

UNIVERSITY OF ILORIN

FACULTY OF PHARMACEUTICAL SCIENCES

DEPARTMENT OF PHARMACEUTICAL AND MEDICINAL CHEMISTRY

Master of Science Degree in Pharmaceutical and Medicinal Chemistry

M. Sc. Pharmaceutical and Medicinal Chemistry

A. List of Academic Staff

Name	Status and Qualifications	Research Interest
N. S. Njinga	Senior Lecturer & Ag. Head of Dept. B.Sc. (Buea); M.Sc., Ph.D. (ABU, Zaria)	Natural Product Chemistry, Organic Synthesis
Moji T. Bakare-Odunola	Professor B.Sc. (Maiduguri); M.Sc., Ph.D. (ABU, Zaria)	Pharmaceutical Analysis/Medicinal Chemistry
S. T. Abdullahi	Reader B.Pharm., M.Sc. (ABU); Ph.D. (OAU, Ife)	Pharmaceutical Analysis, Pharmacokinetics
I. O. Eniayewu	Lecturer I B.Sc., M.Sc., Ph.D. (OAU, Ife)	Pharmaceutical Analysis/Medicinal Chemistry
*O. O. Dosumu	Professor B.Sc., M.Sc. (Ilorin); Ph.D. (Ibadan)	Natural Product Chemistry
*L. A. Usman	Professor B.Sc. (Ed), M.Sc. (Ilorin); Ph.D. (LAUTECH, Ogbomosho)	Natural Product Chemistry
*Modinah O. Abdulraheem	Professor B.Sc., M.Sc., PGDE (Ibadan); Ph.D. (Ilorin)	Analytical Chemistry
*O. Atolani	Senior Lecturer B.Sc., M.Sc., Ph.D. (Ilorin)	Medicinal Chemistry, Organic Synthesis

*Lecturers from other Departments

B. Introduction

Pharmaceutical and Medicinal Chemistry is one of the cardinal areas of specializations in pharmaceutical practice, which involves drug discovery and development. The Master of Science (M.Sc.) in Pharmaceutical and Medicinal Chemistry is to equip students for advanced studies in any of the four specialties viz., natural product chemistry, organic synthesis, medicinal chemistry, pharmaceutical analysis and quality control.

C. Philosophy

Provision of unique opportunities for learning and knowledge in drug discovery and development. Graduates of the programme will provide the middle-class manpower required in pharmaceutical services to the academic institutions, research institutes, pharmaceutical industries, regulatory agencies and other receptors in the health-care delivery system.

D. Aim and Objectives

The aim of the programme is to prepare students for the challenges of pure and applied research in Pharmaceutical and Medicinal Chemistry.

The objectives are to:

- i. provide in-depth knowledge through instruction, advanced techniques and theoretical aspects in the fields of Pharmaceutical and Medicinal Chemistry;
- ii. develop in the graduate, a sense of inquiry, ability for independent research and motivation to excel in the field of Pharmaceutical and Medicinal Chemistry;
- iii. produce graduates who can use and transform theoretical concepts into tools for solving problems for the well-being of humanity; and
- iv. produce middle class manpower in the pharmaceutical and health care delivery system for national development.

E. Admission Requirements

The followings are the requirements for admission of candidates into the M.Sc. (Pharmaceutical and Medicinal Chemistry) degree programme:

- i. 'O' level credits in five subjects (not more than two (2) sittings) including Chemistry, Biology, Physics, Mathematics and English Language.
- ii. Bachelor Degree in Pharmacy or its equivalent from recognized institutions, or:
- iii. Bachelor Degree in Science with a minimum of Second-Class Honours (Upper Division) in Biochemistry, Chemistry and Industrial Chemistry. Such candidates would be required to take some undergraduate courses as specified by the Department.

F. Duration of the Programme

The programme shall run on Full-time basis for a minimum of 18 calendar months and maximum of 24 calendar months with an extension of 12 months.

G. Detailed Course Description

- PCH 801 Pharmaceutical Analysis and Quality Control 4 Credits**
Standards in pharmaceutical analysis. Quality control. Quality standards in official compendia. Good Manufacturing Practice. Identification and limit tests. Recent advances in drug analysis: chemical methods, ultra violet-visible, infra-red, nuclear magnetic resonance, mass, Raman, and electron spin resonance spectroscopy. Application of reaction kinetics to quality control of drugs and stability studies. Bioassay.
45h (T); 45h (P); C
- PCH 802 Natural Products Chemistry 4 Credits**
Secondary metabolites of plants: terpenes, lactones, alkaloids, steroids, flavonoids, biflavonoids, anthocyanins, prostaglandins, stilbenoids, coumarins. Isolation, purification, and characterization of small organic molecules. Uses of chromatographic separation techniques: thin-layer chromatography, gel filtration chromatography, high pressure liquid chromatography, counter-current chromatography techniques.
45h (T); 45h (P); C
- PCH 803 Advanced Medicinal Chemistry 4 Credits**
Physicochemical properties influencing reactivity and biological activity of drugs: ionization, dissociation, partition coefficient. Ferguson's principle of isosterism. Bio-isosterism, Structure-activity relationship. Metabolism. Recent advances, uses, mechanism of action of some chemotherapeutic agents: antibiotics, antimalarials, antivirals antineoplastics. recent advances, uses and mechanism of action of some pharmacodynamic agents: hypoglycemics, antihypertensives, sedative-hypnotics, tranquillizers, antipsychotics, narcotic analgesics, other habit-forming drugs.
60h (T); C
- PCH 804 Organic Synthesis 4 Credits**
Chemical reaction mechanisms. General synthetic reaction patterns and strategies. Chemistry of protecting groups: alcohol, carbonyl, carboxylic and amino groups. Retrosynthetic analysis. Disconnections and reliability of reactions. Synthons: donor and acceptor, functional group interconversions, one group carbon-heteroatom and carbon -carbon disconnections, two group carbon-heteroatom and carbon-carbon

disconnections. Chemo-, regio- and stereo-selectivity Considerations and natural reactivity.

60h (T); C

PCH 805 Concepts in Drug Design 3 Credits

Drug design. Physicochemical approaches to rational development of new drugs. Stereochemistry and biological activity. Quantitative structure-activity relationships. Computer aided drug designs: molecular modelling, docking, scoring. Bioavailability studies. Drug design and dosage regimens. Recent advances in drug design

45h (T); C

PCH 806 Drug Metabolism and Pharmacokinetics 3 Credits

Pharmacokinetic principles. Pharmacokinetics of multiple dosage Regimens. Non-linear pharmacokinetics. Non-compartment analysis. Biochemical transformation of drugs. Recent advances in drug metabolism. Metabolite kinetics. Pharmacogenomics. bioavailability of drugs.

45h (T); C

PCL 804 Research Methodology and Biostatistics 3 Credits

Research philosophy, goals and objectives. Literature search. Research topics. Proposal and report writing. Experimental design. Pharmacologic screening techniques. Ethics in biomedical research. Care and use of laboratory animals. Data presentation. Statistical analysis: descriptive statistics, Students' t-test, analysis of variance, regression, non-parametric test.

30h (T); E

PCP 804 Research Methodology and Presentation 2 Credits

Research proposal writing. Literature search. Operational research and Experimental design. Data gathering modalities, Methods of data analysis. Report writing. Seminar and poster presentations.

30h (T); E

PCP 805 Biostatistics and Biocomputing 2 Credits

Basic biostatistics. Data comparison. Data transformations. Regression analysis. Survival analysis. Statistical consideration in questionnaire design and data gathering modalities. Validation of research instruments. Computer application.

30h (T); 45h (P); E

PCH 807	Seminar and Directed Reading Seminar presentation of literature review on an approved topic in the area of interest or specialization by each student. Attendance of seminars in the Department is compulsory. 90h (P); C	2 Credits
PCH 899	Thesis Completed original research on a topic, approved by the head of department in relevant area of specialization, which must be defended and graded before a panel of Internal and External Examiners. 270h (P); C	6 Credits

H. Graduation Requirements

To be awarded the M.Sc. degree in Pharmaceutical and Medicinal Chemistry, candidate must have registered and passed all core courses in addition to one or two elective(s). Additionally, a thesis, adjudged for its originality and substantial contribution to knowledge, and defended before Postgraduate School approved External Examiner must be submitted by the candidate. A minimum of 30 credits and maximum of 37 credits (inclusive of electives) are required for graduation made up of the followings:

Core courses	24 Credits
Elective courses	7 Credits
Dissertation	6 Credits
Total	37 Credits

I. Summary

Core courses

PCH 801 (4), PCH 802 (4), PCH 803 (4), PCH 804 (4), PCH 805 (3), PCH 806 (3), PCH 807 (2), PCH 899 (6).

Elective courses

PCL 804 (2), PCP 805 (2), PCP 807 (2).