



FEDERAL UNIVERSITY OF TECHNOLOGY
PMB 1526, OWERRI, IMO STATE, NIGERIA

STUDENT'S HANDBOOK



**DEPARTMENT OF SOIL SCIENCE
AND TECHNOLOGY**
SCHOOL OF AGRICULTURE AND AGRICULTURAL TECHNOLOGY



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MESSAGE FROM THE HEAD OF DEPARTMENT

Soil Science as a discipline has grown in popularity more than ever before. A modern soil scientist is not just a plant nutrient specialist but also an environmental scientist. He thus enjoys a wider horizon, including engineering, aesthetics and recreation.

The potentials of Soil Science are better appreciated looking at the career opportunities for its graduates. Job opportunities exist in such areas and organizations as banks, oil companies, construction companies, government and private farms, analytical and quality control outfits, research institutes, universities, ministries and parastatals, NGOs, international organizations like the United Nations (USAID, UNDP, UNESCO, UNICEF, & FAO) and The World Bank.

Most students on entering the Department are faced with the questions such as : (a) the courses they register and the maximum number of units to be carried per semester (b) the grading and weighting system as obtained in the university. These and many more questions find answers in this handbook. Also provided are information on the history, philosophy, mission and vision of the Department. Furthermore, there is information on academic and non academic staff. This handbook is a guide and aims at augmenting similar university information booklets. It however, does not intend to replace the interpersonal guidance provided by the departmental staff. As such students are always encouraged to discuss their academic, personal and related problems with their class advisers and Head of Department. The Department also offers courses leading to the award of PGD, MSc and Ph.D degrees. Further information on such related matters could be obtained from the office of the Head of Department.

Ag. H.O.D.

Soil Science & Technology.

BRIEF HISTORY OF THE DEPARTMENT

The Department of Soil Science and Technology was created in the 2001/2002 academic year. The young department was carved out of the former Department of Crop Science and Soil Science. First intake consisted of seventy six students. To date, the Department has five streams of undergraduate students with a total enrolment of three hundred students. Fifteen students are currently pursuing their postgraduate programmes at the MSc and Ph.D level.

The academic staff consists of four Professors, one Senior Lecturer, one Lecturer 1, one Lecturer II, six Assistant Lecturers and three Graduate Assistants.

The non-teaching staff consists of one administrative officer, one chief laboratory technologist, six agricultural superintendents, two clerical officers and farm hands.

The uniqueness of our Department lies in the fact that all agriculture has its basis and foundation on the soil. Thus in Nigeria, one can readily say No Soil No Agriculture.

PHILOSOPHY, MISSION AND VISION

The philosophy of the Department is to produce graduates with indepth knowledge of both practical and theoretical aspects of our programme in a view to producing “well finished” product that are self reliant, innovative and problem solving. The mission of the Department is to produce high quality manpower at the graduate and postgraduate levels for the purpose of driving the agricultural and other related sectors of the Nigerian economy forward. The target is to produce first rate soil scientists who are confident, independent efficient, visionary, innovative and problem solving through the creation of conducive study environment and excellent teaching and research effort. Our vision in the department of the

Soil Science and Technology is to empower our graduates through high quality and technology – based training in Soil Science for sustainable food production.

STUDENTS WELFARE

Awards are available at the university, school and departmental level for students who excel academically / other areas.

A departmental association – the National Association of Soil Students (NASOSS) exists in the department for the student's professional and social interest at both university and national levels. All Soil Science students are expected to belong to this association.

ADMISSION REQUIREMENTS, WEIGHTING AND COURSE OUTLINE

The Department offers the degree of Bachelor of Agricultural Technology, B. Agric Tech (Soil Science). The requirements for admission into the 5-year degree programme are

a) UTME Entry

Five (5) credits at 'O' level in the relevant subject which must include English Language, Chemistry, Biology or Agric. Science, Mathematics and Physics.

b) Direct Entry

'A' Level in the relevant subjects. Candidates with HND and OND must obtain at least a lower credit pass. Candidates with HND are admitted into year 3 and those with OND into Year 2 when admitted, Candidate may be required to take up course or have courses waived depending on the individual's transcripts in line with the

University regulation. The Department adopts a weighting system in the assessment of students performance. In this, values assigned to grade are multiplied with course units to obtain score points. A summation of the total grade point (TGP), and this when divided by the total number of course units (TNU) gives the student's grade point average (GPA). A cumulative of the GPA gives the CGPA.

A summary of degree classification and the CGPA ranges are as follows:

% Scores	Letter Grade	Grade Point Equivalent
70-100	A	5:Excellent
60-69	B	4: Very Good
50-59	C	3: Good
45-49	D	2: Pass
40-44	E	1: Poor Pass
0-39	F	0: Failure

CGPA

DEGREE CLASS

4.50-5.00	First Class (Hons)
3.5-4.49	Second Class (Hons) Upper Division
2.40-3.49	Second Class (Hons) Lower Division
1.50- 2.39	Third Class
1.00-1.49	Pass

Students with CGPA less than 1.00 will be asked to withdraw from the University.

ACADEMIC STAFF

S/N	NAME	RANK	QUALIFICATION	AREA OF SPECIALISATION
1	Onweremadu, E.U.	Senior Lecturer Ag. HOD SST	B.Agric, M.Sc, Ph.D	Pedology(Soil Survey & Land Use/Environment)
2	Osuji, G.E.	Professor	B.Sc ,M.Sc, Ph.D	Soil Physics/ Conservation
3	Eshett, E.T.	„	B.Sc,M.Sc.Ph.D	Pedology, Soil Chemistry & Mineralogy
4	Oti, N.N	„	B.Agric.,M.Sc.P h.D	Soil Physics/Conservation
6	Uzoho,B.U.	Lecturer I	B.Sc, M.Sc., Ph.D	Soil Chem./Fertility
7	Dr Nkwopara, U.N	Lecturer I	B.Agric., M.Sc. Ph.D	Pedology/Soil Chemistry
8	Dr. Uzoma Kingsley	Asst. Lecturer	B. Agric. M.Sc, Ph.D	Physics & Conservation
9	Ndukwu, B.N	Lecturer II	B.Sc, M.Sc	Pedology
10	Ahukaemere C.M	Asst. Lecturer	B.Sc, M.Sc	„
11	Onwudike, S.U	„	B.Sc, M.Sc.	Soil Chem./Fertility
12	Ihem, E.E	„	B.Agric., M.Sc.	Soil Physics/Conservation
13	Felix Nwashi	„	B.Agric.,M.Sc.	Pedology/Wetlands
14	Agim, L.C.	„	B.Agric.,M.Sc.	Soil Physics/ Conservation

ACADEMIC SUPPORT STAFF

S/N	NAME	RANK	QUALIFICATION	AREA OF SPECIALISATION
1	Mr. E.CEmenyonu	Prin. Agric Supt	OND FISHERIES, HND Crop Prod.Tech	
2	Mrs. R.C. Mbanefo	Prin. Agric Supt	OND, Agric. Tech, HND (crop prod) PGD(MGT)	
3	Mr. N. Nwagbaraocha	Snr. Agric Supervisor	OND, Agric. Tech, HND (Horticulture) PGD(MGT)	
4	Mr. I.U.Opara	Higher Agric Supt	HND (Soil (Conservation) HND Soil Survey and Land Evaluation	
5	Mrs. Iheanacho, E.	Agric. Supt	WASC 1986, OND (Soil conservation tech.	
6	Mrs. S.K Buson	Snr. F/ Hand	FSLC. GCE 1986	
7	Njoku Alexander	Snr. F/ Hand	FSLC	
8	Njoku, E	Farm Hand	WASC	
9	Unegbu, J	"	"	

ADMINISTRATIVE STAFF

S/N	NAME	RANK	QUALIFICATION
1	Mrs Onuoha, E	Admin Officer	B.Sc
2	Ezeanyim, R.O	HCO	HND
3	Mrs Nwoke, C	PS	"
4	Opara O.	Chief . Clerical Officer	WASC
5	Anah, N	Data Processor	HND

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI SCHOOL OF AGRICULTURE AND AGRICULTURAL TECHNOLOGY DEPARTMENT OF SOIL SCIENCE AND TECHNOLOGY HANDBOOK COURSES

YEAR I HARMATTAN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
MTH	101	Engineering Maths I	3,1,0	4
PHY	101	General Physics I	3,0,1	4
CHM	101	General Chemistry I	3,0,1	4
BIO	101	Biology for Agric & Bio I	2,0,1	3
ENG	103	Engineering Drawing I	0,0,1	1
ENG	101	Workshop Practice I	0,0,1	1
GST	101	Use of English I	1,1,0	2
GST	101	Philosophy and Logic	1,0,0	1
IGB	101/FRN 101	Humanities	1,0,0	1
TOTAL				21

YEAR I RAIN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
MTH	102	Elementary Maths II	3,1,0	4
PHY	102	General Physics II	3,0,1	4
CHM	102	General Chemistry II	3,0,1	4
BIO	104	Biology for Agric & Bio II	1,0,1	2
ENG	102	Workshop Practice II	0,0,1	1
GST	102	Use of English II	0,0,1	1
GST	110	Science & Technology Society	1,0,0	1
GST	108	Social Science I	1,0,0	1
IGB	102/FRN 102	Humanities	1,1,0	2
TOTAL				20

YEAR II HARMATTAN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
AGR	203	Introduction To Agriculture	2,0,0	2
AST	201	Principle of Animal Production	1,0,1	2
AGR	205	Agricultural Chemistry	1,0,1	2
AEX	201	Introduction To Agric Ext & Rural Sociology	2,0,0	2
GST	201	Nigerian & African Cultural Dev	1,0,0	1
STA	211	Statistics	2,1,0	3
CSC	201	Computer & Application I	2,1,1	4
AGR	207	Agricultural Biotechnology	1,0,1	2
CST	201	Botany and Principle of Crop Production	1,0,1	2
TOTAL				20

YEAR II**RAIN**

COURSE CODE	COURSE DESCRIPTION	LTP	UNIT
AGR 202	Farm Practice I	0,0,1	1
CST 202	Tree & Vegetable Prod.	1,0,1	2
AST 202	Principles of Animal Prod I	2,0,0	2
CST 204	Field Crop Production	1,0,0	2
AEC 202	Intro. Micro Economics	2,0,0	2
AGR 204	Agric Biochemistry	1,0,0	2
CST 206	Agro Climatology & Biogeography	1,0,1	2
*SST 202	Introduction & Principles of Soil Science	1,0,1	2
FAT 202	Intro to Fisheries & Aquaculture	1,0,0	2
FWT 202	Intro of Forestry Res & Wildlife Management	1,0,1	2
TOTAL			19

YEAR III HARMATTAN

COURSE CODE	COURSE DESCRIPTION	LTP	UNIT
AGR 301	Farm Planning & Structures	1,0,1	2
AEC 301	Intro To Farm Mgt & Prod Economics	2,0,0	2
AGR 303	Agricultural Genetics	1,0,1	2
AEX 301	Community Agricultural Ext	1,0,0	2
*SST 301	Soil Fertility, Chemistry & Fertilizers	1,0,1	2
AEC 303	Agric Marketing & Cooperatives	2,0,0	2
AGR 301	Farm Practice II	0,0,1	1
AST 301	Intro To Tropical Animal Health	1,0,1	2
CST 301	Crop Diseases & Their Control	1, 0,1	2
ENS 301	Intro. To Entrepreneurship & Innovation	2,0,0	2
TOTAL			19

YEAR III**RAIN**

COURSE CODE	COURSE DESCRIPTION	LTP	UNIT
AGR 306	Processing & Storage of Agricultural food Prod.	1,0,1	2
AGE 202	Agric Machinery & Mechanization	1,0,2	3
*SST 302	Soil & Water Conservation Management	2,0,0	2
CST 302	Crop Pests & their Control	1,0,1	2
AGR 302	Farm Practice II	0,0,1	1
AST 302	Animal Feeds & Feeding	1,0,1	2
AGR 304	Agric Statistics & Biometry	1,1,0	2
AEX 302	Intro To Rural Sociology	2,0,0	2
AGR 308	Geographic Information System Applications in Agriculture	1,0,1	2
ENT 302	Business Creation, Growth & Corporate Governance	1,0,1	2
TOTAL			20

YEAR IV HARMATTAN

COURSE CODE	COURSE DESCRIPTION	LTP	UNIT
AEC 401	Agric Planning & Dev.	3,0,0	3
SST 401	Soil Genesis and Classification	1,0,1	2
SST 403	Soil Cartography & Geographic Information Systems	1,0,1	2
SST 405	Soil –Water Pollution & Mgt	1,0,1	2
*SST 407	Irrigation, Drainage & Hydrology	1,0,1	2
AGR 401	Farm Practice IV	0,0,1	1
MGR 405	Technical Report Writing	1,0,1	2
*SST 409	Plant Nutrition Management	1,0,1	2
*SST 411	Wetland Soils and Mitigation	1,0,1	2
* SST 413	Soil Morphology	1,0, 1	2
TOTAL			20

YEAR IV RAIN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
SIW	400	4 th Year Rain Semester SIWES	0,0,4	4
SIW	401	4 th Year Long Vacation SIWES		2
TOTAL				6

YEAR V HARMATTAN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
CST	501	Weeds and Weed Control	2,0,0	2
*SST	511	Remote Sensing Application in Soil Science and Agriculture	2,0,0	2
SST	501	Soil Microbiology and biochemistry	1,0,1	2
SST	503	Soil Survey and Land Use	2,0,1	3
AGR	501	Farm Practice VI	0,0,1	1
SST	505	Soil Chemistry	2,0,0	2
SST	507	Soil Geomorphology & Environmental Conservation Tech	2,0,1	3
SST	509	Research Tech in Soil Tech I	0,0,2	2
Total				17

YEAR IV RAIN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
SIW	400	4 th Year Rain Semester SIWES	0,0,4	4
SIW	401	4 th Year Long Vacation SIWES		2
TOTAL				6

YEAR V HARMATTAN

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
CST	501	Weeds and Weed Control	2,0,0	2
*SST	511	Remote Sensing Application in Soil Science and Agriculture	2,0,0	2
SST	501	Soil Microbiology and biochemistry	1,0,1	2
SST	503	Soil Survey and Land Use	2,0,1	3
AGR	501	Farm Practice VI	0,0,1	1
SST	505	Soil Chemistry	2,0,0	2
SST	507	Soil Geomorphology & Environmental Conservation Tech	2,0,1	3
SST	509	Research Tech in Soil Tech I	0,0,2	2
Total				17

YEAR V RAIN			LTP	UNIT
COURSE	CODE	COURSE DESCRIPTION		
CST	502	Crop Husbandry III, Roots & Tubers and Fibers Sugar Crop	2,0,0	2
SST	502	Soil and Plant Water Relationship	2,0,0	2
*SST	504	Soil & Plant Analysis	1,0,1	2
SST	506	Soil Fertility and Organic Matter	1,0,1	2
SST	508	Soil Physics	2,0,0	2
SST	510	Fertilizer Technology	2,0,0	2
SST	512	Research Techniques in Soil Tech II	0,0,4	4
AEX	508	Group Dynamics	2,0,0	2
Total				18

OUTLINE OF COURSES

YEAR ONE: HARMATTAN SEMESTER

MTH101: Elementary Mathematics I (3, 1, 0)

Set Theory: Fields, union, intersection, complements, functions and their inverse.

Real number systems: integers, rational and irrational numbers, mathematical induction; sequences and series; arithmetic and geometric sequences and series; theory of quadratic equations, absolute values, identities, inequalities and partial fractions, permutations and combinations - binomial theorem.

Trigonometry: Circular measure, trigonometric functions and their properties, addition and factor formulae, solution of triangles.

Complex numbers: Algebra of complex numbers, the Argand diagram, De Moivre's theorem, n th roots of unity.

Calculus and Real Analysis: Elementary functions of a single variable and their graphs, limits and continuity. Rates of change, tangent and normal of a curve. Differentiation of elementary functions - product, quotients, functions of a function.

Implicit differentiation: Maxima, minima and points of inflection, geometrical and physical applications of the derivative, mean value theorem, parametric equations, polar coordinates. Antiderivative, integral, various techniques of integration, volume of revolution, area of surface of revolution.

PHY 101: General Physics 1 (2, 1, 1)

Elementary mechanics, Galilean invariance, work, energy, momentum, angular momentum, conservation laws; harmonic oscillator; rigid bodies; inverse square law forces; ideal fluid; heat and thermodynamics, introduction of kinetic theory of matter.

Prerequisites: O'level physics. MTH 101, MTH 102 should be taken concurrently.

CHM101: General Chemistry 1 (2, 1, 1)

Fundamental concepts, including atomic and molecular structure; states of aggregation of matter, acid-base reactions; homogen, nuclear chemistry, kinetic and treatment of chemical reactions in terms of acid-base concepts - physical and chemical properties, state of matter.

BIO 103: Biology for Biological and Agricultural Sciences (2, 0, 1)

Common life forms and processes, the nature, characteristics and diversity of living organisms, along with a general treatment of process of evolution. Cell structure and cellular metabolism including respiration, growth, and cellular transport. A general treatment of ecology and how living organisms relate to their environment and to each other.

Form and function in plants: A general classification of plants, with emphasis on the families of higher plants that are of economic importance; general angiosperm morphology and anatomy. The process of photosynthesis reproduction, inorganic nutrition, growth and development in higher plants.

ENG 101: Workshop Practice 1 (0, 0, 1)

General: Use of engineering measuring instruments. Callipers, gauges, etc; introduction to hand tools, e.g. practice in wood planners, saws, sanders and pattern marking; sampling and sizing techniques of raw materials.

Sheet-metal work: Production of metal products layout, cutting and shaping, welding, soldering, brazing, fastening and assembly.

Woodwork: Basic working principles and tools'- layout methods, cutting and shaping, finishing and evaluation; finished products.

ENG 103: Engineering Drawing 1 (0, 0, 1)

Introduction to the use of drawing/drafting instruments, descriptive geometry and geometric construction. Drawing, measuring, lettering

and dimensioning objects in various positions. Principles of orthographic projection in the first and third angle.

GST 101: The Use of English (1, 1, 0)

Use of library, use of words and sentence construction. Function of sentences - purposes structure, correct use of verbs (action words), word order and punctuation. Essay/composition writing, paragraphs - structure, function, links and style. Deposition - description and explanation. Special types of exposition, e.g. letter writing. Layout of a business letter, technical reports, including terms of reference, drafting and editing of reports.

GST 103: Humanities (1, 0, 0)

Introduction to the humanities, definition and rationale. Role of literature in the humanities aspects of the contemporary African novel. Significant examples of African/Western Poetry, dramatic art-role and relevance in modern Nigeria with practical demonstrations/ Performances, role of philosophy in the humanities, and its quest for certainty; materialism, idealism, the meaning and significance of selected concepts, freedom, responsibility, obligation, the good life, art beauty, values -relative; inductive arguments and scientific reasoning. Exposure to African history - its role and relevance. African art and music -its history and development. Religion and the meaning of life - past, present and future.

IGB 101: Introduction to Igbo Grammar, Composition and Comprehension (1, 0, 0)

Nkenke nkowa banyere ndi Igbo, Nkowa Asusu, Njirimara Asusu, Uru asusu bara, Mmalite edemede asusu Igbo, Mkpaitauka banyere ndi malitere odide na ogugu asusu igbo dika, schon, ida wars, olauda Equiano, Oldendorp, n'oge ochichi ndi bekee, Ihe mere o jiri di mkpa na aga-akuzi asusu Igbo n'ulo akwukwo anyi ha.

Mkpuruedemede Igbo (Otografi onwu), Akaraedemede, Nkebiokwu Igbo, Nkebiahiri Igbo, Ndakorita Udaume, Udaolu, Ntughari, Edemede (Kompozishon), Nchikota, Ekwumkwu

FRN 101: French Language I (1, 0, 0)

This course will introduce the students to the basics of French Language such as greeting in French alphabets, vowels, pronunciation and accents. The students will also learn the components of French grammar as the article, verb, etc.

YEAR ONE: RAIN SEMESTER

MTH 102: Elementary Mathematics II (3, 1, 0)

Vectors and analytic geometry: Representation of vectors. Vectors addition, and multiplication of vector by a scalar. Components of a vector and director cosines. Linear dependence and independence of vectors. Scalar and vector products of three vectors. Plane analytic geometry of the straight line, conies (circles, parabola, ellipse, hypabola).

Differential equations: Occurrence of differential equation. Differential equations of first degree and first order, like variables, separables, exact homogenous with constant coefficients. **Statistics:** Introduction of statistics. Diagrammatic representation of descriptive data. Measures of location and dispersion for discrete and grouped data. Problems of groupings and associated graphs. Introduction to probability. Sample space and events. Addition law, conditional probability and multiplication rule. Bayes Theorem. Use of permutation and combination in scatter diagram, product moment and rank correlation. Linear regression.

PHY 102: General Physics II (3, 0, 1)

Electrostatics, conductors and dielectrics: Magnetostatics, magnetic fields and induction, magnetic materials, Maxwell's equations; Waves and Oscillation, Electromagnetic wave; Oscillations, Optics, Modern Physics - Experimental basis of quantum physics, Planck's constant; spectra; basic phenomena of atoms, molecules and nuclei.

CHM 102: General Chemistry II (2, 1, 1)

Physical and chemical equilibrium, solids solutions, reaction Kinetics and kinetic theory. Alkanes and cycloalkanes, reactions of carbon - multiple bonds; elimination and substitution, reactions of alcohols and alkyl; halides, aromatic compounds, carbonyl, compounds, organic acid and derivatives, and organic bases.

BIO 104: Biology for Biological and Agricultural Science (1, 0, 1)

Form and function in animals. A general classification of animals with emphasis on the characteristic morphology, and anatomy of the economically important groups, such as Mammalia, Aves, Pisces, Arthropoda, Mollusca and Nematoda. Discussion of the following excesses in animals: nutrition, excretion, reproduction, movement and confirm regulation.

ENG 102 Workshop Practice II (0, 0, 1)

Machine shop work: Lathe work, instruction and working process, shaping, milling, grinding, reaming and metal spinning, etc. design of simple jigs and fixtures. Finished products, sample technique.

GST 102: Use of English II (1, 1, 0)

Vocabulary, use of classical terms, word formation and affixes, special terms, acronyms, choice of correct words, definitions by examples, synonym or antonym, analytic or operational definitions, basic words in fields of specializations e.g. mechanical, electrical, civil, aeronautical, automobile engineering, metallurgy, mathematics.

GST 108: Polity and Economy of Nigeria (1, 1, 0)

The nature and scope of economics. The Nigerian political system; polity and means of production in Nigeria. The structure of the Nigeria economy, aspects of economic and technological dualism; internal migration - rural to urban migration and the informal sector. The role of capital in growth and development; public investment criteria choice of 'appropriate' or 'relevant' technology. Human sources development in Nigeria labour utilization, education and manpower development in

Nigeria labour.

Agriculture in the development process; land tenure and reform, agricultural technology and the green revolution and integrated rural development, industrialization; role and type of industry, choice of techniques, import substitution and export expansion.

The economic role of the government expenditure and taxation; the federal structure, fiscal federalism and revenue allocation; the financial system. Problem of development planning and plan implementation in the Nigeria federal system of government. Prospects of the Nigerian economy.

GST 110: Science, Technology and Society (1, 0, 0)

Section A: Science and Society

Introduction: The need for science; modern scientific methods and evolution, selected key scientific research, innovations and inventions, science and culture.

Nature of Science: History of Science, classifications; science in the civilization of man; scientific evolution of man; social implications. Science and man's environment - harnessing science for production, processing, conservation, distribution and utilization of agricultural products, climate and vegetation; terrestrial and cosmic life; implications and scientific advances, e.g. population control, environmental pollution. Science and thermal energy, nuclear energy, fossils fuels, estimates of energy reserves in Nigeria' case studies of demand and supply for energy.

Section B: Technology and Society

Introduction: Technology in the development of man, role of technology in the national economy; agriculture, entertainment, transportation, communication, medicine and welfare, war and crime, etc. disciplines in technology; professional opportunities in technology in Nigeria,

Technology evolution: History of technological education and practice in Nigeria. Some key revolutions in technology, e.g. electronics and

computer technology, robotics and cybernetics, and their everyday applications.

Implications of technology: Ethics in technology; implications of technological research and advances, e.g. displacement of man by machines, space travel, threat of nuclear and neutron war, the genetic research and energy crisis, etc. Technological products liability: effects of merchandization.

Consumerism: Constraints in the utilization of new technological products - reliability, quality control and cost effectiveness, politics and environment.

**IGB 102: Introduction to Igbo History, Culture and Literature
(1, 0, 0)**

This course will expose students to various aspects of human life among the Igbos as follows: Igbo world-view, Igbo culture and history, Igbo in a world of arts and civilization. It will also provide a good exposure in the area of Igbo world-view, including their social and cultural perspectives, their aspirations and amenities, as some contemporary texts will be incorporated in the study.

Akuko Banyere Ndigbo Na Mmalite Ndu Ha, Ekele Na Nsopuru N'ala Igbo, Uzo di iche e si enye nsopuru, Ndi Igbo Na Nnabata Ndi obia, Ewumewu ndi Igbo, Ewumewu Nkwelite Aku na Uba, Ewumewu Okpukperechi, Agumagu Igbo, Ngalaba Agumagu Igbo na Ejirimara Ha, Akparamagwa na Uru Agumagu Onu na Agumagu Ederede, Nkowa ngalaba agumagu di iche iche, Njem Nlegharianya.

FRN 102: French Language II (1, 0, 0)

Here the students will be drilled in French grammar proper, dialogue and other oral exercises. The students will also be introduced into reading, starting with France Afrique Book 1. At the end of this course, the students should be able to speak basic French and be able to tell the time

in French.

YEAR TWO: HARMATTAN SEMESTER

CST 201: Botany & Principles of Crop Production1 (1,0,1)

Plant anatomy: plant cell structure, components and functions. Plant tissues and their functions. Anatomy of root, stem and leaf; floral structures. Introduction to plant taxonomy. Plant specimen collection, Identification and classification. Classification systems. A brief introduction of the herbarium. Characteristics, distribution, and local examples of: Malvaceae, Dioscoreaceae, Musaceae, Graminae/Poaceae, Solanaceae, Fabaceae/Leguminosae, Compositae, etc. Cell division. Enzymes. Some processes in crops: photosynthesis, translocation, pollination, respiration, energy utilization, seed dormancy and germination, development, mineral nutrition, etc. Growth regulation.

AEX 201: Introduction to Agricultural Extension (2, 0, 0)

The need for agricultural extension, agricultural extension in Nigeria and the world; basic philosophy behind extension work, institutional setting for agricultural extension. Agricultural development agencies, communication and extension teaching processes, adult education principles, practicals on selected oral and written communication methods and audio-visual aids (AVAs).

AGR 203: Introduction to Agriculture (1, 0, 0)

Definition and role of Agriculture in national economy, history of agricultural development with particular reference to Nigeria; branches in agriculture - soil, crop, forestry, animal, horticulture and fishery. Career opportunities in agriculture.

AGR 205: Agricultural Chemistry (1, 0, 1)

Chemistry of the S-block elements and the representative block elements. Brief introduction to the chemistry of first series transition elements. Structure, reactions and functions of hydrocarbons, alcohols, phenols, aldehydes, ketones, organic acids and their derivatives. Atomic structure and bonding. Periodic table. Colloids, chemical kinetics and

equilibrium. Oxidation and reduction. Acids, bases. Properties and reactions of elements of importance in agriculture.

AST 201: Principles of Animal Production I (1, 0, 1)

Introduction to the anatomy, physiology, genetics, breeding, nutrition, health economics, and management of the major tropical ruminant farm animals. Specific treatment will be given to cattle, sheep, goat and rabbit production.

Pre-requisite: BIO 101/103

STA 211: Statistics (2, 1, 0)

Frequency distributions, measures of location and dispersion in simple and grouped data. Laws of probability. The binomial poisson and normal distributions. Estimation and tests of regression and correlation, contingency tables and χ^2 -applications.

Pre-requisites: MTH 101 or 102.

CSC 201: Computer and Applications I (2, 1, 1)

Brief history of computers and computer generation. Classification of computers. Structure of a general purpose computer, number systems. The stored program. Technique of problem solving. Flowcharting, Stepwise refinement, Algorithm for sorting and merging of ordered lists. Data preparation. I/O devices. Data types. Data representations, Data capture. Problem-oriented languages. BASIC and FORTRAN programming: Logic expression; arrays: sequencing; Alternation and Iteration; subprograms and parameters. Elementary numerical algorithms.

Pre-requisites: MTH 101 or MTH 102

AGR 207 Agricultural Biotechnology (1, 0, 1)

Definition and its importance of biotechnology. History of Agriculture, ancient plant germplasm. Fermented foods and beverages. Classical biotechnology, early Microscopy, development of cell theory, nature of gene, plant and tissue culture applications, plant genetic engineering

application, gene transfer methods in animals, transgenic animals and their application. Animal health, animal propagation, regulation of transgenic animals, patenting genetically engineered animals. Aquaculture: Gastropod/bivalves and crustacean production, marine animal health. Algae products and their medical potentials, anticancer and antiviral compounds, antibacterial agents, marine toxins, transgenic fish.

AGR 209: Agricultural Entrepreneurial Studies (2, 0, 0)

Introduction to entrepreneurship, new venture creation, entrepreneurship in theory and practice, opportunity, entrepreneurial team, entrepreneurial finance, raising financial capital, marketing and the new venture, innovation, new venture workshop, growth and harvest.

YEAR TWO: RAIN SEMESTER

CST 202: Tree and Vegetable Crops Production (2, 0, 0)

Origin and distribution of tree and vegetable crops; soil and climatic requirements of some important permanent crops such as cocoa, banana, plantains, citrus, kola, cashew, etc; and some important vegetable crops such as fluted pumpkin, melon, Amaranthus, garden egg, etc; production practices, improvement, harvesting, utilization, processing, storage and economic aspects of some selected permanent and perennial crops.

CST 204: Field Crop Production (2, 0, 0)

Detailed treatment of the major field crops; yam, cocoyam, cassava, sweet potato, maize, rice, sorghum, beans, groundnut, winged beans, sugarcane, tobacco, etc. For each crop there will be detailed discussions on time of planting, site selection, land preparation, planting materials, seed rate, spacing, mulching, Ration (type, rate and frequency), crop protection (weed), and disease control), harvesting, processing and storage.

CST 206: Agric-Climatology and Bio-geography (1, 0, 1)

The principles, aims and scope of climatology and biogeography, The elements and controls of climate and weather and the dynamics of the earth's atmospheric radiation and heating of the atmospheric systems, atmospheric moisture, the dynamics of pressure and wind systems, condensation and precipitation processes. Seasonal radiations in temperature, day length, and radiation, rainfall and evapo-transpiration equipment and maintenance of standard meteorological relation between agriculture and climate with reference to crops, livestock, irrigation, pests and diseases.

AST 202: Principles of Animal Production II (1, 0, 1)

Introduction to anatomy, physiology, genetics, breeding, nutrition, economics and management of the major tropical non-ruminant farm animals. Specific treatment will be given to various poultry, as well as swine.

Pre-requisite: BIO 101/103

AEC 202: Introduction to Macroeconomics (2, 0, 0)

Fundamental treatment of demand and supply; theory of production, pricing and market systems, pricing and employment Sources. Introduction to different fields of Agricultural economics, farm management, production economics, marketing, IT and finance, resource economics, project analysis.

SST 202: INTRODUCTION AND PRINCIPLE OF SOIL SCIENCE (1,0,1)

Fundamental discussions on the distribution and classification of tropical soil: Their Structure, physical, chemical and biological properties, human impact on the soil environment, Soil suitability for agriculture and other, uses as well as the relationship of crop productivity will be dealt with..

AGR 202: Farm Practice I (0, 0, 1)

Students will be required to be intimately involved in the performance of various farm operations. Skills will be taught in various aspects of crop

production and animal husbandry.

FWT 202: Principles of Forestry Resources and Wildlife Management (1, 0, 1)

Definition of forestry terms. Difference between forest and forestry. Renewable natural resources, availability, distribution and potentials. Grazing land, fallow lands, forests and game reserves, national parks and other conservation stands. Components of Renewable Natural Resources Plants, wildlife, water resources, forest soil, etc. Forest exploitation and utilization. Logging and log transportation. (Skidding and Haulage, Road and water transportation). Sawmills and types, types of wood products. World distribution of tropical forests based on climate. Different Nigerian vegetation (forests and savannah). Nigerian wildlife species. Sustained yield management. Forest management plan and its importance in forest management. Introduction to forest ecosystem. Stable and unstable ecosystem. Difference between forest and agro-ecosystem.

FAT 202: Introduction to Fisheries and Aquaculture (1, 0, 1)

Basic concepts in fisheries and aquaculture: fish, shellfish, fisheries, aquaculture, habitat related fisheries-river, lake, in shore/off shore. Exploitable fisheries resources: sardines, mackerels, shark, bonga, tuna, etc. Major fish stocks with emphasis on Nigeria. Capture techniques in natural resources exploitation: traditional peasant and modern fishing methods, fishing vessels, fishing license, regulation, EEZ, etc. Elements of stock assessment techniques: concepts of over fishing, MEI, MSY, Age/aging. Types of aquaculture, organism for culture, feeds used, financial aspects of aquaculture, present status of aquaculture.

SIW 200: Long Vacation Industrial Attachment (0, 0, 2)

AGR 204: Agricultural Biochemistry (1, 0, 1)

Cellular composition and morphology, chemistry, metabolism and synthesis of carbohydrates, lipids and proteins. Importance of pH and buffers. Structure and functions of enzymes.

YEAR THREE: HARMATTAN SEMESTER

CST 301: Crop Diseases and their Control (1, 0, 1)

Causes and control of diseases prevalent among the crops grown in the country. Topics include an introduction to the structure, life history, classification and importance of fungi, bacteria and viruses; the development and spread of plant diseases of tropical crops and stored products and their control.

AEC 301: Introduction to Farm Management and Production Economics (2, 0, 0)

Goals, scope and features of farm management, theory of agricultural production and resource allocation; farm records and accounting; valuation and depreciation; farm business assessment; farm planning and control; enterprises and resource management. Applications of theory to practical situations will be strongly emphasized.

Factors of production, labour, equipment, etc. cropping and farming systems overview.

Pre-requisite: AEC 202, *Introduction to Macroeconomics*

AEC 303: Agricultural Marketing and Cooperatives (2, 0, 0)

Discussion of basic marketing concepts and interrelationships between agricultural production and marketing; approaches to the study of agricultural marketing and elements of international trade. Application of marketing principles to the identification and solution of agricultural development problems.

Pre-requisite: AEC 202, *Introduction to Micro-economics*

SST 301: Soil Chemistry and Fertility (1, 0, 1)

The chemical properties of soils in relation to plant growth. Emphasis will be placed on tropical soils. Topics include chemical composition of soils; the origin and chemistry of plant nutrients, the origin, formation and properties of clay minerals; ion exchange and nutrient absorption by plant roots; leaching of plant nutrients; influence of soil properties on nutrient absorption; inorganic fertilizers and their management; organic manure, soil acidity, soil alkalinity; soil fertility evaluation based

on soil testing and plant analysis; oxidation-reduction potential.

Pre-requisite: SST 202

AGR 303: Agricultural Genetics (1, 0, 1)

Elaboration of the general principles in agricultural production, with specific discussions on Mendellian genetics including functions, nature and structure of genes; basic concepts in the genetics of populations, and quantitative traits of economic importance in plants and animals. Rudiments of selection; and an introduction to breeding objectives and priorities in agriculture. Such objectives as yield, quality resistance, adaptation, stress tolerance and machinizability will be highlighted. Practical and field illustrations of these concepts will be emphasized.

Pre-requisites: BIO 103 and 104, Biology for Agricultural Science I and II

AST 301: Introduction to Tropical Animal Health (1, 0, 1)

Introduction to the occurrences, economic impacts, causes (including environmental) etiology, treatments and methods of prevention of common diseases of livestock in the tropics. Emphasis will be placed on practical health management techniques against these diseases.

AEX 301: Community Agricultural Extension (1, 0, 1)

Introduction to agricultural extension: Meaning, concept, philosophy and principles of agricultural extension, role of governmental and non-governmental organizations (NGOs), Agricultural Extension Service and Agricultural Innovations. Students will visit rural communities, conduct investigations into their agricultural practices and characteristics of the farm and observe development activities of formal agencies in rural areas.

AGR 301: Farm Practice II (0, 0, 1)

Practical illustration and a do-it-yourself involvement of students in the agricultural practices in crops, pests and diseases control, harvest, storage and processing, fertilizers and their applications. Agricultural price data collection, handling, housing, feeding and disease control in sheep, goats, rabbits, wild life and aquatic life. Demonstration and

communication techniques in extension.

ENS 301 Intro. To Entrepreneurship & Innovation (2,0,0)

This introductory course will expose the students to the principles, theories and practices of entrepreneurship and the content will include the concept of organization and theories of entrepreneurship, entrepreneurship culture and barriers to its practice, biographical studies of successful entrepreneurs, the business environment, business and environmental opportunity-set. Threats and opportunity exploiting strategies. The Nigerian business environment. Monitoring and identification of opportunities, approaches to addressing environmental barriers. Intellectual properties, Nigerian copyright laws, strategies for the protection of original ideas, concepts and product from piracy. Also the course will expose the interface between technology development and entrepreneurship as well as entrepreneurial opportunities in a technology-driven environment and business. Management of technology, the concept and types of innovation, theories of innovation, change management and financing innovation.

Also included here is the concept of family business, its cultural context, roles and relationships and strategies for effective functioning, success and succession. The concept of women entrepreneurship, roles, orientation and women entrepreneurial aspirations, their contributions and relevance as well as barriers to women entrepreneurial practices. The student will also explore the various sources of business opportunities, the difference between ideas and opportunities, business opportunity scanning and new venture idea generation. Introduction to strategy and crafting of business strategy in core business functional areas for competitive relevance. The concept of social entrepreneurship and value creation. The role of NGO's in social entrepreneurship. Social entrepreneurship and funding opportunities as well as enhancement factors. Relationship between scientific research innovation and products as well as product invention development, timeliness and processes.

YEAR THREE: RAIN SEMESTER

AGR 302: Farm Practice III (0, 0, 1)

Practical illustration and do-it-yourself involvement of students in the agricultural practices of plant spacing and orchard layouts; manure and compost making; weeds soil conservation techniques; antemortem inspection and slaughter management in animals (agricultural economics questionnaire design and conduct of interviews).

CST 302: Crop Pests and their Control (1, 0, 1)

The identification and control of pests of crops. Emphasis will be on pests of crops grown in the country. Topics include introductory aspects of the structure, life history, identification of insects, nematodes and weeds; principles and methods of insect control and management; introduction to weed ecology and control; the major basis and parasitic nematodes of tropical crops and store products.

AEX 302: Introduction to Rural Sociology (2, 0, 0)

Basic principles, concepts of rural sociology and understanding of rural situations. Importance of rural institutions, social processes and changes in rural areas. Leadership and community power structure. Various agricultural extension and rural sociological communication strategies and their uses.

AST 302: Animal Feeds and Feeding I (1, 0, 1)

Definition, importance, digestion and absorption of nutrients. Common tropical feedstuffs. Energy and protein feeds. Practical demonstration of techniques of feed milling.

SST 302 : SOIL AND WATER CONSERVATION MANAGEMENT (2,0,0)

The general principles of managing soils for the optimum production of crops. Emphasis will be on the application of these principles in the management of tropical soils. Topics include an elementary treatment of causes (wind and water) and control (cultural methods) of erosion; methods of land clearing in the forest and savannah manures, crop rotation, and fallows in the maintenance of organic matter and

improvement of other soil properties. Role of no-till farming on soil improvement of other soil properties. Role of no-till farming on soil improvement, soil compaction and root growth, management of soil acidity; management of low native soil fertility, moisture needs of crops, soil-water-plant relationships, irrigation water application, timing of irrigation; methods of irrigation water application, timing of irrigation; methods, of irrigation; drainage.

Pre-requisite: SST 202

AGR 304: Agricultural Statistics and Biometry (1, 1, 0)

Introduction to simple linear models in agricultural research, and their utilization in the design and analysis of farm experiments. Particular emphasis will be placed on the formulation of appropriate experimental designs and analysis of variance and covariance for completely randomized designs; randomized block designs, design and factorial experiments. Estimation of variance components, regression and correlation coefficients and simple test statistics will be discussed. Recent advances in Bio-statistics will be highlighted as well as introduction to the development of computer-assisted capability for analysis of farm data.

Pre-requisite: STA 211

AGR 306: Processing and Storage of Agricultural food products (1, 0, 1)

Different types of food: supply composition and nutritive value. Spoilage, preservation and processing of food types. Indigenous food processing methods, food additives, quality changes during processing, preservation and storage. Post harvest losses, methods of assessing food quality. Problems militating against quality control programmes in Nigeria. Food industries and their role in reducing post harvest losses.

AGR 308: Geographic Information Systems In Agriculture (1,0,1)

Introduction to Geographic Information Systems (GIS). Terminologies and concepts in GIS. GIS input methods; GPS, Remote Sensing, Digital

information system and data bases, spatial analysis and image processing. Applications of GIS in different aspects of agriculture.

AGE 202: Agricultural Machinery and Mechanization. (1, 0, 2)
(Offered by Dept. of Agric. Engineering)

ENS 302 Business Creation, Growth & Corporate Governance (1,0,1)

Students are expected to be familiar with topics such as Concepts of Business and New value Creation, the Business Planning Process and Start-up decisions, Opportunity search and identification, legal issues relating to start-up. Introduction to feasibility studies and cash flow. Introduction to theories of growth, challenges of growth and growth strategies (external growth strategies, franchising, buy in and buy out). Introduction to mergers and acquisitions. Sources of Funds/Capital e.g. internal and external, formal and informal: past government's efforts and initiatives towards the funding of new ventures and small and medium enterprises in Nigeria, Resource use and efficiency. Principles of Marketing and the Marketing Concepts, the Marketing mix, Product development and management, Ethics and social responsibility and their relevance in business. Ethical behavior, Business ethics and practices in Nigeria-Case studies, Community development projects/welfare. New opportunities for expansion, E-business, E-commerce, E-trade. Managing transition from start to growth, personal discipline, learning, Decision making and Control, Employee decision. Basic financial literacy. Business Strategy. The concept of strategy and strategic issues in business (existing and startup). The Scientist/Engineer as well as an entrepreneur; opportunities and challenges. Venture creation and elements of risk management.

YEAR FOUR: HARMATTAN SEMESTER

SST 401: SOIL GENESIS AND CLASSIFICATION (1,0,1)

A discussion of the main soil forming factors and processes especially in Nigerian Soils. Principles of Soil Classification and Classification Systems.

Soil Survey, Interpretation and plant capability classification. Types and interpretation of Maps; mapping units and mapping. Soils of Nigeria and Imo State. Practical will include study of monolites in the lab; profile description in the field and exercises in soil surveys.

SST 403 : SOIL CARTOGRAPHY & GEOGRAPHIC INFORMATION SYSTEMS (1,0,1)

Definition of soil cartography and its historic development. Types, Function, Techniques of drafting maps, instruments and map compilation. Design and construction of statistical maps and diagrams. Techniques of changing map scales, the co-ordinate system and projection. Cartographic process, symbolizing and processing of data. Geographic Information Systems in Soil Studies. Processing and Storing of geographical data. Digital image processing, Tools in Geographic Information Systems.

SST 405: SOIL –WATER POLLUTION & MANAGEMENT (1,0,1)

Definition, causes, historical development of soil pollution. Social and economic development of soil pollution, oil exploration and municipal waste hazards, water pollution. Human activities in the Urban and Rural Regions.

The concept of determinism and positivism. Methods of environmental impact assessment and Auditing. Environmental impact laws in Nigeria. Classification of impacts and definition of environment Variables. Management and control of pollution.

SST 407: IRRIGATION, DRAINAGE & HYDROLOGY (1,0,1)

Definition, historical development and scope of hydrology. Hydrological cycle and hydrological equation. Precipitation, water losses-evaporation and evapo-transpiration, infiltration, soil moisture interception. Stream flow movement, runoff and hydrograph analysis. Flood estimation and control, ground water, water management and river

SST 409: PLANT NUTRITION MANAGEMENT (1,0,1)

Nutrient requirements of major agronomic crops; nutrient sources;

nutrition management for agronomic crops from yield, quality, economic and environmental perspectives. Essential and beneficial elements, solutions and soil as rhizosphere chemistry, nutritional physiology, ion uptake and translocation, functions of elements, nutrient interactions, genetics of plant nutrition.

Plants response to fertilization; soil and tissue testing methodology and interpretation; irrigation scheduling; irrigation water quality; use of irrigation and fertilizers to minimize environmental impact; writing effective nutrient management plans.

SST 411 : WETLAND SOILS (1,0,1)

Wetland soils as components of natural landscape: biogeochemistry, hydrology, geomorphology, hydric soil indicators, and classification. Soil and redoximorphic features important to wetland delineation and jurisdictional determination. Mitigation of wetland impacts with emphasis on restoration and creation. Constructed wetlands for water treatments.

SST 413 : SOIL MORPHOLOGY

Terminology used to describe soil. Describing soil profile and identifying soil horizon and layers, estimating soil texture, percent sand, silt and clay, hydric soil identification and describing a deep hole for soil evaluation. Field trips.

YEAR FOUR : RAIN SEMESTER

COURSE	CODE	COURSE DESCRIPTION	LTP	UNIT
SIW	400	4 th Year Rain Semester SIWES	0,0,4	4
SIW	401	4 th Year Long Vacation SIWES		2
TOTAL				6

SST 501: Soil Microbiology and Biochemistry (1,0,1)

Microbiological activities in soil; organic matter decomposition, the nitrogen cycle to include the biochemistry and microbiology of nitrification; symbiotic and non-symbiotic N-fixation, the phosphorus cycle, Microbial transformation of sulphur, iron and other minerals ; transformation of hydrocarbons, pesticides, microbial factor of soil aggregate production and destruction; ecological interrelations; soil reaction- acidity, alkalinity and salinity.

Contaminants in soils and groundwater by microorganisms: emphasis on enzymatic mechanisms and metabolic pathways. Approaches for analyzing microbial populations and activities including molecular techniques. Applications of microbial activities for bioremediation of contaminated soils and groundwater.

503 : Soil Survey and Land Use (2,0,1)

Basic principles of soil classification: soil profile study and description, soil survey methodology; soil farming , minerals and rock in relation to soil derived thereof, soil roaming, factors; assemblage of maps; photo; use of aerial photographs, topographic maps; field survey versus grid survey; field mapping; soil morphological investigations, laboratory determination; soil correlation, soil survey report writing; interpretive report; soil classification management properties of some tropical soils and land capability classification for various purposes. The use and misuse of land in the tropics.

SST 505: Soil Chemistry (2,0,0)

Soil chemistry and nutrition of plants. The macro and micro elements, properties, chemistry and utilization of water-logged soils; redox potentials. Methods of chemical analysis of soil.

**SST 507: Soil Geomorphology & Environmental Conservation
Tech (2,0,1)**

Soil development as related to landscape throughout the Quaternary; focusing on the relationship of soils to climate and vegetation, landscape evolution, and time; principles of soil stratigraphy; case histories of soil geomorphic studies; field trips.

Many environmental issues related to urbanization are derived from the manipulation of soil. By coupling contemporary literature in urban soils with soil science, students will be able to evaluate environmental issues within the urban environment and provide new ways of remediating their impact.

SST 509: Research Tech in Soil Tech 1 (0,0,2)

Supervised research into chosen problems in agriculture. Identification of problem, hypothesis formulation, experimental design and data collection.

**SST 511: Remote Sensing Application in Soil Science and
Agriculture (2,0,0)**

Definition, historical development and scope of Remote sensing. Principles of Remote sensing, Types and Applications of Remote sensing in soil and Agriculture, Sensors, Remote sensing and photogrammetry.

YEAR FIVE: RAIN SEMESTER

SST 502: SOIL AND PLANT WATER RELATIONSHIP (2,0,0)

Relationships between soil and Water, water infiltration, hydraulic conductivity.

SST 504: SOIL LABORATORY (1,0,1)

Parent materials, morphology, physical, chemical and biological properties of soils and related soil management and land use practices will be studied in the field and lab.

Soil and plant sampling and sample preparation. Theories and procedures for chemical analysis of soil and plant materials. Analysis of soil and plant elements and the interpretation of data; determination of

pH; principle of instrumentation. Maintenance and operation of major analytic instruments, flame photometers, amino acid analyzer; IRU; UVR; pH meter; conductivity bridge, gas system for monitoring analytical procedures, features and function of soil testing laboratory.

SST 506: SOIL FERTILITY AND ORGANIC MATTER (1,0,1)

Fertility in tropical soils. Nitrogen, potassium, phosphorus and sulphur contents of soils. Liming and its soil-plant relationships. The soil as a plant nutrient medium 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 soil. Soil organic matter, its source, properties and roles in plant nutrition relationship between soil organic matter and other soil nutrients. Soil organic matter maintenance.

SST 508: Soil Physics (2,0,0)

The physical and physio-chemical properties of soils, colloidal behavior. Soil structure, soil texture and surface area of soil particles; soil consistency and Atter-Beg s limits. Soil moisture and its categories and measurements; physteresis; field water cycle; soil-plant atmosphere-continuum, drainage and erosion, prevention of secondary salinization; laboratory determination of the physical properties of soils.

SST 510: Fertilizer Technology (2,0,0)

The course gives the student an opportunity to formulate, mix and supply fertilizer efficient for maximum benefit to the plant. Topics include definition of some fertilizer terms, fertilizer nutrients, their sources and manufacture, nitrogenous and phosphate fertilizers, formulation of compound fertilizers, application methods of fertilizers for maximum efficiency. Soil testing and fertilizer recommendations, Fertigation.

SST 512: Research Techniques in Soil Tech II (0,0,4)

Continuation of supervised research. Data analysis, preparation and oral defence of project reports.



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