy and Logic	2 + 0	2	Required
PCG2302	Vegetable Drugs (Organized & Unorganized)	2 + 1	3	Core
PCH2302	Analytical Pharmaceutical Inorganic Chemistry	2 + 1	3	Core
PCT2302	Physical Pharmacy	2 + 1	3	Core
PYS2168	Practical Physiology	0 + 1	1	Core
PYS2264	Endocrine & Reproductive Physiology	2 + 0	2	Core
PYS2266	Neurophysiology and Special Senses	2 + 0	2	Core
Sub-Total			**24**	
Total			**48**	

NB: In addition to the above, direct entry students should also register the following

First Semester			
CSC2201	Introduction to Computer	2	Required
GSP2201	Use of English	2	Required
Second Semester			
GSP2202	Use of Library, Study Skills & ICT	2	Required
PCT2102	Introduction to Pharmacy	1	Required

THIRD YEAR COURSES (300 LEVEL)

Code	Course Title	Credit Units	Total	Status
First Semester				
CLP3201	Introduction to Clinical Pharmacy	2 + 0	2	Core
PCG3201	Separation Techniques, Fibre and Surgical Dressings	2 + 1	3	Core
PCH3201	Organic Pharmaceutical Chemistry I	2 + 0	2	Core
PCH3303	Pharmaceutical Analysis	2 + 1	3	Core
PCL3201	General Principles of Pharmacology	2 + 0	2	Core
PCL3303	Autonomic Pharmacology	2 + 1	3	Core
PCT3201	Dispensing Theory and Packaging	2 + 0	2	Core
PCT3203	Liquid Dosage Forms	2 + 0	2	Core
PMB3301	Aseptic Technique	2 + 1	3	Core
Sub-Total			**22**	
Second Semester				
CLP3202	Pharmacy Administration I	2 + 0	2	Core
CLP3103	Health Psychology	1 + 0	1	Core
CLP3104	Application of Computer in Pharmacy	1 + 0	1	Core
EEP3201	Entrepreneurship and Innovation	2 + 0	2	Required
PCG3302	Phytochemistry of Medicinal Plants	2 + 1	3	Core
PCH3302	Organic Pharmaceutical Chemistry II	2 + 1	3	Core
PCL3202	Autocoids, GIT and Systemic Pharmacology	2 + 0	2	Core
PCT3102	Dispensing Practical	0 + 1	1	Core
PCT3204	Semi-Solid Dosage Forms	1 + 1	2	Core
PMB3202	Introduction to Pharmaceutical Biotechnology	1 + 1	2	Core
Sub-Total			**19**	
Total			**41**	

FOURTH YEAR COURSE (400 LEVEL)

Code	Course Title	Credit Units	Total	Status
First Semester				
CLP4103	Essentials of Nutrition	1 + 0	1	Core
CLP4201	Pharmacy Laws and Ethics	2 + 0	2	Core
EEP4201	Venture Creation and Growth	2 + 0	2	Core
PAT4201	Pathology and Pathophysiology I	2 + 0	2	Core
PCG4301	Plant Tissue Culture Techniques and Biogenesis	2 + 1	3	Core
PCH4201	Instrumental Methods of Analysis of Pharmaceuticals	1 + 1	2	Core
PCL4303	Chemotherapy	3 + 0	3	Core
PCT4301	Solid Dosage Forms	2 + 1	3	Core
PMB4301	Microbial Chemotherapy	2 + 1	3	Core
Sub-Total			**21**	
Second Semester				
CLP4102	Pharmacy Communication Skills and Public Speaking	1 + 0	1	Core
PAT4202	Pathology and Pathophysiology II	2 + 0	2	Core
PCH4202	Medicinal Chemistry I	2 + 0	2	Core
PCL4202	Endocrine Pharmacology	2 + 0	2	Core
PCL4301	CVS Pharmacology	2 + 1	3	Core
PCT4202	Dosage Form Evaluation and Drug Stability	1 + 1	2	Core
PHS4302	Students Industrial Work Experience (SIWES) I	0 + 3	3	Core
PMB4303	Pharmaceutical Biotechnology I	2 + 1	3	Core
PMB 4202	Infectious Diseases and Pathogenesis	2 + 0	2	Core
Sub-Total			**20**	
Total			**41**	

FIFTH YEAR COURSES (500LEVEL)

Code	Course Title	Credit Units	Total	Status
First Semester				
CLP5101	Pharmacoeconomics	1 + 0	1	Core
CLP5203	Pharmaceutical Care	2 + 0	2	Core
CLP5205	Clinical Pharmacy Clerkship I	0 + 2	2	Core
CLP5207	Biostatistics and Research Methodology	2 + 0	2	Core
PCG5301	Herbal, Complementary and Alternative Medicines	2 + 1	3	Core
PCH5201	Medicinal Chemistry II	2 + 0	2	Core
PCL5202	Pharmacological Screening Methods	0 + 1	1	Core
PCL5201	Central Nervous System Pharmacology	2 + 0	2	Core
PCT5201	Advanced Drug Delivery	2 + 0	2	Core
PMB5101	Preservation and Quality Assurance	1 + 0	1	Core
PMB5203	Pharmaceutical Immunology and Vaccines	2 + 0	2	Core
Sub-Total			**20**	
Second Semester				
CLP5202	Veterinary Pharmacy and Agrochemicals	2 + 0	2	Core
CLP5204	Clinical Pharmacokinetics	1 + 1	2	Core
CLP5206	Pharmacotherapeutics I	2 + 0	2	Core
CLP5208	Pharmacy Administration II	2 + 0	2	Core
PCH5302	Drug Quality Assurance	2 + 1	3	Core
PCL5102	Biochemical Pharmacology	1+ 0	1	Core
PCL5304	Toxicology	2 + 1	3	Core
PCT5102	Ethical Dispensing	0 + 1	1	Core
PHS5301	Students Industrial Work Experience (SIWES) II	0 + 3	3	Core
PMB5202	Pharmaceutical Biotechnology II	2 + 0	2	Core
Sub-Total			**21**	
TOTAL			**41**	

SIXTH YEAR COURSES (600LEVEL)

Code	Course Title	Credit Units	Total	Status
First Semester				
CLP6301	Pharmacotherapeutics II	3 + 0	3	Core
CLP6603	Clinical Pharmacy Clerkship II	0 + 6	6	Core
PCH6201	Radio-Pharmaceuticals	2 + 0	2	Core
PCT6301	Industrial Pharmacy	2 + 1	3	Core
PHS6601	Project	0 + 6	6	Core
Sub-Total			**20**	
Second Semester				
CLP6102	Drug Information Services	1 + 0	1	Core
CLP6205	Public Health Pharmacy	2 + 0	2	Core
CLP6604	Clinical Pharmacy Clerkship III	0 + 6	6	Core
PMB6202	Pharmacogenetics and Omics	2 + 0	2	Core
Sub-Total			**12**	
TOTAL			**32**	

ADMISSION AND EXAMINATION REGULATIONS

ADMISSION

Candidates for admission into PharmD programme of Bayero University, Kano must satisfy the general admission requirements of the University. In addition, all candidates must be at least sixteen (16) years old.

Level I (UTME) Admissions

The following are the general entry requirements for admission into PharmD degree programmes through the Unified Tertiary Matriculation Examination (UTME).

a) An applicant may also be required to undergo Post-UTME screening exercise conducted by the University and obtain an acceptable score as may be set by Senate from time to time.

b) In addition to obtaining acceptable scores in UTME and Post-UTME, a candidate must also hold at least one of the following qualifications, with Passes at Credit level in at least five (5) O' level subjects which must include English Language, Mathematics, Biology, Chemistry, Physics obtained in not more than two sittings:

   i. Senior School Certificate (SSC) from the West African Examinations Council (WAEC) or the National Examinations Council(NECO)
   ii. General Certificate of Education Ordinary Level (GCEO/Level)
   iii. Any other qualification deemed equivalent to any of the above by Senate.

Level II (Direct Entry) Admissions

The following are the general entry requirements for admission into first degree programmes through the Direct Entry (DE).

a) An applicant must apply through the Joint Admission and Matriculation Board, (JAMB).

b) Candidate may also be required to undergo and pass a screening exercise conducted by the University.

c) A candidate must hold at least one of the qualifications listed in 2.1 (c), with a minimum of five credit passes obtained in not more than two sittings.

d) In addition, a candidate must also hold at least one of the following qualifications, with credit passes in Biology, Chemistry and Physics obtained from an institution recognized to run them:

   i. General Certificate of Education Advanced Level (GCE A/Level) with credit passes in all the subjects.
   ii. The Interim Joint Matriculation Board (IJMB) Certificate.
   iii. Acceptable Pharmacy Technician Diplomas from institutions accredited by Pharmacists Council of Nigeria(PCN)

iv. First degree of at least second class lower division in the medical, para-medical, biological, chemical, or physical sciences provided such candidates also had credit passes in Physics, Chemistry, Biology, Mathematics and English language at the SSCE, WASC, GCE 'O' level, NECO or its equivalent.
v. Any other qualification deemed equivalent to these by Senate.

Prohibition of Admission Deferment

A student admitted into the programme in a particular academic year cannot defer the admission/transfer to another year.

Prohibition of Change of Name

A student shall only use the name with which (s)he is admitted into the University and which appears on the qualifications used to secure the admission. This name shall be used in all certificates to be issued by the University.

Registration

Students are required to register all the prescribed courses in the curriculum for any particular session, unless otherwise advised. Students must consult with their respective academic advisers for guidance in registration. It is the responsibility of every student to ensure the completeness of his/her registration.

Type of Course System

The programme operates in modified course credit system. Subject areas consist of unit courses arranged in levels of academic progress viz 100 – 600 Level and assigned credit units as a measure of course weighing. One credit unit shall be equivalent to one hour of lecture and three hours of practical or tutorial per week per semester.

Course Coding System

A system of identifying a course using a combination of 3 letters and 4 digits shall be used. The 3 letters denotes department where the course reside, while the first of the four number digits denotes level; the second, the credit weight and the last two, the course serial number in the department.

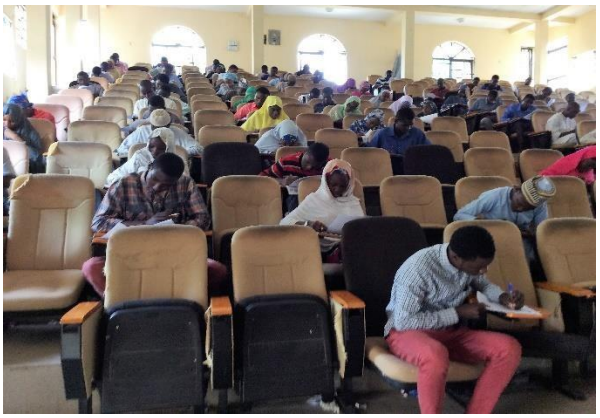
Instructional Methods

a) Formal lectures in classroom
b) Tutorials
c) Practical
d) Small-scale manufacturing and exposure to drug production
e) Pharmacy practice posting to community and hospital pharmacies
f) Clinical pharmacy wardround.

Student's Evaluation Methods

a) Informal/written examination
b) Continuous assessment by means of term paper, frequent tests (formal and informal)
c) Laboratory Reports
d) Oral presentation
e) Conduct and reporting of project work.

EXAMINATION



To be admitted into an examination, a student must have been registered for the relevant course, and must satisfy any University and Faculty requirements regarding attendance, practical and assignments.

a) Examination shall be administered at the end of each course, per semester
b) A student must have at least a 75% attendance of all lectures and practicals in order to be eligible to sit for an examination in a course. This provision can only be implemented if the Department is satisfied that proper attendance record has been kept.
c) In case of Industrial Training, student's performance shall be assessed as satisfactory or unsatisfactory at the end of the attachment period. Any student whose performance is deemed unsatisfactory shall be required to repeat the attachment.
d) Duration of Examination shall be subject to the general University regulations.

Pass Mark

i. The pass mark of 100 level, GSP and all other required courses shall be 45%.
ii. Except for Dispensing and Forensic Pharmacy courses, the pass mark for all courses in the 200 – 600 levels shall be50%.
iii. A pass mark of 60% shall apply to all dispensing courses, as well as Forensic Pharmacy (Pharmacy Law, Ethics and Jurisprudence).

Fractional marks are to be rounded to the nearest whole number.

Grading System

Courses for Level II and higher levels (except required courses) are to be graded and classified as follows:

Percentage Score	Letter Grade	Grade Point (GP)
70 and above	A	5
60 – 69	B	4
50 – 59	C	3
0 – 49	F	0

Continuous assessment shall carry 40% of the total marks for all courses

Item	Sub-Total	Total
Theory Continuous Assessment	25%	
Practical Continuous Assessment	15%	40%
Theory Examination	40%	
Practical Examination	10%	50%
Viva	10%	10%
Total		100%

- ✓ Practical examination is mandatory in all laboratory-based courses
- ✓ In departments that do not do Viva or Practical examination, the scores of such component shall be added up to the theory examination

A score of 50% (C, Pass) shall be recorded for any student who passes a course at a re-sit examination.

Progressing From One Level to Another

i. All the major Level I courses are to be assessed on subject basis by combining the marks of all the courses in a subject area and finding their weighted average, with the credit values of courses serving as their weights. Thus, single marks are to be reported for Biology, Chemistry, Physics and Mathematics. Students are to be assessed on sessional basis. Thus, first and second semester examinations are combined in determining the marks in any subject.

ii. To progress from Level I to II, a student must pass all four major Level I subjects (Biology, Chemistry, Physics and Mathematics).However,
   a. Student that fails not more than one subject will be given a chance to resit the failed component of that subject
   b. All required courses can be carried over but must be passed before graduation.

iii. To progress to any level beyond Level II, a student must pass all the courses of the previous level.

iv. **Resit**: A student who fails not more than one quarter (≤ ¼) of his/her credits shall resit the failed courses.

v. **Repeat:** A student who fails the resit examinations in any course shall repeat the level, subject to (viii) and (ix) below.

vi. A student who fails more than one quarter (> ¼), but not more than one half(≤ ½) of the credits shall repeat the level, subject to (viii) and (ix) below.

vii. **Withdraw:** A student who fails more than one half (>½) of the credits shall be required to withdraw from the programme.

viii. A student can repeat a level at most once.

Examination Misconduct

Candidates for any examination are to conduct themselves properly in and around the examination halls, deviations from the proper conducts may constitute examination misconducts. The following are the categories of examination malpractice and leakage offences, as well as the appropriate punishments for the offences.

A. Category of Offences Punishable by Expulsion from the University

i. Impersonating another student, or being impersonated by another person at an examination.
ii. Exchanging names and/or numbers on answer scripts/sheets.
iii. Introduction and use of relevant unauthorised material(s) into the examination hall.
iv. Exchange of materials (such as question papers, examination cards) containing jottings that are relevant to the on-going examination in the examination hall.
v. Theft and/or illegal removal of examination scripts.
vi. Any kind of mischief likely to hinder the smooth conduct of the examination. For example causing fire, flooding, or engaging in physical violence.
vii. Collaborating with, or copying from, another candidate.

viii. Cheating outside the examination hall, such as in toilets, hall of residence, etc.
ix. An offence that falls under category B committed by a student who was previously rusticated.
x. Using mobile phones and other ICT devices to access voice or text messages, documents, materials from the Internet, etc, during examinations;
xi. Any offence under this category committed by a student of this University in another institution.
xii. Destruction of, or tempering with, evidence by candidates – including preventing access to electronic devices.
xiii. Any other misconduct deemed by the Senate Committee on Examination Misconduct and Senate to warrant expulsion.

B. Category of Offences Punishable by Rustication

i. Facilitating/Abetting/Aiding cheating by another candidate.
ii. Introduction, but not use, of relevant unauthorised materials to the examination hall.
iii. Using mobile phones and other ICT devices in the examination hall for things unrelated to the on-going examination.
iv. Acts of misconduct (such as speaking/conversation) during the examination that is likely to disrupt the conduct of the examination.
v. An offence in category C committed by a previously warned or rusticated student.
vi. Any offence under this category committed by a student of this University in another institution.
vii. Any other misconduct deemed by the Senate Committee on Examination Misconduct and Senate to warrant rustication.

c. Category of Offences Punishable by Written Warning

i. Introduction of unauthorised irrelevant materials into the examination hall.
ii. Writing on the question paper.
iii. Failure to switch off mobile phones and other ICT devices, and/or failure to keep them out of sight.
iv. Any offence under this category committed by a student of this University in another institution.
v. Any other misconduct deemed by the Senate Committee on Examination Misconduct and Senate to warrant warning.

Graduation Requirements

To graduate from the PharmD degree programme, a student is required to have offered and pass all the subjects/ courses specified in the curriculum and satisfy all the requirements governing the award of Bachelors degree of Bayero University, Kano.

Becoming a Registered Pharmacist

To register as Pharmacist in Nigeria, graduates of the PharmD must pass pre-registration exam organized by the Pharmacists Council of Nigeria and complete one year Intern Training Program. The objectives of the internship experience are:

i. To give the graduate experience of applying in practice the knowledge and skill during the undergraduate course
ii. To develop the ability of the graduate to communicate clearly with members of the public and with members of allied professions
iii. To bring the graduate to the commencement of a career in pharmacy practice with a willingness to make professional decisions within current competence and a desire to continually improve competence through experience as well as study,and
iv. To give the graduate an appreciation of the need for continuing study throughout the professional career. More information is available on the *http://www.pcn.gov.ng/*

FACULTY OF PHARMACEUTICALSCIENCES

The Faculty of Pharmaceutical Sciences at Bayero University, Kano was established in 2015/16 session with six Departments.

The Departments are:

i. Clinical Pharmacy & Pharmacy Practice
ii. Pharmaceutical and Medicinal Chemistry
iii. Pharmaceutical Microbiology and Biotechnology
iv. Pharmaceutics and Pharmaceutical Technology
v. Pharmacognosy and Herbal Medicine
vi. Pharmacology and Therapeutics

In addition to the above departments, other Departments and Units of the University service the PharmD programme especially at 100 and 200 Levels. The General Studies and Entrepreneurship Studies are offered by the School of General and Entrepreneurship Studies, while Basic Science courses such as Biology, Chemistry, Mathematics and Physics are taken at relevant Departments under Faculties of Life and Physical Sciences. Biomedical Science courses such as Anatomy, Histology, Biochemistry and Physiology that are necessary at 200 level of the programme are handled by Departments in the Faculty Basic Medical Sciences.

Courses

The under listed courses are offered by more than one department within the faculty or other departments/unit within the University and therefore coordinated at faculty level.

LEVEL 100

BIOLOGY

BIO101 General Biology I (2 Units C: LH 30)

Cell structure and organisation, functions of cellular organelles, characteristics and classification of living things, chromosomes, genes - their relationships and importance, general reproduction, interrelationships of organisms (competitions, parasitism, predation, symbiosis, commensalisms, mutualism, saprophytism). Heredity and evolution (introduction to Darwinism and Lamarkism, Mendelian laws, explanation of key genetic terms), elements of ecology and types of habitat.

BIO102 General Biology II (2 Unit C: LH 30)

A generalised survey of the plant and animal kingdoms based mainly on study of similarities and differences in the external features, ecological adaptations of these forms. Briefs on physiology to include nutrition, respiration, circulatory system, excretion, reproduction, growth and development.

BIO107 General Biology Practical I (1 Unit C: PH 45)

Common laboratory hazards: prevention and first aid. Measurements in biology. Uses and care of microscope: compound and dissecting microscope. Biological drawings and illustration, scaling, accuracy and proportion. Use of common laboratory apparatus and laboratory experiments designed to illustrate the topics covered in BIO 101.

BIO108 General Biology Practical II (1 Unit C: PH 45)

Anatomy of flowering plants. Primary vegetative body: stem, leaf and root to show the mature tissues, namely parenchyma, collenchyma, sclerenchyma, xylem and phloem. Types of fruits and seeds. Care and use of dissecting kits and other biological wares. Dissection and general histology of animal tissues based on vertebrate forms. Morphology and functions of epithelial, muscular, nervous and connective tissues. Examination of various groups of lower invertebrates under microscopes, identification of various groups of organisms in the animal kingdom and any experiment designed to emphasise the practical aspects of topics in BIO 102.

CHEMISTRY

CHM 101 GENERAL CHEMISTRY I (2 Units C: LH 30)

Atoms, molecules, elements and compounds and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridisation and shapes of simple molecules. Valence Forces; Structure of solids. Chemical equations and stoichiometry; Chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry; rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102 GENERAL CHEMISTRY II (2 Units C: LH 30)

Historical survey of the development and importance of Organic Chemistry; Fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures, nanochemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The Chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

CHM 107: General Chemistry Practical I (1 Unit C: PH 45)

Laboratory experiments designed to reflect topics presented in CHM 101. These include acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

CHM 108: General Chemistry Practical II (1 Unit C: PH 45)

Laboratory experiments designed to reflect topics presented in CHM 102.

PHYSICS

PHY 101: General Physics I (Mechanics) (2 Units C: LH 30)

Space and time; units and dimension. Vectors and scalars. Differentiation of vectors: displacement, velocity and acceleration; kinematics. Newton laws of motion (Inertial frames, Impulse, force and action at a distance, momentum conservation). Relative motion. Application of Newtonian mechanics. Equations of motion. Conservation principles in physics. Conservative forces, conservation of linear momentum, Kinetic energy and work, Potential energy, System of particles, Centre of mass; Rotational motion; Torque, vector product, moment, rotation of coordinate axes and angular momentum. Polar coordinates; conservation of angular momentum; Circular motion; Moments of inertia, gyroscopes and precession; Gravitation: Newton's Law of Gravitation, Kepler's Laws of Planetary Motion, Gravitational Potential Energy, Escape velocity, Satellites motion and orbits.

PHY 102: General Physics II (Electricity & Magnetism) (2 Units C: LH 30)

Forces in nature; Electrostatics; electric charge and its properties, methods of charging; Coulomb's law and superposition; electric field and potential; Gauss's law; Capacitance; Electric dipoles; Energy in electric fields; Conductors and insulators, current, voltage and resistance, Ohm's law and analysis of DC circuits; Magnetic fields; Lorentz force; Biot-Savart and Ampère's laws; magnetic dipoles; Dielectrics; Energy in magnetic fields; Electromotive force; Electromagnetic induction; Self and mutual inductances; Faraday's and Lenz's laws; Step up and step down transformers: Maxwell's equations; Electromagnetic oscillations and waves; AC voltages and currents applied to inductors, capacitors, resistance, and combinations.

PHY 107: General Practical Physics I (1 Unit C: PH 45)

This introductory course emphasizes quantitative measurements, the treatment of measurement errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity and many

others covered in PHY 101 and PHY 102. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

PHY 108: General Practical Physics II (1 Unit C: PH 45)

This is a continuation of the experiments designed for PHY 101 and PHY 102 some of which have been covered under PHY 107.

MATHEMATICS

MTH 101: Elementary Mathematics I

(Algebra and Trigonometry) (2 Units C: LH 30)

Elementary set theory, subsets, union, intersection, complements, Venn diagrams. Real numbers; integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers; algebra of complex numbers; the Argand diagram. De-Moivre's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formulae.

MTH 102: Elementary Mathematics II (2 Units C: LH 30)

(Calculus)

Function of a real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation. Extreme curve sketching; Integration as an inverse of differentiation. Methods of integration, Definite integrals. Application to areas, volumes.

COMPUTER SCIENCE

COS 101: Introduction to Computer Science (2 Units: LH 30)

Survey of computers and information processing and their roles in society. This course introduces a historical perspective of computing, hardware, software, information systems, and human resources and explores their integration and application in business and other segments of society. Students will be required to complete lab assignments using the PC's operating system, and several commonly used applications, such as word processors, spreadsheets and graphics presentations applications. Internet and on-line resources, browsers and search engines.

GST 111 Communication in English (2 Units C: LH 15; PH 45)

Sound patterns in English Language (vowels and consonants, phonetics and phonology). English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations). Sentence in English (types: structural and functional, simple and complex). Grammar and Usage (tense, mood, modality and concord, aspects of language use in everyday life). Logical and critical thinking and reasoning methods (logic and syllogism, inductive and deductive argument and reasoning methods, analogy, generalisation and explanations). Ethical considerations, copyright rules and infringements. Writing Activities: (Pre-writing, writing, post writing, editing and proofreading; brainstorming, outlining, paragraphing). Types of writing, summary, essays, letter, curriculum vitae, report writing, note making and many

others. Mechanics of writing. Comprehension strategies: (Reading and types of reading, comprehension skills, 3RSQ). Information and communication technology in modern language learning. Language skills for effective communication. Major word formation processes. Writing and reading comprehension strategies. Logical and critical reasoning for meaningful presentations. Art of public speaking and listening. Report writing.

GST 112: Nigerian Peoples and Culture (2 Units C: LH 30)

Nigerian history, culture and art up to 1800 (Yoruba, Hausa and Igbo peoples and culture; peoples and culture of the ethnic minority groups). Nigeria under colonial rule (advent of colonial rule in Nigeria; colonial administration of Nigeria). Evolution of Nigeria as a political unit (amalgamation of Nigeria in 1914; formation of political parties in Nigeria; nationalist movement and struggle for independence). Nigeria and challenges of nation-building (military intervention in Nigerian politics; Nigerian Civil War). Concept of trade and economics of self-reliance (indigenous trade and market system; indigenous apprenticeship system among Nigeria peoples; trade, skill acquisition and self-reliance). Social justices and national development (law definition and classification). The Judiciary and fundamental rights. Individual norms and values (basic Nigerian norms and values). Patterns of citizenship acquisition; citizenship and civic responsibilities; indigenous languages, usage and development; negative attitudes and conducts. Cultism, kidnapping and other related social vices. Re-orientation, moral and national values. The 3Rs – Reconstruction, Rehabilitation and Re-orientation. Re-orientation strategies: Operation Feed the Nation (OFN), Green Revolution, Austerity Measures, War Against Indiscipline (WAI), War Against Indiscipline and Corruption (WAIC), Mass Mobilisation for Self-Reliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

DEAN'S OFFICE

PCY 101: Introduction to Pharmacy (1 Unit C: LH 15)

Orientation to Pharmacy - the role of a Pharmacist in health services. Opportunities in Pharmacy. History of pharmacy. Evolution of the Pharmacy profession. Various disciplines of Pharmacy. Stages in the development of a new drug. Concept of dosage forms. The prescription.

LEVEL 200

ANATOMY

ANA 2361: General Anatomy (3 Units: LH 45)

Basic Anatomy: Basic organization of the human body: A study of human biological structure at various levels of complexity: from sub-cellular to gross and microscopic structure of individual organ systems. Structure-function correlations are emphasized. Integumentary system. Circulatory system. Lymphoid system. Alimentary system. Musculoskeletal system. Respiratory system. Urinary system. Genital system. Endocrine system. Nervous System. Organs of special sense.

ANA2362: Histology (3 Units: LH 30; PH 45)

Histology: The Tissues. The lymphatic system. The alimentary system. The exocrine glands. The urinary glands. The reproductive system. Organs of special senses.

Embryology: General embryology - Male gamete, female gamete, fertilization (gametogenesis). Development of early embryo and developmental malformations.

Systemic embryology - musculoskeletal system, respiratory system, cardiovascular system, nervous system, urogenital system, and developmental malformations.

Genetic anatomy - genetic apparatus, and genetically related malformations. Influence of drugs on development.

Practicals – This will involve the use of plastic models and slides for histology and class demonstrations.

BIOCHEMISTRY

BCH 2261: **General Biochemistry (2 Units: LH 30)**

Importance of biochemistry to the health Sciences - levels of medical care and biochemistry. Membranes and cell structure techniques used in biochemistry and medicine. Protein structure and function- primary, secondary and tertiary structure of proteins in blood. Digestion, absorption and transport across membranes. Protein calorie malnutrition.

Metabolism - introduction of the study of intermediary metabolism. Carbohydrate chemistry, digestion, absorption and metabolism. Lipid chemistry, digestion, and metabolism including phospholipids and prostaglandins. Lipidoses. Metabolism of amino acids. Amino acid degradation and biosynthesis. Essential and non-essential amino acids. Ketogenic and glucogenic amino acids.

BCH2362: **Bioenergetics (3 Units: LH 30; PH 45)**

Nucleic acids - DNA, RNA and elementary treatment of their structure. Biochemistry of heredity. Discovery and properties of the genetic materials, DNA replication and cell division. Cloning and recombinant DNA Technology. Mutagens and mutation. Mechanism of protein synthesis. Biochemistry of hormones and hormonal action to include actions of cyclic-AMP, cyclic-GMP, adrenaline, glucagon and insulin. Detoxification mechanisms including cytochrome P_{450} and other isoforms. Haem degradation and other important biochemical transformation of medical importance.

PHYSIOLOGY

PYS2264: Endocrine and Reproductive Physiology (2 Units: LH30)

Introduction to endocrine glands, local and general hormones. Mechanism of action, regulation, function and abnormalities of thyroid, parathyroid, anterior and posterior pituitary hormones. Synthesis, regulation, functions and mechanism of action of adrenocortical hormones and aldosterone. Introduction and functional anatomy of male and female reproductive systems, fertilization and implantation, fertility and infertility.

PYS 2265: General Principle and Blood Physiology (2 Units: LH30)

Introduction to Physiology, definitions, organ system, homeostasis and feedback control system, role of organ system in homeostasis, cell structure and components, transport mechanisms across biological membranes and cell organelles.

Body fluids, composition and functions of body fluids. Cell physiology, excitable tissues, mechanism and properties of contractile tissues.

PYS2266: Neurophysiology and Special Senses (2 Units: LH 30)

Neurophysiology: Organisation of the CNS and CNS control systems. Spinal reflexes. Excitation and Inhibition. Localization of functions in the cortex. Motor system. Pyramidial and extrapyramidal sensory systems. Reticular formation. Cerebellum: Control of posture. Neurobiology rhythms. Sleep and unconscious states. Memory, learning.

Autonomic Nervous System: Parasympathetic and sympathetic neuroeffectors. Cholinergic mechanisms. Adrenergic mechanisms. Autonomic reflexes. Adrenal medulla. Autonomic drugs.

Special Senses: Eyeball: retina, sight, accommodation. Photochemical mechanism. Receptor potential. Light reflexes and adaptation. Ear: sound waves, hearing. Taste. Smell.

PYS2267: Gastrointestinal and Renal Physiology. (2 Units: LH 30)

General Introduction to GIT functions, enteric nervous system, GIT motility, GIT secretions, control and functions. Enterohepatic circulation. Abnormalities of GIT: pectic ulcer, diarrhea, cholera and jaundice. General functions of renal system, renal regulation of body water and electrolytes, urine formation, countercurrent mechanism, Acid-base balance, micturition and its abnormalities.

PYS2269: Cardio-respiratory Physiology. **(2 Units: LH30)**

Introduction and functional anatomy of respiratory system, pulmonary circulation, regulation of respiration, mechanism of breathing, pulmonary volumes and capacities, anatomic and physiologic dead space, respiratory regulation of acid-base balance, hypoxia, transport of oxygen by the blood, abnormalities and diseases of respiratory system. Physiologic anatomy, function and properties of cardiac muscles, cardiac action potential, pacemaker potential, conducting system of the heart, stroke volume, cardiac output, E.C.G., systemic circulation. heart rate and its control, blood pressure and its control, abnormalities and diseases of cardiovascular system.

PYS2168: Practical (1 Unit: PH 45)

Determination of full and differential blood count, packed cell volume, blood pressure, urinalysis, spirometry, visual acuity, hearing and reflexes.

GENERAL STUDIES

GSP2204: Foundation of Nigerian Culture, Government and Economy

Introduction and concept of culture; People of Nigeria and their cultures pre & post-colonial eras; The heritage of the past; Nigerian political system in pre and post-colonial era; Ethics and Nigerian legal system; Religion and national development in Nigeria; Historical analysis of education and national development in Nigeria; The Nigerian economy; Media, language and culture.

GSP2205: Philosophy and Logic

Definition, scope and historical origins of Philosophy; Main divisions and methods of Philosophy; Science and analysis of reality, metaphysics, ethics and epistemology; Idealism, materialism, naturalism and realism; Logical terms, Laws of thought, Nature and fundamental principles of logic; Logic as principle of reasoning; Relationship between logic and science, social sciences and humanities; Definition and types of arguments.

GSP2206: Peace Studies and Conflict Resolution

Basic concepts & terms in peace and conflict resolution; Theories of peace and conflict resolution; Dynamics, role and resolution of conflict in African Societies; Conflict management; Conflict and role of NGOs in conflict resolution; Achieving peace and reconciliation the African way (GACACA); Women and youth in peace building; Peace keeping operations in the African sub-region; Conflict and peace reporting in Africa; Conflict and conflict resolution in Nigeria; Unity, development and cooperation as analytical tools.

LEVEL 300

EEP3201: Entrepreneurship and Innovation

The Course is an introductory course for studying entrepreneurship for the first time. The course is aimed at creating awareness, providing the knowledge and skills that are important to achieving success in all human endeavours. Areas covered are: developing entrepreneurship/intrapreneurship, Nigerian entrepreneurship environment, creativity and intellectual rights, technological entrepreneurship, management of innovation, family business and succession planning, women entrepreneurship, social entrepreneurship and business opportunity evaluation.

LEVEL 400

EEP4201 Venture Creation and Growth

The aim of the course is to develop students' competence and confidence in creating viable business with high potentials for new value addition and high income. The course is designed to enable students achieve economic independence after graduation. Its main goal is to help change students' mindset away from paid jobs and over-dependence on families and government. The course covers concept of business and new value creation financing, theories of growth, sources of funds, marketing, opportunities for expansion, ethics and social responsibility and managing transition from start to growth.

PHS 4302: Students Industrial Work Experience (3 Units: PH 12 weeks) (SIWES I)

This is a supervised work-experience progress of approximately three months' duration, commencing with the long vacation or an appropriate date stipulated by the Industrial Training Coordinator.

During the programme, students are attached to pharmaceutical establishments including drug manufacturing units, hospital pharmacies and community pharmacies. Each student keeps a record of his/her training and experience during the programme in a log book and is visited for supervisory purposes by an academic staff member from the Faculty. In addition, an experienced pharmacist located in the pharmaceutical establishment to which the student is attached provides day-to-day supervision.

LEVEL500

PHS5301: Students Industrial Work Experience (3 Units: PH 12 weeks) (SIWES II)

This is a supervised work-experience progress of approximately three months' duration, commencing with the long vacation as in SIWES I. During the SIWES II, students are expected to be attached to other areas pharmaceutical practice different from the ones exposed to during the SIWES I.

LEVEL 600

PHS6601: **Project (6 Units: PH 270)**

It is expected that each student at the level of final year (fifth professional year) should carry out independently a project encompassing a written research dissertation as well as a specific amount of laboratory or field work in some fields. The period spent on such projects will have to be carefully guided.

Department of Clinical Pharmacy & Pharmacy Administration

Clinical Pharmacy is the science and practice of rational medication use.

It is the branch of pharmacy which pharmacists provide patient care that optimizes the use of medication and promotes health, wellness, and disease prevention. Clinical pharmacists are valuable information sources who provide scientifically valid information as to the best use of medications.

Staff

S/N	Name	Qualification	Rank
1.	Prof Sani Malami	BPharm, MSc, PhD Pharmacology (ABU)	Professor (Full time) HOD
2.	Dr. Hadiza Ma`aji	B.Pharm., MSc.(Clinical Pharm.), PhD (Clinical Pharmacy)	Associate Professor (Visiting)
3.	Dr. Abubakar Sadiq Wada	B. Pharm.2011, M.Sc. (Pharm) 2017 PhD Pharamcology (BUK)	Lecturer I (Full time)
4.	Safiya Bala Borodo	B. Pharm.2006, M.Sc.(Pharm) 2017	Lecturer I (Full time)
5.	Dr. Sa'adatu Muhammad Julde	B. Pharm.2011, M.Sc.(Pharm) 2018 PhD Pharmacology BUK	Lecturer I (Full time)
6.	Mustapha T. Idris	B. Pharm, 2020 MPH (Master in Public Health), in-view, M.Sc (clinical pharmacy) on going	Assistant lecturer (Full time)
7.	Nasiru A. Sani	B. Pharm, 2020 M. Sc. (Public Health), in-view	Assistant lecturer (Full time)
8.	Dr. Shuaibu Aliyu	B.Pharm. M.Sc., (Clin. Pharmacy & Biopharm.) 2014, M.Sc. Pharm. Chem. 2015, PhD Clin. Pharmacy 2021.	Senior Lecturer (Visiting)

Courses

LEVEL 300

CLP3201: Introduction to Clinical Pharmacy (2 Units: LH 30)

Introduction to clinical pharmacy. Principles of clinical pharmacy. Clinical pharmacy in the tropics. Use of medical terms and abbreviations. Patient medication profile. Drug-drug and drug-food interactions. Bioavailability and bioequivalence with emphasis on product registration with regulatory bodies. Compartment models: single and multiple compartment models. Drug clearance. Hepatic elimination of

drugs. Intravenous infusions. Multiple dosage regimens. Prolonged action dosage form administration. Non-linear pharmacokinetics. Calculation of various pharmacokinetic parameters

CLP3202: Pharmacy Administration I (2 Units: LH 30)

Definition, pharmacy business. Definitions of management and administration. Management process. Importance of management in pharmacy business (customers/patients/public relationship, retail competition, selling and promotion in hospital and community pharmacies). Industrial pharmaceutical organisations (medical and sales representative). Marketing (concept, functions, marketing mix and communication, product growth, salesmanship). Advertising and sales promotion. Personnel management (leadership, recruitment, remuneration, negotiation, staff training, evaluation, motivation and management). Entrepreneurial Development - Generating and developing business ideas. Conducting market surveys. Preparing a business plan. Selecting a business location, including roads, water and electricity supplies, and appropriate technology for the business. Policy and Legal Framework - Legal procedure. Information service. Intellectual property rights and patenting of inventions. Risk and insurance. Legal aspects of employment. Taxation. Ethics and good business practice.

CLP3103: Health Psychology (1 Unit: LH15)

General principles of psychology. Medical sociology. Role of psychology in healthcare delivery. Psychological factors in anxiety, depression and psychosomatic illness.

CLP3104: Application of Computer in Pharmacy (1 Unit: LH15)

Use of Internet in Pharmacy – role of computer/internet as information retrieval and example of web-sites that are related to pharmacy field e.g www.pcn.gov.ng, www.nafdac.gov.ng, www.healthcareforums.comwww.druginfonet.com.

Use of Computers in Retail Pharmacy Shop – Role of computer in retail outlet and examples of some software used in retail outlets e.g Business solution software, World standard drug database, Drug bank, MEDLARS (Medical Literature Analysis and Retrieval System) and DIALOG.

Hospital and Clinical Pharmacy – Role of computer in hospital pharmacy practice, Drug interaction software such as MEDIPHOR (monitoring and Evaluating of Drug interactions by a pharmacy oriented reporting) and PAD (Pharmacy Automated Drug Interaction Screening and Computer program are designed to calculate drug dosage to suit individual patients need and data storage.

Computers in Education- e.g. KINPAK is software used to obtain Area under curve (AUC), Peak plasma concentration (Cmax) and peak plasma time (tmax).

LEVEL 400

CLP4201: Pharmacy Laws and Ethics (2 Units: LH 30)

Ethics of pharmacy profession in Nigeria. Laws related to the National Agency for Food and Drug Administration and Control (NAFDAC), National Drug Law Enforcement Agency (NDLEA), Standard Organization of Nigeria (SON), Pharmacists Council of Nigeria (PCN), WHO/FAO Codex Alimentarium Commission, United Nations Narcotic Commission, Federal Environmental Protection Agency (FEPA), etc; Food, drug and cosmetics laws including regulation, inspection, registration, advertising, manufacture, and sale/distribution. Poison, dangerous drugs and Pharmacy Acts. Essential Medicine List (EML). Fake and counterfeit drug laws. Consumer protection council law. All other relevant laws

related to the practice of pharmacy including those of the Pharmacists Disciplinary Committee and Assessors rules, Pharmacists registration rule, Patent and Proprietary Medicines, etc. Legislation on animal health products. National Health Insurance Scheme (NHIS) and other health policies, and National Drug Policy.

CLP4102: Pharmacy Communication Skills and Public Speaking (1 Unit: LH 15)

Principles of communication. Appearance as a mode of communication. Various styles of listening and response to patient interview and education. Interpersonal communication. Emphatic listening. Conflict management, assertiveness, patient education and counseling. Patient interview. Medication history taking. Pharmacist relationship with other health care professionals.

CLP4103: Essentials of Nutrition (1 Unit: LH15)

Nutrition and food safety. Total parenteral nutrition in emergency cases e.g. shock, coma, and gastro-intestinal obstruction. Essential and non-essential amino acids formulation of total parental nutrition.

PAT 4201: Pathology and Pathophysiology I (2Units: LH 30)

The normal cell and the adopted cell. Cell injury, processes involved in cell death, cell adaptation, processes to injury, cell ageing and destruction of aged cells, inflammatory process (acute and chronic), and tissue repair, wound healing: fibrosis, scaring, etc. Neoplasia and its clinical aspects. Pathology of thromboembolic, immune, and genetic disorders. Pathology of systemic/deficiency diseases: diabetes mellitus; anaemia; gout; fluid and haemodynamic derangements; infectious disease; protein-calorie malnutrition; vitamins and minerals deficiency. Organ/System Pathology: blood vessels and the heart; lymph nodes and spleen; skin; liver; gastrointestinal tract' pancreas; breast and biliary tract.

PAT 4202: Pathology and Pathophysiology II (2 Units: LH 30)

This course is designed to provide the pathological and physiological foundation necessary for understanding the basis of pharmacotherapeutics. Focus will be on Pathophysiology and clinical manifestation of selected cardiac, pulmonary, metabolic, endocrine, gastrointestinal, hepatic, heamatologic and oncologic disorders. Effect of liver disease on drug disposition, rational use of supportive therapy in management of patients receiving chemotherapy. Principles of fluid and electrolyte therapy. Monitoring therapeutic outcomes.

After completing the course, the student will be able to describe the various pathophysiological mechanisms of disease processes which are vital for the drug use decision-making process. The student will acquire the scientific knowledge essential for the application of pharmaceutical care.

LEVEL 500

CLP5101: Pharmaco economics (1 Unit: LH15)

Definitions, overview of basic economics. Structure and politics of Nigerian health system. Healthcare costs. Pharmaco economic techniques i.e. cost minimization, cost effectiveness, cost utility, cost benefits. Pharmaco economic methods - objectives, study design, comparison of alternatives and cost assessment. Pharmaceutical outcomes. Health maintenance organizations (HMOs). National Health Insurance Authority (NHIA).

CLP5202: Veterinary Pharmacy and Agrochemicals (2 Units: LH 30)

Introduction to Veterinary Pharmacy. Formulation and storage of veterinary drugs. Administration of veterinary drugs. Growth promoters. Agrochemicals.

Common veterinary drugs – antibacterial, antiviral, antifungal, antiprotozoan and anthelmintics. Vaccines and other biologicals. Anti-inflammatory agents and

corticosteroids. Vitamins, heamatinics, dietary supplements, digestants and other feed additives. Insecticides, ascaricides and rodenticides. Disinfectants (antiseptics - topical and urinary).

CLP5203: **Pharmaceutical Care** **(2 Units: LH 30)**

Principles of pharmaceutical care including health promotion, proper nutrition, age-related changes affecting medication selection and effects. Direction, evaluation and reporting of adverse drug reactions. Pathophysiologic, pharmaceutical, pharmacologic, and therapeutic considerations in managing conditions such as pain, fever, nausea, vomiting, constipation, cancer and diarrhoea.

CLP5204: Clinical Pharmacokinetics **(2 Units: LH 15; PH45H)**

This course focuses on the utilization and application of pharmacokinetic principles in developing a pharmaceutical care plan for a given patient. Use of mathematical principles to predict drug disposition in individual patients will be emphasized. Effect-time and concentration-effect relationships will be explored.

CLP5205: Clinical Pharmacy Clerkship I **(2 Units: PH90)**

This practical course is designed to provide the opportunity for the student to have direct patient contact and associated pharmacy experiences. The course is constructed to enable the student to assimilate and apply his/her previously acquired pharmaceutical knowledge in a patient care environment. In addition, the student will progressively develop clinical pharmacy communication skills emphasizing empathy, education and ethics through interactions with a variety of patients on specific-drug related problems and medical diseases, improve professional communication and interpersonal relationship with other health care providers through ongoing interactions related to patient care issues and develop students to become pharmacists with good-problem solving skills and professional judgment.

Clerkship in hospitals should be conducted in such a way that the student is trained to achieve the following outcomes:

- Patients receive the maximum benefit from drug therapy.
- Appropriate selection of drugs and monitoring of drug therapy.
- Cost-containment initiatives in patient care.
- Pharmaceutical care provision in multiple-practice environments.
- Educational services on drug-related issues to other health care practitioners, pharmacy students and residents, patients and the community.
- Drug information services to clinicians, patients and the community.
- Play key roles in the development of disease specific drug-treatment guidelines.

Activities will cover history taking, medication records review, patient education and counseling, drug therapy monitoring, interventions and counter prescribing, health promotion, disease prevention and responding to symptoms. The students will be rotated through different sites including community pharmacies, and primary health care centers.

In consultation with hospital authorities, students will participate in each rotation under the instruction of a preceptor (registered pharmacist resident in the site) who will be assisted by a Faculty clinical instructor. In hospitals, students will also participate in ward rounds and be involved in drug decision-making process in the care of in-patients, in consultation with the medical/pharmaceutical consultants.

Each student will make an oral case presentation and submit a written report at the end of each rotation.

CLP5206: Pharmacotherapeutics I **(2 Units: LH30)**

This course will emphasize the application of the knowledge of the pathophysiology, clinical manifestations, laboratory interpretation of results,

epidemiology, biopharmaceutics and pharmaceutical care to develop skills in planning the rational therapeutic and non-drug therapy of selected diseases.
Case studies and WHO/other standard indicators/prescribing guidelines are employed as approaches to developing the ideas of rational drug therapy, monitoring drug therapy and drug interactions. Areas to be covered will include cardiovascular systems, nephrology, psychiatry/neurology, hematology/oncology, infectious diseases (including HIV/AIDS and STDs), common eye and ear disorders, paediatric and geriatric drug therapeutics, drug therapy in pregnancy and clinical toxicology.

CLP5207: Biostatistics and Research Methodology (2 Units: LH 30)

Review of basic statistics. Measures of central tendency. Paired sample hypothesis: parametric and non-parametric analysis. Multi-sample hypotheses and multiple comparisons. Two factor analysis of variance. Data transformations. Multi-way factorial analysis of variance. Linear regression and comparing linear regression equations. Simple linear correlation and multiple regressions. Binomial distribution, testing for randomness and analysing data using statistical computer packages. Designing research methodology. Selecting appropriate statistical test. Computer-based data analysis. Interpretation and evaluation of results.

CLP5208: Pharmacy Administration II (2 Units: LH 30)

Starting and managing a Pharmacy Enterprise: Pharmacy financing and administration (sources and limitations of funds, choosing between new pharmacies and buying existing one, purchasing part-time interest in existing pharmacy) and healthcare financing (government and donor finance, revolving funds, etc). Managing drug supply (drug procurement, quality assurance, storage, distribution, and inventory control/management). Finance and Record Keeping: Financing business venture. Costing and pricing products/services. Financial analysis and control (record-keeping systems, financial statements and their analysis, budgeting and cash flow).
Research & Development: Consultancy and research services. Product design, development and presentation. Launching of new products/services.

LEVEL 600

CLP6301: **Pharmacotherapeutics II (3 Units: LH45)**

This course emphasizes the application of the knowledge of the pathophysiology, clinical manifestations, epidemiology, diagnosis, biopharmaceutics and pharmaceutical care to develop skills in planning the rational therapeutic and non-drug therapy of selected diseases. Case studies and WHO/other standard indicators/prescribing guidelines are employed as approaches to developing the ideas of rational drug therapy, monitoring drug therapy and interactions.

Areas to be covered will include, fluid and electrolyte balance, pulmonary systems, gastroenterology, rheumatology, endocrinology, medical emergencies and critical care therapeutics including treatment of poisoning and adverse drug reactions.

CLP6102: Drug Information Services (1 Unit: LH15)

Information sources and services. Methods of use and the nature and status of information available such as books and journals. The pharmaceutical associations. Drug information centers, poison centers, self-help societies, industries and the Internet-based information. Skills required in disseminating information. Limitations on the use of drug leaflets. Legal status of advice from local drug information centers and its relationship to professional responsibility and negligence. Principles of information evaluation. Drug information service and monitoring/evaluation of adverse drug events.

CLP6603: **Clinical Pharmacy Clerkship II** **(6 Units: PH270)**

Same as in Clinical Clerkship I except that areas where students will be posted will include obstetrics and gynecology.

CLP6604: **Clinical Pharmacy Clerkship III** **(6 Units: PH270)**

Same as in Clinical Clerkship I except that areas where students will be posted will include general practice medicine and surgery as well as first aid and cardiopulmonary resuscitation.

CLP6205: Public Health Pharmacy **(2 Units: LH 30)**

This course will cover an overview of epidemiological methods. Epidemiology of communicable and non-communicable diseases. It will also cover literature search, data gathering modalities, questionnaire design, approaches to data analysis, operational research and experimental design and report writing. Other areas include Principles and concept of Primary Health Care (PHC). Drug use and management in PHC (commonly used drugs, drug selection and distribution/essential medicine list concept and drug information/education in primary health care, and Traditional Medicines in PHC with emphasis on health technology and available resources, community participation, etc;

Drug use in infertility and family planning management. Nutrition (good nutrition, nutritional status of the community and drug management/prevention of malnutrition). Provision of preventative, curative, promotive and rehabilitative services and public education/enlightenment in primary health care will be discussed with special emphasis on the role of pharmaceutical care in promoting public health.

Department of Pharmaceutical & Medicinal Chemistry

Pharmaceutical andMedicinal Chemistry are disciplines that are involved with design, chemical synthesis and development of pharmaceutical agents, or bio-active molecules (drugs).

Pharmaceutical & Medicinal Chemistry encompasses drug design, drug synthesis, and the evaluation of drug efficacy and drug safety. The disciplines focuses on the discovery of new drugs and the development of tools needed to monitor their large-scale synthesis and medical effectiveness.

Staff

S/N	Name	Qualification	Rank
1.	Dr Sani Bello Sai'du	BSc (BUK) MSc, PhD Pharmaceutical Chemistry (ABU)	Associate Professor (Full time)
2.	Prof Abdullahi Mustapha	BSc Pharmacy (ABU) PhD Pharmaceutical Chemistry(Chelsea College University of London)	Professor (Contract)
3.	Prof Ibrahim Adamu Yakasai	BPharm, MSc, PhD Pharmaceutical Chemistry(ABU)	Professor (Full time)
4.	Dr. Suleiman Danladi	B.Pharm (Unimaid), MSc Pharmaceutical Chemistry (UNISZA, Malaysia), PhD (ABU)	Senior Lecturer (Full time)
5.	Alkassim Hassan Mohammed	B.Pharm (ABU), MSc Pharmaceutical Chemistry (UNISZA,Malaysia)	Lecturer I (Full time)
6.	Najib Yahaya Sani	B.Pharm (ABU), MSc Pharmaceutical Chemistry (UNISZA, Malaysia)	Lecturer I (Full time)
7.	Maryam Umar Ibrahim	BSc (BUK), MSc Pharmaceutical Chemistry (UNISZA, Malaysia)	Lecturer II (Full time)
8.	Dr Asmau Hamza	B. Pharm. 2004 MSc. 2012 Pharm Chem. PhD 2022 Pharm Chem.	Senior Lecturer (Visiting)

Courses

LEVEL 200

PCH 2201: **Introduction to Pharmaceutical Chemistry (2 Units: LH 30)**

Introductory Pharmaceutical Inorganic Chemistry: Review of principles of thermodynamics, chemical and ionic equilibria. Chemical kinetics relevant to pharmacy, effect of these on the feasibility of drug synthesis, mixing, solubility.
Biological redox systems.
Introductory Pharmaceutical Organic Chemistry: Characteristics of organic chemistry, its relationship to other branches of chemistry and its relevance to pharmacy. Physical properties of organic compounds – melting point, boiling point, solubility. Classes of Organic Compounds; Structural concepts, nomenclature, occurrence, reactions, IR, physical and chemical properties with examples of some pharmaceutical agents.

PCH 2302:

Analytical Pharmaceutical Inorganic Chemistry (3 Units: LH 30; PH 45)

Introduction: Sources and Implications of inorganic impurities in Pharmaceutical products. Comparative study of the physico-chemical properties, preparation and uses of the elements of the periodic table and their compounds of pharmaceutical importance.
Preliminary Analysis (Dry Tests): Preliminary dry tests (action of heat, flame, colorations, charcoal block reductions, borax and phosphate bead reactions, ammonium radical test). Preliminary tests for acid radicals. Preparation of a solution of the solid. General scheme for the separation of cations into groups.

LEVEL 300

PCH 3201: Organic Pharmaceutical Chemistry I (2 Units: LH 30)

Reactivity of organic compounds - General review of the concept of aromaticity in benzene and how this affects substitution in such structures. General review of organic reactions lending to inter conversion and modification of functional groups through nucleophilic and electrophilic substitution, elimination, addition and rearrangement reactions. Utility of these reactions for isolation, characterisation, elucidation of structure and synthesis of medicinal products.

PCH 3302: Organic Pharmaceutical Chemistry II (3 Units, LH 30, PH45)

Stereochemistry - Review of total concept of stereoisomerism as distinct from isomerism of other types. Optical and geometrical isomerism. Chiral and achiral molecules. Resolution of racemic mixtures and importance in Pharmacy. Optical rotatory dispersion and its uses. Importance of stereochemistry in terpenes.
Organic synthesis of medicinal compounds such as preparation of benzocaine (Ethyl-p-aminobenzoate), preparation of aspirin, preparation of sulphanilamide;

PCH 3303: Pharmaceutical Analysis (3 Units: LH 30; PH 45)

Definitions, theories and applications of Acid- Base Titrations; Non-aqueous Acid-base Titrations; Oxidation-Reduction Titrations; Iodometric titrations; Complexometric Titrations; Gravimetric Analysis and other Miscellaneous methods such as Gasometric assays-carbon dioxide and oxygen, sodium nitrate titrations, mercuric acetate titrations.

LEVEL 400

PCH 4201: (2 Units: LH 15; PH 45)

Instrumental Methods of Analysis of Pharmaceuticals

Absorption spectrophotometry. Infra-red spectroscopy. Fluorimetry. Atomic Absorption spectroscopy. N.M.R. spectrometry. Gas-Iiquid chromatography. High Performance Liquid Chromatography. Mass spectrometry. Other methods such as Polarography, potentiometry; and polarimetry;

PCH 4202: Medicinal Chemistry I (2 Units: LH30)

Physicochemical approaches to drug design. Historical, Free-Welcon and Hansch approaches. The concept of isosterism. Bioisoterism as a tool in drug design. Structure-Activity-Relationship (SAR) in drug design. Anti-metabolite and pro-drug approach to design of new drugs.

A study of the following classes of drugs in respect of their nomenclature, physical and chemical properties, SAR, synthesis, assay, metabolism and uses: General and local anaesthetics, sedative-hypnotics, antipsychotics, anticonvulsants, analgesics, and antidepressants. Chemistry of drug metabolism.

LEVEL 500

PCH 5201: Medicinal ChemistryII (2 Units: LH30)

Study of the chemistry of medicinal compounds - The chemistry, nomenclature, physicochemical properties, stereochemistry, and synthesis (where necessary), structure-activity-relationship, metabolism and uses of the following groups of drugs: Antihypertensives, diuretics, steroids including steroidal hormones. Chemotherapeutic agents such as sulphonamides, anti-malarials, antibiotics, anthelmintics, trypanocides, schistosomicides, amoebicides, anticancer and antiviral agents.

Photochemistry - General principles. Characteristics of photochemical reactions and applications both in the synthesis and spoilage of drugs.

PCH 5302: Drug Quality Assurance (3 Units: LH 30; PH45)

Drug quality assurance system - Monographs and specifications for drugs and drug products. Applications of chemical and physicochemical analytical methods in purity determinations. Identification of pharmaceuticals, radio-pharmaceuticals and medicinal products. Basic tests methodology for essential drugs. Equivalence and bioequivalence of drug products. Biopharmaceutical methods in purity determination. Analysis of drugs in biological samples.

LEVEL 600

PCH6201: Radio-Pharmaceuticals (2 Units: LH 30)

Introduction to Radiopharmacy, Types of radioactivity and radio-active decay particles and their measurements. Pharmaceutical application of radio isotopes. Nuclear medicine.

Department of Pharmaceutical Microbiology & Biotechnology

Pharmaceutical Microbiology is the study of microorganisms associated with the manufacture of pharmaceuticals.

Pharmaceutical Biotechnology is a field that uses micro- and macroorganisms and hybridomas to create pharmaceuticals that are safer and more cost-effective than conventionally produced pharmaceuticals

Pharmaceutical Biotechnology is a rapidly evolving and multidisciplinary field that focuses on the new developments in the production of proteins, organisms, DNA-based vaccines, therapeutic proteins, downstream processing and characterisation, bioinformatics and advanced molecular principles.

Staff

S/N	Name	Qualification	Rank
1.	Prof. Muhammad Dauda Mukhtar	BSc, MSc, PhD Microbiology (BUK)	Professor Ag HOD (Full time)
2.	Aisha Mohammed	B.Pharm, MSc Pharm. Microbiology (ABU), PhD (BUK)	Senior Lecturer (Full time)
3.	Bashir Ado Kurawa	B.Pharm (ABU), MSc Biotechnology (Teesside University, UK)	Lecturer I (Full time)
4.	Dr HauwaKawuBala	BSc, MSc, PhD Pharmaceutical Microbiology (ABU)	Lecturer I (Full time)
5.	Abdurrahaman Umar Yola	B.Pharm (ABU), MSc (ABU)	Lecturer II (Full time)

Courses

LEVEL 200

PMB 2301: Introductory Pharmaceutical Microbiology (3 Units: LH 30, PH45)

- Historical development of microbiology and the effects on health.
- General structure of the bacterial cell. The bacterial spore, its structure and resistance to inactivating agents.
- Systematic classification of bacteria and characteristics of major groups – Taxonomy. Protoplasts, spheroplasts and L-Forms.
- Nutritional requirements and growth of bacteria. Bacterial culture media and evolution of pure culture technique.
- Enumeration of microorganisms. Fungi and moulds; their importance in pharmacy, and medicine.
- The Rickettsia, Chlamydia, Viruses (including HIV/AIDS) and viral

replication.
- Introductory parasitology. Protozoal parasites of Public Health importance.

Practical - Laboratory exposure for handling, identification and growing of microorganisms. Experiments to bring out other salient parts of the course.

LEVEL 300

PMB 3301: Aseptic Techniques (3 Units: LH 30, PH45)

- Antimicrobial agents as disinfectants, preservatives and antiseptics.
- Factors affecting microbial death, sterilization, aseptic techniques and processes.
- Water and its purity, water as a vehicle and sterile preparations. Production and storage of water and bacteriological examination of water.
- Quality determination of parenteral products
- Pyrogens and pyrogen testing.
- Evaluation of microbial contents of pharmaceutical preparations and products.
- Factory and Hospital hygiene.

Sterile Preparations

- Aseptic techniques
- Injections (small and large volumes), eye drops, eye lotion

Practical: Effect of dry and wet heat sterilization on a bacterial population as well as effect of heating with bactericides on bacterial survival.

PMB 3202: Introduction to Biotechnology (2 Units: LH 15, PH45)

- Introduction to biotechnology,
- Terms and Terminologies
- Techniques in biotechnology such as cutting and joining of DNA molecule, cloning, Polymerase chain reaction(PCR)
- Basic tools used in biotechnology
- Introduction to bioinformatics

Practical - Laboratory exposure to some of the theoretical aspect of the course.

LEVEL 400

PMB 4301: Microbial Chemotherapy (3 Units: LH 30, PH45)

- Brief historical perspective of chemotherapy.
- Fundamental principles of rational chemotherapy
- Selective toxicity principle.
- Classification of antimicrobial agents with special reference to mechanism of action and chemical structures. Drugs inhibiting cell wall synthesis (beta-lactam antibiotics). Inhibitors of protein synthesis (aminoglycosides, macrolides, tetracyclines). Drugs that interfere with cell membrane integrity. Inhibitors of RNA and DNA synthesis (quinolones).
- Miscellaneous antimicrobials e.g., sulphonamides, trimethoprim, fusidic acid, clindamycin, lincomycin, chloramphenicol.
- Antifungal agents.
- Antiviral agents. Interferon and interferon inducers.
- Development of resistance to antibiotics by microorganisms: plasmid mediated and biochemical basis.
- Control of emergence of resistance.

Practical - Laboratory exposure to some of the theoretical aspect of the course.

PMB 4202 - Infectious Diseases and Pathogenesis (2 Units: LH 30)

- General introduction and Terminologies
- Infections, mechanisms of infections, host-parasite relationship, transmission of infections. Pathogenesis.
- Identification and infection patterns of pathogenic organisms.
- Urinary tract, GIT and respiratory tract infections.
- Emerging and re-emerging diseases

PMB 4303: Pharmaceutical Biotechnology I (3 Units: LH 30, PH45)

- Fundamentals of biomanufacturing and industrial fermentation.
- Use of microorganisms in biotechnology, including search for cultures, approaches in strain development, genetic/enzymatic engineering techniques and selective isolation of mutants.
- Upstream and downstream processing.
- Primary and secondary metabolites.
- Bioentrepreneurship, including clinical trials registration. Intellectual property and patent rights of biotechnological products.
- Biosafety
- Biotechnological products and Pharmaceutical Care - an overview of relevant information service to patients on storage, re-constitution, stability, antigenicity, and self-administration.

Practical: Laboratory exposure to some of the theoretical aspect of the course.

LEVEL 500

PMB 5101: Preservation and Quality Assurance (1 Units: LH 15)

- General principles of spoilage and preservation against biodegradation.
- Raw materials quality.
- In-process microbiological controls.
- Quality Assurance of finished products.
- Limiting number of viable organisms.
- Principles of preservation of multiphase systems.
- Code of Good Pharmaceutical Manufacturing Practice (GPMP).
- Biotechnological manufacturing facility and environment. General layout, environmental requirements and associated quality assurance (QA) in production.

PMB 5202 - Pharmaceutical Biotechnology II (2 Units: LH 30)

- Clinical importance of recombinant proteins e.g. human insulin, growth hormones, interferon.
- Pharmaceutical immunology including but not limited to Engineering antibodies for therapy – production of monoclonal antibodies, recombinant antibodies and antibody fragment.
- Gene Therapy.
- Biotechnology in vaccines development – DNA vaccines, vaccine production by recombinant DNA for prevention of viral and bacterial infections.
- Identification of potential biotechnological products; plants and transgenic animals as potential sources of recombinant biotechnological products.
- Characterization of expressed proteins.
- An overview of biotechnological products in current use, including novel products and their use in therapeutics and diagnostics. Emphasis should also be made on their advantages over conventional drugs

PMB 5203: Pharmaceutical Immunology and Vaccines (2 Units: LH 30)

Principles of immunology. Antigen/antibodies reactions and applications. Antibody production. Antigen/antibody reaction – allergy. Immunological products. Immunization procedures. Bacterial and viral vaccines. Diagnostic reagents. Immunosera.

LEVEL 600

PMB 6202: Pharmacogenetics and Omics (2 Units: LH 30)

- Introductory Omics
- Genomics.
- Drug metabolism and disposition.
- Phenotyping, Genotyping and Drug-drug interactions with their implication and application in drug delivery systems

Department of Pharmaceutics & Pharmaceutical Technology

Pharmaceutics and Pharmaceutical Technology is designed to meet the needs of the pharmaceutical and related industries.

Pharmaceutics and Pharmaceutical Technology prepares students to work in manufacturing, research and development, and quality control and quality assurance departments of pharmaceutical, cosmetics, and related chemical industries.

Staff

S/N	Name	Qualification	Rank
1.	Prof. Mahmud Sani Gwarzo	BPharm, MSc, PhD Pharmaceutics (ABU)	Professor/HOD (Full time)
2.	Prof. A. K. Oluwosulu	B. Pharm, 1993 M.Sc. (Pharmaceutics), 2011; Ph D, (ABU)	Professor (Part time)
3.	Dr Halima S Mahmud	B Pharm 2002 M.Sc. (Pharmaceutics) 2009 Ph.D, 2016;	Associate Professor (Part time)
4.	Dr Salim Ilyasu	B.Pharm, MSc Pharmaceutics (ABU) PhD(ABU)	Lecturer I (Full time)
5.	Aliyu Babale	B.Pharm, MSc Pharmaceutics (ABU)	Lecturer II (Full time)
6.	Bashir Ibrahim Adam	B.Pharm, MSc Pharmaceutics (ABU) in view	Assistant Lecturer (Full time)

Courses

LEVEL 200

PCT 2101 Pharmaceutical Calculations (1CU; LH30)

- Utilize percent and ratio strength to calculate the quantity of an ingredient in a pharmaceutical preparation.
- Perform calculations involving preparation and use of stock solutions.
- Utilize the processes of alligation medial and alligation alternate in problem-solving.
- Calculate quantities of ingredients when reducing and enlarging formulas.
- Perform calculations related to the constitution of dry powders for solution or suspension.

PCT 2302 Physical Pharmacy (3 CU; LH30, PH45)

- Properties of Solutions. Solutions of liquids in liquids. Distribution of solutes

between immiscible liquids and applications of the distribution law in pharmacy. Colligative properties of solutions. Phase equilibria: The phase rule. Systems of one and two components and applications in pharmacy, e.g., eutectic mixture and sublimation (freeze drying). Dissolution and Solubility.

- Adsorption: The mechanism of adsorption: The Langmuir and B.E.T. isotherms. Chemisorption and factors affecting the amount adsorbed; Application of adsorption in pharmacy.

- Surface and Interfacial Phenomena: Surface tension, contact angle and the wetting of solids. Spreading of one liquid over another. Mechanism of capillary rise and effect of temperature. Method of determining surface tension.
- Surface active agents and their classification. Pharmaceutical applications and medicinal importance of surface active agents. Bulk properties of surfactant solutions. Micelle formation and methods for the determination of the critical micelle concentration (C.M.C.). Factors affecting micelles. Stability of micelles. Solubilization. Factors affecting solubilization, and pharmaceutical applications of solubilization.
- Colloidal systems. Classification of colloids. Properties of colloidal solutions. Preparation of lyophobic solutions. Stability of lyophobic colloids.
- Newtonian fluids. Flow characteristics of Newtonian fluids and effect of temperature. Determination of viscosity - principles of capillary tube, Redwood and falling sphere viscometers, rotational viscometers. The flow properties of disperse systems and viscosity coefficients of colloidal dispersions. Viscosity imparting agents in pharmacy. Non-Newtonian fluids. Plastic, pseudo plastic and dilatants flows. Thyrotrophic systems.

PCT 2303 (3CU; LH30, PH45)

Introduction to Pharmaceutics and Pharmaceutical Technology

- Fundamental operations in weighing: Errors in using dispensing balances. Minimum weighable amounts and weighing techniques. Conical and beaker shaped measures for dispensing liquids. Errors in measurements and measuring technique. Household measures and weighing of small amounts of materials.
- Principles, factors affecting choice of method, design and mode of operation of equipment used in Particle size analysis and Separation, Comminution, Mixing, Drying, Heat and Mass Transfer, Fluid Flow, Filtration, Distillation, Evaporation, Centrifugation and Extraction.

LEVEL 300

PCT 3201 Dispensing Theory and Packaging (2 CU; LH 30)

- Dispensing theory: Physicochemical characteristics of drugs and excipients
- Packaging- properties and functions of good packaging materials; advantages and disadvantages of materials used for packaging. Metals (e.g. tin, iron and aluminum) and plastics. Solvent properties, toxicity, permeability and light transmission characteristics. Glass - mechanical strength and resistance to thermal shock. Flake and specula formation. Paper and board. Closure testing. Folded, bung and push-on seals. Reasons for test failures. Package testing. Glass - mechanical strength and resistance to thermal shock. Flake and specula formation. Paper and board. Closure testing. Folded, bung and push-on seals. Reasons for test failures. Package testing.

PCT 3102 Dispensing Practical (1CU; PH45)

- Dispensing solutions, mixtures, linctuses, syrups, elixirs, oral liquids, emulsions, applications, lotions, gargles, mouth washes, nasal and ear drops etc.

PCT 3203 Liquid Dosage Forms (2 CU LH 30)

- Dosage Forms-Types of Pharmaceutical liquid preparations and principles involved in their formulation: Solutions, mixtures, linctuses, syrups, elixirs, oral liquids applications, lotions, gargles, mouth washes, nasal and ear drops e.t.c
- Dispersed systems. Suspensions: factors affecting the preparation of a physically stable suspension. Flocculated and deflocculated systems. Caking and re-suspension. Sedimentation behaviour of flocculated and deflocculated suspensions. Pharmaceutical applications of suspensions. Colouring agents used in the formulation of suspensions. Emulsions and emulsification: types of emulsion and testing of emulsion types. Theories of emulsions (Bancroft's Harbens oriented wedge and the complex film theories). Emulsifying agents and their classification. Methods available for the preparation of emulsions. Preservation and stability of emulsions. Concept of hydrophilic-lipophilic balance (HLB). Formation of emulsions by HLB methods. Methods for determining HLB numbers.

PCT 3204 Semi-solid Dosage Forms (2 CU; LH15; PH45)

- Semi-solid emulsions. Creams - types and preparations. Ointments - types of ointment bases and methods of preparation. Pastes - their bases and method of preparation. Jellies and Poultices - Kaolin Poultice B.P.C. Gels: The structure and properties of gels. Application of gels in pharmacy. Suppositories and pessaries. Methods of their preparation. Shapes and size properties of an ideal suppository base. Types of suppository bases. General methods of preparation of suppositories and their packaging.

LEVEL 400

PCT 4301 Solid Dosage Forms (3CU; LH30, PH45)

- Flow properties of powders. Cohesive pharmaceutical powders. Experimental methods used for measuring the "cohesiveness" of powder beds. Factors affecting the tensile strength of powders. Factors affecting the flow properties of powders. Granulation and tablet technology. Reasons for and methods of granulation. Essential granule properties. Tablet manufacture. Solid dosage coating. Types of coating materials and methods. Requirements for core tablets and coating of granules. Fluidized bed and compression coating. Capsules: Hard gelatin capsules materials for capsules. Method of capsule production. Capsule filling equipment and operations. Formulation and finishing of capsules. Soft gelatin capsules. Nature of the soft gelatin shells and of the capsule content. Modified-release dosage forms-Advances in solid dosage form technology.

PCT 4202 Dosage Form Evaluation and Drug Stability (2CU; LH15, PH45)

- Standard for tablets and capsules.
- Formulation factors affecting the dissolution rates of solid dosage form.
- *In-vitro* dissolution tests for liquids, semi-solid and solid dosage forms. Natural convention: Non-sink methods such as solvometer, hanging pellet, and static disc methods. Forced convention: Non-sink methods such as wruble, beaker, oscillating tube rotating disc methods. Forced convention: Sink

methods (adsorption, partition, dialysis and column methods, continuous flow through system, computerised automated systems). Correlation of *in-vitro* and *in-vivo* tests. Examples of correlation of *in-vitro* and *in-vivo* data of some drugs, e.g. aspirin, digoxin, griseofulvin and oxytetracycline tablets and capsules. Problems involved in obtaining perfect correlation

- Drug Stability. Incompatibilities in liquid dosage forms. Chemical degradation of pharmaceutical products. Physical factors influencing chemical degradation. Microbiological degradations. Accelerated stability testing.

LEVEL 500

PCT 5201 Advanced Drug Delivery (2 CU; LH30)

- Biopharmaceutics
- Drug Delivery Systems as it relates to Biotechnology. Recent Advances in drug delivery and technology. Delivery of biopharmaceuticals. Novel drug delivery systems: site-specific/targeted delivery, bioartificial organs, production of therapeutic proteins/biochemicals, gene therapy, protein/peptide delivery, liposomes, polymeric substances. Pharmaceutical Nanotechnology: Applications of nanomedicines in biomedical sciences.
- Ocular and Transnasal delivery systems.
- Transdermal Drug delivery systems. Drug release mechanisms.
- Pulmonary Drug Delivery-Aerosol Science and Technology. Formulation of aerosols. Basic aerosol technology. Formulation techniques of different aerosol systems. Factors affecting spray characteristics of aerosols. Filling techniques and testing methods of aerosol packs.
- Design of therapeutic and diagnostic agents.
- Design and Manufacture of medicines for pediatric and geriatric populations

PCT 5102 Ethical Dispensing Practical (1 CU; PH45)

- Dispensing of Prescription drugs, detecting drug interactions, contraindications

LEVEL 600

PCT 6301 Industrial Pharmacy (3CU; LH30; PH45)

- Industrial set-up and Production Processes: Systematic development of Pharmaceutical industry. Essential elements for setting up a viable Pharmaceutical industry including primary and auxiliary industries. Materials of construction, plant design, infrastructural facilities, building specifications. Production management. Potential and unexplored raw materials in Nigeria for Pharmaceutical industry: pilot plant, scale up technologies for tablets, capsules, semi-solids, etc.
- Formulation of herbal medicines into dosage forms. Standardization, stability studies, microbiological evaluation and standardization of doses.
- **cGMP**. General introduction with glossary of terms. General inspection, quality assurance and quality control procedures and sampling. Personnel and training. Building and environmental hygiene. Planning formula and manufacturing instructions. Handling of starting materials, packaging materials, intermediate products, and finished products. Standard and batch packaging and labeling instruction. Control of packaging materials and packing operations. Supervision of production, storage, transport and distribution. Manufacture and control of sterile medicinal products including premises processing environment, aseptic area and equipment.

Department of Pharmacognosy & Herbal Medicine

Pharmacognosy is the study of the physical, chemical and biochemical properties of drugs or potential drug substances of natural origin as well as the search for new drugs from natural sources.

The renaissance of herbal medicine creates a demand for studies in the field of pharmacognosy. From a practical perspective this includes:

- quality control (identity, purity, consistency)
- efficacy (therapeutic indications, clinical studies, pharmacological investigations)
- safety (adverse reactions, drug interactions, contraindications, precautions)

Staff

S/N	Name	Qualification	Rank
1.	Prof. Sulaiman Yusuf Mudi	BSc, MSc, PhD Chemistry	Professor/Ag HOD
2.	Idris Mas'ud Aliyu	B.Pharm (Unilag), MSc Herbal Medicine (UNISZA, Malaysia)	Lecturer I (Full time)
3.	Dr Saifullahi Umar	BSc Chem (BUK), MSc, PhD Pharmacognosy (ABU)	Senior Lecturer (Full time)
4.	Abdul'Azeez Aliyu	B.Pharm, MSc Pharmacognosy (ABU)	Lecturer II (Full time)
5.	Anas Abba	BSc Chem (BUK), MSc Pharmacognosy (ABU)	Lecturer II (Full time)

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Courses

LEVEL 200

PCG 2201: Introduction to Pharmacognosy (2 unit: LH 30)

- Definition, subject coverage and area application, relationship with other subjects, definition of terms e.g natural drug, synthetic, organised and unorganized drug.
- Classification of Vegetable Drugs: Alphabetically, morphologically, pharmacologically, and chemically. Plant description – morphology and anatomy. The cell differentiation and cell contents.
- Adulteration of crude drugs, courses, detection, Evaluation of crude drugs, different types of evaluation e.g Organoleptic, Microscopical, chemical, Biological and physical.
- Various publications on Pharmacognosy- pharmacopoeia text books, Classification under certain arrangements. E.g Alphabetical, taxonomical, morphological and chemical systems
- Cytology, cytomorphology, cytogenesis, plant cell wall: formation, structure and composition of the primary and secondary cell walls, various chemo-

microscopical test used in the detection of cellulose, hemicellulose etc

- Microscopy: definition, types of microscope, use and care of microscope, quantitative microscopy; use of Camera Lucida, graticules, eye-piece, determination of various physical constants involving microscopical character. Photomicrography: introduction, magnification, importance of microscope in the study of crude drugs and detection of adulterants, Cell inclusion; food reservoirs, waste product, secretory products.

PCG2302 -Vegetable Drugs (Organized & Unorganized) (3unit: LH30, P45H)

- General botanical characters and diagnostic features of different morphological groups of the plant structure. Detailed morphological study of leaves, barks, roots and rhizomes, woods, seeds, flowers, bulbs and fruits
- Macroscopical and microscopical characters of the whole and powdered drugs. Active constituents and tests for their identification, pharmaceutical and other uses, pharmaceutical preparations (where applicable),
- Unorganized (Acellular) drugs – Introduction, classification, occurrence, distribution, properties, and uses of various preparations, acellular products, starches, gums, mucilages, fixed oils, fats, waxes, carbohydrates and resins.
- **Practical:** Exercises shall be provided on identification of some common medicinal plants, vernacular names and uses of such plants in the Faculty garden or nearby available botanical garden. Tests for starch, gums fixed oils etc.

LEVEL 300

PCG 3301: (3unit: LH30, PH15)

Separation Techniques, Fibre and Surgical Dressing

- Extraction processes: definition, solvents used in the extraction of active constituent from natural drugs, extraction processes used in the preparation of galenical in pharmacy (preparation of infusion, decoction, tincture and extracts), official methods of extraction of crude drugs e.g maceration, percolation hot and cold extractions
- General separation techniques: filtration, sublimation distillation, crystallization techniques. Introduction to chromatography, principles, history importance and analytical studied etc. classification of chromatogphy; types of separation processes e.g absorption partition, frontal analysis displacement chromatography and elution chromatography etc
- Chromatographic techniques e.g Column, Paper thin layer gel filtration electrophoresis.
- Fibres and Surgical Dressing**:** Introduction, importance, relevance, uses and classification of various fibres (Vegetable, animal, synthetic and minerals etc test to distinguish the various type), production of various fibres (raw cotton, chemical wood pulp; Viscose rayon, calcium alginate silk etc), Surgical products: surgical adhesive tapes, protective and plasters, classification of dressing (dressing for general binding for sprains and fractures). Surgical tapes, textile tapes and plastic film tapes, non-stitch adhesive suture, Linen-testers.

PCG 3302 Phytochemistry of Medicinal Plants (3 unit: LH 30, PH45)

- Introduction: aims function and application of the subject Phytochemistry, importance of secondary metabolites as drugs, occurrence of plant products in modern prescriptions, classification of phytomedicines on the basis of their

pharmaceutical actions, introduction to phytochemistry as means of searching for new pharmaceuticals from plants

- Study of some medicinal plants with cardiovascular, antimalarial, steroidal properties, steroidal hormones of plant and animal origin, plant pigment and sugar substitute of plant origin.

LEVEL 400

PCG 4301 **(3 unit: LH30, PH45)**

Plant Tissue Culture Techniques and Biogenesis

Plant Tissue Culture – introduction, scope and methods of initiation of cultures, factors affecting growth of cultures and its advantages over intact plants for the production of medicinal plants and their constituents, e.g. products produced by cell cultures alkaloids, glycosides etc

Biogenesis of natural products – definition, importance of metabolism and metabolic pathways, definition of secondary metabolites and sources of energy for biosynthesis, types of biochemical reactions and biosynthesis of some selected groups of plant constituents including carbohydrates, alkaloids, glycosides etc

Practical: Practical exercise on preparation, initiation and production of plant tissues and cell cultures

LEVEL 500

PCG5301 Herbal, Complementary and Alternative Medicines (3 unit LH30, PH45)

This course will introduce various categories of alternative/complimentary medical practices and explores the reasons for the rising trend towards alternative medicine including cultural, socio-economic, immigration, and perceptions of conventional medicine. Mind-body interventions, manual manipulations, Asian and Chinese healing methods, aromatherapy, hypnosis, acupuncture, diet, homoeopathy. Nutrition and lifestyles, psychiatry, bone setting, and hydrotherapy. Global situation in the use of traditional medicine and regulatory aspects of alternative medicines. Detailed study on some Nigerian medicinal plants Herbaria. Nigerian economic plants. Forensic pharmacognosy and toxicological analysis of poisonous plants.

Practical/Demonstration: Case studies to enhance understanding of the relationship between the various alternative medical practices and orthodox medicine

Department of Pharmacology & Therapeutics

Pharmacology is the study of how chemical agents, both natural and synthetic (i.e., drugs) affect biological systems.

Pharmacological studies encompass investigation of the derivation, chemical properties, physiological and behavioral effects, mechanisms of action, biological transformations, and the therapeutic and non-therapeutic uses of drugs.

Pharmacology is often described as a bridge science because it incorporates knowledge and skills from a number of basic science disciplines including physiology, biochemistry and cell and molecular biology.

Staff

S/N	Name	Qualification	Rank
1.	Dr Ibrahim Salahuddeen Muhammad	BPharm, MSc. Pharmacology (ABU)	Senior Lecturer/HOD (Full time)
2.	Dr Abdullahi Hamza Yaro	BPharm. MSc, PhD Pharmacology (ABU)	Professor (Full time)
3.	Prof. L. Alhassan Bichi	BSc, Ph.D Pharmacology (University of London)	Professor (Full time)
4.	Prof Musa Aliyu	BPharm, MSc, PhD Pharmacology (ABU)	Professor (Full time)
5.	Prof Basheer A.Z. Chedi	BPharm. MSc. PhD Pharmacology (ABU)	Professor (Full time)
6.	Prof Sani Malami	BPharm, MSc, PhD Pharmacology (ABU)	Professor (Full time)
7.	Dr IgbiksTamuno	B.Med. Sc. MBBS, MSc Pharmacology (Unilag)	Senior Lecturer (Full time)
8.	Dr Murtala Jibrin	MBBS, MSc Pharmacology (Aberdeen), PhD (Manchester)	Senior Lecturer (Full time)
9.	Dr. Adamu Bello Shu'aibu	MBBS, MSc Pharmacology (BUK)	Lecturer I
10	Balarabe Abdullahi Nazifi	BPharm, MSc. Pharmacology (ABU), PhD (ABU)	Senior Lecturer (Full time)
11	Rabiu Abdullahi Abubakar	BPharm (ABU), MSc Pharmacology (UNISZA, Malaysia) PhD (BUK)	Senior Lecturer (Full time)
12	Dr Umar Sharif Abdussalam	MBBS, MSc Pharmacology (BUK)	Lecturer I
13	Dr Mustafa Abdullahi Huguma	BSc Biochem (BUK), MSc, PhD Pharmacology (ABU)	Senior Lecturer (Full time)
14	Adamu Ya'u	BPharm (ABU), MSc Clinical Pharmacology (UNISZA, Malaysia)	Lecturer I

15	Safiya Borodo	BPharm (ABU), MSc. Pharmacology(BUK)	Lecturer I
16	Dr Abubakar Sadiq Wada	BPharm (ABU), MSc. Pharmacology(BUK) PhD(BUK)	Lecturer I
17	Dr Sa'adatu Julde Muhammad	BPharm (ABU), MSc. Pharmacology(BUK) PhD(BUK)	Lecturer I

Courses

LEVEL 300

PCL3201: General Principles of Pharmacology (2 Units: LH 30)

Definition of pharmacology. Scope and sub-divisions of pharmacology. Methods and measurements in pharmacology: Drug development and evaluation. Biological assays. Clinical trials. Measurement and evaluation of toxicity. Pharmacokinetics: routes of drug administration, kinetics of drug absorption, distribution. Blood-brain-barrier, placental barrier, biotransformation and elimination. Pharmacodynamics: mechanisms of drug action, drug receptors, signal transduction and second messengers, selectivity of drug action, factors affecting drug action in man, dose-response relationships, agonists, antagonists and their interactions with receptors. Drug toxicity and adverse drug reactions.

PCL3202: Autocoids, GIT and Respiratory Pharmacology (2 Units: LH 30)

Autocoids, Ocular Pharmacology. Miotics and mydriatics. Drugs used in glaucoma. Ophthalmological diagnostic agents. Respiratory Pharmacology - Asthma and antiasthmatic drugs. Expectorants, mucolytics and antitussives. Gastrointestinal pharmacology - Laxatives and purgatives. Antidiarrhoeal drugs. Oral rehydration therapy. Antipeptic ulcer drugs. Spasmolytics, emetics and anti-emetics.

PCL3303: Autonomic Pharmacology (3 Units: LH 30; PH45)

Review of the anatomy and physiology of the autonomic and somatic nervous systems. General principles of neurohumoral transmission.

Cholinergic transmission. Synthesis, storage and release of acetylcholine. Muscarinic and nicotinic actions of acetylcholine. Muscarinic receptor agonists and antagonists. Cholinesterases and anticholinesterases. Drugs used in myasthenia gravis. Drugs affecting autonomic ganglia. Neuromuscular blocking agents.

Adrenergic transmission; Synthesis, storage, release and inactivation of noradrenaline. Neuronal and extraneuronal uptake mechanisms. Sympathomimetic amines. Adrenergic neuron blocking drugs. Drugs affecting the storage, release and disposition of neurotransmitters. Adrenoceptor blocking agents (alpha and beta blockers). Methods of studying neurotransmitters. Nitric oxide (NO) and non-adrenergic non-cholinergic (NANC) transmission.

LEVEL 400

PCL4301: Cardiovascular Pharmacology (3 Units: LH 30; PH45)

Physiology of the cardiovascular system. Cardiac glycosides. Anti-arrhythmics. Vasodilators. Antianginal drugs. Antihypertensive drugs including diuretics. Drug treatment of shock. Cholesterol and hypocholesteroemic drugs. Anticoagulants, fibrinolytics and Haematinics. Renal Pharmacology – Diuretics: osmotic diuretics, carbonic anhydrase inhibitors, thiazides, loop diuretics, potassium sparing diuretics. Urine-pH altering agents.

PCL4202: EndocrinePharmacology (2 Units: LH30)

Introduction to endocrine pharmacology. Hormones of the hypothalamus and pituitary gland. Thyroid and antithyroid drugs. Adrenocortical hormones. Oestrogen and progestogens. Hormonal contraceptives. Androgens, anabolic steroids; mineralocorticoids. Insulin and antihyperglycaemic drugs. Parathyroid hormone, calcitonin and vitamin D. Oxytocin and the ergot alkaloids.

PCL4303: Chemotherapy (3 Units: LH45)

The pharmacology of the following drugs: Sulphonamides. Beta-lactam antibiotics (penicillins, cephalosporins, carbapenems, and monobactams). Tetracyclines. Chloramphenicol. Aminoglycosides. Miscellaneous antibiotics - macrolides, polymyxins, lincosamides, quinolones, metronidazole,bacitracin.
Chemotherapy of tuberculosis and leprosy. Antifungal agents. Chemotherapy of protozoan parasitic infections: antimalarials, antiamoebics, drugs used in trichomoniasis, giardiasis, trypanosomiasis, leishmaniasis. Antihelmintics. Antiviral agents; HIV/AIDS treatment. Antineoplastic agents.

LEVEL 500

PCL5201: Central Nervous System Pharmacology (2 Units: LH 30)

Review of the functional organization of the CNS. Local and General anaesthetic agents. Pre-anaesthetic medication. Hypnotics and sedatives. Centrally acting muscle relaxants. CNS stimulants. Drugs used in Parkinson's disease. Drugs used in other neurodegenerative diseases. Antipsychotics. Antiepileptic drugs, Antidepressants and mood stabilizing drugs. Opioid analgesics and Non-steroidal anti-inflammatory Drugs (NSAIDs).

PCL5102: Biochemical Pharmacology (1 Unit: LH15)

Principles of biochemical pharmacology. Function of sub-cellular structures. Neurohumoral transmission. Biochemical basis of drug-receptor interactions. Biochemical mechanisms of drug resistance. Structure-activity-relationships of drugs.

PCL5103: Pharmacological Screening Methods (1Unit: LH15)

Pharmacological methods of screening drugs. Principles of drug evaluation. Determination of LD_{50} and ED_{50}

PCL5304: Toxicology (3 Unit: LH 30; PH45)

Introduction to toxicology. Pesticides, Insecticides, Herbicides, and Rodenticides. Solvent vapours and gases, Toxins of animal origin, Heavy metal poisoning and their antagonists. Food toxicology.