

Faculty of Pharmaceutical Sciences
DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY AND
INDUSTRIAL PHARMACY

M.PHARM AND Ph.D DEGREE PROGRAMME

PHILOSOPHY

There is the expanding need and demand for pharmacists who are adequately trained and equipped to respond to the existing and evolving new challenges and opportunities in the science and technology of dosage forms formulation, evaluation and storage. The master of pharmacy (M.Pharm) is designed to provide training in existing and emerging technologies in the science and technology of dosage forms, their formulation, evaluation, storage and their application in patients care in rapidly changing healthcare environment. It provides opportunities to integrate dosage forms development and formulation with the pharmaceutical care practice model, and research in local and global settings.

OBJECTIVES

The programme has the following objectives:

- (i) to train manpower in the areas of pharmaceutical technology and industrial
- (ii) pharmacy who are scientifically and technological fit in a competitive global environment.
- (iii) To train graduate pharmacists in the areas of powder and tablet technology, Current Good Manufacturing Practice, quality control of various pharmaceutical dosage forms, biopharmaceutics and pharmacokinetics, all forms of drug delivery science and technology and on research techniques.

SCOPE

Postgraduate studies will be offered in the areas of powder and tablet technology, semi-solid dosage design, cosmetic science, liquid formulation, technology, biopharmaceutics and pharmacokinetics quality control, novel drug delivery systems and phyto pharmaceuticals.

EMPLOYMENT OPPORTUNITIES

The Master of Pharmacy (M.Pharm) graduate of the programme are sufficiently prepared and equipped to work in (i) hospitals (ii) Pharmaceutical industries (iii) research institutes (iv) drug, water cosmetic food and chemical regulatory agencies (v) Civil Service and (vi) academia.

ENTRY REQUIREMENT

Master of Pharmacy programme

Candidate for the Master of Pharmacy (M.Pharm) programme must possess a Bachelor of Pharmacy (B.Pharm) degree in Pharmacy obtained from an approved pharmacy school with a

minimum grade point average (GPA) as applicable in the University of Nigeria, Nsukka Postgraduate Academic Regulations.

Ph.D Programme:

Graduates of University of Nigeria or other recognized universities with Bachelor of Pharmacy degree in Pharmacy and a Master of Pharmacy degree in Pharmaceutical technology, Industrial pharmacy, physical pharmaceutics with CGPA of at least 4.0 on a 5 point scale, 3.0 on a 4 point scale or their equivalent will be eligible for admission to a Ph.D programme in the department of Pharmaceutical Technology and Industrial Pharmacy.

MODE OF STUDIES

Master of Pharmacy and Ph.D Programme

The mode of study for the master of pharmacy programme (M.Pharm) in Pharmaceutical Technology and Industrial Pharmacy shall be by both course work and research work embodied in a thesis. The thesis constitutes 12 credit units. In addition to course work and thesis students are to attend Faculty Seminar and deliver at least one seminar in the course of their study.

Entrants to Doctor of Philosophy programme are to carry a total of 30 credit units comprising two course work of 6 credit units each, seminars of 6 credit units and thesis of 12 credit units. The seminars comprise, use of ICT in research grand writing, Ph.D proposal and final seminar and synopsis writing.

DURATION OF STUDY

Master of Pharmacy Programme

Full Time: 3 semesters minimum and 6 semesters maximum
Part Time: 4 semesters minimum and 8 semesters maximum

Ph.D Programme

Full Time: 6 Semesters minimum and 10 Semesters maximum
Part Time: 8 Semesters minimum and 12 semesters maximum

AREAS OF SPECIALIZATION

1. Powder and Tablet Technology
2. Dispersed Systems and Semi-Solids
3. Formulation science and Technology
4. Bipharmaceutics and Pharmacokinetics
5. Parenteral Dosage form Technology

6. Industrial Pharmacy

STRESS AREAS

Powder Technology
Tablet Technology
Disperse Systems and Semi-Solids
Current Good Manufacturing practices
Quality Assurance and Quality Control
Parenterals
Research Techniques
Novel Drug Delivery Systems
Biopharmaceutics and Pharmacokinetics
Industrial Work Experience
Seminar
Thesis

M.Pharm Programme

First Semester

<u>Course No.</u>	<u>Title</u>	<u>Unit</u>
PGC 601	Research Methodology & Application of ICT In Research (Masters Degree Course)	3
PTN 611	Advances in Powder and Tablet Technology	3
PTN 621	Current good Manufacturing Practice and Quality Control	3
<u>Second Semester</u>		
PTN 631	Disperse systems and Semi-solid	3
PTN 641	Biopharmaceutics & Pharmacokinetics	3
PTN 651	Industrial Work Experience	3
PTN 661	Seminar	3
PTN 690	Thesis	12
	Total	<u>33 Units</u>

PHD PROGRAMME

First Semester

PTN 721	Novel Drug Delivery Systems I	3
PTN 751	Use of ICT in Research	3
PTN 711	Proposal Seminar	3

Second Semester

PTN 732	Novel Drug Delivery System II	3
PGC 701	Synopsis and Grant Writing	3
PTN 752	Seminar	3
PTN 790	Thesis	12

Total

33 Units

COURSE DESCRIPTIONS

PGC 601 Research Methodology and Application of ICT in Research (Masters Degree Course)

In-depth research work aimed at acquiring full knowledge and presentation in scholarly writing of the concepts, issues, trends in the definition and development of the study area from African and Western perspectives. Major steps in research: Selection of problem, Literature review. Design, Data collection, analysis and interpretation. Conclusions Study of various research designs, Historical, Case Studies, Surveys, Descriptive, Cross sectional, Experimental etc. Analysis, surveys and synthesis of conceptual and philosophical foundations of different disciplines. Identification of research problems and development of research questions and or hypotheses. Detailed treatment of methods of collecting relevant research data and the format for presenting research results (from designing the table of contents to referencing, bibliography and appendix). Data analysis and result presentation in different disciplines using appropriate analytical tools. Methods of project/dissertation writing Application of appropriate advanced ICT tools relevant in every discipline for data gathering analysis and result presentation. Essential of Spreadsheets, Internet technology and Internet search engines. All registered Masters Degree students must attend a solution-based interactive workshop to be organized by the School of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course conducted by selected experts.

(3 Units)

PTN 611 Advance in Powder and Tablet Technology

Flow properties and other characteristics of powders, shear measurements. Advances in powder mixing and segregation. Physico-technical properties of powders. Advances in formulation, processing and quality control of compressed and coated tablets. Tablet problems and remedies. Mobilisation of local excipients for the pharmaceutical industry. Theory of compaction (pressure-hardness profile, mechanisms of consolidation), types of deformation. Determination of compaction behaviors.

(3 Units)

PTN 621 Current Good Manufacturing Practice and Quality Control

Current good manufacturing practice – general consideration; personal, premises, storage areas, equipment and starting materials; environmental implications and health considerations. Principles of quality control, design and limitations of specifications. Reference materials,

statistical methods, sampling for analysis, in-process quality control. Physical and chemical methods of analysis. Evaluation techniques for raw-materials, equipment and various pharmaceutical dosage forms, Quality control in relation to packaging materials.

(3 Units)

PTN 631 Disperse Systems and Semi-Solids

Advances in formulation, rheology and stability of emulsions, suspensions, ointments, creams and pastes. Suppositories, formulation and evaluation. Quality control of dispersed systems. Colloids, their classification, stability, manufacture and applications. Various areas of application of dispersed systems in drug delivery. Formulation of dispersed phase based cosmetic products. Biopharmaceutics and Toxicological considerations in cosmetic products.

(3 Units)

PTN 641 Biopharmaceutics and Pharmacokinetics

Studies of the influence of physical and chemical properties of drugs and formulation and biological action, Application of basic kinetic principles to the following: rates of release of active principles from a dosage form; rates of drug absorption distribution, and elimination as a function of route of administration and formulation factors. Influence of plasma proteins on the theories of drug receptor site interactions. Physico-chemical, formulation and biological factors affecting bioavailability. Drug- drug and food drug interactions and their implications in bioavailability and dosage form design. Pharmacokinetic aspects of new drug delivery systems. Basic pharmacokinetic parameters and their role in drug absorption distribution and eliminations.

(3 Units)

PTN 651 Industrial Work Experience

Practical studies in Pharmaceutical manufacturing laboratories and experience embodied in a report.

(3 Units)

PTN 661 Seminar

A student is expected to present two seminars in emerging areas of pharmaceutical research related to his area of specialization at the department and one final seminar at the Faculty level prior to submission of synopsis of his/her research work.

(3 Units)

PTN 690 M. Pharm Thesis

Original research by the student in chosen area of specialization to be embodied in the thesis to be defended before external and internal examiners.

(12 Units)

Ph.D Programme

1. PTN 721: Novel Drug Delivery Systems I

Course Content

Lipid based drug delivery systems self emulsifying drug delivery systems (SEDDS), formation, formulation, practical considerations, assessment of efficiency, role of SEDDS in

bioavailability in the gastrointestinal tract, materials used in the development of SEDDS, Applications of SEDDS. Amphiphilic block copolymers, their chemical modifications, block copolymer micelles for drug delivery, design, characterization and biological significance. Liposomes as drug carriers – properties, formulations and applications. Niosomes – structure, advantages, methods of preparation and application. Microspheres. Preparations and applications, mechanism of drug release from microspheres. Hot-melt Extrusion (HME) in dosage form formulation – advantages and applications, Formulation research and development, HME in commercial products. Nasal and ocular drug delivery systems, Transdermal drug delivery systems. **(6 Units)**

PTN 751 Use of ICT

How to assess information online on various subjects literature search and literature evaluation, citing of online information/data in research writing. Networking in research, video conferencing. **(3 Units)**

PTN 711 Proposal Seminar

All Ph.D students are to present a proposal seminar on their areas of research detailing objective of the research, research methodology and expected outcomes. The seminar should cover detailed literature on areas of research. **(3 Units)**

II. PTN 732 Novel Drug Delivery Systems II

Course Content

Nanomaterials, preparation of nanoparticles, applications in drug design. Nanocarriers, their applications and advantages of nano-based drug delivery systems. Nanocrystals, protein based nanoparticles, dendrimers, carbon nanotubes, organic nanoplateforms, polymeric nanoparticles. Integrated nanocomposite hydrogel nanoparticles, ceramic nanoparticles, carbon based nanoparticles. Integrated nanocomposite particles, use of nano particles in drug targeting – passive targeting, active targeting. Factors that impact the efficiency of nanodrug delivery systems – size and shape, surface characteristics. Safety concerns in nanodrug delivery manufacturing issues and economic barriers. **(6 Units)**

PGC 701 Synopsis Writing and Grant Writing

Identification of types and nature of grant and grant writing, mining of grants application calls on the internet. Determining appropriate strategy for each grant application. Study of various grant application structures and contents and writing of concept notes, detailed project description, budgeting and budget defense. Study of sample grant writings in various forms and writing of mock research and other grants. Identification of University of Nigeria synopsis structure and requirements, (Introduction, Methodology and Results). Determining the content of each sub-unit of the synopsis. Steps in writing of synopsis from the Dissertation/Thesis document. Structural and language issues. Common errors in synopsis writing and strategies for avoiding them. The roles of the student and the supervisor in the production of a synopsis. Writing of mock synopsis. All registered Ph.D students must attend a solution-based interactive workshop to be organised by the School of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course conducted by selected expert. **(3 Units)**

PTN 752 Seminar

This constitutes two seminars – one at the department and the other in the faculty. The research outcomes and contribution of the work to knowledge constitute this two seminars. Seminar at the departmental level is to be scored by only the approved Ph.D supervisors in the department and the supervisor on 50: 50% basis. **(3 Units)**

III. PTN 790 Doctoral Thesis

The Ph.D programme is a very well comprehensive research in any chosen area of specialization in Pharmaceutical Technology and Industrial Pharmacy.

(12 Units)

List of Approved Supervisor

Supervisor	Area of Specialization	Approved Programme
Professor S.I. Ofoefule, B. Pharm M.Pharm, Ph.D (Nig) MPSN, MIPAN, FIIA	Powder and Tablet Technology Drug Delivery Using Polymeric Materials and Drug Targeting, Nanoscience, Bipharmaceutics, Pharmacokinetics, Drug analysis and Phytomedicine. Novel Drug delivery systems, Hot melt Extrusion. Compaction of Pharmaceutical Powders, excipient development and functionality testing. Pharmaceutical Equipment Fabrication and evaluations.	M.Pharm & Ph.D
Professor A. Chukwu, B. Pharm; M. Pharm, Ph.D (Nig) FPC Pharm	Formulation of Pharmaceuticals and Cosmetics. Powders and Tablet Technology; Pharm Equipment and Industrial Pharmacy, Natural Product Formulations and Analysis, Biopharmaceutics and Pharmacokinetics	M.Pharm & Ph.D
Professor G.C. Onunkwo B. Pharm M.Pharm. Ph.D. (Nig) MPSN, MIPAN	Drug Delivery System, herbal formulations and evaluations, lipid based drug delivery systems. Tablet technology and drug quality control. Application of gums and polymeric materials in pharmaceutical formulations	M.Pharm & Ph.D
Professor J.O. Onyechi, B.Pharm M.Pharm Ph.D (Nig) MPSN	Formulation Sciences of Solid Liquid, Semi-solid dosage forms and Aerosol delivery Technology Industrial Pharmacy Practice including Validation processes.	
Dr. I. V. Onyishi, B. Pharm., M.Pharm, Ph.D. (Nig) MPSN	-Formulation Science and Technology of Dosage forms and their evaluation Excipient development and applications in Lipid drug delivery Micro and nano science Tablet and Technology Development &	M.Pharm

	standardization of Herbal medicines Drug Design, pharmacokinetics and pharmacodynamic of API	
Dr. N.C. Obitte, B.Pharm, M.Pharm, Ph.D (Nig) MPSN	Formulation Science and Technology of dosage forms. Lipid based drug delivery systems Tablet Technology and drug quality control.	M.Pharm
Dr. C.O. Agubata, B.Pharm, M.Pharm, Ph.d, MPSN	Formulation Science and Technology of Dosage forms. Lipid based drug delivery Systems, Tablet Technology and drug Quality Control.	M.Pharm