

COLLEGE OF PLANT SCIENCE AND CROP PRODUCTION (COLPLANT)

DEPARTMENT OF CROP PROTECTION

INTRODUCTION

The Department of Crop Protection was carved out of the former Department of Crop Production and Crop Protection through the Senate approved restructuring of the Departments of Crop Production and Crop Protection, and Plant Physiology and Crop Ecology. The former Department of Crop Production and Crop Protection existed as a unit of the Department of Agricultural Management of the former Federal University of Technology, Abeokuta (FUTAB) that became College of Science and Technology, Abeokuta (COSTAB) and later University of Agriculture, Abeokuta in 1988.

The Department of Crop Protection conducts basic and applied research in crop protection on arable and permanent crops of Nigeria and indeed tropical Africa. These investigations utilise research laboratories, screen houses, phytotrons, insect museum, field laboratory and experimental plots on the University Crops farm and University Extension Villages. It also has close working relationships with other Departments and the Agricultural Media Resources and Extension Centre of the University. In its teaching and research activities, the Department actively co-operates with the International Institute of Tropical Agriculture (IITA) Ibadan, all Agricultural Research Institutes in the country as well as State Ministries of Agriculture.

POSTGRADUATE DIPLOMA

POSTGRADUATE DIPLOMA IN CROP PROTECTION

STRUCTURE

Course Title	Units
Courses	16
Field Report	3
Project	3
Seminar	2

Course Code	Course Title	Units
College Core Courses		
PDC 701	Principles of Crop Production	4
PDB 702	Design & Statistical Analysis of Experiments	3
Courses		
PDC 704	Principles of Entomology	3
PDC 705	Economic Entomology	3
PDC 706	Principles of Plant Pathology	3
PDC 707	Principles of Weed Management	3
PDC 708	Crop Ecology	3
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COURSE SYNOPSIS

PDC 701 – Principles of Crop Production (4 Units)

Environmental factors of Crop Production. Yield limiting factors and concepts related to their influence on crop growth. Production systems, stand diversity, plant distribution and crop yield.

PDC 704 - Principles of Entomology (3 Units)

Insect development and growth. Metamorphosis; General biology of major insect orders. Concepts of pests; factors leading to development of pests; types of pests and damage assessment. Ecological principles and population dynamics.

PDC 705 - Economic Entomology (3 Units)

Major insect pests of selected cultivated crops: cereals, legumes, vegetables, roots and tuber crops and tree crops. Insect Pests of stored products. Pest control strategies – cultural, chemical and biological. Behaviour of pesticides in environment. Classification of insecticides and general mechanism of their action.

PDC 706 - Principles of Plant Pathology (3 Units)

Fungal, bacterial and viral diseases of major crops of Nigerian Agriculture. Epidemiology of disease organisms. Major diseases of selected cultivated crops and their symptoms; cereals, legumes, roots and tuber crop, vegetables and tree crops. Disease associated with crops in storage. Nematodes of major crops. Disease and Nematode control strategies.

PDC 707 - Principles of Weed Management (3 Units)

Types of weeds. Weeds associated with cultivated crops and their control. Weed control: cultural, biological and chemical weed management; Herbicides, types, and mode of action.

PDC 708 - Crop Ecology (3 Units)

Ecosystems, ecological concepts; environment; ecological distribution of crops; plant succession.

M. AGRIC IN CROP PROTECTION

The M. Agric. programme in Crop Protection has options in the areas of Entomology, Nematology, Plant Pathology and Vertebrate Control. The aim of the programme is to produce agriculturists well versed in the art and science of crop protection. It involves both course work and thesis research.

Courses/Units (M. Agric.)

Course Code	Course Title	Units
	Compulsory College Courses	
SOS 715	Soil Fertility and Plant Nutrition	3
PBS 703	Bio-statistics	3
CSC 701	Use of Computer in Research	4

OPTIONS

Course Code	Course Title	Units
Entomology Option		
Core Courses		
CPT 710	Insect Physiology	3
CPT 711	Insect Morphology, Systematics & Taxonomy	3
PT 712	Insect Ecology & Behaviour	3
CPT 713	Principles & Methods of Entomological Research	3
CPT 714	Applied Entomology	3
		15
Nematology Option		
Core Courses		
CPT 715	General Morphology & Taxonomy of Plant Parasitic Nematodes	3
CPT 716	Functional Nematology/Agro-Nematology	3
CPT 717	Nematological Techniques	3
CPT 718	Economic Nematology	3
		12
Plant Pathology Option		
Core Courses		
CPT 719	Physiology of Fungi	3
CPT 720	Advanced Mycology	3
CPT 721	Bacteriology	3
CPT 722	Plant Virology	3
CPT 723	Principles & Practices of Plant Disease Control	3
		15
Vertebrate Control Option		
Core Courses		
CPT 724	Vertebrate Pests of Tropical Crops	3
CPT 725	Population Ecology	3
CPT 726	Principles & Practices of Vertebrate Pests Control	3
CPT 727	Pesticides	3
		12

Elective Courses

Not less than 6 units from other options.....	6
Dissertation.....	6
Seminar.....	2

Minimum number of units required for graduation is 36.

COURSE SYNOPSIS

CPT 710 - Insect Physiology

Structure and functions of the integumentary system, Digestive system, Respiratory system, Important maintenance activities, reproduction and Development, Co-ordination. Locomotion insects.

CPT 711 – Insect Morphology, Systematics and Taxonomy

Insect systematics, purpose and methods of identification classification, Components of biological classification. Taxonomic categories, Nomenclature, Classification of the Class Insects.

CPT 712- Insect Ecology and Behaviour

Ecology of insects – life system concept. Environmental components, Aquatic environment, Terrestrial environment. Intra-and inter-specific interactions, population dynamics. Community and Energy flow. Behaviour of insects, kinds of behaviour – aggression and dominant territoriality. Communication periodicity in behaviour.

CPT 714 – Applied Entomology

Principles of insect control – Definition and categorization of pests, Development of pest status. Insect pest damage Economics of insect pest attack, Forecasting Insect pest outbreak. Methods of Pest Control – Biological, Genetic, Environmental, Chemical, Mechanical, Physical, Legislative, Cultural, Host Plant resistance, Integrated Pest Management.

CPT 715 - General Morpho-anatomy and Taxonomy of Plant Parasitic Nematodes

Plant – parasitic nematodes, survey of different types, microscopy and nematode identification: Taxonomic characters, families and genera of important plant-parasitic nematodes in the Tropics.

CPT 716 - Functional Nematology/Agro-nematology

Nematodes in relation to other soil organisms, Plant-nematode relations or interactions; nematodes as biological agents of pest control; population dynamics of nematodes; Methods of nematode control in agricultural soils. Mechanisms of Resistance to plant parasitic nematodes.

CPT 717 - Nematological Techniques

Sampling for nematodes, nematodes extraction of nematodes from soil, extraction of nematodes from plant parts; preservation of nematodes, mounting of nematodes for microscopic work and for future references. Drawing of nematodes. Electron microscopy and nematology, Photomicrography.

CPT 718 - Economic Nematology

Economically important plant- parasitic nematodes of cereals, legumes, fibre crops, tree crops, root and tuber crops. Crop Loss Assessment. Diagnostic programmes in Nematology.

CPT - 719 - Physiology of Fungi

Growth and reproduction. The genetics of pathogenic fungi. Kinds of inoculum produced. Liberation of spores. General features of effective dissemination, Fungi diseases of national and international importance. Control measures, quarantine, cultural, chemical, host plant resistance etc.

CPT 720 – Advanced Mycology

Classification and nomenclature of plant parasitic fungi. Morphology, Biology and Ecology of fungi. Method in determining nutritional requirements of fungi effect of environmental factors on growth and sporulation.

CPT 721 – Bacteriology

Classification and properties of plant pathogenic bacteria. Growth and reproduction. The genetics of bacteria. Kinds of inoculum produced. Dissemination. Bacteria diseases of national and international importance. Control measures, quarantine, cultural, chemical, host plant resistance etc.

CPT 722 - Plant Virology

The nature of viruses growth and reproduction. The genetics of viruses. Kinds of inoculum produced. Dissemination, Virus diseases of national and international importance. Control measure, quarantine, cultural, borne infections. Vector host relationship in arthropod-borne infections. Methods in the study of plant viruses.

CPT 723 - Principles and Practice of Plant Disease Control

Pathogens, host plant and the environment. Phytoxicity. A review of methods and materials used in plant disease control and the problems involved in their applications.

CPT 726 - Pesticides

Classification, toxicology, mode of action. Pesticides in the environment. Pesticide calculations. Pesticides studies

ACADEMIC STAFF LIST

Name	Rank	Qualification	Area of Specialisation
Adeoti, A. Y. A	Professor	B.Sc, M. Phil(Ibadan), Ph.D (ABU)	Plant Pathology/Mycology
Afolami, S. O	Professor	B.Sc, Ph.D (Ibadan)	Nematology
Enikuomehin, O. A	Reader	B.Sc(Ekpoma),M.Sc, Ph.D (Ibadan)	Plant Pathology
Olatunde, G. O	Reader	B.Sc (Unilag), M.Sc, Ph.D (Ibadan)	Entomology
Pitan, O	Senior Lecturer	B.Sc (Unilag), M.Sc, Ph.D (Ibadan)	
Atungwu, J. J	Senior Lecture	B.Agric, M.Agric, Ph.D (UNAAB)	Nematology
Popoola, A. R	Lecturer I	B.Sc (Ife), M.Sc (Ibadan), Ph.D (Jos)	
Fajimi,	Lecturer II	B.Sc, Ph.D	Virology
Emily I. Ayo-John	Lectuer II	B.Sc, Ph.D	Virology
Osipita, A. A	Lecturer II	B.Sc(Ife), M.Sc, Ph.D(Ibadan)	

DEPARTMENT OF HORTICULTURE

INTRODUCTION

The Department was established by the University in 1992/93 academic session, to train both undergraduate and post graduate students in production, improvement, storage, processing and marketing of Horticultural crops.

The establishment of the Department is in recognition of the significant role horticultural crops play in agricultural development in Nigeria. Horticulture is a wide field, running parallel with agriculture.

Postgraduate training in Horticulture began in the 1993/94 session. Three programmes are offered: the Postgraduate Diploma in Horticulture (PDH), Master of Agriculture (M. Agric., Horticulture and the Ph.D (Horticulture). The complete curriculum for the Postgraduate Diploma takes one full academic year, the Master

programme takes two full academic years and the Ph.D programme three full academic years with or without course work. Thesis based on research work is required for the M. Agric and Ph.D programmes in addition to the required courses, particularly for the M. Agric programme. For the Postgraduate Diploma programme, only a project is required in addition to the specified courses to be taken by students.

The overall objective of the three post graduate programmes in the Department is to provide an advanced training/knowledge in the theories, practice and research in modern application of Horticulture to resource utilization and development in Nigeria in particular and the whole world in general. Students are trained for future challenges in the areas of Olericulture (vegetable crop production and processing), Pomology (fruit crop production and processing), Floriculture (cultivation and management of ornamental, flowering and shade plants) and Landscape Gardening (development and decorative planting of garden, ground, tourist centers, recreational centers, fishponds, round-about, lawns, etc).

In addition, landscape Architecture is offered to students who are particularly interested in beautification of indoor and out-door environments. Career opportunities in Horticulture also include handling and processing technology of exotic horticultural crops and extension aspects of Horticulture.

Postgraduate diploma in Horticulture programme is aimed at people with first degree in agriculture, botany and biology and related professionals in the field who wish to upgrade their knowledge in the special areas of Horticulture.

Admission is therefore open to candidates who have been working with Ministries of Agriculture at State or Federal level, Research Institutes and other relevant organizations or sectors. Such candidates must have had considerable field experience in Crop production, research and/or Extension and those with similar exposure in Landscape Horticulture practices.

Candidates must have minimum of First Degree in Agriculture, Horticulture, Botany and related fields from University of Agriculture, Abeokuta and any University recognized by senate. Holders of Higher National Diploma at upper credit level in General Agriculture or Crop Science with three years field experience may be considered. Preference shall be given to those who are sponsored by their employers.

POSTGRADUATE DIPLOMA IN HORTICULTURE

The programme shall comprise course work, field trips, projects and seminar presentations, as specified below:

Course Title	Units
Course work	16
Field Report	3
Project Report	3
Seminars	2

Total Units (minimum) for the award of P.G. Diploma = 24 Units

Post Graduate Diploma Course Work

First Semester

Course Code	Course Title	Units
	College Core Courses	
PDC 701	Principles of Crop Production	4
	Departmental Courses	
PDH 701	Introduction to General Horticulture	3
PDH 703	Greenhouse use and Maintenance	2
PDH 707	Seminar	1
PDH 799	Project Work	3
		13

Second Semester

Course Code	Course Title	Units
PDB 702	Design and Statistical analysis of Experiments	3
PDH 702	Horticultural Crop Propagation	3
PDH 704	Advanced Nursery Management practices	2
PDH 706	Elements of landscaping/Floriculture	3
PDH 708	Seminar	1
PDH 799	Project Work	3
PDH 710	Field Report	3
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M. AGRIC. IN HORTICULTURE

Facilities are provided in the department of Horticulture for postgraduate course and research leading to the degree of Master of Agriculture in Horticulture. A student is, however, free to incline to any of the following specific areas:

- i. Post Harvest Physiology and Produce Storage
- ii. Vegetable Production and Improvement
- iii. Tropical Fruit Production and Improvement
- iv. Ornamental Crops Production

The candidate for the M. Agric in Horticulture is required to meet the University of Agriculture, Abeokuta requirements for admission into post-graduate studies. Graduates should have a minimum of Second Class Upper Division obtained in areas of Agriculture, Horticulture, Crop Science and Agronomy. In special cases, candidates with a Second Class Upper Degree in Botany may be considered. However such candidates may require additional time to complete required background courses. In exceptional cases, candidates with a Second Class Lower Degree may be considered. Holders of UNAAB PGD in related areas may be considered.

STRUCTURE

Course Title	Units
College courses (compulsory)	9
Core courses	15
Electives	4
Thesis Research	6
Seminars	2

Total minimum units for award of M.Sc. Degree = 36

First Year – First Semester

Course Code	Course Title	Units
	Compulsory College Courses	
PBS 703	Bio-statistics	3
SOS 715	Soil Fertility and Plant Nutrition	3
CSC 701	Use of computer in Research	4
		10

Compulsory Departmental Core courses

Course Code	Course Title	Units
HRT 701	Post harvest Physiology and Produce handling	3
HRT 703	Propagation Techniques in Horticulture	3
HRT 705	Produce Handling Facilities and Structures	2
HRT 797	Seminar	1
		9

Elective Courses

Course Code	Course Title	Units
HRT 707	Advanced Vegetable Crop Production/Olericulture	3
HRT 709	Introductory Biotechnology	3
		6

First Year – Second Semester

Course Code	Course Title	Units
	Compulsory Departmental Core courses	
HRT 702	Physiology of Harvested Horticultural Crops	3
HRT 704	Control of Crop Growth and Development	3
HRT 798	Seminar	1
		7

Electives

Course Code	Course Title	Units
HRT 706	Advanced Pomology	3
HRT 708	Advanced Floriculture/Ornamental Horticulture	3
		6

Second Year – First and Second Semesters

Course Code	Course Title	Units
HRT 799	Dissertation	6
		6

DOCTOR OF PHILOSOPHY (Ph.D) DEGREE IN HORTICULTURE

The candidate for Ph.D Degree is required to meet the University of Agriculture, Abeokuta requirements for admission into post-graduate studies. However, candidates should hold good M. Agric. Degree in Horticulture of the University of Agriculture, Abeokuta or its equivalent from any University recognised by Senate. Holders of one year M.Sc. Degree with average course score of 60% and above may be considered on the condition that they shall register for M. Agric/Ph.D in the first instance, and then change over to full Ph.D programme, purely on merit.

The Ph.D. Degree in Horticulture is basically by Research. However, there may be course work, which will vary depending on the background of the candidate but would contain the relevant courses that have not been taken at M.Sc. Degree Level and in some cases may include courses in related basic sciences.

SYNOPSIS FOR POST GRADUATE DIPLOMA COURSES

PDH 701 – Introduction to General Horticulture

Scope of horticultural science; vegetable crop, fruit/plantation crop production and ornamental crop production; nutritional and aesthetic aspects; importance of nursery and greenhouse; environmental factors for growth and sustained yield, cultural practices for production; harvesting and post-harvesting handling of produce, career prospects in various branches of horticulture.

PDH 702 – Horticultural Crop Propagation

Asexual and sexual methods of propagation: Seed treatment, raising and handling of desired transplants; growth culture, micro-propagation techniques.

PDH 703 – Greenhouse use and Maintenance

Siting architecture, infrastructure facilities, provisions of environmental requirements, sanitation and general maintenance

PDH 704 – Nursery Management

Definition and types of nursery, site selection and preparation, propagation techniques, structures and facilities, environmental requirement of nurseries, cultural and maintenance practices; handling of transplants.

PDH 706 – Elements of Landscaping

Introduction to landscape plan preparation, identification of tropical ornamental plants, culture of trees, shrubs and flowers. Shade trees: annual, biennial and perennial shrubs and hedge plants, bedding and foundation plants, etc Planting, designs.

SYNOPSIS FOR M. AGRIC. COURSES

HRT 701 – Post Harvest Physiology and Produce Storage

Post harvest environmental on quality of produce. Influence of field environment and production practices on post-harvest physical and chemical changes in vegetable and fruit crops.

HRT 702 – Physiology of Harvested Horticultural Crops

Basic metabolic processes associated with fruit-crops, vegetable and ornamental crops. Effects of environmental regulation and other supplementary treatments on the physiology and quality of horticultural produce. Harvesting techniques and basic processing of produce.

HRT 703 – Propagation Techniques in Horticulture

General handling of propagation; propagation structure and facilities and techniques. Handling of transplants and maintenance practices on the field.

HRT 704 – Control of Crop Growth and Development

Growth and crop phenology, hormonal control of growth and yield sustenance as influenced by mineral nutrition and water supply, yield improvement and rejuvenation of low producing crops.

HRT 705 – Produce Handling Structures and Facilities

Importance of environmental control and quality maintenance in handling of harvested fruit-crops, vegetables and ornamental crops. Efficiency of various structures and facilities for post-harvest handling of horticultural crops.

HRT 706 – Advanced Pomology

Production and maintenance of and yield sustenance in fruits crops; post harvest handling and processing and marketing of produce. Emphasis is to be paid on the development of analytical approach to basic problems and research finding interpretation and application.

HRT 707 – Vegetable Crop Production

Classification of vegetable crops: production systems; environmental management of field-grown crops, weeds disease and post management harvesting and marketing of produce.

HRT 708 – Horticulture

Definition, propagation; environmental control of production; production structures and facilities; nursery and subsequent establishment; culturing and growth training; preservation of cut flowers; florists bed less and flower shows.

SENIOR STAFF LIST

Name	Rank	Qualification	Area of Specialisation
Okelana, M.A. O	Reader	B.Sc, Ph.D (Ibadan), CBIOL, MIBiol (London)	Horticultural Crop Physiology
Olasantan, F. O	Professor	B.Sc, M.Sc, Ph.D(Ibadan) PGDE (Ilorin)	Cropping Systems Agronomy/Olericulture
Oladokun, M.A. O	Professor	B.Sc (Ibadan), M.Sc (California) Ph.D (Ibadan) MBA (Ife)	Plant Physiology
Aiyelaagbe, I.O.O	Professor	B.Sc, M.Sc., Ph.D (Ibadan)	Cropping Systems/Horticulture
Bodunde, J. G	Reader	B.Sc (Ibadan), M.Sc, Ph.D (ABU)	Environmental Physiology/ Horticulture

DEPARTMENT OF PLANT BREEDING AND SEED TECHNOLOGY

POSTGRADUATE DIPLOMA IN PLANT BREEDING AND SEED TECHNOLOGY

STRUCTURE – UNITS

Course Title	Units
Courses	16
Field Report	3
Project Work	3
Seminars	2
Total	24

Postgraduate Diploma Courses

Course Code	Course Title	Units
PDB 710	Fundamentals of Genetics	3
PDB 702	Design and Statistical analysis of EXPT	3
PDB 703	Seed Biology	2
PDB 704	Varietal Evaluation and release	2
PDB705	Introduction to Plant Breeding	3
PDB 706	Seed Production Technology in Nigeria	3
		16

MASTER OF AGRICULTURE IN PLANT BREEDING AND SEED TECHNOLOGY

STRUCTURE – UNITS

Course Title	Units
College Courses (compulsory)	9
Core Courses	15
Electives	4
Thesis Research	6
Seminars	2
Minimum Total for Award of M.Agric. Degree	36

Course Code	Course Title	Units
	College Courses	
PBS 703	Biostatics	3
SOS 715	Soil Fertility and Plant Nutrition	3
CSC 701	Use of Computer in Research	4
		10
	Core Courses for M.Agric. in Plant Breeding	
PBS 701	Biometrical Genetics I	3
PBS 702	Biometrical Genetics II	3
PBS 704	Advanced Plant Breeding	3
PBS 705	Physiological Genetics	3
PBS 706	Crop Taxonomy	3
		15
	Core Courses for M.Agric. in Seed Technology	
PBS 710	Seed Processing and Handling	3
PBS 711	Seed Production	3
PBS 712	Seed Certification	3
PBS 713	Seed Storage	3
PBS 714	Seed Biology	3
		15

Electives for M.Agric. in Plant Breeding

Any of the core courses listed for M.Agric. in Seed Production

Electives for M.Agric in Seed Technology

Any of the core courses listed for M.Agric in Plant Breeding.

PH.D IN PLANT BREEDING AND SEED TECHNOLOGY

STRUCTURE- UNITS

There may be course work, which will vary depending on the background of the candidate but would contain the relevant courses that have not been taken at M.Sc. degree level and in some cases may include courses in related basic sciences.

COURSE SYNOPSIS

Postgraduate Diploma in Plant Breeding and Seed Technology.

PBD 701 – Fundamentals of Genetics (3 Units)

Cell division – Mitosis and Meitosis. Pattern of inheritance, historical theories of the organ of life. Gregor Mendel and the Laws of genetics. Prediction of offspring by using Laws of probabilities, Chemical basis of heredity. Genetics code. Gene Actions and interaction –Pleiotropism, complementary gene action, gene frequencies; Hard-Weinberg Laws. Cytogenetics – Types of Ploidy.

PDB 702 – Design and Statistical Analysis of Experiments (3 Units)

Notations in statistics; measures of central tendencies – standard deviation, variance, standard error. Coefficient of variation, etc; Introduction to statistical inference and testing of hypothesis: Chi-square (X²) Principles of Biological experimentation – definition of terminologies: Experimental designs – Completely Randomised Design

(CRD), Randomised Complete Block design (RCBD), Latin square, Factorial experiments, split-plot design. Correlation and Regression analyses.

PDB 703 – Seed Biology (2 Units)

Floral induction and initiation in Plants; Pollination and Fertilisation; seed formation and development, seed germination and the physiological factor affecting germination; seed dormancy.

College courses: PDB 705
 PDC 703
 PDC 701

PDB 704 – Varietal Evaluation and Release (2 Units)

Importance of varietal evaluation Relationship of varietal evaluation with selection. Analysis of multi-location variety date; the role of genotype x environment interaction in selection.

PDB 705 – Introduction to Plant Breeding (3 Units)

Reproduction in flowering plants – characteristics of self and crosspollinated crops. Types of self-incomatibility system hetemorphic, homomorphic gametophic, sporophytic systems; Male sterility – genetic male sterility and cytoplasmic male sterility. Breeding problems involving quantitative characters. Role of environment in plant breeding; Selection techniques. Breeding of asexual propagated crops.

PDB 706 – Seed Production Technology in Nigeria (3Units)

Agronomy of Seed Production. Climatic and other requirements for seed multiplication. Weeds, importance and control. Techniques of producing varitally pure seed. Controlled seed multiplication. Seed drying. Seed cleaning. Seed storage systems, crop insepction. Seed treatment and packaging.

NEW POSTGRADUATE AREAS OF SPECIALIZATION

Postgraduate degrees offered in the Department are basically in the areas of Plant Breeding and Seed Technology. However, new areas of specialization have emerged under the two options stated below:

- (a) M.Agric/Ph.D (Plant Breeding)
- (b) M.Agric/Ph.D (Seed Technology)

For M. Agric. in Plant Breeding, the new area of interest is Plant Biotechnology while Seed Pathology is the new area of interest in M. Agric. Seed Technology.

STRUCTUR E AND UNITS

Structure and units are the same for the two options (a) and (b) above. While the same College courses would be offered by all, different courses are mounted to reflect the new areas of interest and make them adequate in their chosen areas of specialization, as reflected below:

M. Agric/Ph.D Plant Biotechnology and M. Agric Seed Technology

STRUCTURE

Course Title	Units
College Courses (Compulsory)	10
Core Courses	15
Electives	6
Thesis Research	6
Seminars	2
Minimum Total for the Award of M.Agric Degree	19

COURSE UNITS M.Agric (Seed Technology) Pathology Area

COMPULSORY COLLEGE COURSES

Course Code	Course Title	Units
PBS 703	Biostatistics	3
SOS 715	Soil Fertility and Plant Nutrition	3
CSC 701	Use of Computer in Research	4
		10

CORE COURSES FOR M. AGRIC IN SEED TECHNOLOGY (PATHOLOGY AREA)

Course Code	Course Title	Units
PBS 707	Fundamentals of Seed Pathology	3
PBS 708	Experimental Techniques in Seed Pathology	3
PBS 709	Mycotoxins in Seed Health	3
PBS 713	Seed Storage	3
PBS 716	Epidemiology of Seed Disease	3
		15

CORE COURSES FOR M. AGRIC PLANT BREEDING (BIOTECHNOLOGY AREA)

Course Code	Course Title	Units
PBS 715	Introductory Biotechnology	
PBS 717	Genetic Engineering and In-vitro Culture	
PBS 718	Molecular Genetics and Cytogenetics	
PBS 720	Instrumentation	
PBS 704	Advanced Plant Breeding	
		15

ELECTIVES FOR M. AGRIC IN SEED PATHOLOGY (OPTION)

Any of the core courses listed for M. Agric in Seed Technology proper e.g. PBS 704: Advanced Plant Breeding PBS 706: Crop Taxonomy

COURSE SYNOPSES

The course synopses for the two area of specialization are stated below:

(A) M. Agric. (Seed Technology) — Seed Pathology area of interest.

PBS 709: Fundamentals of Seed Pathology - 3 Units

Concept of seed-borne mycoflora. Plant diseases caused by seed-borne pathogens. Seed diseases of major tropical crops. Transmission of seed disease agents. Mode of infection by seed-borne inoculum. Micro-climate and seed disease development. Seed health, mycotoxins and human health. Control of field and storage diseases of seeds. Integrated pest management approach to seed disease control. Seed health and quarantine programmes.

PBS 708: Experimental Techniques in Seed Pathology - 3 Units

General morphology and taxonomy of seed-borne fungi, bacteria, nematode and viruses. Principles and methods of seed health testing. Modern techniques for detection of seed-borne inoculum. Ecological aspects of seed health testing. Survey of seed diseases, seed-borne diseases and causal agents with reference to taxonomic distinctions.

PBS 709: Mycotoxins in Seed Health - 3 Units

Seed diseases of importance to human/animal health. Mycotoxins; Ochratoxin, Zearalenone, Trichothecenes, Aflatoxin, Deoxynivalenol, Fumonisin B1 etc. Bioassay methods, estimation in seeds and toxicology. Nature of toxigenic organisms. Storage facilities and conditions congenial for mycotoxin development.

PBS 716: Epidemiology of Seed Disease - 3 Units

Assessment of seed disease losses. Sources, transmission and development of seed-borne inoculum. Adaptive features of seed-borne pathogens. Epiphytotics in seed populations. Ecology of seed-borne pathogens. Microclimate effect on seed, pathogen, transmission agent and overall disease development.

M.Agric. In Plant Breeding

PBS 701 – Biometrical Genetics 1 (3 Units)

Sources of genetics variation, scaling test; joint scaling test using weighted least square; genotype x environment interactions – joint regression analysis; stability models, path analysis and selection models.

PBS 702 Biometrical Genetics II (3Units)

Biparental progenies, North Carolinal Irandil, Diallel and partial diallel analyses. 3-Way and double cross hybrids, Line x tester analysis; classification analysis.

PBS 703 – Biostatistics (3 Units)

Matrices and applications, variance and covariance analysis, Nested ANOVA; expected mean square; Fixed and random models; single DF comparison; a review of factorial experiments and split – plot design; Regression Analysis.

PBS 704 – Advanced Plant Breeding (3Units)

Gene action, heritability, inbreeding and heterosis. Response to selection; selection methods for self-pollinated crops, genotype x environment interaction. Breeding techniques for self-and cross-pollination crops, conservation of genetic resources.

PBS 705 – Physiological Genetics

Plant environment – types of crop response to environment; Growth analysis; methods for detecting varietal differences; photosynthetic efficiency; C and C4 plants. Physiological basis of heterosis in plants. Molecular genetics – DNA and RNA, Genetic mode. Chemical taxonomy.

PBS 706 – Crop Taxonomy (3 Units)

Angiosperm systematics; procedures for term-preparation of herbarium material, the use of keys on plant taxonomy. The relevance of plant anatomy, genetics, phytochemistry, etc to plant taxonomy. Numerical taxonomy. Chemo-systematics.

M.Agric in Seed Production

PBS 710 – Seed Processing and Handling (3Units)

Seed processing Principles, Pre-cleaning and conditioning. Basic cleaning Dimensional sizing. Specific gravity separation. Surface texture separation. Air separators. Electronic separators. Miscellaneous cleaning equipment. Commercial seed treatments. Seed handling. Accessories. Design and layout of processing plant.

PBS 711 – Seed Production (3 Units)

The seed industry. Essential requisites of a seed Programme. Agronomic and climatic aspects of Seed reproduction. Determinants of seeds quality. Seed multiplication. Production of seed for the farmer, contract seed production. Harvesting and drying. Seed processing certification. Seed legislation, seed marketing, Field Inspection, test for cultivar authenticity.

PBS 712 – Seed Certification (3Units)

Brief history, Objectives. Certification authority. Manpower requirements. Elements of Sound Seed Certification programme. Minimum certification standards. Field inspection. Pre and Post harvest control (varietal purity, seed borne disease). Seed quality tests in the laboratory. Summary of certification scheme. Certification of blends, phytosanitary certification.

PBS 713 – Seed Storage (3Units)

Types of seeds. Seed moisture relationships. Life span of seeds. Seed deterioration. Possible causes of seed deterioration. Seed storage, purposes and percepts. Storage pests; storage fungi. Types of storage. Conditioned storage. Seed packaging.

PBS 714 – Seed Biology (3 Units)

Plant meristems. Reproductive processes in plants. Floral initiation, Flowering and pollination. Fertilisation, apomixes, the developing ovule. Seed setting and seed development. Chemical composition of seeds. Seed germination. Pattern of germination. Seed structure. Factors affecting seed germination. Dormancy, Seed agronomy (cycle).

STAFF LIST

Name	Rank	Qualification	Area of Specialisation
Ariyo, O. J	Professor	B.Agric. (UNN), M.Sc. Ph.D(Ibadan)	Plant Breeder
Kehinde, O. B		B.Sc., M.Sc. Ph.D(Ibadan)	Plant Breeder
Ajala, M. O		B.Sc. (Ife), M.Sc.(Edinburgh), Ph.D(Ibadan)	Seed Scientist
Ojo, D. K		B.Sc. (Ife), M.Sc, (Ibadan), Ph.D (UNAAB)	Plant Breeder
D.A.C. Akintobi-Adeyemo		B.Sc.(Ife),M.Sc (Calif), Ph.D(Ibadan)	Seed Scientist
Daniel, I. O		B.Sc., M.Sc., Ph.D (Ibadan)	Seed Scientist
Adebisi, M. A		B. Agric., M. Agric., Ph.D (UNAAB)	Seed Scientist

DEPARTMENT OF PLANT PHYSIOLOGY AND CROP PRODUCTION

INTRODUCTION

In a recent reorganization within the College of Plant Science and Crop Production, the Department of Plant Physiology and Crop Production and the Department of Crop Protection were created from the former Departments of Crop Production and Crop Protection and that of Crop Physiology and Crop Ecology. The postgraduate program in the Department provides advanced training in courses that are relevant to understanding the farming systems as well as those physiological processes that determine crop yield performance in a defined environment. The research philosophy aims at improving the efficiency of utilization of growth resources for optimum production and use of appropriate cultural practices to stabilize and sustain yields within the cropping system. Hence the available areas of specialization are Crop Physiology, Crop Production, Cropping Systems and Weed Science.

POSTGRADUATE DIPLOMA

POSTGRADUATE DIPLOMA IN CROP PRODUCTION TECHNOLOGY

STRUCTURE

Course Title	Units
Courses	16
Field Report	3
Project	3
Seminar	2 – Predata 1 unit -- Postdata 1 unit

Course Code	Course Title	Units
	College Core Courses	
PDC 701	Principles of Crop Production	4
PDB 702	Design and Statistical Analysis of Experiments	3
	Courses	
PDC 702	Land Use Planning	3
PDC 703	Fertilisations in Sustainable Land Use System	3
PDC 706	Principles of Weed Management	3
PDC 708	Crop Ecology	3
		19

COURSES SYNOPSIS

PDC 701 – Principles of Crop Production

Environmental factors of Crop Production. Yield limiting factors and concepts related to their influence on crop growth. Production systems stand diversity, plant distribution and crop yield.

PDC 702 – Land Use Planning

Farm surveying, equipment and uses. Discussion to include general considerations in land use planning edaphic, climatic and economic considerations. Soil erosion control.

PDC 703 – Fertilisers in Sustainable Land Use System

Conception of sustainable land use, introductory agroforestry fertilizer management, Economics of fertilizer use, fertilizer and economic develop.

PDC 707 – Principles of Weed Management

Types of weeds. Weeds associated with cultivated crops and their control. Weed control: cultural, biological and chemical weed management; Herbicides, types and mode of action.

PDC 708 – Crop Ecology

Ecosystems, ecological concepts; environment; ecological distribution of crops; plant succession.

MASTERS IN AGRICULTURE (M. Agric)

The M. Agric programme in the Department presently focuses on the following areas of specialization; Crop Production, Crop Physiology, Cropping Systems and Weed Science

Courses/Units (M.Agric.)

Course Code	Course Title	Units
	Compulsory College Courses	
SOS 715	Soil Fertility and Plant Nutrition	3
PBS 703	Biostatistics	3
CSC 701	Use of Computer in Research	4
		10

DEPARTMENTAL ELECTIVES

Department of Plant Physiology and Crop Production

Courses / Units

Course Code	Course Title	Units
Specialization in Crop Physiology		
Core Courses		
PCP 701	Crop Ecology	3
PCP 705	Plant Growth and Yield Analysis	3
HRT 701	Post Harvest Physiology of Crops	3
PCP 702	Plant Water Relations & Mineral Nutrition	3
PCP 704	Weed Control and Management	3
		15
Specialization in Crop Production		
Core Courses		
PCP 701	Crop Ecology	3
PCP 705	Plant Growth and Yield Analysis	3
PCP 702	Plant Water Relation and Mineral Nutrition of Plants	3
PCP 704	Weed Control and Management	3
PCP 706	Cropping Systems	3
AMW 702	Microclimatology	3
		18
Specialization in Weed Science		
Core Courses		
PCP 705	Plant Growth and Yield Analysis	3
PCP 707	Herbicides	3
PCP 703	Weed Biology and Ecology	3
PCP 704	Weed Control and Management	3
AMW 702	Microclimatology	3
		15
Elective Courses		6
Not less than 6 units from other options		6
Dissertation		2
		18

Seminar

PCP 701 – Crop Ecology (3Units)

Ecology and Agronomy of different crops. Climatic, edaphic, biotic and geographical factors of the environment and their relationships to crop distribution and productivity.

AMW 702 – Microclimatology (3 Units)

Study of the climate near the ground in relation to crop production. Radiation balance, heat balance, soil heat fluxion and soil temperature, sensible heat flux, surface and air temperatures. Wind and turbulent transport. Atmospheric humidity, transpiration, evaporation and evapotranspiration carbon dioxide balance and photosynthesis. Improvement of water use efficiency. Modification of climate in crop production.

PCP 702 – Plant Water Relations and Mineral Nutrition (3Units)

Properties and Biological Significance of Water: Structure of water and aqueous solutions; water vapour and chemical thermodynamics; water distribution in plant parts; plant water balance and measurement of status in the plant.

Movement of Water in Soil and Plant: Soil water content; retention, entry and movement within the soil; entry into plant and movement within; atmospheric absorption of water; transpiration dynamics and measurement in the plant.

Water Deficit and Crop Growth: Development of internal water deficit; significance of water deficit in protoplasmic flux, cell division, cell enlargement, nitrogen metabolism, photosynthesis and plant growth, salinity and plant growth. Crop growth in relation to water supply. Crop phenology and cropping operations and water supply, pests and disease epidemiology as controlled by water supply.

Mineral Nutrition of Plants: Individual nutrient element needs of plants; plant growth and nutrient supply, nutrient uptake and nutrient sources. Nutrient balance and crop performance.

Plant Nutrition Studies: Techniques in nutrition studies. Laboratory, glass house and field observations. Visual symptoms of nutrient deficiencies. Field diagnosis of nutrient deficiency.

Nutrient Deficiency Manifestation in Crops: Occurrence of nutrient deficiency; soil fertility and nutrient deficiency manifestation. Methods of ascertaining nutrient deficiency; alleviation of deficiency and crop production protocols for management of nutrient deficiency. Sustainable crop production and nutrient applications.

PBS 703 – Advanced Biostatistics (3Units)

Experimental design. Sampling techniques, pilot experiments. Factorial experiments, Split-plot design, unequal and sub-class numbers. Multiple and partial regression and correlation. Analysis of covariance; non-linear regression. Binomial and Poisson distributions. Non-parametric statistics.

PCP 703 – Weed Biology and Ecology (3 Units)

The physico-chemical and biotic factors affecting plants in nature, plant communities, ecological methods. Principles, of weed ecology and physiology. Distribution and competitiveness of major weeds. Weed taxonomy and identification. Description of major terrestrial and aquatic weeds prevalent in Nigeria. Prerequisite in general plant ecology course.

PCP 707 – Herbicides (3 Units)

Herbicides : history and development, classification, characteristics, chemistry and mode of action. Basis for selectivity. Toxicological effects of herbicides. Herbicides residues and their persistence. Environmental consequences of herbicidal use. Methods of estimating herbicide residues.

PCP 705 - Plant growth and Yield Analysis (3 Units)

Kinetics of growth rate. Theories: components of growth rate; determination of primary values; data analysis, and transformation. Use and abuse of growth analysis. Environmental regulation of the components of yield. Measurement of growth resources, dry matter production and its distribution into various sinks. Role of plant characters in development of growth and yield. Regulations of growth and yield. Climatic factors affecting growth and yield of field crops.

HRT 701 – Post Harvest Physiology of Crops (3Units)

Harvest indices. Concept of ripening changes during maturation, reaping and senescence. Pre and post harvest factors affecting crop quality. Regulation of ripening and senescence.

PCP 706 – Cropping Systems (3Units)

Physiological origins of crop yield. Management practices employed in crop production. Farming systems – traditional and modern concepts. Fertiliser management in cropping systems. Agroforestry. Research methods in cropping systems. Role of environmental factors in management practices involving crop production. Farming systems – traditional and modern farms. Fertiliser management in cropping systems. Enhancement and measurement of productivity, sustainability, stability and equitability of cropping systems. Research methods in cropping systems. Application of systems analysis and simulation for decision making in cropping systems.

PCP 704 – Weed Control and Management (3 Units)

Importance of weeds in the ecosystems. Principles and practices of weed management in field, horticultural and plantation crops; waterways and wastelands. Influence of climatic, edaphic and biotic factors on the effectiveness of different weed management strategies. Socio-economic considerations in weed management of problem weeds.

PCP 714 – Seminar (2 Units)

Pre-data seminar 1 unit

Post-data seminar 1 unit

PCP 717 – Dissertation Project (3 Units)

An assessment of the student performance in the execution of the research project report.

ACADEMIC STAFF LIST FOR POST GRADUATE PROGRAMMES

Name	Rank	Qualification	Area of Specialisation
Lagoke, S.T.O	Professor	B.Sc. (ABU), Ph.D (Ibadan)	Weed Science
Okeleye, K. A	Professor	BSc(Ibadan),MSc., Ph.D(Ife)	Agronomy/Plant Physiology
Adetiloye, P.O.	Professor	B.Sc., Ph.D. (UNN)	Cropping Systems Agronomy
K. A. Elemo	Reader	BSc.(Ibadan)MSc., Ph.D(Los Bano, Philippines)	Agronomy/Cropping Systems
J. A. Adigun	Reader	B.Sc., M.Sc., Ph.D.(ABU)	Weed Science
V.I.O. Olowe	Reader	M.Sc.(Krasnodar), Ph.D. (Ife)	Agronomy
M.O. Atayese	Senior Lecturer	B.Sc. (Lagos), M.Sc., Ph.D (Ibadan)	Plant Physiology
A. A. Oyekanmi	Senior Lecturer	M.Sc. (Tashkent), Ph.D (Krasnodar)	Agronomy/Crop Physiology
S. O. Adigbo	Lecturer I	B. Agric, M. Agric., Ph.D (UNAAB)	Agronomy/Crop Production
T. O. Fabunmi	Lecturer I	B. Agric.Tech. (Bauchi) M.Sc (Ibadan), Ph.D (UNAAB)	Agronomy/Crop Production

DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL MECHANISATION

INTRODUCTION

Postgraduate training in Soil Science began in the 1992/93 Session with four students enrolled in the various areas of specialization. Three programmes are offered Ph.D (Soil Science), Master of Agriculture (Soil Science) and the Postgraduate diploma. The complete curriculum for the Ph.D takes about 3 full academic years where no course work is required; the Master of Agriculture (M.Agric), 2 full academic years; and The Postgraduate Diploma, One full academic year.

Thesis based on research work is required in both the PhD and M.Agric programmes. Only a project is required for the postgraduate diploma programmes in addition to the required courses to be taken in the academic year. All courses are to be taken in the first academic year.

The overall objectives of the postgraduate programmes are to provide an advanced academic training in research and modern application of soil science to resource development. It is also to prepare student for the world of work in professional areas such as soil surveys, soil related research in government institutes, private organizations, industries and universities; agricultural and industrial extension services; and soil conservation and management.

POSTGRADUATE DIPLOMA IN SOIL MANAGEMENT AND LAND USE PLANNING

STRUCTURE

The programme consists of course work (all courses at the P.G. Diploma level are compulsory), fieldwork and reports, project work and seminars. The minimum units for the award of Postgraduate Diploma are distributed as follows:

Course Title	Units
Courses	16
Field Report	3
Project Work	3
Seminars	2

POSTGRADUATE DIPLOMA COURSES

First Semester

Course Code	Course Title	Units
PDS 701	Soil Testing and Fertiliser	3
	Recommendation	3
PDS 703	Fertiliser and fertilizer Management	2
PDS 705	Soil Fertility Management	1
PDS 718	Seminar	3
PDS 799	Project Work	12

Second Semester

Course Code	Course Title	Units
PDS 702	Soil Management and Conservation	3
PDS 704	Soil Survey and Land Use Planning	3
PDS 706	Soil-Water-Plant Relationships	2
PDS 798	Seminar	1
		9

M.AGRIC IN SOIL SCIENCE

AREAS OF SPECIALISATION:

Soil Chemistry
Soil Fertility
Soil Mineralogy
Soil Physics
Soil Management and Conservation
Soil Microbiology and Biochemistry
Pedology
Land Use Planning and Management
Environmental Soil Science.

STRUCTURE

The program consists of core courses covering the key area of soil science, elective courses in the area of specialization of the candidate, thesis research and seminars.

The structure is given below:

Course Title	Units
College courses (compulsory)	9
Core courses	12
Electives	7
Thesis (SOS 709)	6
Seminar (SOS 798)	2
	36

Minimum Total for Award of M.Agric. Degree – 36 Units

First Semester

Course Code	Course Title	Units
Compulsory College Courses		
PBS 703	Biostatistics	
SOS 715	Soil Fertility and Plant Nutrition	
CSC 701	Use of Computer in Research	
		10
Compulsory core Department Courses		
SOS 701	Soil Chemistry	3
SOS 703	Advanced Pedology	3
SOS 798	Seminar	1
		7

Elective Courses

Pedology/Soil Survey and Land Use Planning/Soil Mineralogy Specialisation

Course Code	Course Title	Units	L	P
SOS 709	Soil Management and Conservation	3	2	1
SOS 711	Management of Problem Soils	-	-	-
SOS 717	Remote Sensing	2	2	2

Soil Chemistry/Soil Fertility Specialisation

Course Code	Course Title	Units
SOS 705	Soil and Plant Analysis	3
SOS 713	Soil-Water-Plant Relationship	3
SOS 707	Fertiliser and Fertiliser Technology	3
		9

Soil Microbiology and Biochemistry Specialisation

Course Code	Course Title	Units
SOS 709	Soil Management and Conservation	3
SOS 713	Soil-Water-Plant-Relationship	3
		6

Environmental Soil Science Specialisation

Course Code	Course Title	Units
SOS 709	Soil Management and Conservation	3
SOS 709	Soil Environmental Chemistry	3
		6

Second Semester

Elective Courses

Pedology/Soil Survey and Land Planning/soil Mineralogy Specialisation

Course Code	Course Title	Units
SOS 702	Soil Physics	3
SOS 708	Advanced Analytical Techniques	3
SOS 710	Soil Mineralogy and Micromorphology	3
SOS 712	Advanced Soil Genesis and Classification	3
SOS 714	Soil Survey and Land Use Planning	3
SOS 718	Landscape and Soil Ecology	3
		18

Soil Chemistry/Soil Fertility Specialisation

Course Code	Course Title	Units
SOS 702	Soil Physics	3
SOS 706	Soil Physical Chemistry	3
SOS 708	Advanced Analytical Chemistry	3
SOS 716	Soil Hydrology	3
		12

Soil Microbiology and Biochemistry Specialisation

Course Code	Course Title	Units
SOS 704	Soil Microbiology and Biochemistry	3
SOS 706	Soil Physical Chemistry	3
SOS 708	Advanced Analytical Chemistry	3
SOS 715	Soil Fertility and Plant Nutrition	3
SOS 718	Landscape and Soil Ecology	3
		15

Soil Physics/Soil Management and Conservation Specialisation

Course Code	Course Title	Units
SOS 702	Soil Physics	3
SOS 708	Advanced Analytical Chemistry	3
SOS 716	Soil Hydrology	3
		9

Environmental Soil Science Specialisation

Course Code	Course Title	Units
SOS 706	Soil Physical Chemistry	3
SOS 708	Advanced Analytical Techniques	3
SOS 718	Landscape and Soil Ecology	3
(b) SOS 798	Seminar	1
		10

PH.D SOIL SCIENCE

Areas of Specialisation at Ph.D Level

- Soil Chemistry
- Soil Fertility
- Soil Physics
- Soil Conservation and Management
- Soil Microbiology and Biochemistry
- Pedology
- Soil Mineralogy
- Land Use Planning and Management
- Environmental Soil Science.

The candidate for Ph.D degree is required to meet the University of Agriculture, Abeokuta requirements for admission into postgraduate studies. However, candidates should hold M.Agric Soil Science degree of the University of Agriculture, Abeokuta or its equivalent from any other University recognized by the Senate. Holders of one year M.Sc. degree with average course score of 60 per cent and above may be considered on the condition that they shall register for M.Agric/Ph.D in the first instance.

STRUCTURE

There may be course work, which will vary depending on the background of the candidate but would contain the relevant soil course that have been taken at M.Agric Degree level and in some cases include courses in related basic sciences.

SYNOPSIS OF POSTGRADUATE DIPLOMA COURSES

PDS 701 – Soil testing and Fertiliser Recommendation (3Units)

Principles and methods of soil testing. Soil and plant tissue-sampling techniques, interpretation of soil test results. Fertiliser recommendation.

PDS 702 – Soil Conservation and Management (3 Units)

Causes of soil degradation. Soil erosion and methods of control under different cropping system. Soil structure improvement and maintenance.

PDS 703 – Fertiliser and Fertiliser Management (3Units)

Types of fertilizer Economics of fertilizer use. Methods of fertiliser application. Fate for applied fertilizer. Fertiliser manufacture. Fertiliser formulation.

PDS 704 – Soil Survey and Land Use Planning (3Units)

Principles and methods of soil survey. Elements of air photography and photogrammetry use of soil resource inventories in planning and use. Management of land use systems.

PDS 705 – Soil Fertility Management (2Units)

Concepts and assessment of soil fertility. Nutrient requirements of crops. Symptoms of nutrient deficiency and toxicity. Fertiliser assessment procedures and programmes. Maintenance of soil fertility under different cropping/farming systems.

PDS 706 – Soil Fertility Management (2Units)

Concepts and assessment of soil fertility. Nutrient requirements of crops. Symptoms of nutrient deficiency and toxicity. Fertiliser assessment procedures and programmes. Maintenance of soil fertility under different cropping/farming systems.

SOIL SCIENCE COURSE SYNOPSES

Compulsory Courses

SOS 701 – Soil Chemistry (3Units)

Basic chemical principles. Soil chemistry and bioavailability of chemical nutrients. The solid phase (crystal chemistry of silicates, structural classification of silicates). Rate processes in relation to nutrient availability. Interactions of chemicals with the reactive surfaces. Soil as an adsorption system. Soil pH and acidity index and that salt affected soils. Chemistry of fertilizers, heavy metals and other toxic elements in soils. Behaviour of pollutants in the soil.

SOS 702 – Soil Physics (3 Units)

Effect of soil physical properties on plant growth and other uses of soil. Analysis and quantification of the physical properties and physical behaviour of unsaturated soils i.e. Transport and accumulation of water, heat, gases and solutes. Factors affecting infiltration, saturated flow and unsaturated flow.

SOS – 703 – Advanced Pedology (3 Units)

Principles of pedology with special emphasis on soil genesis; microclimate and soil climate in soil genesis, relationship between geomorphology and pedology; in-depth study and analysis of major world classification systems (Soil taxonomy, Canadian soil classification system, French classification system, FAO/UNESCO soil legend); study of classification of soils Nigeria, and Africa; fabric and mineral analysis of soils; soil development evaluation.

SOS 704 – Soil Microbiology and Biochemistry (3Units)

Principles of soil biochemistry in relation to soil components as potential energy sources and electron acceptors and protoplasmic constituents. Microbial ecology. Production of soil materials through organic matter Decomposition. Redox reactions in field soils. Nutrient transformations in anaerobic soil conditions. Biological processes in the rooting zone. Minor toxic elements, pesticides and microbial degrading. Microbiology of water pollution.

ELECTIVES

SOS 705 – Soil and Plant Analysis (3 Units)

Principles and procedures of chemical analysis of soil. Analysis of plants and fertilizer for available and total constituents. General principles of soil testing sampling techniques for plant and soil analysis sample pretreatments. Interpretation of analytical data. Procedures for fertilizer recommendation. Quality control and laboratory management.

SOS – 706 Soil Physical Chemistry (3 Units)

General colloid science. The surface chemistry of soil colloids. Laws of Thermodynamics. Principles of chemical kinetic in relation to soil system. (Reaction order, rate constants, temperature effect, kinetics of microbial catalysed reactions).

SOS 707 – Fertiliser and fertilizer Technology (3Units)

Review of past and current fertilizer use in Nigeria. Fertiliser types manufactures use and application. Organic fertilizers. Fertiliser efficiency. Fertiliser characteristics, storage and marketing. Special fertilizer formulation. Fertiliser use in relation to surface and ground water pollution, feed and food quality.

SOS 708 – Advanced Analytical Techniques (3Units)

Methods for the isolation and recognition of soil components. Fundamental principle of analytical technique (spectrophotometry, electroanalytical techniques, X-ray diffraction, thermal methods AAS, x-ray fluorescence, spectrography chromatography etc). The application of radio-isotopic methods and gas chromatography to the study of the movement of ions and pesticides in soils. Advanced spectrometry instrumentation. Quality control and laboratory management. Analytical techniques in soil physics. Soil microbiological and biochemical assays.

SOS 709 – Soil Management and Conservation (3 Units)

Soil water movement, soil aeration drainage and plant growth. Drainage systems and selection. Cropping systems in relation to soil moisture. Soil moisture determination. Water erosion, wind erosion, sediments and control. Evapotranspiration losses and control.

SOS 710 – Soil Mineralogy and Micromorphology (3Units)

Structure of the earth; mineralogical and chemical composition of the earth's crust and relationship to soil; general concept of mineral weathering and genesis in soil; classification of soil minerals; structure of silicate clay minerals; organic soil mineral and their structure; weathering in soil environments; recent techniques in soil mineral studies; principles of micromorphology.

SOS 711 – Management of Problem Soil (3Units)

Definition, and scope. Management of acid soil. Management of acid sandy soils. Management of acid clay soils. Management of saline and alkali soils. Management of acid sulphate distributed soils. Management of soils damaged by construction activities, industrial wastes, and oil spillage.

SOS 712 – Pedology Processes (3 Units)

Processes that form soil material; weathering sequences, ratios and indices, production of soil material through organic matter decomposition. Processes of soil horizon and profile development, processes in soil with impeded drainage processing in freely drainage profiles, dynamics processes in the rooting zone of plants; processes influenced by soil management practices.

SOS 713 – Soil-Water-Plant Relationships (3Units)

Water balance, dependence of and on water in the context of world's agriculture. Measurements for water resource assessment. Hydrological structure of vascular plants. Movement of water in soils. Movement of water towards and into the root system. Movement out of the plant-soil system.

SOS 714 – Soil Survey and Land Use Planning (3Units)

Principles and methods of soil survey. Soil survey techniques including parametric mapping. Use of soil resource inventories in planning land use. Remote sensing, and soil survey interpretation. Qualitative and quantitative land evaluation and land use system analysis, geographical information system (GIS).

SOS 715 – Soil Fertility and Plant Nutrition (3Units)

Essentiality of plant nutrition. Basic concepts in soil plant relationships. Soil fertility and productivity. Soil organic matter, fertilizers and lime use. Soil fertility evaluation. Cropping system and soil fertility management.

SOS 716 – Soil Hydrology

The hydrological cycle. Relationships between the hydrological cycle and agriculture, forestry and nature, Water balance of the soil profile including rhizosphere. The interaction between groundwater, precipitation and evapotranspiration. Water and solute transport in saline and alkali soils. Desalination of soil and water quality. Influence of soil and vegetation on the hydrological cycle.

SOS 717 – Advanced Remote Sensing (3Units)

Review of basic principles; qualitative and quantitative techniques applied to analysis of remotely sensed data; quantitative approaches of remote sensing data analysis to land classification; applications of remote sensing in resource studies with illustrative case studies from literature; equipment for data analysis; current trends in remote sensing and application in soil and agricultural surveys.

SOS 718 – Landscape and Soil Ecology (3Units)

System thinking and application to landscape and soil ecology; factors; forces and processes of stability I natural ecosystem; cause-effect-affected relationships in man-made (social) ecosystems (e.g. agroecosystems); soil ecosystem; the troublesome elements (CHONSP), their disposal; land (soil) pollution; environmental impact assessment

SOS 719 – Soil Environmental chemistry (3Units)

Examination and description of specific chemical properties and processes in soil and in relation to environment; consequences of the processes in relation to environmental quality and pollution application of basic chemical concepts to the terrestrial system in the examination of the behaviour of solutes and associated solid phases in soils and related resources.

ACADEMIC STAFF LIST FOR POSTGRADUATE PROGRAMMES

Name	Rank	Qualification	Area of Specialisation
Adetunji, M. T	Professor	B.Sc.(Ife), M.Sc. (Ibadan), Ph.D(Ife)	Soil Chemistry/Soil Fertility
Sala.ko, F. K	Professor	B.Agric, M.Sc. (Nigeria), Ph.D (Ibadan)	Soil Physics/Soil Conservation
Victoria U. Aiboni		M.Sc. (Moscow), Ph.D(Ife)	Pedology/Land Evaluation
Oluwatoyin A. Babalola	Reader	B.Sc, M.Sc.,(Ilorin) Ph.D(ABU)	Soil Microbiology
Adekunle, I. O.	Lecturer I	B. Agric. (Ife), M.Sc. (Ibadan)	Soil Fertility
Adejuyigbe, C. O.	Lecturer I	B.Agric (Ife), M.Sc. , Ph.D (Ibadan)	Soil Fertility
Adesodun, J.K.	Lecturer I	M.Sc., Ph.D. (Nsukka)	Soil Physics/Soil Conservation
Azeez Jamiu Oladipupo	Lecturer I	B.Agric, M.Agric, Ph.D(UNAAB)	Soil Chemistry