REVISED POSTGRADUATE PROGRAMME
DEPARTMENT OF PHARMACOGNOSY AND ENVIRONMENTAL MEDICINE
FACULTY OF PHARMACEUTICAL SCIENCES
UNIVERSITY OF NIGERIA, NSUKKA

M.PHARM, M.Sc. AND DOCTOR OF PHILISOPHY (Ph.D) DEGREE PROGRAMMES

Philosophy and Objectives

The Department of Pharmacognosy offers postgraduate courses leading to the award of the degrees of Master of Pharmacy (M.Pharm). Master of Science (M.Sc.) in Pharmacognosy. The basic philosophy in addition to the fundamental philosophy of the University is designed to encourage and promote the training/knowledge of students in all aspects of Pharmacognosy, pharmaceutical separation techniques, drug evaluation, ethnobotany, ethnopharmacology, clinical Pharmacognosy as well as environmental toxicology.

The Department of Pharmacognosy offers postgraduate courses leading to the award of the degrees of Doctor of Philosophy (Ph.D).in Pharmacognosy. The basic philosophy in addition to the fundamental philosophy of the University is designed to encourage and promote the training/knowledge of students in all aspects of Pharmacognosy, pharmaceutical separation techniques, drug evaluation, ethnobotany, ethnopharmacology, clinical Pharmacognosy as well as environmental toxicology.

The students on successful completion of the postgraduate programme are expected to be aware of their environment and appreciate the delicate balance between plant life and the needs of the society through their knowledge of the amazing facts of plant life and plant products. The successful postgraduate student will be able to originate and conduct meaningful and relevant research in a chosen field of Pharmacognosy, and act as a consultant for traditional herbal practitioners in the respective communities for standardization of useful medicinal plants.

Programme Structure/Mode of Studies

The programme is designed to give an understanding of the basic principles and in depth studies of various aspects of Pharmacognosy, pharmaceutical separation processes, drug evaluation and quality control as well as Phytochemistry as they relate to the course. All students are expected to participate in field trips and occasional excursions. Students may require supplementing the fund for these tours – field trips and excursions.
The Masters students should pursue the degree through coursework and project report/dissertation. Students must attend Faculty Seminar and deliver at least one seminar in the course of their study. The course details are shown below. The areas available for specialization includes: Phytochemistry: Biomedicinal chemistry: Ethnobotany; phytopharmacology, Drug evaluation and Quality control.

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The Doctor of Philosophy students should pursue the degree through coursework and the award of Ph.D degree will be based mainly on comprehensive research to be embodied in a Thesis. The candidates for Ph.D Programme are to carry a total of thirty credit units comprising; Thesis of twelve units, Research Grant Writing, Synopsis Writing, Seminars as well as elective courses. TheSeminars comprise the use of ICT in Research Grant Writing, Ph.D Proposal and Final Seminar and Synopsis Writing.Course details are shown below. The areas available for specialization includes: Phytochemistry: Biomedicinal chemistry: Ethnobotany; phytopharmacology, Drug evaluation and Quality control.

Entry Requirements
Candidates for the Master of Pharmacy (M.Pharm) or Master of Science (M.Sc) Programme must possess a Bachelor of Pharmacy (B.Pharm) or Bachelor of Science (B.Sc) Degree of Pharmacy or Botany (or related courses) obtained from approved Pharmacy school or University with a minimum grade point average (GPA) as applicable in the University of Nigeria, Nsukka Postgraduate academic regulations.

Graduates of University of Nigeria or other recognized Universities with Bachelor of Pharmacy degree in Pharmacy and Master of Pharmacy degree in Pharmacognosy or Bachelor of Science (B.Sc) in Botany or related courses and Master of Science in Pharmacognosy with a CGPA of at least 4.0 on a 5 point scale (60 % in a percentage weighting); 3.0 on a 4 point scale or their equivalent, will be eligible for admission to a PhD programme in the Department of Pharmacognosy and Environmental Medicines.

Duration of Programme

M. Sc/M. Pharm Programme
Full – time: A minimum of 3 Semesters
A maximum of 5 Semesters

Part – time: A minimum of 4 Semesters
A Maximum of 6 Semesters

Master's/Ph.D Programme
Full – time: A minimum of 8 Semesters
A maximum of 12 Semesters

Part – time: A minimum of 10 Semesters
A Maximum of 14 Semesters

Doctoral (Ph.D) Programme
Full – time: A minimum of 6 Semesters
A maximum of 10 Semesters

Part – time: A minimum of 8 Semesters
A Maximum of 12 Semesters

Job Opportunities
Students graduating from the department, having attained sufficient theoretical and practical skill may choose career in teaching and/or research in Universities, Research institutions, Civil service or Pharmaceutical industries.

LIST OF APPROVED SUPERVISORS

PROFESSORS

C.O. Ezugwu; B.Pharm, M.Pharm, Ph.D. (Nig.)	Phytochemistry and Phytoevaluation
S.I. Inya-Agha, B.Pharm; M.Phil. Ph.D. (Nig.)	Phytochemistry

SENIOR LECTURERS

C.E.C. Ugwoke;	B.Sc, M.Sc, Ph.D. (Nig.)	Phytoecology and Ethnobotany
U.E. Odoh;	B.Sc, M.Sc, Ph.D. (Nig.)	Phytochemistry, Drug Evaluation and Quality Control

COURSE CONTENT

First Semester

Course no.	Course Title	Units
PCG 601	Advanced Separation Methods	3
PCG 611	Chemotaxonomy and Comparative Phytochemistry 3	
PCG 621	Advanced Biomedicinal Chemistry	3
PCG 631	Quantitative Microscopical Analysis	3
PCG 641	Analytical Techniques	3
.	Second Semester	Unit
PCG 642	Medicinal and Poisonous Plants of Nigeria	4
PCG 652	Drug Design	4
PCG 690	Project Dissertation	12
	Compulsory Course	
PGC 601	Research Methodology and Application of ICT in Research	3

PHD COURSE CONTENT

First Semester

Course No.	Course Title	Units
PCG 701	Application of Bioinformatics in Biomedical Sciences	3
PCG 703	Seminar I	3
PCG 711	Chemotaxonomy and Advanced Phytochemistry	3
PCG 731	Phytogenetics and Plant Cell/Tissue Culture	3
PCG 741	Novel Drugs from Medicinal Plants	3

Second Semester

Course No.	Course Title	Units
PCG 704	Seminar II: Research Grant and Proposal Writing	3
PCG 742	Synopsis Writing	3
PCG 752	Advanced Structural Elucidation of plant Constituents	3
PCG 762	Herbal Medicine Formulation and Standardization	3
PCG 790	Doctoral Dissertation/Thesis	12

Compulsory Courses

PGC 701	Synopsis and Research Grant Writing	3

NOTE I: MINIMUM OF 30 UTNITS
NOTE II: RESEARCH PROPOSAL TO BE GIVEN WITHIN 3 MONTHS
NOTE III: PROGRESS REPORT TO BE COMPLETED EVERY 6 MONTHS

COURSE DESCRIPTION

PGC 601 Research Methodology and Application of ICT in Research

In-depth work aimed at acquiring full knowledge and presentations in scholarly writing of the concepts, issues, trends in the definitions and development of the study area from African and Western perspectives. Major steps in research; Selection of problem, Literature review, Designs, Data Collection, Analysis and Interpretation, Conclusion. Study of various research design, 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 spread sheets, Internet Technology and Internet Search Engines. All registered Masters Degree 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 the selected experts (3 Units)

PCG 601 Advanced Separation Methods

Theoretical concept, including partition chromatography, absorption chromatography. Advances in ion-exchange chromatography, gel filtration chromatography and zone electrophoreses. Column chromatography, paper chromatography and high performance liquid chromatography. Droplet counter current chromatography (DCCC). Flash – affinity – and zone analysis chromatography, the choice of a suitable chromatographic procedure. Application of these techniques in the quantitative separation of medicinal plant constituents. (3 units)

PCG 611 Comparative Phytochemistry

Introduction, definitions/terminologies; techniques in chemotaxonomy. Chemotaxonomy of medicinal plants. Differential accumulation of various groups of plant constituents by plant drugs. Chemical racism and plant genetics – Cytotoxic agents of plant origin. Alkaloids as drugs of addiction. Saponins and their relationship to steroidal hormones: Development of new therapeutic agents from natural products. (3 units)

PCG 621 Advanced Biomedicinal Chemistry

Metabolic pathway and aberrant reactions – physiochemical consideration in drug action. Annual endochemicals as sources of biologically active molecules – Modulation of natural products to improve their pharmacodynamic properties. Bio-precursors and carrier pro-drugs from natural products.(3 units)

PCG 631 Quantitative Microscopical Analyses

Advanced techniques in microscopical analysis of drug – Camera Lucida, polarizing microscopy. Electron Microscopy. Phase-contrast microscopy .Quantitative microscopy. Microscopical evaluation of crude drugs and standardization of crude drugs. (3 units)

PCG 641 Advanced Analytical Techniques

Spectroscopic evaluation of the active constituents of medicinal plants. Structure elucidation of secondary plant metabolics by a combination photometry. Condometry: Electrogravimetry: Tratcer Techniques (Use of Geiger-Muller Counters and Scintillation Counters): X-ray dittraction medicinal analysis; opical Rotary Dispersion in Drug Standization.(3 units)

PCG 642 Medicinal and Poisonous Plants of Nigeria:

Botanical and geographical sources, history, morphology, medicinal or toxic constituents and action of the important medicinal and poisonous plants growing in Nigeria – Therapeutic agents from African flora. (4 units)

PCG 652 Chemistry Drug Design

Physiochemical properties and biological activity – factors affecting drug action at the active sit-principles and applications of theoretical drug design Application of molecular orbital and negentropy to Drug Studies – influence of steroselectivity and molecular topography of medicinal substances. Differential approaches to chemical drug design. Fundamental structure and synthesis in drug research. (4 units)

PCG 690 Project Dissertation (12 units)

NOTE: Minimum of **30 Credit**units

PHD **COURSE DESCRIPTIONS**

PGC 701 Synopsis 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 Writing 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 of content of each sub-unit of the synopsis. Steps in writing of synopsis from the Dissertation/Thesis documents. Structural and language issues. Common errors in synopsis writing and strategies for avoiding them. The role of the student and 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 organized by the School of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course, conducted by selected experts

PCG 701): APPLICATION OF BIOINFORMATICS IN BIOMEDICAL SCIENCES
A detailed over view of bioinformatics; a treatise on the concepts of genomics, proteomics and their various applications in drug design, discovery and evaluation, plant DNA bar-coding etc. **(3 Units)**

PCG 703: SEMINAR I
Presentation of a seminar on any selected topic of current relevance after the approval of the supervisor and or the Departmental PG coordinator. This seminar must hold in the first semester of the first year of the programme. Another seminar which constitutes research outcomes and contributions of the work to knowledge should be given at the Departmental level. This should be score by the only approved Ph.D Supervisors in the Department and the Supervisor on 50:50% basis. **(3 Units)**

PCG 704: SEMINAR II RESEARCH GRANT AND PROPOSAL WRITING
Defense of a proposal for a research grant written on any selected topic of current relevance after the approval of the supervisor and or the Department PG coordinator. This seminar must hold in the second semester of the said year of the programme. **(3 Units)**

PCG 711: ADVANCED PHYTOCHEMISTRY:
Plant metabolic pathways and the biosynthesis of secondary plant metabolites – plant growth regulators. Importance of phyto-chemical constituents in plant taxonomy. Role of genetics, DNA/RNA hybridization in taxonomy. Phytochemistry of secondary metabolites from lower plants like algae, lichens, ferns and marine plants.**(3 Units)**

PCG 731: PHYTOGENETICS AND PLANTS CELL/TISSUE CULTURE:
The Gene as a hereditary material, structure and mode of expression; nuclear and cytoplasmic genes and their mode of inheritance; Gene mutation, chromosomal aberrations and polyploidy.Genetic base of plant cell/tissue culture. Techniques and applications of plant Cell and Tissue Culture for the production of plant metabolites with specific examples of alkaloids glycosides terpenes/steroids, and antibiotics obtained through plant cell and tissue cultures (Genetically modified medicinal plants). **(3 Units)**

PCG 762 : HERBAL MEDICINE FORMULATION AND STANDARDIZATION:

Basic principles of formulating herbal medicines into liquid, solid and semi solid/topical dosage forms including suspensions, infusions, tinctures, syrups, capsules, tablets, crams ointments etc. chemical and physicochemical properties of the crude drug that affect formulation processes and dosage forms. Biological test systems for evaluation of medicinal plant materials. Standardization of herbal medicinal formulations using simple spectroscopic, titrimetric and pharmacodynamics techniques.**(3 Units)**

PCG 741: NOVEL DRUGS FROM MEDICINAL PLANTS:
Medical plants as alternatives suitable for conventional standarddrugs. Phytopharmacology, biogenesis and therapeutics potentials of the following classes of drugs: Anti-tumour agents, Cariovascular drugs, Anti malarial, Anti-microbial, anti-diabetic, anti ulcer, anti hypertensive, immunomodulatory, Steroids and hormones of plant origin.**(3 Units)**

PCG 742: Synopsis Writing:
Students are to write synopsis based on the areas they covered in each academic session, and they are to submit a final synopsis to the Faculty Postgraduate Committee for assessment and scoring before the final copy is sent to the School of Postgraduate Studies for further necessary action (3 Units)

PCG 752: ADVANCED STRUCTURAL ELUCIDATION OF PLANT CONSTITUENTS
Methods for isolating and elucidating high molecular weight phyto-constituents.Structural elucidation of plant and invertebrate proteins of biological importanceand novel compounds from marine organisms.**(3 Units)**

PCG 790: DOCTORAL DISSERTATION/THESIS
Thoroughly researched and adequately analyzed results of the data which must contribute significantly to the overall knowledge and insight of Pharmacognosy and Environmental Medicine. **(12 Units)**

NOTE: Minimum **30 credit** Units

INSTRUCTION: The first two semesters of the Doctoral programme shall be devoted to course work and written examinations; the remaining sessions for Thesis, seminars and orals. Each Doctoral student shall complete and submit a progress Report (in the prescribed form), each

semester of his/her programme, through the supervisor, through the Head of Department and through the Dean of the Faculty to the Dean, School of Postgraduate Studies.