



**NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF AGRICULTURAL SCIENCES**

DEPARTMENT OF CROP AND SOIL SCIENCES

**UNDERGRADUATE STUDENT HANDBOOK
(2018-2020)**

**NATIONAL OPEN UNIVERSITY OF NIGERIA
HEADQUARTERS
JABI, ABUJA**



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**Vision and Mission Statements of
The National Open University of Nigeria**

Vision Statement

To be regarded as the foremost University providing highly accessible and enhanced quality education anchored by social justice, equity, equality and national cohesion through a comprehensive reach that transcends all barriers.

Mission Statement

To provide functional, cost effective, flexible learning which adds lifelong value to quality education for all who seek knowledge.

NOUN Anthem

National Open University of Nigeria
Determined to be the foremost university in Nigeria
Providing highly accessible
And enhanced quality education
Anchored on social justice
Equity, equality and national cohesion

Come to NOUN
For quality, cost effective and flexible learning
That adds lifelong value
For all who yearn
For quality education
And for all who seek knowledge

WELCOME FROM THE HEAD OF DEPARTMENT

Welcome to the Department of Crop and Soil Sciences (CSS) at National Open University of Nigeria! We are proud to offer Bachelor degrees in both Crop Science and Soil science and land resource Management, with the ability to conduct research in a variety of specialized areas within each discipline through open distance learning in line with the core mandate of the university.

The Department of Crop and Soil Sciences offers two bachelor degree programs in the broad area of crop science: including crop breeding and genetics, crop and seed production, turf management, crop physiology, cereal chemistry, and crop biotechnology; and soil and land resource management, including soil fertility and crop nutrition, soil physics, soil chemistry, soil microbiology, soil genesis morphology and classification, organic and sustainable agriculture, and remote sensing technology including GIS, GPS, and soil mapping. Programs are designed to discover and develop principles of crop and soil sciences and to apply these principles to the development of new crop varieties and new crop, soil and water management practices in agricultural, urban, and natural environments.

Our goal is to train leaders of tomorrow, scientists and educators to make valuable and lasting contributions in their chosen field of endeavor. To achieve this goal, CSS provides students the opportunity to develop in-depth knowledge in their field, to develop critical thinking skills and to conduct original, creative, cutting-edge research. CSS students have opportunities to teach in the classroom and in outreach programs. Students also have the opportunity to develop a breadth of knowledge across the varied CSS disciplines and beyond by interacting with colleagues and faculty working in research areas outside of their own.

Most agree that the time they spent in undergraduate school was some of the most challenging and rewarding in their life. Immerse yourself in the experience and take full advantage of the many social and professional opportunities coming your way. You will make many

new and lasting friends from around the country. Your time here will be filled with personal and professional growth, change, and accomplishment. At times you may want to give up. Don't. The CSS department and staff are dedicated to enriching your graduate experience and ensuring that it is World Class. We wish you every success in your program and your subsequent endeavors in crop and soil science-related professions.

Dr. Aliyu Musa

Head, Department of Crop and Soil Sciences

PART 1 INTRODUCTION

This handbook is for students studying degree programme offered by the Crop and Soil Science Department. You should read this handbook carefully at the start of the year and refer to it throughout your programme.

You should check your University email account regularly for information and reminders about your programme and activities in the Crop and Soil Science Department.

Policies and procedures regarding undergraduate education are set at three levels - the university, school, and department. The NOUN *Policies and Procedures* contain most of the general policies on admissions and programs. Please refer to these websites for current information. This handbook addresses departmental policies and procedures in addition to the aforementioned. Failure to follow these policies and observe the degree requirements inevitably results in complications and could delay or jeopardize completion of your degree. Please read this handbook carefully and keep refer it throughout your program of study here.

The graduation requirements of the both Bachelor degrees programme, which must be met for completion of a degree program, are those published in the Policies and Procedures of the university in effect at the time of the student's initial admission as a regular or provisional student. Departmental requirements are those in effect at the time the student files a program of study.

1.1 Statement of Ethics

The CSS department and staff are committed to the basic values of: Accountability Integrity Positive Attitude Respect Honesty Passion Quality Work Ethic

By upholding these values, we strive for our students to develop scientific and professional values of their own. We highly encourage our students to reflect on and consider the following guiding principles:

1. Uphold the highest standards of scientific investigation and professional comportment, and an uncompromising commitment to the advancement of knowledge.
2. Honor the rights and accomplishments of others and properly credit the work and ideas of others.
3. Strive to avoid conflicts of interest.
4. Demonstrate social responsibility in scientific and professional practice, by considering whom their scientific and professional activities benefit, and whom they neglect.
5. Provide honest and impartial advice on subjects about which they are informed and qualified.
6. As mentors of the next generation of scientific and professional leaders, strive to instill these ethical standards in students at all educational levels.

1.2 Mission, Objectives, Philosophy and Learning Outcomes

Mission Statement

The mission of the Bachelor Degree Program in CSS is to provide fundamental training in basic and applied crop and soil sciences. Upon completion of their graduate program, students in CSS will be able to formulate, design, and implement research, evaluate and interpret data objectively, and communicate results of their work effectively in oral and written forms and also to provide functional, cost-effective, flexible learning which adds life-long value to quality education for all who seek knowledge

Overall Aims and Objectives

The aims and objectives of the proposed programme are in line with the National Policy on Education and within the bounds of the mission of the university.

1. Develop effective programs for students that allow them to become well educated and highly skilled individuals with the potential to be national and international leaders;
2. Conduct scientific research on globally relevant problems in crop and soil sciences and contribute this knowledge to their discipline;
3. Enhance the visibility and impact of graduate programs in crop and soil sciences;
4. Place students in lead academic, research, and industry positions.

Aims/Objectives for Crop Science

The programme aims to provide:

- Opportunity for agricultural problems to be resolved through the scientific manipulation of crops and their environment for enhanced productivity with the aim of attaining food security.
- Training opportunity for students in the application of crop physiology for enhanced productivity through the deployment of improved production practices as well as management of crop environment.
- Graduates with entrepreneurial culture, communication skill, computer literacy, problem – solving behavior, life-long learning and subject matter interest to ensure employment opportunities.
- Graduate that are creative, innovative and full of initiatives for self-employment.

Relevant supportive resources for teaching and research in crop production and allied disciplines through ODL mode of delivery.

Aims/Objectives for Soil and Land Resource Management

The major aims/objectives of the programme among others are:

- Soil Science has a major role to play in ensuring adequate food production, just as it did with the phenomenon of “green revolution” which included the use of fertilizer to boost food production.
- As food production is boosted, environmental problems also arise, which will be tackled by expertise from the field of soil science through open and distance learning.
- Furthermore, soil science has a role to play in tackling environmental challenges arising from industrial and domestic activities. This necessitated the inclusion of land management for an appropriate focus on environmental soil science.

Philosophy

The philosophies of the two programmes are:

For Bachelor degree in Crop Science is an applied biological and physical sciences designed to equip the students with basic skills for production of food and fibre. The Science is foundation of civilization which aims to create quality learning environment, for research and development through Open and Distance Learning (ODL).

While for Bachelor degree for Soil and Land Resource Management evolved as an agricultural and natural science with the focus on agriculture in view of the need to provide food security for mankind aims to create quality learning environment, for research and development via Open and Distance Learning (ODL).

Learning Outcomes

1. Knowledge of field. Understands the breadth and depth of knowledge associated with their discipline;

2. Scientific reasoning. Designs, conducts, analyzes, and interprets research effectively on important problems in their discipline;
3. Communication. Communicates effectively to a diverse group of people using appropriate traditional and emerging technological media;
4. Original contribution. Makes an original contribution to their discipline.

1.3 Staff in the Crop and Soil Science Department

S/N	Name of Staff	Area of Specialisation	Qualification/Date	Rank
1.	Prof. V. A. Tenebe	Agronomy	Ph.D. Agronomy M.Sc., B.Sc.	Professor
2.	Dr. Aliyu Musa	Soil Science	Ph.D. Soil Science 2000, M.Sc. 1995, B.Sc.	Senior Lecturer (Head of Department)
3.	Dr. Andrew D. Keswet	Agric Mechanization	Ph.D Agric. Mechanization, M.Sc., B.Sc.	Senior Lecturer
4.	Dr. A. M. PetuIbikunle	Crop Science	Ph.D. Agronomy, M.Sc. Crop Physiology and Production, B. Agric.	Senior Lecturer
5.	Dr. B BShani	Agric. Engineering	Ph.D. Agric. Engineering 2008, M.ENG. Agric. Engineering 2004, B. ENG. Agric. Engineering, PGDE 2011	Lecturer I
6.	Dr. Godwin A. Alhassan	Farming System Agronomy	Ph.D. Agronomy 2015, M.Sc. Crop Production 2004, MBA Management 2002, B.Sc. Agriculture 1984	Lecturer II

7.	Dr. Obasi Sunday N	Soil Science	Ph.D. Soil Survey & Land use Planning 2005, M.Sc. Soil Survey, and Land use Planning 2010, B. Sc. Soil Science 2005	Lecturer II
8.	Mrs. Alawode O. Yetunde	Crop Science	M.Sc. Agronomy 2011, B. Agric. 2005.	Asst. Lecturer

Technical Staff

S/N	Name of Staff	Area of Specialisation	Qualification/Date	Rank
1.	Mr. Isaac AmehOchaba	Agricultural Engineering	HND Agricultural Engineering 2014	Higher Technical Officer (Farm Mgt.)
2.	Mr. Bashir Abdullahi	Crop Science	National Diploma Agricultural Engineering 1993	Assistant Technical Officer
3	Mr. Gambo J Garba	Agricultural Technology	National Diploma Agric. Technology	Assistant Technical Officer Soil

Administrative Staff

S/N	Name of Staff	Area of Specialisation	Qualification/Date	Rank
1.	Mr. Aliyu Alhassan	Management	SSCE 1997/NECO2007 ND Business Admin2002	Senior Secretarial Assistant 1
2.	Mrs. Talatu Danladi		Cert. in accounting Assistant III 1993, TC II (Referred) 2008, Accounting Assistant III & NCE 2011	Farm Assistant (Farming)

Environmental Attendant

S/N	Name of Staff	Area of Specialisation	Qualification/Date	Rank
1.	Mr. Gungret John Kumden		SSCE 2009	Environmental Assistant
2.	Mrs. Laitu Depot		FSLC 1996 & Certificate in Life Stock Management.	Environmental Attendant (Farming)

1.4 Communication within the Department and Faculty

Departmental Communication

Contacting Staff and Postgraduate Students

You can search for staff and postgraduate students' contact details via the University website directory: <http://noun.edu.ng>. If you cannot contact a particular member of staff, please email fas@noun.edu.ng with details. Note, however, that staff are not in every day as their research commitments frequently take them out of department.

Existing Communication Channels

Direct Communication

Newsletters

The newsletters are emailed out and comprise relevant information as part of your study, and includes Student Support Newsletter and Career Notices.

Emails

Important notices and communication related to your studies will be sent to your students university email account, therefore please check these regularly. You will have been issued with a university account when you register at the beginning of your studies in NOUN. Students can set up their email accounts on their mobile devices.

SMS

Sending SMS to students' mobile phone is used as an important information access or gesture of goodwill.

Facebook and Twitter

The department has a Facebook and twitter account which is accessible from the website. These are also used by student representatives for communicating with students on specific programmes, or course units.

Passive Communication**Websites**

The department uses the university website is <http://www.noun.edu.ng>

The information for current students webpage has a mindful of information related to your studies. You can access timetable information by year, course units and descriptions and course materials, student support guidance, general information, and much more. You can also access the on-line student handbook.

Student Portal

The Student portal is a communication source that links into a number of support resources and information related to your studies.

E-courseware

This is a virtual e-learning tool in the student portal which is used for a number of course unit materials and assessments.

Notice boards

There are student notice boards throughout the faculty and department

Personal Communication

Academic Staff Office Hours

Academic staff have an office hour so that students can speak to lecturers about concerns related to a specific course unit, or other aspects of their study. The office hours are with Tracey on reception.

Academic Advisor Meetings

Academic Advisor Meetings are arranged twice per semester. Your Academic Advisor is there to support you throughout your studies.

Reception Information Point

The main information point in the faculty is the Reception Area in Faculty of Agricultural sciences. This is one of be a conthat provides information, advice and guidance for all students.

PART 2: UNDERGRADUATE PROGRAM ADMINISTRATION

Undergraduate Program Bylaws

The Department of Crop and Soil Sciences undergraduate programs are governed by official bylaws, approved by the Faculty of Agricultural Sciences, The Academic Planning, and the NOUN Senate. The Department of Crop and Soil Sciences under Graduate Program Bylaws define the qualifications for membership for the Faculty, administration of the Crop and Soil Sciences under Graduate Programs, composition of undergraduate student advisory committees, and participation of Crop and Soil Science under graduate students in the administration of the Crop and Soil Sciences Programs.

The Crop and Soil Sciences under Graduate Programs are administered by Head of department and other Academic staff to provide overall leadership, development and implement policies, represent the interests of the Program to the Faculty and University administrators, be responsible for coordinating all under Graduate Program administrative matters within the faculty, manage the departmental resources for undergraduate student support in CSS, coordinate CSS graduate course teaching assignments, and appoint a CSS Under Graduate Committee. The Under Graduate Committee coordinates and advises the Department Head on the Crop and Soil Sciences under Graduate Programs. Currently the committee is composed of the Crop Science and Soil Science under Graduate Coordinators areas in which the CSS Under Graduate Committee assists and advises the Head include:

- Review, develop and update long-range goals for the CSS Under Graduate programs and plans for their attainment.

These ideas shall be presented at least once annually to a meeting of all faculty.

- Serve as a sounding board for new ideas, changes, etc., in academic or administrative issues.
- Provide guidance on administration of the CSS Under Graduate Programs.
- Lead the assessment process for the CSS Under Graduate programs.
- Coordinate all activities related to recruitment of CSS Under Graduate students.
- Develop and maintain recruiting materials, including web materials, as required.
- Review all student applications and, in conjunction with the Department Head after consultation
- with appropriate CSS Under Graduate Faculty, determine the appropriate disposition of applications
- (acceptance or rejection) in a timely manner.
- Regularly (at least annually) review the CSS Under Graduate curriculum.
- Make recommendations to CSS Under Graduate Faculty regarding curricular revision. Such
- recommendations are forwarded to the Department Head to be presented to the Under Graduate
- Faculty for approval by majority vote.
- Prepare drafts of course or curricular change forms for revision and submission by the CSS Department Head.
- With approval by the CSS Department Head, other ad hoc committees may be appointed as needed. Changes to the existing Under Graduate Committee responsibilities must be approved by amendment of bylaws.

2.1 Academic Program Information

All applicants to the Soil Science graduate program need to submit GRE scores. The submitted scores need to be less than 5

years old. Any exception to this policy must be approved by a majority of the soils faculty. Submission of GRE scores is not required but is highly recommended for the Crops graduate program in order to qualify for competitive fellowships and scholarships.

Course units and credits

Students normally need to take a total of 175 credits of course units before graduation as follows;

1. Total credit units for 100 level is 35 units
2. Total credit units for 100 level is 43 units
3. Total credit units for 100 level is 35 units
4. Total credit units for 100 level is 24 units
5. Total credit units for 100 level is 38 units

Course Unit Selection

Compulsory courses: all students in the crop and soil science department are automatically enrolled onto their mandatory course units as part of their programme of study. You can see which course units you are registered on by logging in to noun registration website.

Optional courses: If you are on a programme that includes optional course units, then you will need to self-select course units; further information is available from the university registration website.

Course unit selection opens at the beginning of each semester for the following academic year. You are strongly advised to take this opportunity to provisionally select optional course units to make sure that you get a place on your preferred options. The selection process opens again during the first two weeks of each semester; this provides an opportunity for you to enroll, add and amend your preferred optional course units.

2.2 Degree Options

The department currently runs two degree programmes;

1. Bachelor Degree of Crop of Science Option
2. Bachelor Degree of Soil and Land Resource Management

Because research is an integral part of science, most students complete the degree program. The final year project describes a research project conducted by the student. The final year project typically has three sections: a background or literature review that sets the stage for the research; a section with one or more chapters describing the actual research and containing data and analysis; and a general conclusion. The final year project should be formatted in a style that is consistent throughout.

2.3 Students' Examination Guidelines And Regulations

Examination constitutes a very important aspect of the University's activities. The conduct of its examinations is taken seriously. Therefore, the University does not condone any form of examination misconduct. Students are advised to abide by the following rules and guidelines:

- A student's matriculation number serves as his/her examination number.
- Students should normally write examinations at their designated centres.
- Students must bring to the examination hall their writing materials and any other material, which may be permitted by the University for a particular examination. These materials must have been listed as essential for certain question(s).
- Students arriving an hour after the commencement of an examination shall be allowed to sit for the examination only at the discretion of the Supervisor. Such a student will not be allowed an extra time.

- Once a student is admitted into the examination hall, he/she may not leave the hall until he/she has finished with the examination. If for any cogent reason the student must leave the Hall, he/she must do so with the permission of the Supervisor.
- A student must be accompanied by an invigilator if permitted to leave the examination hall temporarily (e.g. visiting the rest-room, etc.).
- No answer booklets other than those supplied by the University are allowed in the examination hall. All rough works must be done in the supplied answer booklets and crossed out neatly. All supplementary answer sheets/booklets must be tied/attached to the main answer booklet.
- Silence must be observed in the examination hall. Any student requiring the attention of the invigilator should raise his/her hand.
- Any activity or behaviour which may be construed as examination misconduct or malpractice (e.g. cheating etc.) shall be liable to discipline in accordance with the University's rules and regulations governing examination as contained in the Students' Handbook.
- Communication between students is strictly forbidden during examinations. Any student found receiving or giving assistance would be sanctioned. Such a student may be required to withdraw from the examination and subsequently made to face the university examination malpractice panel.
- Students are not permitted to smoke or sing or pray aloud or engage in any activity that may distract others in the examination halls.
- Bags and briefcases are not allowed in examination halls. The University will not be liable for any loss or damage of a student's personal effects/property.

- Un-authorized materials (such as textbooks, course materials, notebooks, sheets/scrap of papers) in printed or electronic form are not allowed in examination hall.
- Pagers and mobile phones are not permitted at all in examination halls.
- Students must observe the Supervisor's instructions regarding the commencement and end of an examination. Students who start writing before being told to do so, or who continue writing after being asked to stop would be sanctioned.

2.4 Information for New Students

2.4.1 Orientation Programme

Student orientation programme is done at their various Study Centers. All fresh students are required to undergo an orientation programme prior to their registration. The programme is intended to acquaint the students with the whole range of services and privileges available to them as well as their responsibilities as members of an academic community. Regulations require satisfactory completion of the orientation before matriculation in the University.

2.4.2 Registration

The University's registration system is computerized and so most of the registration exercise is online. Each student is provided with internet access, user name and password to log on the registration portal of the University website.

For fresh students, the registration procedures include participation in interview and screening exercise where credentials are screened for authenticity. It also includes payment of relevant fees for both fresh and returning students. The University's academic year comprises of two semesters. Each student is assigned an academic adviser during the

registration exercise in the Department. It is important for students to get proper advice from their assigned Academic Adviser, regarding the number and relevance of the courses to register for.

To be accepted as a bonafide student, eligible to attend lectures as the case may be and take examinations, the student must duly register within the stipulated period for all prescribed courses at the beginning of each semester. Any student who fails to duly register within the specified time period will pay a late registration fee. This concession is only for the period approved for the late registration.

2.4.3 Deferment of Admission

Is entertained only based on university policy and conditions such could be when a student falls sick or suffers an accident after registering for a programme in the University. Such a student would apply with relevant medical report to the Dean of his/her Faculty through the Head of the Department for deferment of a semester or sessions as the case may be to enable him/her fully recover.

2.4.4 Change of Programme and Course

Student process change of courses via their respective study centers. The students download the required form via their Study Centers and process it through their respective Study Centers.

2.4.5 Registered Students who wish to change their Programme of Study

Registered Students who wish to change their Programme of Study process it via their respective study centers. The students download the required form via their Study Centers and process it through their respective Study Centers.

2.4.6 New Students who were wrongly admitted to a Programme

Students who were wrongly admitted to a programme can seek counsel from their counselor.

2.4.7 Change of Registered Courses through “Add/Drop” Provision

A Student who wants to make changes to his/her registered courses after completion of his/her registration shall do so on prescribed Add/Drop forms. This provides students' the opportunity to delete (drop), add or substitute courses he/she has previously registered for during the current registration exercise. The change(s) become effective after approval by the HOD. Under no circumstance should a student just abandon a course he/she has registered for or attend lectures and/or sit for examinations of course(s) for which he/she has not duly registered without first having his/her change(s) approved through the Add/Drop forms.

2.4.8 Credit Transfer

Credit transfer is the process by which recognition is granted by NOUN to applicants on the basis of previous studies undertaken in another institution, and also on the basis of prior learning. Credit transfer may be approved when a course previously passed in another institution is assessed as being equivalent to a course in NOUN.

Credit Unit

Credit unit (CU) represents the weight assigned to the course, and is recorded in unit hours. One credit is considered as one hour of classroom lecture per week or two hours of laboratory exercise per week. Thus, CU consists of specified number of student – teacher hours / week / semester.

Minimum Credit Unit Requirement:

There is a minimum credit weight loading of courses allowed at any particular semester for academic purposes if a student is studying in the full-time mode. However, the minimum number of credits one can register for in a semester in the Open learning system is still dictated by one's purse, ability and time available.

Maximum Credit Unit Requirements:

There is also a maximum number of credits the University can allow for registration in any given semester.

Core Courses:

There are courses that are compulsory for all students in a given **programme**. A student must pass these courses before he or she will be allowed to register for courses at the next level or indeed graduate if the course is at the highest level.

Required Courses:

A student must register for all required courses. Failure in any of these courses does not prevent graduation if the student has passed enough credits for graduation. Failing a required course however, will affect the Grade Point Average (GPA), because all such courses registered for will be used in computing their GPA.

Grade Point (GP)

This involves the assigning of numerical or alphabetical letter to the scores of students at examination, reports or projects. Letter systems generally run from A (5 points), to B (4 points), C (3 points), D (2 points), and F (0 points)

Grade Point Average (GPA)

This refers to the evaluation of student's performance in any semester. It is the average of weighted grade points earned in the

courses offered by a student in a semester. The GPA is calculated as follows:

$$\text{GPA} = \text{TCE}/\text{TCR}$$

Where:

TCR = Total Credits Required

TCE = Total Credits Earned

Cumulative Grade Point Average (CGPA)

The CGPA represents an up-to-date average (i.e. cumulative) of the GPA earned by the student in at least two semesters. It is an indication of the student's overall performance at any point in the course of his/her training at the University. Cumulative Grade Point Average (CGPA) is attained after two semesters or more in an academic programme.

Calculation of CGPA/GPA

CGPA is calculated as follows:

$$\text{CPE}/\text{CCR}$$

Where:

CPE = cumulative points earned

CCR = cumulative credits registered

Elective Courses:

These are courses available in one's domicile University or from other Faculties in the University. While students are advised to work hard and pass their elective courses, they can still graduate if they have sufficient credits to do so even if they failed some electives. They should however note that the number of failed courses will eventually affect their grading, because all such failed courses will be used in computing their GPA.

2.5 General Studies Courses

Regardless of the academic programmes at the undergraduate level and to some extent Postgraduate level, in which a student is enrolled, all first year undergraduate students must register for and pass some general courses. These are GST courses. If a

student fails any of these, he or she would not be allowed to graduate. These courses are:

Courses

1. GST 101 - Use of English and Communication Skills I
2. GST 102 - Use of English and Communication Skills II
3. GST 103 – Computer Fundamentals
4. GST 104 - Use of Library
5. GST 105 - History and Philosophy of Science
6. GST 107/707/807 - A Study Guide for the Distance Learner
7. GST 201 - Nigerian Peoples and Culture
8. GST 202 - Fundamentals of Peace Studies and Conflict Resolution
9. GST 203 - Introduction to Philosophy and Logic
10. GST 204 - Entrepreneurship and Innovation
11. GST 302 - Business Creation and Growth

2.6 Programme Delivery Method

The NOUN employs a range of delivery methods to take education to the people and make learning an enjoyable activity. These methods include:

- Printed instructional materials, audio, video tapes and CD-ROMs. These would be transported to you by courier companies, NIPOST and NOUN's in-house transport division.
- Television and radio broadcast of educational programmes.
- Electronic transmission of materials in multimedia (voice, data, graphics, video) over fixed line (telephone or leased lines), terrestrial and VSAT wireless communication systems.

Study Centers in each of the geo-political zones, states and local government areas shall perform critical roles in the delivery of

instruction. Study Centres are resource places where a student picks up course and other study materials as well as interact with instructional facilitators and tutors, student counsellors, study centre directors and with other students. A number of other learner support facilities including internet browsing, e-mailing, library and a range of communication channels are also available at the study centres.

1. 7.1 Basic Admission Requirements and Expected Duration of the Programmes

To be admitted into the 5-year B. Agriculture, or B. Aquaculture and Fisheries Management degree programmes. Candidates must have:

- a) Undergraduate programmes (100 Level)
5 credits in WASC/GCE/NECO subjects including English, Mathematics, Chemistry, Biology/Agricultural Science and any one of the following: Physics, Geography or Economics, at least a pass in Physics.
- b) For Direct Entry (200 Level)
 - "A" Level passes in the relevant subjects.
 - ND with a minimum of upper credit plus 5 credits in WASC/GCE/NECO subjects including English, Mathematics, Chemistry, Biology/Agricultural Science and any one of the following: Physics, Geography or Economics, at least a pass in Physics is required for 200level.

Course Duration- 4 years for direct entry candidates and 5 years for students who came in from 100 levels.

- b) Post-graduate Programme
 - i. PGD Agricultural Extension and Management

Candidates seeking admission for PGD Agricultural Extension and Management must possess a Bachelor's degree with at least 3rd class division. Candidates with pass degree and minimum of 3 years cognate experience in related field may be accepted. HND holders in Agricultural Sciences or related disciplines may be admitted. Holders of Bachelor degree in Basic Science, Biological/Earth Sciences and Agricultural Sciences from universities that are recognised by NOUN are admissible.

Graduation Requirements

To graduate, a student shall have undergone 4 or 5 years of study depending on his entry point, including 12 calendar months of Farm Practical Year (FPY/SIWES). The activities of the farm practical year should include periodic seminars on the student's work as a way of stimulating interest as well as the presentation of a written report to be graded at the end of the year.

Course workload must meet the graduation requirements of the university. However, in doing so, the student must earn a minimum of 167 credit units for the five -year programme and 132 credit units for the four- year (direct entry) programme in agriculture and related fields as indicated under course requirements.

The submission of an undergraduate project report based on supervised research is a graduation requirement, which must not be compromised. This requirement exposes the student to problem-solving techniques and provides him/her with the ability to organise ideas from literature and research findings. In short, it prepares the student for the work ahead and for further training at the post-graduate level. This area of academic preparation needs to be maintained and developed further.

Degree Classification

The determination of the class of degree shall be based on the Cumulative Grade Point Average (CGPA) earned at the end of

the programme. The GPA is computed by dividing the total number of credit points (TCP) by the total number of units (TNU) for all the courses taken in the semester. The CGPA shall be used in the determination of the class of degree according to the following table:

CUMULATIVE GRADEPOINT AVERAGE (CGPA)	CLASS OF DEGREE
4.50 – 5.00	First Class
3.50 – 4.49	2 nd Class Upper
2.40 – 3.49	2 nd Class Lower
1.50 – 2.39	3 rd Class

The maximum length of time allowed to obtain a degree in the Department shall be sixteen semester for the 5-year degree programme and fourteen semesters for students admitted directly into the 200 level. For extension beyond the maximum period, a special permission of Senate shall be required on the recommendation of the Faculty Board.

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Credit Units	Percentage Score	Letter Grades	Grade Points (GP)	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA) 5-Point System	Class of Degree
Vary according to contact hours assigned to each course per week per semester and according to work load carried by student	70 – 100	A	5	Derived	4.50 5.00	1 st Class
	60 – 69	B	4	by Multiplying (i) & (iv)	3.50 4.49	2 nd Class Upper
	50 – 59	C	3	and divide by total credit units	2.5 - 3.49	2 nd Class Lower
	45 – 49	D	2		1.50 to 2.49	3 rd Class
	40 – 44	E	1		<1.5	Fail

Probation

Probation is a status granted to a student whose academic performance falls below an acceptable standard. A student whose Cumulative Grade Point Average is below 1.00 at the end of a particular year of study, earns a period of probation for one academic session.

Withdrawal

A candidate whose Cumulative Grade Point Average is below 1.00 at the end of a particular period of probation should be required to withdraw from the university.

Any student who cannot satisfy the graduation requirements within 2-years after the prescribed duration for the programme (i.e. 6 or 7 years after admission) shall be required to withdraw from the university.

Course Credit Unit System

This should be understood to mean a 'quantitative system of organisation of the curriculum in which subject areas are broken down into unit courses which are examinable and for which students earn credit(s) if passed'. The courses are arranged in progressive order of difficulty or in levels of academic progress, e.g. Level or year 1 courses are 100, 101, etc. and Level II or Year II courses are 200, 202, etc.

The second aspect of the system is that courses are assigned weights allied Credit Units.

Cumulative Grade Point Average (CGPA)

This is the up-to-date mean of the Grade Points earned by the student in a programme of study. It is an indication of the student's overall performance at any point in the training programme. To compute the Cumulative Grade Point Average, the total of Grade Points multiplied by the respective Credit

Units for all the semesters are added and then divided by the total number of Credit Units for all courses registered by the student.

Evaluation

Course Evaluation

Continuous Assessment should be a significant component of the assessment of a student's performance in a course. It should constitute between 30 and 40% of the final grade awarded. The Grade Point Average (GPA) and the Cumulative Grade Point Average (CGPA) systems are the yardsticks for evaluating students' performance from semester to semester and from year to year. The final degree classification should be based on the final CGPA ranges contained in the following table:

CUMULATIVE GRADE POINT AVERAGE (CGPA)	CLASS OF DEGREE
4.50 – 5.00	First Class
3.50 – 4.49	2 nd Class Upper
2.40 – 3.49	2 nd Class Lower
1.50 – 2.39	3 rd Class

External Examiners System

External Examiners should be used only in the final year of the under-graduate programme to assess final year courses and projects, and to certify the overall performance of the graduating students, as well as the quality of facilities and teaching. However, the existing practice of using external examiners for major subject areas in professional programmes should be continued.

2.7 SIWES/Farm Practical Year Rating and Assessment

The fourth year should be basically left for practical farm training. This training should be for duration of 12 months of which not less than 80% should be devoted to practical training on a farm and related industries. There should be no classroom lectures during the practical year. The Farm Practical Year (FPY/SIWES) programme as recommended by Nigeria Universities Commission (NUC) is premised on the philosophy that a 12 calendar month hands-on training programme be mounted at 400 level for B. Agricultural Science Students to make them “learn by doing” via undertaking practical farming activities on both crops and livestock. However, given the open and distance learning mode of the university, The FPY/SIWES year will comprise of seventy two (72) weekends (Fridays and Saturdays) of field work as indicated below.

200level – 8weeks

300level – 12 weeks

400level -- 52weeks

The 72 weeks of weekend-time farm practical work must be completed before registering for any 500 Level courses.

Teaching and Research Farm

To meet the minimum standard for accreditation (NUC minimum benchmark), the Faculty farm at Kaduna which also serve the Departments is being upgraded into a teaching and research farm where face-to-face facilitation will be done for students within the Kaduna catchment area. Identified designated schools/colleges of agriculture and large farms around the country are being approached with Memorandum of Understanding (MoU) to use their facilities for students training.

Laboratory Practical

This will be done via the following ways:

- i. Using the existing laboratories of other tertiary institutions at least one in each geo-political zone. MOU will be signed with these institutions.
- ii. Virtual laboratory/use of video clips.
- iii. Established model laboratory at the Faculty.

Research Project/Thesis

The submission of an undergraduate project/ thesis based on supervised research is a graduation requirement, which must not be compromised. This requirement exposes the student to problem-solving techniques and provides him with the ability to organise ideas from literature and research findings. In short, it prepares the student for the work ahead and for further training at the post-graduate level. This area of academic preparation needs to be maintained and developed further.

1. Maintenance of Curricular Relevance

The Department of Economics and Extension in its drive to maintain a standard and also follow up with the progress of its graduates shall:

- Maintain a 2-way communication strategy involving the Department, and employers/professional bodies for periodic evaluation of competency and or work output of its graduates.
- Undertake a 5- year periodic review of curriculum by a group of experts who should be professors and associate professor/readers.
- Innovate quality enhancing strategies: Encouragement of research at all levels (including undergraduate programme) into low cost affordable technologies that farmers can adapt and adopt for sustainable entrepreneurship.
- Use of indigenous technology and culture to make the curriculum relevant.

2.8 Outline Programme Proposal (Opp)

1. RECOMMENDED COURSES FOR THE BACHELOR DEGREE OF CROP OF SCIENCE OPTION

100 LEVEL

First Semester

Course Code	Course Title	Credits
GST 101	Use of English and Communication Skills I	2
CIT 101	Computers in Society	2
GST 121	Use of Library	1
GST 105	History and Philosophy of Science	2
BIO 101	General Biology I	2
BIO 191	Practical Biology	1
CHM 101	Introduction to Inorganic Chemistry I	2
CHM 191	Practical Chemistry I	1
AGR 101	Mathematics for Agriculture I	2
PHY 121	General Physics	2
PHY 191	Practical Physics I	1
CHM131	Organic Chemistry for Agriculture I	2
Sub Total Credit Unit		20

Second Semester

Course Code	Course Title	Credits
GST 102	Use of English and Communication Skills II	2
CHM 132	Organic Chemistry for Agriculture II	2
BIO 102	General Biology II	2
CHM 192	Introductory Practical Chemistry II	1
PHY 192	Practical Physics II	1
BIO 192	Practical Biology	1

AGR 102	Mathematics for Agriculture II	2
CHM 102	Physical Chemistry	2
GST 104	Introduction to Social Sciences	2
Sub Total Credit Units		15

Total credit units for 100 level course = 35

200 LEVEL

First Semester

Course Code	Course Title	Credits
ARD 201	Principles of Agricultural Extension	2
ARD 251	Introduction to Agricultural Economics	2
AGR 201	General Agriculture	3
ARD 203	Introduction to Home Economics	2
SLM 201	Principles of Soil Science	2
AGR 203	Principles of Crop Production	2
AGR 205	Introduction to Agro-Climatology	2
FRM 211	Forestry and Wildlife Management	2
ANP 201	Introduction to Biotechnology	2
AGR 207	Anatomy and Physiology of Farm Animals	2
GST 201	Nigerian People and Culture	2
Sub Total Credit Units		23

Second Semester

Course Code	Course Title	Credits
ARD 202	Introduction to Rural Sociology	2
ANP 202	Principles of Animal Production	2
ANP 204	Introduction to Agricultural Biochemistry	3
AGR 204	Computer Appreciation and Application to Agriculture	2
AGR 202	Introduction to Agric. Engineering	2

FST 202	Principles of Food Science and Technology	3
AFS 220	Introduction to Fisheries and Wildlife	2
ENT 204	Entrepreneurship and Change Management	2
AGR 206	Crop Anatomy, Taxonomy and Physiology	2
Sub Total Credit Units		20

Total credit units for 200 level courses = 43

300 LEVEL

First Semester

Course Code	Course Title	Credits
SLM 301	Introduction to Soil Mineralogy	2
SLM 303	Introduction to Pedology and Soil Physics	2
SLM 305	Introduction to Soil Chemistry, Fertility and Microbiology	3
SLM 309	Soil Analytical Techniques	2
CRP 309	Arable Crops Production	2
CRP 313	Permanent Crops Production	2
SLM 307	Introduction to Soil Microclimatology	2
AGR 307	Environmental Impact Assessment	2
Sub Total Credit Units		17

Second Semester

Course Code	Course Title	Credits
SLM 302	Soil Fertility and Plant Nutrition	2
CRP 312	Farm Power and Agric. Mechanisation	2
SLM 306	Soil Erosion and Conservation	2
SLM 308	Soil and Water Management	3

SLM 310	Watershed Hydrology	2
SLM 314	Computer- based Terrain Analysis	2
CRP 308	Agric. and Bio-Resources Management	2
SLM 312	Report Writing in Soil Science	1
ENT 310	Cultural Change and Entrepreneurship	2
Sub Total Credit Units		18

400 LEVEL (FARM PRACTICAL YEAR)

Semester – SIWES

Course code	SKILL	CREDITS
SLM 407	Soil-Site Characterisation	2
CRP 401	Crop Production Techniques (Permanent, Arable and Horticultural Crops, etc.)	2
SLM 401	Soil Fertility, Soil and Water Management	2
ANP 405	Animal Husbandry Techniques (Cattle , Sheep, Goats, Poultry, Pigs and Rabbits)	1
CRP 405	Agricultural Product Processing and Storage	2
CRP 407	Crop Protection and Pest and Disease Control	2
ANP 403	Animal Health Management	1
SLM 403	Farm Design Survey and Land Use Planning	2
AEC 401	Farm Management Records and Accounts	1
ARD 401	Extension Practices	1
AGM 401	Farm Mechanisation Practices	1
SLM 405	Agricultural Meteorology	1
AGM 403	Workshop practices	1
AGR 403	Biotechnology in Agricultural Production	1

AFM 409	Fisheries	1
AGR 401	Report Writing	3
	Total	24

500 LEVEL

First Semester

Course Code	Course Title	Credits	Status
CRP 501	Weed Science and Control	2	C
CRP 503	Seed Production Technology	2	C
CRP 505	Vegetable and Fruit Production	2	C
CRP 507	Farming Systems	1	C
CRP 509	Organic Crop Production Systems	1	C
CRP 511	Introduction to Crop Biotechnology	1	C
CRP 517	Organic and Urban Farming	2	C
CRP 513	Plant Pest and Disease Control	2	C
AGR 501	Research Techniques	1	C
AGR 503	Analytical Technique in Agriculture	2	C
ARD 509	Agric. Business Management and Finance	2	E
AGR 515	Techniques for Scientific Writing and Presentation	1	C
Sub Total Credit Units		19	18

Second Semester

Course Code	Course Title	Credits	Status
ANP 518	Pasture and Forage Production	2	C
CRP 502	Plant Growth and Development	2	C
CRP 504	Advanced Crop Protection	2	C
CRP 506	Landscape Horticulture and Floriculture	2	C
CRP 508	Post-Harvest Physiology and Produce Storage	2	C
CRP 512	Crop Evolution and Adaptation	2	C
CRP 516	Produce/Post-harvest Management	2	C
AGR 502	Seminar	1	C
AGR 599	Project	4	C
Sub Total Credit Units		19	19

RECOMMENDED COURSES FOR BACHELOR DEGREE OF SOIL SCIENCE AND LAND RESOURCE MANAGEMENT OPTION

100 LEVELS

First Semester

Course Code	Course Title	Credits
GST 101	Use of English and Communication Skills I	2
CIT 101	Computers in Society	2
GST 121	Use of Library	1
GST 105	History and Philosophy of Science	2
BIO 101	General Biology I	2
BIO 191	Practical Biology	1
CHM 101	Introduction to Inorganic Chemistry I	2
CHM 191	Practical Chemistry I	1

AGR 101	Mathematics for Agriculture I	2
PHY 121	General Physics	2
PHY 191	Practical Physics I	1
CHM131	Organic Chemistry for Agriculture I	2
Sub Total Credit Unit		20

Second Semester

Course Code	Course Title	Credits
GST 102	Use of English and Communication Skills II	2
CHM 132	Organic Chemistry for Agriculture II	2
BIO 102	General Biology II	2
CHM 192	Introductory Practical Chemistry II	1
PHY 192	Practical Physics II	1
BIO 192	Practical Biology	1
AGR 102	Mathematics for Agriculture II	2
CHM 102	Physical Chemistry	2
GST 104	Introduction to Social Sciences	2
Sub Total Credit Units		15

Total credit units for 100 level course = 35

200 LEVEL

First Semester

Course Code	Course Title	Credits
ARD 201	Principles of Agricultural Extension	2
ARD 251	Introduction to Agricultural Economics	2
AGR 201	General Agriculture	3
ARD 203	Introduction to Home Economics	2
SLM 201	Principles of Soil Science	2
AGR 203	Principles of Crop Production	2
AGR 205	Introduction to Agro-Climatology	2
FRM 211	Forestry and Wildlife Management	2

ANP 201	Introduction to Biotechnology	2
AGR 207	Anatomy and Physiology of Farm Animals	2
GST 201	Nigerian People and Culture	2
Sub Total Credit Units		23

Second Semester

Course Code	Course Title	Credits
ARD 202	Introduction to Rural Sociology	2
ANP 202	Principles of Animal Production	2
ANP 204	Introduction to Agricultural Biochemistry	3
AGR 204	Computer Appreciation and Application to Agriculture	2
AGR 202	Introduction to Agric. Engineering	2
FST 202	Principles of Food Science and Technology	3
AFS 220	Introduction to Fisheries and Wildlife	2
ENT 204	Entrepreneurship and Change Management	2
AGR 206	Crop Anatomy, Taxonomy and Physiology	2
Sub Total Credit Units		20

Total credit units for 200 level courses = 43

300 LEVEL

First Semester

Course Code	Course Title	Credits	Status
SLM 301	Introduction to Soil Mineralogy	2	C
SLM 303	Introduction to Pedology and Soil Physics	2	C
SLM 305	Introduction to Soil Chemistry, Fertility and	3	C

	Microbiology		
SLM 309	Soil Analytical Techniques	2	C
CRP 309	Arable Crops Production	2	C
CRP 313	Permanent Crops Production	2	C
SLM 307	Introduction to Soil Microclimatology	2	C
AGR 307	Environmental Impact Assessment	2	C
Sub Total Credit Units		17	17

Second Semester

Course Code	Course Title	Credits	Status
SLM 302	Soil Fertility and Plant Nutrition	2	C
CRP 312	Farm Power and Agric. Mechanisation	2	C
SLM 306	Soil Erosion and Conservation	2	C
SLM 308	Soil and Water Management	3	C
SLM 310	Watershed Hydrology	2	C
SLM 314	Computer-based Terrain Analysis	2	C
CRP 308	Agric. and Bio-Resources Management	2	C
SLM 312	Report Writing in Soil Science	1	C
ENT 310	Cultural Change and Entrepreneurship	2	C
Sub Total Credit Units		18	18

400 LEVEL (FARM PRACTICAL YEAR)**Semester – SIWES**

Course code	Skill	Credits	Status
SLM 407	Soil-Site Characterisation	2	C
CRP 401	Crop Production Techniques (Permanent, Arable and Horticultural Crops etc)	2	C
SLM 401	Soil Fertility, Soil and Water Management	2	C
ANP 405	Animal Husbandry Techniques (Cattle , Sheep, Goats, Poultry, Pigs and Rabbits)	1	C
CRP 405	Agricultural Product Processing and Storage	2	C
CRP 407	Crop Protection and Pest and Disease Control	2	C
ANP 403	Animal Health Management	1	C
SLM 403	Farm Design Survey and Land Use Planning	2	C
AEC 401	Farm Management Records and Accounts	1	C
ARD 401	Extension Practices	1	C
AGM 401	Farm Mechanisation Practices	1	C
SLM 405	Agricultural Meteorology	1	C
AGM 403	Workshop practices	1	C
AGR 403	Biotechnology in Agricultural Production	1	C
AFM 409	Fisheries	1	C
AGR 401	Report Writing	3	C
	Total	24	

500 LEVEL

First Semester

Course Code	Course Title	Credits	Status
SLM 501	Advance Soil Fertility	2	C
SLM 503	Soil Physics	2	C
SLM 505	Soil Microbiology and Biochemistry	2	C
SLM 507	Soil Morphology and Classification	3	C
SLM 509	Waste Management and Soil	2	C
ARD 509	Agricultural Business Management	2	C
CRP 517	Organic and Urban Farming	2	C
AGR 515	Techniques of Scientific Writing and Presentation	1	C
Sub Total Credit Units		16	16

Second Semester

Course Code	Course Title	Credits	Status
SLM 504	Anthropogenic Impact on Land	2	C
SLM 506	Integration Soil Management	2	C
SLM 508	Land Reclamation	2	C
SLM 510	Soil Survey and Land Evaluation	2	C
SLM 512	Fertilizer Technology	2	C
SLM 514	Soil Ecosystem	2	C
SLM 516	Advanced Soil Science	2	C
AGR 502	Student Seminar	1	C
AGR 599	Project	4	C
Sub Total Credit Units		19	

2.9 Detailed Programme Proposal (Dpp) For Bachelor Degree of Crop of Science Option

100 LEVEL COURSES

First Semester

BIO 101: General Biology I (Botany / Zoology) (2 Units)

Characteristics of living things, cell as the basic unit of living things, cell structure, organisation, cellular organelles, tissues, organs and systems. Classification of living things, general reproduction and concept of inter-relationships of organism, heredity and evolution, elements of ecology (introduction) and habitats.

CIT 101: Computers in Society (2 Units)

What is computer, types of computer, history of digital computer, element of a computer hardware and software, how to work with a computer, operating system, windows, files, word processing, copying a text, saving, changes to a document and formatting, spelling checker and introduction to printing a document, spread sheet, entering and correcting data, using formula, numeric formats, creating charts, types of charts, power points and presentation, networking, internet and e-mail, reading and responding to an e-mail message.

GST 105: History and Philosophy of Science (2 Units)

General description of the nature of science and basic scientific methods and theories; history of western science and science in ancient times, middle ages and the rise of modern science; an overview of African science; man and his environment and natural resources; nature, scope and technological development and inventions; great scientist of Nigerian origin.

GST 101: Use of English and Communication Skills (2 Units)

This course is to enable students learn the skills of listening and comprehension, retrieve information, for interpreting and evaluation, effective reading skills, comprehending at varying speed levels, reading for vocabulary development in various academic contents.

CHM 101: Introductory Inorganic Chemistry I (2 Units)

Hypothesis, theory and law with appropriate illustrations, nature of matter – 3 states of matter, atomic structures, electronic energy levels and orbitals, Periodic classification of elements and its relationship to their electronic configuration, Chemical bonding, survey of properties and trends in groups I, II, IV, V & VII metals.

CHM 131: Organic Chemistry for Agriculturist 1(2 Units)

Definition, nomenclature; functional groups; homologous series; families of organic compounds – composition, structure, formulae, synthesis, isolation and purification; isomerism; electronic theory in organic chemistry; alkanes, alkenes and alkynes; Benzene ring and aromatic compounds.

CHM 191: Introductory Practical Chemistry I (1 Unit)

Practical based on CHM 101 and CHM 131: Cations and Anions-Identification, Acid-base titrations, redox reactions and determinations.

PHY 191: Introductory Practical Physics 1 (1 Unit)

Graphs, measurement; error analysis; determination of acceleration due to gravity by means of simple pendulum; determination of force constant of a spiral spring and the constant; determination of surface tension of water; determination of specific latent heat of fusion of ice; determination of the coefficient of limiting static friction between two surfaces; determination of the coefficient of static

friction on two surfaces using an inclined plane; determination of the relative density of kerosene using the specific gravity bottle; determination of the relative density of a granular substance not soluble in water using the specific gravity bottle.

PHY 121: General Physics (2 Units)

Relevance of Physics to Agriculture. Selected topics and application to agriculture in mechanics, properties of matter, waves and sound, vibrations, electromagnetism, heat optics, light, thermal physics. Atomic and nuclear physics

AGR 101: Mathematics for Agriculturists 1 (2 Units)

Algebra and trigonometry: Real number system; real sequences and series; set and subsets; unit interaction, complements; empty and universal sets; Venn diagram; one way correspondence between sets; quadratic function and equations; solution of linear equations; simple properties of determinants; indices and binomial theorem; transformations; e.g. log transformation; equations of straight line and application to simple regression equations; permutations and combinations; circular measure, trigonometric functions of angles; addition and factor formulae; complex numbers; moments and couples; relative velocity; calculus; elementary functions of simple real variable; graphs of simple functions, the differentiation of simple algebraic: exponential and log functions; the differentiation of a sum; product, quotient, function of function rules; implicit differentiation : definite and indefinite integrations of functions; application of definite and indefinite integrals to areas and volumes.

BIO 191: Practical Biology I (1 Unit)

Simple practical based on BIO 101 theoretical courses

GST 121: Use of Library (1 Unit)

Brief history of libraries, library and education, university library and other types of libraries, types of library materials, using library materials including e- learning, e-materials, understanding library catalogues and classification, copyright and its implications, database resources, bibliographic citations and referencing development of modern CIT, hardware technology software technology, input, output and storage devices, communication and internet services, word processing skills

Second Semester

AGR 102: Mathematics for Agriculturists II (2 Units)

Types of vectors and their application; matrices; simple linear equations; loci; integration; differential equations; first and second-order chemical equations; straight lines and planes; angle between lines and planes; distance of point from a plane; distance between 2 skew lines; circles. Introduction to statistics; diagrammatic representation of descriptive data; measures of location and dispersion for grouped data; curves and graphs; histograms; scatter diagram; theory of probability; binomial distribution; collection, tabulation and representation of agricultural data; mean; mode and median; analysis of variance; linear regression and correlation.

CHM 102: Physical Chemistry (2 Units)

Atoms; Sub-atomic particles, Isotopes, Avogadro's number; The Mole Concept; Chemical Formulae; The Laws of Chemical Combinations; Equations and Calculations; State of Matter; Gases, Liquids and Solids; Chemical Thermodynamics; Energetic and Thermo chemistry; Buffers, Chemical Equilibrium and Equilibrium Constants; Solubility Products; Chemical kinetics; Electrochemistry; Nuclear Binding Energy, Fission and Fusion.

PHY 192: Practical Physics II (1 Unit)

Selected experiments on topics covered in PHY 111 and PHY 122, application of a variety of simple experimental techniques with emphasis on quantitative measurements, experimental errors and graphical analysis.

GST 102: Use of English and Communication Skills II (2 Units)

Writing paragraphs; topic, sentence and coherence, development of paragraphs;

Illustration, description, cause and effect including definitions, formal letters, essential parts and stylistic forms; complaints and requests, jobs ordering goods, letters to government and other organisations; writing reports; reporting events, experiments, writing summaries.

BIO 102: General Biology II (Botany and Zoology) (2 Units)

Cellular basis of life; general structure and functions of plant cells and cellular organelles; plant cell division; heredity; diversity in plant cells and habitats; Morphology general characteristics, life cycles and range of forms of bacteria, viruses, fungi, algae, bryophytes, Lichens and pteridophytes, general structure of animal cell. Functions of animal cells and cellular organelles; animal cell types and division. Forms, functions and life history of invertebrates using selected examples from classes of invertebrates such as Protozoa, Coelenterates, Arthropods, Platyhelminthes, Aschelminthes, Annelida and Mollusca.

CHM 132: Organic Chemistry for Agriculturist II (2 Units)

Simple reactions of hydrocarbons, alcohols and acids, introductory organic basic chemistry and importance of lipids, proteins and carbohydrate and other natural products, petroleum chemistry, oils and fats, hydrogenation of oils. Polymer and biological important molecules, relevance of physics to agriculture. Selected topics and application to agriculture in

mechanics, properties of matter, waves and sound, vibrations, electromagnetism, heat optics, light, thermal physics, atomic and nuclear physics

CHM 192: Introductory Practical Chemistry II (1 Unit)

Practical based on general chemistry CHM 101 and introductory organic chemistry I CHM 102- Determination of melting and boiling points and reaction of functional groups.

GST 104: Introduction to Social Science (2 Units)

Classification of social systems, interpersonal relationships, personality traits and leadership qualities. The role of the media, meaning, scope and indices of development: historical perspectives, ideological bases, economic, political and social factors of development, self-reliance and national development. Growth and spatial distribution of population, delivery of public goods through public enterprises and agencies, peaceful co-existence among nations.

BIO 192: Practical Biology I (1Unit)

Simple practical based on BIO 102 theoretical courses

200 LEVEL COURSES

First Semester

GST 201: Nigerian Peoples and Culture (2 Units)

Nigerian's perception of his world, culture areas of Nigeria and their characteristics, evolution of Nigeria as a political unit, concept of functional education, social justice, individual and national development, norms and values and moral obligation of citizens

ANP 201: Introduction to Biotechnology (2 Units)

Nucleic acids, nucleotides and nucleosides, structure and function of DNA and RNA, translation into proteins, the genetic

code, DNA errors and repair: Genes; Gene structure, function, replication, expression; Gene repair, mutation, recombination and cloning; Principles of DNA recombination. Molecular Tools/Techniques, Biotechnology application in animal agriculture: DNA probes, transformation of microorganisms, recombinant DNA vaccines, transformation of animals. Other biotechnology applications: Delivering peptides and enzymes, targeting rumen protozoa, developing a new feed additive, reducing phosphorus pollution, pathogens in manure and the environment, improving fibre digestion.

Practical: Extraction of DNA and RNA from animal tissues; in vitro translation, transcription, recombination and cloning.

ARD 201: Principles of Agricultural Extension (2 Units)

The meaning of extension science, the scope of agricultural extension, the need for agricultural extension, basic extension principles in agricultural production. The extension agents, rural communities and communication principles and strategies: Discussion of principles behind agricultural extension.

ARD 203: Introduction to Home Economics Extension (2 Units)

Philosophy, scope, objectives and historical development of Home Economics. Examination of basic human needs with respect to food, clothing, shelter and health; programme approaches in Home Economics which will help meet these needs. Preparation for careers in variety of occupations, role of women in agriculture.

ARD 251: Introduction to Agricultural Economics (2 Units)

The scope of agricultural economics. Basic economic Principles applied in agricultural production and marketing. Efficient organisation of scarce resources and factors of agricultural

production, discussions of principles and philosophies involved in Agricultural Economics.

AGR 201: General Agriculture (3 Units)

The distribution of agriculture: World population and food supply, history, scope and importance of agriculture to man. Agriculture and natural environment. Characteristic features of tropical agriculture and how they affect production. Land use and tenure, trends in the production, distribution and utilisation of agricultural products, Measures of improving Nigerian agriculture, climatic, edaphic and social factors in relation to crop production and distribution in Nigeria, systems of crop farming, types, distribution and significance of farm animals; basic principles of animal farming. Place of forestry, fish farming and wildlife in agriculture.

AGR 203: Principles of Crop Production (2 Units)

Crop production and its development, The principles, problems and prospects of crop production, importance of crop rotation, cultural practices, water and soil conservation; irrigation and drainage, general types of characteristics of arthropods, microorganisms and other pests affecting crops. Weeds and their effects on crop production, pests, disease and weed control. Basic Mendelian genetics. Principles of crop production, harvesting, processing and storage.

FRM 211: Forestry and wildlife Management (2 Units)

Renewable natural resources, availability, distribution and potential, the important forest trees and wildlife (with emphasis on Nigerian species) classification, morphology and distribution of important forest trees, forest and game reserves in Nigeria, silviculture, afforestation characteristics of major timber and their uses. Felling and transportation.

SLM 201: Principles of Soil Science (2 Units)

Soils, their origin and formation, physical properties of soils, Soil moisture, air and temperature, soil classification and survey, soil colloids; soil reactions, soil organic matter and soil organisms, soil and water conservation; nutrient requirements and mineral nutrition to plants, introduction to fertilizer.

AGR 205: Introduction to Agro-Climatology (2 Units)

The principles, aims and scope of climatology, the elements and controls of climate and weather and dynamics of the earth's atmosphere, radiation and heating of the atmospheric system; atmospheric moisture, the dynamics of pressure and wind systems, condensation and precipitation process, seasonal variations in temperature, daylight, radiation, rainfall and evapo-transpiration, equipment and maintenance of standard meteorological stations, the tropical climate; relation between agriculture and climate with reference to crops, livestock, irrigation, pests and diseases.

AGR 207: Anatomy and Physiology of Farm Animals (2 Units)

Parts of the beef and dairy cattle, sheep, goats, pigs, rabbits and poultry, fundamentals of cell biology, anatomy and physiology of the cell, cell types. anatomy and physiology of animal tissues, nervous system, skeletal system, muscle, bone, circulatory system, reproductive, digestive, special senses and other systems of farm animals. Physiological functions of animals – homeostatic, nutrition and digestion, respiration. Temperature regulation, excretion and reproduction, endocrinology, the blood and circulation, lactation, milk let down and egg production, water balance.

Second Semester

AGR 206: Crop Anatomy Taxonomy and Physiology (2 Units)

Parts of the crop cell types. Introduction to plant taxonomy, characteristics, distribution, economic importance and local

examples of leguminosae, gramineae, compositae, Dioscoreaceae, Rutaceae, development of cells and tissues; use of plant keys, cell biology, cell and cell types, comparative anatomy of major plant organs, enzymes, photosynthesis and translocation; pollination, respiration and energy utilisation; seed dormancy and germination, development; mineral nutrition, growth regulation.

ANP 202: Principles of Animal Production (2 Units)

History of animal agriculture, the role of livestock in the national economy. Livestock breeds and distribution in Nigeria. Management practices and systems including housing, feeding, breeding and reproduction, health and products processing, effects of climate and other factors on behaviour and handling of animals, Animal production as a business and its interface with other sectors of the national economy, the role of innovations in science and technology through research in the development of animal production.

Practical: Identification of different livestock species and breeds, housing and equipment, common livestock parasites and diseases, livestock products and by-products.

ANP 204: Introduction to Agricultural Biochemistry (3 Units)

Chemistry of living matter; cells, enzymes and intermediary metabolism, tissues and their chemicals. Hormones: classification, control and interactions. Use of natural and synthetic hormones in animal production. Chemistry and metabolism of carbohydrates: definition, classification, reactions of monosaccharide's, tests of carbohydrates; Glycolysis, citric acid cycle, hexose monophosphate shunt, gluconeogenesis, glycogenesis, glycogenolysis. Chemistry, physical properties and metabolism of lipids: definition and classification; biosynthesis of saturated fatty acids (SFA) synthesis of acylglycerols, oxidation of FA, energy balance sheet from SFA

oxidation. Chemistry and metabolism of proteins, enzymes and nucleic acids, Amino acid structure, properties and reactions, enzyme properties, functions and inhibition.

Practical: Testing of carbohydrates, acidic hydrolysis of starch. Tests for lipids – saturated and unsaturated, tests for proteins, proximate analysis of plant and animal products.

ARD 202: Introduction to Rural Sociology (2 Units)

Meaning, importance, and basic concepts and principles of rural sociology, rural versus urban living culture, cultural values and cultural environment, settlement patterns and village organisation, factors which influence rural living conditions, types or rural economics, problems of developing rural economies, rural infrastructure, major rural social institutions – marriage and family, religion, politics, social theories and interactions, general strategies to rural development, role of communities, social aspects of production and marketing in the rural areas, communication and technological change in rural society.

FST 202: Principles of Food Science and Technology (3 Units)

Definition and scope of food science and technology, food distribution and marketing, food and its functions, food habits, food poisoning and its prevention, principles of food processing and preservation, discussion of different preservation methods, deterioration and spoilage of foods, other post-harvest changes in food, contamination of foods from natural source, composition and structures of Nigeria/West African food; factors contributing to texture, colour, aroma and flavour of food, cost; traditional and ethnic influences of food preparation and consumption pattern.

AGR 202: Introductory Agricultural Engineering (2 Units)

Concepts and objectives of agricultural engineering, workshop tools; principles of internal engine. Study of farm machinery used for tillage, plough, cultivation, farm power and operating, principles, maintenance procedures of farm machinery.

AFS 220: Introduction to Fisheries and Wildlife (2 Units)

The important fishes and wildlife of West Africa with emphasis on Nigeria species, classification, evolution, morphology and basic structure of fishes, the adaptation of fish to aquatic life, life cycle of principal species of fishes and wildlife industries in Nigeria, fundamental principles of fish and wildlife management and production.

AGR 204: Computer Appreciation and Application to Agriculture (2 Units)

History of computers, functional components of computer, characteristics of a computer, problem solving; flow charts, Algorithms, computer programming, statements; Introduction to the use of EXCEL, SAS, SPSS, GENSTAT, Introduction to problem solving with the computer; Data entry and editing with the computer. Data analysis using different statistical packages.

ENT 206: Entrepreneurial Studies 1 (2 Units)

The objective of the course to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in agriculture, it draws on the spirit of innovation, creativity, and opportunity. The course offers the students a broad overview of entrepreneurship from historical and current perspectives in the context of agriculture, the course concept can be adapted to bring out the salient features which the would-be-entrepreneur has to bear in mind for a successful effort. Historical background of entrepreneurship, basic concepts and definitions of entrepreneurship, functions of the entrepreneur, characteristics of the entrepreneur, benefits of entrepreneurship,

the entrepreneurial process (Record- keeping, planning and forecasting, budgets and budgeting, start off).

300 LEVEL COURSES

First Semester

CRP 301: Statistics and Field Experimentation (3 Units)

Basic concepts of statistics. Frequency distribution, measure of location and measure of variation. Probability distribution, normal and binomial distribution, Histograms, mean, mode and median, sampling, statistical inference, test of significance, F-test, t-test, Chi-square test, analysis of variance. Principles of field experimentation in crops and soil sciences; research methodology; experimental layout; field survey; normal distribution and sampling; measurements and data analysis; Basic concepts of field experimentation; selection of experimental designs for specification; collection and analysis of data; interpretation of results of different designs; paired plot, completely randomised, randomised complete block, Latin square, split plot, factorial experiments. Correlation and regression.

CRP 303: Principles of Crop Protection (3 Units)

Major pests, fungi, bacteria, viruses and nematodes, weeds and other diseases of tropical crops and stored products. Definition of pests. Study of insect pests of major local crops, their significance and principles of their control. Study of the effects of plant diseases caused by viruses, bacteria, fungi and nematodes and their control. Effects of weeds on crops and livestock and the principles and methods of their control. Strategies of integrated pest management. Characteristics of disease agents (fungi, bacteria, viruses, nematodes). Crop protection methods (cultural, biological, physical, chemical, host-plant resistance). Shortcoming and advantages of different pest assessment and control methods.

CRP 305: Crop Genetics and Breeding (2 Units)

Mendelian genetics; Introduction to population and quantitative genetics; multiple alleles, mitosis and meiosis. The origin, organisation and transmission of biological variations, theory of evolution, fundamental principles of inheritance; objectives and general principles of crop breeding including their application to self-populated, cross-populated and vegetatively propagated crops; general and special methods of selection in in-breeders and out-breeders; incompatibility, male sterility, heterosis and polyploidy in crop breeding; mutation breeding; Breeding methods for crop improvement, development, multiplication and distribution of improved varieties.

CRP 311: Stored Produce Protection (2 Units)

Role of pesticides in pest management. Toxicology of major groups of pesticides used in stored produce protection. Principles of pesticide application and significance of droplet size. Application techniques for control of field and storage pests. Application machinery, safe handling and storage of pesticides. Pesticides and the environment. Chemical residues in stored products.

CRP 309: Arable Crop Production (2 Units)

Origin, distribution, soil and climatic requirements of cereals, legumes, oilseeds, tubers, fibre crops, root crops and other important annual crops in Nigeria. Improved varieties of major annual crops, production practices, harvesting, processing, storage, utilisation and economic aspects of selected arable crops. Factors affecting yield, propagation methods and cultivation and improvement practices for selected arable crops.

CRP 313: Permanent Crop Production (2 Units)

Origin, distribution, soil and climatic requirements of some important permanent crops such as cocoa, oil palm, rubber, kola nut, coffee, coconut, citrus, plantain, bananas, mango,

sugarcane, cashew etc. Production practices, improvement, harvesting, processing, utilisation, storage and economic aspects of some selected permanent and perennial crops. Principles of tree crop practices such as nursery, propagation, transplanting, mulching, irrigation, fertilization, harvesting and post-harvest handling of some selected fruit tree crops (citrus, mango, oil palm, guava, cashew etc).

ANP 301 : Introduction to Non-Ruminant Animal Production (2 Units)

Management of breeding stock; growing and young animals; housing equipment and feeding principles of poultry, rabbits and pigs; production and management practices; livestock economics, health management of stock; processing and marketing of poultry pigs and rabbits.

AGR 307: Environment Impact Assessments (2Units)

Definition of Environmental Impact Assessment (EIA); Classification of EIA; Elements of EIA; Basic Guidelines of EIA; Role and Function of Environmental Impact Assessment.

Second Semester

CRP 302: Crop Physiology (3 Units)

Study of the functioning of plants, its significance in agriculture, and the manipulation of these functions to attain maximum crop productivity; roles of light, water and temperature in plant performance; flowering, fruiting and ripening, seed dormancy and seed germination; mineral nutrition, photosynthesis and dry matter accumulation. Respiration, nitrogen metabolism, including legume root nodule physiology; plant growth substances and their potential uses in agriculture. Environmental factors affecting dry matter accumulation in crop plants. Physiology of grain yield, Water stress and drought physiology. Assimilate partitioning in relation to yield determination and patterns; crop geometry and cultural manipulations.

Practical component

CRP 304: Principles of Horticultural Crop Production (2 Units)
History, definition, classification and importance of vegetables and fruits in Nigeria, importance, scope and distribution of fruits and vegetables grown in Nigeria with reference to climate and soil; basic principles and practice of horticulture; requirements for siting fruit orchards and vegetable farms, Varieties and adaptation of exotic vegetables and fruits to the Nigerian environment. Practices used in the production of horticultural crops, including establishment, nutrition, maintenance, harvesting and post-harvest technology and handling of horticultural produce. Horticultural cropping systems. Types and systems of vegetable and fruit production; production practices, handling, processing, storage, marketing and utilisation of vegetables and tropical fruit crops. Methods of plant propagation. Nursery plant production, handling and marketing. Nursery systems, diseases and pests of vegetables and tropical fruit crops. Horticultural machines and equipment. Principles of producing, planting, maintaining ornamental trees, shrubs, perennials and fruits in the nursery, home and parks.

CRP 306: Principles of Irrigation and Drainage (2 Units)
Forms of irrigation; costs and profitability of irrigation; application of irrigation to different crops. Soil-water-plant-atmosphere relationship; assessment of water requirements for crops meteorological approach and critical growth stages for water of different field crops; economic and efficient use of water; scheduling irrigation for major field and horticultural crops; agronomic management of irrigated crops: effect on salinity, alkalinity, acidity and flood-prone soils on growth and development of crop plants; agronomic practices for crops in problematic soils. Soil erosion, soil drainage under irrigation or under natural rainfall. Maintenance of irrigation equipment and assessment of traditional irrigation techniques. Hydrologic

cycle, role of water in crop growth. Irrigation resources in Nigeria.

CRP 308: Agriculture and Bio-Resources Management (3 Units)

Biological diversity, genetic diversity, specific diversity, species of local cereal, local legume species, local fruit tree species, genetic diversity expressed through large number of associations or combination of genes in individuals of single species, wild local plants related to cultivated species, or whose genetic diversity is crucial ingredient to cross-breeding or hybridisation process aimed at giving more vigour to the crop varieties that have been cultivated over so many years, loss crop genetic variability of crops or genetic erosion, species disease resistance, utilisation of plant and animal genetic resources. Biotechnological protection of forest plantations and economic plants, germ plasm appropriation and privatisation for crop improvement, patents and plant breeders rights, production of improved plants and animals.

CRP 310: Harvesting, Processing and Storage of Crops (3 Units)

Harvesting methods for tropical crops: tree crops, roots and tubers, grain crops. Fundamentals and principles of crop storage and transportation. Traditional and modern methods of crop processing and storage. Storage and self-life problems in crop products; ideal environments for crop storage. Design and operation of equipment for storage. Storage and storage-life of harvested fruits, seeds, vegetables, flowers and other crop products. Principles of controlled-environment for transit and long-term storage. Operational equipment for storage and preservation.

CRP 312: Farm Power and Agric. Mechanisation (3 Units)

Aims and objectives of agricultural mechanisation. Study of farm machinery used for tillage; ploughs, harrows, cultivators;

harvesting and processing equipment (sprayers and dusters). Equipment for livestock (automatic feed conveyors, automatic drinkers for poultry, feeding and watering equipment; milk and milk handling equipment, and meat processing equipment). Water lifting and irrigation equipment. Overview of farm power sources; the internal construction engine; the transmissions system; the tractor chassis, wheel and types; the electrical system; the hydraulic system and the three-point linkage; tillage requirement and implement selection, row crop planter and grain drills; mowers, rakes and building equipment; forage and combine harvester; crop drying and dryers; introduction to hammer, burr and roller mills, and their uses in farming; estimation of cost of operating an agricultural machine; made-in of farm equipment.

Practical Component

SLM 302: Soil Fertility and Plant Nutrition (3Units)

Fertility in tropical soils. Soil organic matter; its properties and maintenance; liming and its soil plant relationship; nitrogen, potassium, phosphorus and sulphur content of soil. The soil as a plant nutrient medium, fertilizers and fertilizer management-their manufacture, sources, applications, methods, rates and timing, handling and storage of fertilizers. Crop growth and response to soil nutrients, major, secondary and trace elements in crop nutrition; nutrient absorption, maintenance and loss in soil fertility in extensive and intensive agriculture. Role of legumes in soils.

ANP 302: Introduction to Ruminant Animal Production (2 Units)

Management of breeding stock; growing and young animals; housing equipment and feeding principles of cattle, sheep and goats; production and management practices; livestock economics, health management of livestock; processing and marketing of cattle, sheep and goats.

AEA 308: Principles of Farm Management (2Units)

Theory of production. Principles of agricultural production and resource use: factor-factor, factor –product and product-product relationship. Consumption and resource allocation in agriculture. Farm cost and revenue theories. Element of time, risk and uncertainty in agricultural production. Types of farm record and their uses. Farm budgeting, gross and net margin analysis and farm planning.

ENT 306: Entrepreneurial Studies II (2 Unit)

The objective of the course to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in agriculture. It draws on the spirit of innovation, creativity, and opportunity. The course offers the students a broad overview of entrepreneurship from historical and current perspectives in the context of agriculture, the course concept can be adapted to bring out the salient features which the would-be-entrepreneur has to bear in mind for a successful effort.

400 LEVEL (FARM PRACTICAL YEAR) SIWES

Course Code	Skill to be Acquired	Credits
CRP 401	Crop Production Techniques 1 (Permanent and Arable Crops)	2
CRP 401	Crop Production Techniques II (Horticultural Crops etc)	2
ANP 405	Animal Husbandry Techniques (Cattle , Sheep, Goats, Poultry, Pigs and Rabbits)	2
CRP 405	Agricultural Product Processing and Storage	2
CRP 407	Crop Protection and Pest and Disease control	2
ANP 407	Animal Health Management	2

SLM 401	Soil Fertility, Soil and Water Management	2
SLM 403	Farm Design Survey and Land Use Planning	2
AEC 401	Farm Management Records and Accounts	2
ARD 401	Extension Practices	2
AGM 401	Farm Mechanisation Practices	2
SLM 405	Agricultural Meteorology	2
AGM 403	Workshop Practices	2
AGR 403	Biotechnology in Agricultural Production	3
AFM 401	Fisheries	2
AGR 401	Report Writing	3
	Total	34

Each student will write a report on each of these areas that will be evaluated.

500 LEVEL COURSES

CRP 501: Weed Science and Control (3 Units)

Weed definition, biology, classification, reproduction and economic importance. Weed control methods and problems associated with them. Mechanisms of weed seed dissemination, prolificacy, survivability, persistence and colonisation. Parasitic weeds. Weed management: prevention, eradication and control. Weed control methods: cultural, chemical, biological and integrated. Herbicides: classification, formulations, methods of application, dosage calculations, application equipment and their calibration for uniform and adequate delivery of herbicides; herbicide handling and disposal, assessment of herbicide performance. Weed control in crop and non-crop situations. Safety factors in the use of herbicides; basis for herbicide selectivity. Practical methods of controlling weeds in Nigeria.

CRP 503: Seed Production Technology (2 Units)

Elements of seed industry. Seed programme development. Purity analysis, seed viability and vigour. Seed storage principles. Seed conservation and germplasm. Seed packaging purposes, types and cost implications. Seed marketing principles and objectives. Marketing, organisation and management. Structure and nature of seed; seed viability, vigour, dormancy and deterioration; methods of breaking seed dormancy; production, processing, drying treatment, distribution of improved seed; seed certification standards. Principles and methods of seed production for self-pollinated crops, cross-pollinated and hybrids. Procedures for field inspection, seed legislation and control. Seed testing procedures, seed programmes in Nigeria; seed marketing. Seed sampling methods (types and techniques) and seed blending procedures and calculations; seed laws. Plant breeders' right- implementation and evaluation. Synthetic seed; somatic embryogenesis.

CRP 505: Vegetable and Fruit Crop Production (3 Units)

History, definition, classification and economic importance of vegetables and fruits cultivated in Nigeria. Varieties and adaptation of exotic vegetables and fruits to the Nigerian environment. Types and systems of vegetable and fruit production, production practices, handling, processing, packaging, storage, marketing and utilisation of vegetables and tropical fruit crops; methods of plant propagation; nursery systems; diseases and pests of vegetables and fruit crops; horticultural machines and equipment; requirements for siting fruit tree orchards and vegetable farms; principles of producing, planting and maintaining ornamental trees, shrubs, perennials and fruits in the nursery, homes and parks.

CRP 507: Farming Systems (2 Units)

Concepts, definition and classification of farming systems. Factors determining farming systems: physical, biological and

socio-economic, characteristics of tropical small-scale farming systems: nomadic, shifting cultivation, fallow, rotation, permanent cultivation, ley farming. Intercropping, mono-cropping, sole cropping, sequential cropping, relay cropping, strip cropping. Important crop-based farming systems: lowland rice-based, upland cereal-based, root crop-based, small-scale mixed farming, irrigated smallholder farming, smallholder farming with plantation (perennial) crop-based and agro-forestry. Farming systems research: descriptive and prescriptive.

CRP 509: Organic Crop Production Systems (3 Units)

Soil resource management in organic crop system (soil and water conservation). Soil fertility evaluation and management (manuring, fallowing, mulching, composting). Mixed farming and cropping systems in organic crop production (intercropping, crop rotation, mono-cropping etc). Conservation of biodiversity. Sustainable land-clearing system. Crop protection in organic agriculture. Organic foods, organic standards, certification and market. Advantages and disadvantages of organic agriculture. Basic practices in organic crop production (site selection, land preparation, seed selection, planting and post-planting operations). Pest management methods in organic crop production with emphasis on insects, nematodes, weeds, vertebrates and pathogens. Use of botanicals and bio-intensive integrated pest management.

CRP 511: Introduction to Crop Biotechnology (3 Units)

Introduction to key concepts and definition in plant biotechnology. Importance of biotechnology in agriculture, specifically in crop improvement and production. Nucleic acid structure and its manipulation in genetic engineering, including nucleic acid hybridization, function of endo-nucleases, polymerase and other enzymes. Role of southern blot, restriction fragment length, polymorphism and other techniques in gene mapping. Transformation and production of transgenic crops.

Basic principles of plant tissue culture techniques including micro-propagation and rapid multiplication techniques. Protoplast, cell, tissue and organ culture. In vitro and in vivo cultures. Somatic embryogenesis in rapid germination of agriculture and rural development in the developing countries.

CRP 513: Plant Pest and Disease Management (3 Units)

Pest management and population dynamics of different kinds of animals which are plant pests. The concept of economic threshold in pest damage in crops. Pest surveys and pest damage assessment. Different management strategies: cultural, exclusion, biological, environmental management, chemical and breeding for pest resistance. The economics of pest management; the combination and the sequential use of various strategies to achieve population management. The advantages and limitations of pest management practices. Pest management and strategies suited to small mixed farms. Principles of plant quarantine and phytosanitary measures. The importance and usefulness of disease pyramid in disease management. Prerequisites for disease management method. Plant disease prognosis, its method and importance in disease management. Philosophies behind the use of exclusion, eradication, protection and therapy as management measures. Basic methods used in disease management: legislative, cultural, biological, chemical and breeding for disease resistance.

CRP 517: Organic and Urban Farming (2 Units)

Definition of urban farming. Major types of horticultural crops grown under organic and urban farming system. Importance of organic farming. Protected crops cultivation. Peculiarities of organic and urban farming. Concepts of home gardening, market gardening and commercial gardening. Certification of organic horticultural products. Materials used in organic crops production. Sources of organic fertilizer materials. Environmental and health implications of organic and urban

farming. Influence of urbanisation and environmental factors. Problems of organic and urban/ dry season horticultural farming. Maintenance of soil fertility and crop protection. Irrigation in urban farming. Prospects in urban/ dry season horticultural farming.

AGR 515: Techniques of Scientific Writing and Presentations (1 Unit)

Techniques of scientific writing and seminar presentations for agricultural students.

AGR 501: Research Techniques (3 Units)

Defining a research problem; developing hypotheses and objectives; principles of research design; questionnaire preparation and collection of data; measurement and data collection; statistical theory; different statistical methods for handling data; presentation of research finding in narrative tabular and graphical forms.

AGR 503: Analytical Techniques in Agriculture (2Units)
Elective

Basic principles governing common laboratory equipment; principles governing basic analytical procedures. Introduction to use of instruments, equipment and machines: Microscopy, Spectrophotometry, Histometry, PCR, Gel Electrophoresis, HPLC, TLC, GC, LN2 Generator, CASA, Haematology, Serum Analyser, Cryopreservation.

ARD 509 :Agric. Business Management and Finance (2 Units)

The scope of agricultural business and management; types of agricultural business management and organisation: enterprise selection, production planning: public policies affecting agric. business: farm growth, organisation of large scale farms. Legal organisation and tax strategies. Economics of agricultural processing, marketing management. Principles of agricultural

finance: principles of farm credit; capital needs of agricultural industries; sources of loans; funds and collateral security for loans; credit agencies and government credit policy and approaches to efficient credit management. Farm accounting inventory balance sheet and cash book and cash book analysis

Second Semester

CRP 502: Plant Growth and Development (2 Units)

Seed germination and dormancy. Juvenility and senescence. Translocation and respiration in plants, role of environmental resources. Water and water stress in plants. Light and solar radiation, role of plant nutrients. Sexual and asexual reproduction in plants. Plant growth stages: induction, initiation, differentiation, development, blooming, flowering, and senescence. Mechanisms in plant growth and development. The sigmoid growth curve. Factors influencing plant growth and development. Photosynthesis, plant growth and partitioning of assimilate. Yield limiting factors and yield components. Growth regulators: auxins, gibberellins, cytokinins, etc. Plant growth and measurements. Growth analysis: relative growth rate, crop growth rate, net assimilation rate, leaf area index; roles of plant organs: leaf, stem, roots, flower, fruits and seeds.

AGR 502: Students Seminar (1Unit)

Presentation and discussion of various topics in animal science, the student is also expected to prepare and participate in all seminars and present a seminar in the final year.

CRP 504: Advanced Crop Protection (3 Units)

Quarantine regulations and phyto-sanitary measures; fundamentals of plant resistance to diseases; principles and methods of disease management; principles, techniques and equipment for applying crop protection chemicals in the control of field and storage pests, diseases and weeds; equipment maintenance and repair; storage of pesticides.

CRP 506: Landscape Horticulture and Floriculture (2 Units)

Definition of landscaping. Natural vs man-made landscape. Scope and historical sketches of landscaping: to enhance property beauty and value; to provide screening --- institutional, private property, parks, gardens, roundabouts and recreational areas. Plants for the landscape. Landscaping---e.g. gardens, sporting arena, stadia. Design principles, design practice, basic styles, preparing the plan design, symbols and drawings. Landscape construction. Hard landscaping, soft landscaping. Contouring and levels. Maintenance and management of established landscape. Landscape contracts and contractual agreements. Floriculture industry in Nigeria. Identification and classification of cut flowers of commercial importance to export market. Principles and practices of out-of-door and greenhouse cut-flower production. Cultural practices including propagation, establishment, fertilisation, pruning and training, gardening, packaging and marketing. Cut-flower preservation techniques.

CRP 508: Post-harvest Physiology and Produce Storage (3 Units)

Seed storage and factors affecting storage of seeds, grains, fruits, roots, tubers, and vegetables. Effect of environment on maturity and senescence. Storage life and harvested fruits, seeds, vegetables and flowers; tropical environment in relation to maturity; ripeness and senescence; physical and chemical indices of quality in fruits, seeds, vegetables, flowers and other crop products; storage of crop materials; traditional methods of vegetable processing and storage; fundamentals of crop storage and transportation; storage and shelf-life problems; ideal atmosphere for storing fruits, seeds, vegetables, flowers and other crop products; controlled-environment for transit and long-term storage, protective treatment, design and operation of equipment for storage and preservation. Post-harvest losses and prevention, economic, qualitative, quantitative, nutritional and germination losses.

CRP 512: Crop Evolution and Adaptation (2 Units)

Theory of evolution. Mechanics of crop evolution. Roles of hybridisation, recombination and natural selection in crop evolution. Isolating mechanism. Modes of speciation. Concepts of primary and secondary centres of origin. Origin of commonly cultivated crops. Genetic variations in populations. Genetic drift.

ANP 518: Pasture and Forage Production (2 Units)

Adaptation and botany of native and introduced tropical forage plants, their establishment, production, utilisation and maintenance in permanent and temporary pastures. Pastures in Nigerian agriculture. Improvement and management of pastures. Characteristics of grasses, legumes and shrubs; pasture seed production and pasture plants. Forage conservation, dry season feeds. Grazing systems.

CRP 516: Produce/Post Harvest Management (2 Units)

Tropical environment in relation to maturity, ripening and senescence, physical and chemical indices of quality in fruits, seeds, vegetables, flowers and other crop products. Storage and storage-life of harvested fruits, seeds, vegetables, flowers and other crop products. Fundamentals and principles of crop products processing and storage, storage and shelf life problems in crop products, ideal environment for storage, principles of controlled environment for storage, principles of controlled environment for transit and long term storage, operational equipment for storage and preservation.

AGR 599: Project (4 Units)

A student is expected to choose and execute a special project under the supervision of staff. Duration of the project is two semesters.

2.10 Detailed Programme Proposal (Dpp) For Bachelor Degree of Soil Science and Land Resource Management Option

100 LEVEL COURSES

First Semester

BIO 101: General Biology I (Botany / Zoology) (2 Units)

Characteristics of living things, cell as the basic unit of living things, cell structure, organisation, cellular organelles, tissues, organs and systems. Classification of living things, general reproduction and concept of inter-relationships of organism, heredity and evolution, elements of ecology (introduction) and habitats.

CIT 101: Computers in Society (2 Units)

What is computer, types of computer, history of digital computer, element of a computer hardware and software, how to work with a computer, operating system, windows, files, word processing, copying a text, saving, changes to a document and formatting, spelling checker and introduction to printing a document, spread sheet, entering and correcting data, using formula, numeric formats, creating charts, types of charts, power points and presentation, networking, internet and e-mail, reading and responding to an e-mail message.

GST 105: History and Philosophy of Science (2 Units)

General description of the nature of science and basic scientific methods and theories; history of western science and science in ancient times, middle ages and the rise of modern science; an overview of African science; man and his environment and natural resources; nature, scope and technological development and inventions; great scientist of Nigerian origin.

GST 101: Use of English and Communication Skills (2 Units)

This course is to enable students learn the skills of listening and comprehension, retrieve information, for interpreting and evaluation, effective reading skills, comprehending at varying speed levels, reading for vocabulary development in various academic contents.

CHM 101: Introductory Inorganic Chemistry I (2 Units)

Hypothesis, theory and law with appropriate illustrations, nature of matter – 3 states of matter, atomic structures, electronic energy levels and orbitals, Periodic classification of elements and its relationship to their electronic configuration, Chemical bonding, survey of properties and trends in groups I II, IV, V & VII metals.

CHM 131: Organic Chemistry for Agriculturist 1(2 Units)

Definition, nomenclature; functional groups; homologous series; families of organic compounds – composition, structure, formulae, synthesis, isolation and purification; isomerism; electronic theory in organic chemistry; alkanes, alkenes and alkynes; Benzene ring and aromatic compounds.

CHM 191: Introductory Practical Chemistry I (1 Unit)

Practical based on CHM 101 and CHM 131: Cations and Anions-Identification, Acid-base titrations, redox reactions and determinations.

PHY 191: Introductory Practical Physics 1 (1 Unit)

Graphs, measurement; error analysis; determination of acceleration due to gravity by means of simple pendulum; determination of force constant of a spiral spring and the constant; determination of surface tension of water; determination of specific latent heat of fusion of ice; determination of the coefficient of limiting static friction between two surfaces; determination of the coefficient of static friction on two surfaces using an inclined plane; determination of the relative density of kerosene using the specific gravity

bottle; determination of the relative density of a granular substance not soluble in water using the specific gravity bottle.

PHY 121: General Physics (2 Units)

Relevance of Physics to Agriculture. Selected topics and application to agriculture in mechanics, properties of matter, waves and sound, vibrations, electromagnetism, heat optics, light, thermal physics. Atomic and nuclear physics

AGR 101: Mathematics for Agriculturists 1 (2 Units)

Algebra and trigonometry: Real number system; real sequences and series; set and subsets; unit interaction, complements; empty and universal sets; Venn diagram; one way correspondence between sets; quadratic function and equations; solution of linear equations; simple properties of determinants; indices and binomial theorem; transformations; e.g. log transformation; equations of straight line and application to simple regression equations; permutations and combinations; circular measure, trigonometric functions of angles; addition and factor formulae; complex numbers; moments and couples; relative velocity; calculus; elementary functions of simple real variable; graphs of simple functions, the differentiation of simple algebraic: exponential and log functions; the differentiation of a sum; product, quotient, function of function rules; implicit differentiation : definite and indefinite integrations of functions; application of definite and indefinite integrals to areas and volumes.

BIO 191: Practical Biology I (1 Unit)

Simple practical based on BIO 101 theoretical courses

GST 121: Use of Library (1 Unit)

Brief history of libraries, library and education, university library and other types of libraries, types of library materials, using library materials including e- learning, e-materials,

understanding library catalogues and classification, copyright and its implications, database resources, bibliographic citations and referencing development of modern CIT, hardware technology software technology, input, output and storage devices, communication and internet services, word processing skills

Second Semester

AGR 102: Mathematics for Agriculturists II (2 Units)

Types of vectors and their application; matrices; simple linear equations; loci; integration; differential equations; first and second-order chemical equations; straight lines and planes; angle between lines and planes; distance of point from a plane; distance between 2 skew lines; circles. Introduction to statistics; diagrammatic representation of descriptive data; measures of location and dispersion for grouped data; curves and graphs; histograms; scatter diagram; theory of probability; binomial distribution; collection, tabulation and representation of agricultural data; mean; mode and median; analysis of variance; linear regression and correlation.

CHM 102: Physical Chemistry (2 Units)

Atoms; Sub-atomic particles, Isotopes, Avogadro's number; The Mole Concept; Chemical Formulae; The Laws of Chemical Combinations; Equations and Calculations; State of Matter; Gases, Liquids and Solids; Chemical Thermodynamics; Energetic and Thermo chemistry; Buffers, Chemical Equilibrium and Equilibrium Constants; Solubility Products; Chemical kinetics; Electrochemistry; Nuclear Binding Energy, Fission and Fusion.

PHY 192: Practical Physics II (1 Unit)

Selected experiments on topics covered in PHY 111 and PHY 122, application of a variety of simple experimental techniques

with emphasis on quantitative measurements, experimental errors and graphical analysis.

GST 102: Use of English and Communication Skills II (2 Units)

Writing paragraphs; topic, sentence and coherence, development of paragraphs;

Illustration, description, cause and effect including definitions, formal letters, essential parts and stylistic forms; complaints and requests, jobs ordering goods, letters to government and other organisations; writing reports; reporting events, experiments, writing summaries.

BIO 102: General Biology II (Botany and Zoology) (2 Units)

Cellular basis of life; general structure and functions of plant cells and cellular organelles; plant cell division; heredity; diversity in plant cells and habitats; Morphology general characteristics, life cycles and range of forms of bacteria, viruses, fungi, algae, bryophytes, Lichens and pteridophytes, general structure of animal cell. Functions of animal cells and cellular organelles; animal cell types and division. Forms, functions and life history of invertebrates using selected examples from classes of invertebrates such as Protozoa, Coelenterates, Arthropods, Plantyhelminthes, Aschelminthes, Annelida and Mollusca.

CHM 132: Organic Chemistry for Agriculturist II (2 Units)

Simple reactions of hydrocarbons, alcohols and acids, introductory organic basic chemistry and importance of lipids, proteins and carbohydrate and other natural products, petroleum chemistry, oils and fats, hydrogenation of oils. Polymer and biological important molecules, relevance of physics to agriculture. Selected topics and application to agriculture in mechanics, properties of matter, waves and sound, vibrations,

electromagnetism, heat optics, light, thermal physics. atomic and nuclear physics

CHM 192: Introductory Practical Chemistry II (1 Unit)

Practical based on general chemistry CHM 101 and introductory organic chemistry I CHM 102- Determination of melting and boiling points and reaction of functional groups.

GST 104: Introduction to Social Science (2 Units)

Classification of social systems, interpersonal relationships, personality traits and leadership qualities. The role of the media, meaning, scope and indices of development: historical perspectives, ideological bases, economic, political and social factors of development, self-reliance and national development. Growth and spatial distribution of population, delivery of public goods through public enterprises and agencies, peaceful co-existence among nations.

BIO 192: Practical Biology I (1Unit)

Simple practical based on BIO 102 theoretical courses

200 LEVEL COURSES

First Semester

GST 201: Nigerian Peoples and Culture (2 Units)

Nigerian's perception of his world, culture areas of Nigeria and their characteristics, evolution of Nigeria as a political unit, concept of functional education, social justice, individual and national development, norms and values and moral obligation of citizens

ANP 201: Introduction to Biotechnology (2 Units)

Nucleic acids, nucleotides and nucleosides, structure and function of DNA and RNA, translation into proteins, the genetic code, DNA errors and repair: Genes; Gene structure, function, replication, expression; Gene repair, mutation, recombination and cloning; Principles of DNA recombination. Molecular Tools/Techniques, Biotechnology application in animal agriculture: DNA probes, transformation of microorganisms, recombinant DNA vaccines, transformation of animals. Other biotechnology applications: Delivering peptides and enzymes, targeting rumen protozoa, developing a new feed additive, reducing phosphorus pollution, pathogens in manure and the environment, improving fibre digestion.

Practical: Extraction of DNA and RNA from animal tissues; in vitro translation, transcription, recombination and cloning.

ARD 201: Principles of Agricultural Extension (2 Units)

The meaning of extension science, the scope of agricultural extension, the need for agricultural extension, basic extension principles in agricultural production. The extension agents, rural communities and communication principles and strategies: Discussion of principles behind agricultural extension.

ARD 203: Introduction to Home Economics Extension (2 Units)

Philosophy, scope, objectives and historical development of Home Economics. Examination of basic human needs with respect to food, clothing, shelter and health; programme approaches in Home Economics which will help meet these needs. Preparation for careers in variety of occupations, role of women in agriculture.

ARD 251: Introduction to Agricultural Economics (2 Units)

The scope of agricultural economics. Basic economic Principles applied in agricultural production and marketing. Efficient organisation of scarce resources and factors of agricultural production, discussions of principles and philosophies involved in Agricultural Economics.

AGR 201: General Agriculture (3 Units)

The distribution of agriculture: World population and food supply, history, scope and importance of agriculture to man. Agriculture and natural environment. Characteristic features of tropical agriculture and how they affect production. Land use and tenure, trends in the production, distribution and utilisation of agricultural products, Measures of improving Nigerian agriculture, climatic, edaphic and social factors in relation to crop production and distribution in Nigeria, systems of crop farming, types, distribution and significance of farm animals; basic principles of animal farming. Place of forestry, fish farming and wildlife in agriculture.

AGR 203: Principles of Crop Production (2 Units)

Crop production and its development, The principles, problems and prospects of crop production, importance of crop rotation, cultural practices, water and soil conservation; irrigation and drainage, general types of characteristics of arthropods, microorganisms and other pests affecting crops. Weeds and their effects on crop production, pests, disease and weed control. Basic Mendelian genetics. Principles of crop production, harvesting, processing and storage.

FRM 211: Forestry and wildlife Management (2 Units)

Renewable natural resources, availability, distribution and potential, the important forest trees and wildlife (with emphasis on Nigerian species) classification, morphology and distribution of important forest trees, forest and game reserves in Nigeria,

silviculture, afforestation characteristics of major timber and their uses. Felling and transportation.

SLM 201: Principles of Soil Science (2 Units)

Soils, their origin and formation, physical properties of soils, Soil moisture, air and temperature, soil classification and survey, soil colloids; soil reactions, soil organic matter and soil organisms, soil and water conservation; nutrient requirements and mineral nutrition to plants, introduction to fertilizer.

AGR 205: Introduction to Agro-Climatology (2 Units)

The principles, aims and scope of climatology, the elements and controls of climate and weather and dynamics of the earth's atmosphere, radiation and heating of the atmospheric system; atmospheric moisture, the dynamics of pressure and wind systems, condensation and precipitation process, seasonal variations in temperature, daylight, radiation, rainfall and evapo-transpiration, equipment and maintenance of standard meteorological stations, the tropical climate; relation between agriculture and climate with reference to crops, livestock, irrigation, pests and diseases.

AGR 207: Anatomy and Physiology of Farm Animals (2 Units)

Parts of the beef and dairy cattle, sheep, goats, pigs, rabbits and poultry, fundamentals of cell biology, anatomy and physiology of the cell, cell types. anatomy and physiology of animal tissues, nervous system, skeletal system, muscle, bone, circulatory system, reproductive, digestive, special senses and other systems of farm animals. Physiological functions of animals – homeostatic, nutrition and digestion, respiration. Temperature regulation, excretion and reproduction, endocrinology, the blood and circulation, lactation, milk let down and egg production, water balance.

Second Semester

AGR 206: Crop Anatomy Taxonomy and Physiology (2 Units)

Parts of the crop cell types. Introduction to plant taxonomy, characteristics, distribution, economic importance and local examples of leguminosae, gramineae, compositae, Dioscoreaceae, Rutaceae, development of cells and tissues; use of plant keys, cell biology, cell and cell types, comparative anatomy of major plant organs, enzymes, photosynthesis and translocation; pollination, respiration and energy utilisation; seed dormancy and germination, development; mineral nutrition, growth regulation.

ANP 202: Principles of Animal Production (2 Units)

History of animal agriculture, the role of livestock in the national economy. Livestock breeds and distribution in Nigeria. Management practices and systems including housing, feeding, breeding and reproduction, health and products processing, effects of climate and other factors on behaviour and handling of animals, Animal production as a business and its interface with other sectors of the national economy, the role of innovations in science and technology through research in the development of animal production.

Practical: Identification of different livestock species and breeds, housing and equipment, common livestock parasites and diseases, livestock products and by-products.

ANP 204: Introduction to Agricultural Biochemistry (3 Units)

Chemistry of living matter; cells, enzymes and intermediary metabolism, tissues and their chemicals. Hormones: classification, control and interactions. Use of natural and synthetic hormones in animal production. Chemistry and metabolism of carbohydrates: definition, classification, reactions of monosaccharide's, tests of carbohydrates; Glycolysis, citric acid cycle, hexose monophosphate shunt, gluconeogenesis,

glycogenesis, glycogenolysis. Chemistry, physical properties and metabolism of lipids: definition and classification; biosynthesis of saturated fatty acids (SFA) synthesis of acylglycerols, oxidation of FA, energy balance sheet from SFA oxidation. Chemistry and metabolism of proteins, enzymes and nucleic acids, Amino acid structure, properties and reactions, enzyme properties, functions and inhibition.

Practical: Testing of carbohydrates, acidic hydrolysis of starch. Tests for lipids – saturated and unsaturated, tests for proteins, proximate analysis of plant and animal products.

ARD 202: Introduction to Rural Sociology (2 Units)

Meaning, importance, and basic concepts and principles of rural sociology, rural versus urban living culture, cultural values and cultural environment, settlement patterns and village organisation, factors which influence rural living conditions, types or rural economics, problems of developing rural economies, rural infrastructure, major rural social institutions – marriage and family, religion, politics, social theories and interactions, general strategies to rural development, role of communities, social aspects of production and marketing in the rural areas, communication and technological change in rural society.

FST 202: Principles of Food Science and Technology (3 Units)

Definition and scope of food science and technology, food distribution and marketing, food and its functions, food habits, food poisoning and its prevention, principles of food processing and preservation, discussion of different preservation methods, deterioration and spoilage of foods, other post-harvest changes in food, contamination of foods from natural source, composition and structures of Nigeria/West African food; factors contributing to texture, colour, aroma and flavour of

food, cost; traditional and ethnic influences of food preparation and consumption pattern.

AGR 202: Introductory Agricultural Engineering (2 Units)

Concepts and objectives of agricultural engineering, workshop tools; principles of internal engine. Study of farm machinery used for tillage, plough, cultivation, farm power and operating, principles, maintenance procedures of farm machinery.

AFS 220: Introduction to Fisheries and Wildlife (2 Units)

The important fishes and wildlife of West Africa with emphasis on Nigeria species, classification, evolution, morphology and basic structure of fishes, the adaptation of fish to aquatic life, life cycle of principal species of fishes and wildlife industries in Nigeria, fundamental principles of fish and wildlife management and production.

AGR 204: Computer Appreciation and Application to Agriculture (2 Units)

History of computers, functional components of computer, characteristics of a computer, problem solving; flow charts, Algorithms, computer programming, statements; Introduction to the use of EXCEL, SAS, SPSS, GENSTAT, Introduction to problem solving with the computer; Data entry and editing with the computer. Data analysis using different statistical packages.

ENT 206: Entrepreneurial Studies 1 (2 Units)

The objective of the course to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in agriculture, it draws on the spirit of innovation, creativity, and opportunity. The course offers the students a broad overview of entrepreneurship from historical and current perspectives in the context of agriculture, the course concept can be adapted to bring out the salient features which the would-be-entrepreneur has to bear in mind for a successful effort.

Historical background of entrepreneurship, basic concepts and definitions of entrepreneurship, functions of the entrepreneur, characteristics of the entrepreneur, benefits of entrepreneurship, the entrepreneurial process (Record- keeping, planning and forecasting, budgets and budgeting, start off).

300 LEVEL COURSES

First Semester

SLM 301: Introduction to Soil Mineralogy (3 Units)

Soil components; silicate mineral structure, characteristics and classification of minerals; clay mineral structures/types and their properties; relationship of mineralogy to agriculture, engineering, and other environmental sciences, use of TEM, SEM, XRD, TGA and other analytical equipment in mineral identification.

SLM 303: Introductory Pedology and Soil Physics (2 Units)

The earth; review of concept of soil and its formation; soil morphology and profile description; soil classification and survey; properties and classification of soils of Nigeria. Reviews of basic laws of physics relating to forces potentials. Soil-water relation, moisture content retention and energy levels; movement at saturation. Soil and hydrologic cycle; infiltration, water redistribution in soil, drainage, soil heat regimes, evaporation and evapo-transpiration.

SLM 305: Introductory Soil Chemistry, Fertility and Microbiology (3 Units)

Soil phases; availability of soil nutrients, cation exchange capacity and base saturation; soil acidity and liming; nutrient movement in soils; nutrient uptake mechanisms; chemistry, status and availability of essential nutrients in soils. Micro-organisms in soil-kinds, number and activities; role of micro-organisms in plant growth; the dynamic nitrogen and

phosphorus pools; organic matter-sources, transformation and functions in soil.

AGR 307: Environmental Impact Assessment (2 Units)

Definition of Environmental Impact Assessment (EIA); Classification of EIA; Elements of EIA; Basic Guidelines of EIA Role and Function of Environmental Impact Assessment.

SLM 307: Introduction to Soil Microclimatology (3 Units)

Meteorology and climatology in relation to the soil-atmosphere interface with emphasis on the microclimate; physical processes taking place within the microclimate, modification of the microclimate by agricultural practices; meteorological instruments and use of weather data.

SLM 309: Soil Analytical Techniques (3 Units)

Precision, bias, accuracy and operational variations in analytical techniques; types of laboratory chemicals, analytical instruments and principles of operation (colorimeter, flame analyzer, atomic absorption spectrophotometers, pH meter); plant and soil sampling and sample preparation; nitrogen and phosphorus determinations in soil and plant; potassium analysis in soil, plant and fertilizers. Evaluation of analytical data, special techniques and precautions in micronutrient analysis; features and functions of a standard soil-testing laboratory.

CRP 309: Arable Crop Production (2 Units)

Origin, distribution, soil and climatic requirements of cereals, legumes, oilseeds, tubers, fibre crops, root crops and other important annual crops in Nigeria. Improved varieties of major annual crops, production practices, harvesting, processing, storage, utilisation and economic aspects of selected arable crops. Factors affecting yield, propagation methods and cultivation and improvement practices for selected arable crops.

CRP 313: Permanent Crop Production (2 Units)

Origin, distribution, soil and climatic requirements of some important permanent crops such as cocoa, oil palm, rubber, kola nut, coffee, coconut, citrus, plantain, bananas, mango, sugarcane, cashew etc. Production practices, improvement, harvesting, processing, utilisation, storage and economic aspects of some selected permanent and perennial crops. Principles of tree crop practices such as nursery, propagation, transplanting, mulching, irrigation, fertilization, harvesting and post-harvest handling of some selected fruit tree crops (citrus, mango, oil palm, guava, cashew, etc.).

Second Semester

SLM 302: Soil Fertility and Plant Nutrition (3 Units)

Fertility in tropical soils. Soil organic matter; its properties and maintenance, liming and its soil-plant relationships; nitrogen, potassium, phosphorus and sulphur contents of soil. The soil as a plant nutrient medium; fertilizers and fertilizer management – their manufacture, sources, applications, methods, rates and timing; handling and storage of fertilizers. Crop growth and response to soil nutrients; major, secondary and trace elements in crop nutrition; nutrient absorption, maintenance and loss in soil fertility in extensive and intensive agriculture. Role of legumes in soils.

Practical Component

Identification and uses of some soil sampling equipment, identification of samples of chemical fertilizers; soil sampling for fertility evaluation; plant sampling techniques for identification and characterisation of nutrient deficiency symptoms; management of organic wastes.

SLM 306: Soil Erosion and Conservation (2 Units)

Farming systems, husbandry and land use in the tropics; erosion process; types of erosion and causative agents; extent and

economic importance with reference to Nigeria; erosion-soil productivity relation and modeling; methods of predicting rates of erosion; soil conservation methods and policies.

SLM 308: Soil and Water Management (3 Units)

Land preparation techniques for soil conservation and soil-water management damages to soils; causative factors and control of soil erosion through land preparation and other soil management practices.

SLM 310: Watershed Hydrology (2 Units)

Watershed characteristics -- climate, soils, vegetation; hydrological processes, surface and subsurface flows; channel processes; reservoirs; soil-vegetation interaction; hydrology models; watershed management.

SLM 312: Report Writing in Soil Science (I Unit)

Experimental designs; field experimentation; the use of statistics and graphics, technical reports, theses and dissertations; journals and their formats.

SLM 314: Computer-based Terrain Analysis (2 Units)

Soil landscape models; ecosystem types; digital remote sensing; geographical information system; geographical positioning system, computer cartography; introductory geostatistics.

CRP 312: Farm Power and Agric. Mechanisation (3 Units)

Aims and objectives of agricultural mechanisation. Basic mechanics, workshop tools .Principles of internal combustion engines and electric motors. Study of farm machinery use for tillage: ploughs, harrows cultivators, farm power transmission system. Harvesting and processing equipment (sprayers and dusters). Equipment for livestock (automatic feed conveyors, automatic drinkers for poultry, feed and watering equipment, milking and milk handling, surveying instrument use on the

farm. Operating principles, selection and maintenance procedures of farm machinery. Farm machinery costing and records. Workshop and building materials use on the farm.

CRP 308: Agric and Bio-resource Management (2 Units)

Biological diversity, genetic diversity, specific diversity, species of local cereal, local legume species, local fruit tree species, genetic diversity expressed through large number of associations or combination of genes in individuals of single species, wild local plants related to cultivated species, or whose genetic diversity is crucial ingredient to cross-breeding or hybridisation process aimed at giving more vigour to the crop varieties that have been cultivated over so many years, loss crop genetic variability of crops or genetic erosion, species disease resistance, utilisation of plant and animal genetic resources. Biotechnological protection of forest plantations and economic plants, germplasm appropriation and privatization for crop improvement, patents and plant breeders rights, production of improved plants and animals.

ENT 306: Entrepreneurial Studies II (2 Units)

The objective of the course to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in agriculture. It draws on the spirit of innovation, creativity, and opportunity. The course offers the students a broad overview of entrepreneurship from historical and current perspectives in the context of agriculture, the course concept can be adapted to bring out the salient features which the would-be-entrepreneur has to bear in mind for a successful effort.

**400 LEVEL (FARM PRACTICAL YEAR)
SEMESTER – SIWES**

Course code	Skill	Credits
SLM 407	Soil-Site Characterisation	2
CRP 401	Crop Production Techniques (Permanent, Arable and Horticultural Crops, etc.)	2
SLM 401	Soil Fertility, Soil and Water Management	2
ANP 405	Animal Husbandry Techniques (Cattle , Sheep, Goats, Poultry, Pigs and Rabbits)	2
CRP 405	Agricultural Product Processing and Storage	2
CRP 407	Crop Protection and Pest and Disease control	2
ANP 403	Animal Health Management	2
SLM 403	Farm Design Survey and Land Use Planning	2
AEC 401	Farm Management Records and Accounts	2
ARD 401	Extension Practices	2
AGM 401	Farm Mechanisation Practices	2
SLM 405	Agricultural Meteorology	2
AGM 403	Workshop Practices	2
AGR 403	Biotechnology in Agricultural Production	3
AFM 409	Fisheries	2
AGR 401	Report Writing	3
	Total	34

500 LEVEL COURSES

First Semester

SLM 501: Advanced Soil Fertility (2 Units)

Review of soil fertility; conversion units; soil components in relation to plant growth; soil organic matter and soil micro-organisms in relation to soil fertility; cation exchange capacity; soil acidity and liming; salinity and alkalinity; soil aeration; diagnosing nutrient deficiencies in plants; routine soil testing; research approach into establishing soil test programme, fertilizer recommendations; soil fertility research in Nigeria.

SLM 503: Soil Physics (2 Units)

Soil structure; soil water; flow of water in saturated and unsaturated soils and Darcy's laws; flow of water in heterogeneous layered medium; diffusivity; soil moisture retention characteristics; drainage; hysteresis; field water cycle; ground water drainage; soil plant atmosphere continuum; spatial variability of soil properties.

SLM 505: Soil Microbiology and Biochemistry (3 Units)

The role of micro-organisms in soil; methods of isolation and estimation of soil microbes; factors affecting abundance of bacteria in soil; nitrogen and phosphorus cycles; rhizosphere microbes; biological nitrogen fixation; mycorrhiza organic matter in details; fate of crop residues, animal wastes and sewage materials, petroleum hydrocarbons, detergents and pesticides in soils.

SLM 507: Soil Morphology and Classification (3 Units)

Concepts and definitions of soil; processes and factors of soil formation; field study of soils; soil classification; principle and historical background; types of soil classification systems. Local and international; uses of soil classification.

SLM 509: Waste Management and Soil (3 Units)

Properties of agricultural, municipal and industrial wastes; exchange, sorption and precipitation reactions in soil; soil biota; site selection. Economic considerations; decomposition of organic residues; rates of waste application; composting; recycling C and N; soluble-salt considerations; food chain accumulations of metals and health implications; environmental quality problems.

ARD 509: Agric. Business Management and Finance (3 Units)

The scope of agricultural business and management; types of agricultural business management and organisation: enterprise selection, production planning: public policies affecting agric. business: farm growth, organisation of large scale farms. Legal organisation and tax strategies, economics of agricultural processing, marketing management. Principles of agricultural finance: principles of farm credit; capital needs of agricultural industries; sources of loans; funds and collateral security for loans; credit agencies and government credit policy and approaches to efficient credit management. Farm accounting inventory balance sheet and cash book and cash book analysis

CRP 517: Organic and Urban Farming (2 Units)

Definition of urban farming. Major types of horticultural crops grown under organic and urban farming system. Importance of organic farming. Protected crops cultivation. Peculiarities of organic and urban farming. Concepts of home gardening, market gardening and commercial gardening. Certification of organic horticultural products. Materials used in organic crops production. Sources of organic fertilizer materials. Environmental and health implications of organic and urban farming. Influence of urbanisation and environmental factors. Problems of organic and urban/ dry season horticultural farming. Maintenance of soil fertility and crop protection. Irrigation in urban farming. Prospects in urban/ dry season horticultural farming.

AGR 515: Techniques for Scientific Writing and Presentation (1 Unit)

Techniques of scientific writing and seminar presentations for agricultural students.

Second Semester

SLM 504: Anthropogenic Impacts on Land (3 Units)

Current types of soil resources concepts; land use as related to soils; interaction technology on the soil environment; possible short and long-term effects of fertilizers, pesticides, acid rain and other amendments on the soil-water ecosystem; environmental impact assessment.

SLM 506: Integrated Soil Management (2 Units)

Problem soils - acid soils, salt affected soils, wetland soils, polluted soils, eroded lands, organic soils, regosols, etc., their characteristics and use; soil organic carbon sequestration; soil nutrient dynamics.

SLM 508: Land Reclamation (2 Units)

Soil degradation in agriculture, forms and causes (soil compaction, erosion, sediment deposition, soil and water pollution and wastes etc) and effect on crop production. Land reclamation technologies for degraded soils.

SLM 510: Soil Survey and Land Evaluation (2 Units)

Values, purposes and types of soil survey; assemblage and use of maps, photos and imageries, soil morphological investigations; laboratory determinations, soil correlations; soil survey report writing; interpretative reports.

SLM 512: Fertilizer Technology (2 Units)

Fertilizer terminologies; importance of fertilizers in agriculture, history of fertilizer consumption, compositions of macro-and micro-nutrient fertilizer sources, calculation of fertilizer rates and methods of application; manufacture of fertilizers with

special reference to phosphorus and potassium; chemical and physical methods of assessing fertilizer materials.

SLM 514: Soil Ecosystem (2 Units)

The ecosystem concept, soil organisms in ecosystem structure and function; soil as an ecosystem; the soil biota; sources of energy and nutrients for soil organisms; development of the soil ecosystem; microbial ecology; organic matter decomposition and energy. Biogeochemistry of C and N; aerobic and anaerobic processes; nutrient cycling; contributions of Rhizobium and mycorrhizas; nutrient, cycling and energy flow; inter-relationships of soil and vegetation on the landscape.

SLM 516: Advanced Soil Science (3 Units)

Silicate chemistry; soil forming rocks and minerals; composition of the soil. Processes and factors of soil formation; physical state of soils; texture; structure; porosity; density; soil water. Relationships; evapo-transpiration; tillage and soil properties, factors and processes affecting plant growth, soil micro-organisms; shifting cultivation and the fallow system.

AGR 599: Project (4 Units)

This course is compulsory before graduation. Each student is required to carry out a supervised research project. The final grade will consist of the assessment of the quality of the project report, the student's attitude to work, seminar presentation and viva.

AGR 502: Student Seminar (1 Unit)

Presentation and discussion of various topics in animal science, the student is also expected to prepare and participate in all seminars and present a seminar in the final year.