NIGERIAN COUNCIL OF FOOD SCIENCE AND TECHNOLOGY (NiCFoST)

GUIDELINES FOR THE ESTABLISHMENT OF FOOD SCIENCE AND TECHNOLOGY PROGRAMMES IN NIGERIAN UNIVERSITIES, POLYTECHNICS AND MONOTECHNICS.

FEBRUARY 2022

NiCFoST TD003

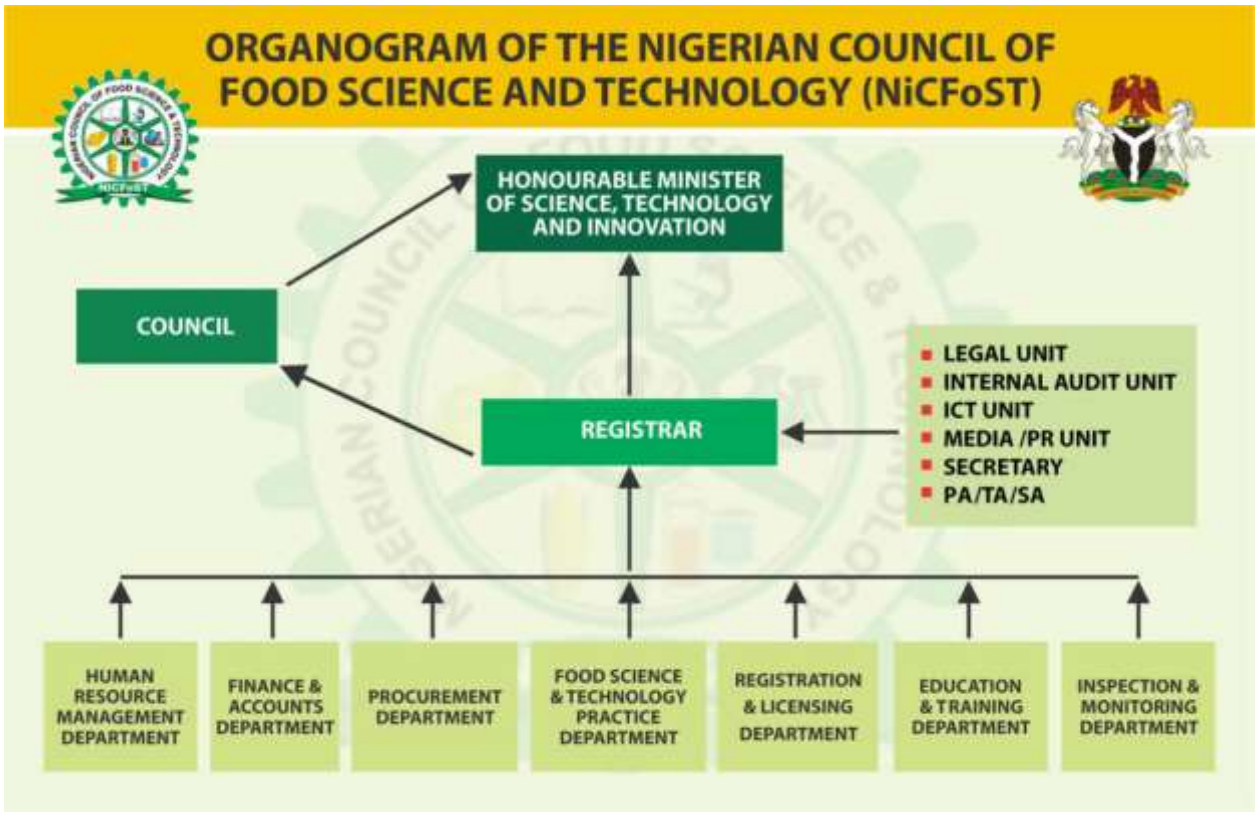
ABOUT NiCFoST

The Nigerian Council of Food Science and Technology (NiCFoST) was established by the NiCFoST (Establishment) Act, 2019.

The Council is domiciled in the Federal Ministry of Science, Technology, and Innovation (FMSTI) to regulate the practice and profession of Food Science and Technology in Nigeria.

Pursuant to this, the Council is responsible for the development of curriculum of Food Science and Technology programmes and its variant Disciplines (Food Technology, Food Science, Food Science & Nutrition, Food Science and Biotechnology, Brewing Science & Technology, Brewing & Beverage Technology etc.) in the tertiary institutions and for accreditation of such programmes in partnership with National Universities Commission (for Universities) and National Board for Technical Education (for Polytechnics and Monotechnics).

It shall also grant practice licence to qualified Food Scientists and Technologists and approve the business locations for their practice.


ORGANOGRAM OF THE NIGERIAN COUNCIL OF FOOD SCIENCE AND TECHNOLOGY (NiCFoST)
HONOURABLE MINISTER OF SCIENCE, TECHNOLOGY AND INNOVATION
COUNCIL
REGISTRAR
LEGAL UNIT
INTERNAL AUDIT UNIT
ICT UNIT
MEDIA /PR UNIT
SECRETARY
PA/TA/SA
HUMAN RESOURCE MANAGEMENT DEPARTMENT
FINANCE & ACCOUNTS DEPARTMENT
PROCUREMENT DEPARTMENT
FOOD SCIENCE & TECHNOLOGY PRACTICE DEPARTMENT
REGISTRATION & LICENSING DEPARTMENT
EDUCATION & TRAINING DEPARTMENT
INSPECTION & MONITORING DEPARTMENT

NIGERIAN COUNCIL OF FOOD SCIENCE AND TECHNOLOGY (NiCFoST)

MANDATE

To regulate the Practice and Profession of Food Science and Technology in Nigeria

OUR VISION

Efficient professional management of the various segments of the Nigerian Food Value Chains and Supply Systems following current best scientific practices for food security.

OUR MISSION

To develop and promote the highest standards in the training and practice of Food Science and Technology profession in Nigeria.

NIGERIAN COUNCIL OF FOOD SCIENCE AND TECHNOLOGY (NiCFoST)

GUIDELINES FOR THE ESTABLISHMENT OF FOOD SCIENCE AND TECHNOLOGY PROGRAMS IN NIGERIAN UNIVERSITIES, POLYTECHNICS AND MONOTECHNICS.

FEBRUARY 2022

NiCFoST TD003

CONTENTS

1.0 INTRODUCTION

The role of the Nigerian Council of Food Science and Technology (NiCFoST) in the regulation of the training of Food Scientists and Technologists for registration as professionals in Nigeria is captured in the NiCFoST Establishment Act of 2019 which states in Part I, Section 3, that the Council shall:

(a) "determine the standards of knowledge, exposure to equipment, practice and skills to be attained by persons seeking to become members of the profession of Food Science and Technology (in this Act referred to as "the Food Profession") and to be registered and review those standards as circumstances may require"

(b) "promote the highest standards of competence, practice and conduct among the members of the food profession"

(c) "coordinate, regulate, facilitate and promote the development of the discipline and practice of food profession in Nigeria"

1.1 Training Objective

With these provisions, it is imperative that NiCFoST shall develop the guidelines for the establishment of Food Science and Technology programmes in Nigerian universities, polytechnics and monotechnics. It is also important to harmonize the programmes in order to achieve a level of uniformity in the quality of the graduates from the various institutions. The primary objective is to train suitably qualified persons in the scientific knowledge of Food and Technology of adding value to agricultural commodities. Where the programmes are already in operation in any institution, NiCFoST shall in conjunction with the relevant institutions, be a part of the accreditation system in addition to other professional regulatory functions.

2.0 THE CURRICULUM

NiCFoST recognizes the diverse nature of the disciplines that contribute to Food Science and Technology. This multidisciplinary features of the Food Science and Technology profession, imposes an enormous challenge on the effort to regulate the training of future professionals. The problem is partly solved by ensuring that the curriculum covers the minimum inputs required from the various areas and blend these to the core FST subjects to forge a package that can transform a student into a truly functional professional as much emphasis will be placed on hands-on practical training as in the theoretical learning. The various institutions can make up the basic curriculum with courses that give focus to certain areas, may be due to the agricultural practices, food commodities, industrial food activity, food markets, peculiar challenges and other such features that constitutes issues of comparative advantage peculiar to their location.

The major undergraduate courses expected as minimum content are as follows:

2.1 UNDERGRADUATE COURSES IN FOOD SCIENCE AND TECHNOLOGY

YEAR 1

1ST Semester

Year One: Maths I, Physics I, Chemistry I, Biology, Engineering Workshop practice I, Engineering Drawing I, Use of English I

2nd Semester

Year One: Maths II, Physics II, Chemistry II, Engineering Workshop Practice II, Engineering Drawing II, Use of English II

YEAR 2

1ST Semester

Maths (Differential equations), Maths (Introduction to Statistics and Probability), Physics (Applied Electricity), Computer Appreciation, Physical Chemistry, General Microbiology, Engineering Workshop Practice III, GST.

Introduction to Food Science and Technology: Definition of Food, Food as an item of human necessity, Importance of value addition to Food supply, composition and nutrition. Principles and methods of food processing and preservation. Role of microorganisms in food processing and preservation. Food storage, including the role of pests and microorganisms.

Introduction to food additives quality changes during processing, preservation and storage, including post-harvest losses, endogenous and modern Food industries in Nigeria and their role on war against hunger. Indigenous food processing methods.

2ND Semester

Maths (Introductory Numerical Analysis), Modern Physics, Inorganic Chemistry, Organic Chemistry,

Introduction to Process Calculations: Mathematical methods of processing data analysis; use of linear, semi-log graph papers in data analysis; representation of concentrations of multi component systems on triangular graphs etc. Units and dimensions - different systems of units and conversions; fundamental and derived dimensions, dimensional consistency. Gas laws - concept of the ideal gas, standard conditions, Dalton's Law, Amagat's Law, volume, mole and pressure fractions and percentage in gas mixtures. Processes and reaction (steady and unsteady states) types and industrial equipment used. Use of flow charts, chemical equations, stoichiometry, limiting reactants, excess reactants, conversion, selectivity, yield, once through and recycle systems and tie substances, material balance - conversion law, component balances. Fuels and combustion - types of fuel, combustion reaction and fuel gas analysis, calculation on air requirements for combustion, excess air. Energy balance - types of energy, specific heats (Cp Cv) calculation of enthalpy changes, latent heats of vaporization fusion, solution, mixing etc. Introduction to enthalpy - concentration diagrams and applications, general energy balances for simple processes, uses of steam table and charts. Humidity - wet and dry bulb thermometry, the humidity chart and its applications in solving dry and humidification problems.

Introduction to Biochemistry: A study of the classification, nomenclature, structure, configuration and basic chemical properties of carbohydrates, proteins and lipids. Enzymes classification and nomenclature, theory of enzyme activities and specifications. Enzyme kinetics; introduction to Michaelis-menten equation, factors affecting activity, activation and inhibition of enzymes. Introduction to metabolism; glycolysis and the role of ATP, the citric acid cycle, pentose phosphate pathway, lipid and amino acid metabolism. The nucleic acids. The biosynthesis of protein.

SIWES I

YEAR 3

1ST Semester

Unit Operations in FST I: Thermodynamic properties of food materials. Fluids - perfect and real fluids, compressible and incompressible fluids. Newtonian and Non - Newtonian fluids - flow properties, including Pseudoplastic flow, dilatancy etc. Measurement of flow properties - viscometer, (capillary, rotational etc) and other mechanisms. Heat transfer-stationery and non-stationery heat conduction. Heat transfer through composite bodies.

Forced and natural convection, relation. Mass Transfer- stationery mass transfer by molecular diffusion, mass transfer by forced convection (analogy with heat transfer) simultaneous heat and mass transfer (with in the food industry).

Food Processing Fundamentals: Basic methods of food processing and preservation. Principles and practice in thermal and low temperature preservation dehydration/drying concentration, irradiation and fermentation. Discussion should include equipment and systems. Preliminary and preparative operation for the processing e.g. selection, sorting, cleaning, grading and storage; including discussion for the industrial equipment.

Human Nutrition: An introduction to food and Nutrition policy. Food classes composition and balanced diet. Food enrichment and supplementation energy and nutrient requirements of classes of individuals (babies, weaning, children, the young, adult, elderly, sick people, pregnant and lactating women). Malnutrition - biochemistry (Nutrient interaction), physiology. Effects of cultural food habits, economics (assessment of nutritional status) and ignorance. Nutritional disorders. Nutrition and mental development. Biological Value methods of assessment of food quality. Antinutritional factors in food.

Food Machinery: Design features and functions of cleaning; sorting and grading equipment for agricultural products - grains, fruits, vegetables and livestock products. Grading Tables; Size reduction - cutting, milling, shredding etc; agglomeration, filtration; sedimentation and clarification equipment (Types and Uses). Mechanical separations (expressions and centrifugation). Agitation; mixing and homogenization equipment (types and applications). Electric motors (types and applications).

Food Chemistry and Analysis: Nature and properties of water, carbohydrate, protein and lipids in food. Chemical and biological changes that occur in foods during handling processing and storage with respect to the protein content of some selected foods e.g. meat, fish, milk eggs, protein seeds and tubers. Enzymic and non-enzymic browning; fruits, cereal and tubers. Lipids from animal and plant sources, hydrogenation, emulsions, and emulsifiers, lipid peroxidation. Natural food pigments (e.g. chlorophyll, carotenoids, anthocyanins) flavours. Types (natural and nature-identical and artificial flavourings substances). Forms in which flavours are available and methods of incorporation). Minerals and vitamins. Water in biological reactions, solutions and intermolecular forces. Analysis of food macronutrients (lipids, protein and carbohydrate) of dry products, liquid and semi-solid food products.

Crop and Animal Production:

Introduction to Agric

Economics:

2ND Semester

Unit Operations in Food Technology II: Pumps and compressors used in the food industries: Types, characteristics and applications. Power requirements in fluid transport. Fuel utilization in practical steam generation (solid, oil, gas fire boilers). Type and

utilization of boiler steam distribution system and waste-heat management boiler feed-water treatment.

Equipment and uses of the following unit operations in food industries: distillation, evaporation extraction (liquid-liquid, leaching, absorption, membrane separation processes).

Food Laws and Standards: Definition and importance of food laws and standards (national and international). The development of food standards and regulations. The Codex Alimentarius. The food regulatory agencies in Nigeria. Food laws of Nigeria. Existing food regulations in Nigeria. Comparison with the foreign standards.

Postharvest Physiology and Storage: Plant physiology or biochemistry of maturation, ripening and senescence of plant produce. Harvest indices. Quality attributes of edible plant tissues. Regulation ripening and ripening and senescence (respiration and ethylene phenomena). Fresh plant produce, handling, physiological disorders and diseases of plant tissues (control of post-harvest losses). Response of plant tissues to stress conditions and to injury animal-quality criteria of edible animal tissues. Biochemistry of conversion of muscle to meat. Response of animal tissue to stress condition and injury post mortem. Fresh animal produce, storage temperature, relative humidity and moisture content of the stored foods. Short term and long-term storage. Traditional methods of handling and storage of both plant and animal procedure should be considered.

Food Microbiology: Study of micro-organisms associated with spoilage of fruits, vegetables, meat and meal products (including poultry), sea foods, milk and milk products, cereal products, oil seeds (nuts). Frozen foods canned and fermented foods. The enzymes and microorganisms in food processing. Public health aspects of food microbiology, including food poisoning (from bacteria and fungi) and infection (bacterial, protozoan, viral of microbial origin). Microbial indicators.

Physical Properties of Food: Concepts and definitions. Importance of properties in formulation, processes and storage including thermal, optical, textural and rheological evaluation of food products. Selected local food product will be used in examples.

Basic Financial and Industrial Management:

Marketing Management:

YEAR 4

1ST Semester

Technical Report Writing and Presentation: Methods and formation involved in writing and presentation of scientific research and technical reports. Current techniques in scientific paper presentation. Referencing in food and technology research journals. Use of audio-visual presentation aids.

Food Process Plant Design: Food plant construction material strength and corrosion resistance (with particular reference to specific metals, alloys, polymer, wood, ceramic etc.). Under different environments, corrosion, prevention techniques, material

selection in food industry. Diagrammatic representation: instruments, activators, valves, line diagrams etc. Block and flow charging. Instrumentation (flow, level, pressure, temperature, composition). Controller types and modes of operation. Control valves (types, characteristic etc.). Pipeline design and plant-layout in the food industry. Introduction to process design economics. Optimization techniques.

Fruits and Vegetables Processing: Types and quality criteria of fruits and vegetables. Pre-processing handling, preservation and storage conditions of fresh fruits and vegetables including their processed products. Use of chemicals in the preservation of fruits and vegetable products. Processing of some fruits to single strength juices, pastes, puree, concentrates, jam, jelly and marmalade. Utilization of products and by-products of fruits and vegetable origin. Traditional and modern techniques involved in processing.

Principles of Food Quality Management: Definition, scope significance of food quality and quality control. Quality parameters evaluation. Sampling plans and statistical methods employed in data analysis: Analysis of Variance (ANOVA) regression and correlation coefficients. Microbial and production quality control (from raw material through the production line to finished product). Construction of quality control charts. ISO Quality standards and HACCP.

Meat and Meat Product Processing: Structure of muscles and composition of meat. Principles and processes of meat, fish, poultry, eggs, sea food products including, sausages, meat, corned beef, canned fish. Curing, drying, refrigeration, freezing, and chemical treatment as means of preserving animal tissues. Meat packaging, practical exercises should include animal slaughter, carcass dressing, identification of meat and poultry cuts. Meat tenderization. Meat, fish and poultry, industry in Nigeria. Micro-organisms of interest in meat, fish and poultry industries.

Food Instrumental Analysis: Sampling techniques (gases, liquids and solids). General principles of chromatographic techniques; column paper, thin layer, gel, gas-liquid, gas-solid chromatography, High Performance Liquid Chromatography (HPLC). Spectroanalytical methods colorimetry and spectrophotometry, flame emission and absorption spectroscopy. Applications in food analysis. Basic principles of infra-red and near infra-red spectroscopy. Nuclear magnetic resonance and mass spectrometry. Basic laws of spectroscopy. Nuclear magnetic resonance and mass spectrometry. Basic laws of spectroscopy. Nuclear magnetic resonance and mass spectrometry. Basic laws of spectrometry (Beer's law). Polarimeter and refractometer.

Alcoholic and Non-Alcoholic Beverage Technology: Types differentiation of alcoholic and non-alcoholic beverages. Principles and practices applied in the production of alcoholic beverages. Material selection including yeast strains.

Function of selected ingredients. Common defects in beer, wine, malt and soft drinks. Beneficial and unwanted yeast in the beverage industries. Local raw materials in the production of beer, wine and malt beverages. Relationship of raw material selection to quality of product.

2ND Semester

Six Months

SIWES

YEAR 5

1ST Semester

Food Product Development: New food product development objectives, motivations in concept creation. Screening of initial concepts (ideas). Material selection and testing. Laboratory development and assessment of new products (prototypes). Use of production guidance and consumer testing.

Milk and Dairy Technology: Physical and chemical properties of raw milk and milk components. Handling of raw milk. Definition and differential of different milk products. Technology and manufacture of different milk products including butter, ice cream, cheese, powdered milk and cultured milk products. Simulated milk products (e.g. soymilk) including margarine. Micro-organism of importance in milk product and homogenization operations.

Cereals and Milling Technology: The structural and compositional features of the principal cereals to relate to the efficiency of milling operations. The theory and practice of pre-milling processes-conditioning/tempering and aeration. Types of mills; wet and dry milling. Milling processes applied to maize, rice, sorghum, wheat, millet, oat, barley, roots and tubers. Detailed studies of the comprehensive mechanism of milling as employed in various food produce. Particle size analysis. Product and by-product utilization.

Food Product Packaging: The history and principles of food packaging, nature and properties of conventional materials glass, metal, plastic, wood and paper. Synthetic packaging material, composite, packaging, laminated and coated packaging materials. Moisture and gas movement across packages. Migration of compounds from packages into food and their health implication. Package testing (mechanical strength and permeability). Implication of local packaging materials on product quality and losses. Types of packaging equipment and processes.

Oil Seeds Processing: Composition and quality criteria of oilseeds, detailed study of the processing techniques, equipment's and products of soybeans, African pear, locust bean, melon seed (egusi), groundnuts, African oil bean, sunflower seeds, castor seed, palm fruit, coconuts etc. Application of oils, some by-products in margarine, butter and protein food condiments and other products from oil seed residues. Waste management in the processing of oil seeds. Comparative assessment of the efficiency of the modern and traditional methods.

Food Reactor Design: The design and analysis of food biological reactors with isothermal, non-isothermal and adiabatic operations and applications. Batch and semi-batch reactors, continuous stirred tank reaction, plug flow reactor and laminar flow reactors.

Undergraduate FST Seminar:

Thesis Research I: A research project in a food related topic approved by the department and supervised by a qualified academic staff in the department.

2ND Semester

Processing of Miscellaneous Foods: Processing of cocoa, tea, coffee, sugar, confectionery, protein concentrate and isolate. African oil beans (ugba), garri, fufu, ogi, local seasonings and other local novelty products.

Food Plant Sanitation and Waste Management: Hygienic practices for preparation, packaging of food production including, food plant and its premises food hygiene and regulations. Sanitizing and cleaning agents and their properties. Method of plant cleaning and disinfections. Factors influencing choice of cleaning and sanitizing method. Types of gaseous effluent and solid wastes of food plants. Principles and limitation of methods of treatment, utilization and disposal. Effects of industrial food wastes on the environment. Conversion of wastes for fuel, animal feed etc. Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) for waste effluents. Coagulation, emulsion breaking, neutralization precipitation and chemical oxidation processes as methods of waste water treatment and biological treatment of wastes. Machines utilized in sanitation and disinfection in food plants.

Bakery Technology: Study of the baking processes, basic properties, chemical and biological reactions of ingredients used in production of bakery products. Emphasis on fundamental principles of biological and chemical leavening and rheological properties of dough, batters and ingredients. Biscuit technology, cake and paste products. The use of composite flour and non-wheat flour in bakery equipment and machines (types, functions, selection and requirements) equipment to be studied will include farinometers, extensometers, alveographs etc.

Nutritional Evaluation of Food Processing: Effects of various commercial and home processing operations such as slicing, washing, blanching, freezing, boiling, drying, salting, sugaring, dehydration adjustment of pH etc. Nutrients available in various foods e.g. fruits, vegetables, milk, cereals, oil seeds, meat, fish and poultry. Importance of proper packaging on nutrient retention. Nutrient losses during storage. Nutrient enrichment during processing.

Thesis Research II: A research project in a food related topic approved by the department and supervised by a staff in the department. The results will be presented in the form of a thesis followed by an oral defense.

Special Topics in Food Science and Technology: Current advances in different areas of Food Science and Technology. These include current and emerging topics in such areas as special technology, regulatory matters, food industry and other topics not covered in the current outline.

Water Treatment, Processing and Quality: Quality of potable water used as ingredients in food products. Materials and methods applied in converting a water supply to good quality water. Treatment of water for packaging and for pipeline distribution. Safety measures for pipe network distribution of water.

3.0 RESEARCH AND PRACTICAL TRAINING EQUIPMENT

3.1 Laboratory Facilities

The laboratory buildings must be of approved height with good ventilation and connected to steady supply of cooking gas, water and electricity.

Appropriate signage should be placed at strategic positions in the lab or workshop building to give instructions to those using the facility and guide them on safety matters, Personal Protective Equipment (PPEs) and other house rules.

The number of people using the facility should not be more than the recommended number.

The number of each of the items listed could vary for different institutions depending on the size of the building and the expected number of users. The list of items shown below is not exhaustive but represent the minimum required for proper teaching and learning in any Department of Food Science and Technology in Nigeria.

A. Food Chemistry Laboratory

i	Analytical Balances
ii	Refrigerators
iii	Deep freezers
iv	Blast freezer
v	Rotary Vacuum Evaporators (some with vertical inclined condenser)
vi	Oven (Moisture Extraction)
vii	Moisture meters
viii	Centrifuges (small and medium)
ix	Refractometer
x	Stop Clock / Timers
xi	Hot Plates
xii	Heating Mantles (different sizes)
xiii	Water Baths (thermostatically controlled)
xiv	Deionizer
xv	pH Meters
xvi	pH Papers
xvii	Full range of glass wares
xviii	Bunsen Burners

xix	Tripod Stands
xx	Retort Stands
xxi	Porcelain Tiles
xxii	Spatula (Stainless Steel, Various sizes)
xxiii	Clamps
xxiv	Cork Bore Set and Unit
xxv	Moisture meters
xxvi	Chromatography Oven Separating Chamber
xxvii	Refrigerated Centrifuge
xxviii	Magnetic Stirrer
xxix	Combined Hot Plate Magnetic Stirrer 220/240
xxx	Voltage Stabilizers
xxxi	Conductivity Meter
xxxii	Colorimeter
xxxiii	UV /Visible Spectrophotometer
xxxiv	Rapid Visco Analyzer
xxxv	Multiple Speed Rotary Viscometer (Brookfield)
xxxvi	Regular viscometer
xxxvii	Infra-Red Moisture Meter
xxxviii	Macro and Micro Kjeldhal Apparatus

xxxix	Soxhlet Apparatus (Different configuration/sizes)
xl	Heating assembly for Soxhlet extractor
xli	Mechanical Stirrer
xlii	Hydrometers (Different Gravity Ranges)
xliii	Glass Thermometers (Different Temperature Ranges)
xliv	Digital Thermometer Probes
xlv	Beam Balances
xlvi	Vacuum Pump
xlvii	Range of Filter Papers (Different pore sizes)
xlviii	Mortars and Pestles
xlix	Test Tube Packs
l	Test Tube Holders
li	Laboratory Trolleys
lii	Waste Bins
liii	Waste sack polythene light duty 60 x 20 cm
liv	Melting point apparatus 220/240v
lv	Warring Blender or Vitamix Blender (1200W Capacity)
lvi	Fume Chambers
lvii	Distillation Apparatus
lviii	Fractional Distillation Assembly
lix	Ice Making Machine
lx	Penetrometer
lxi	Hardness Tester
lxii	Muffle Furnace
lxiii	Shaker Orbital Shaker
lxiv	Distilled Water Unit
lxv	Assorted Quick-fit Apparatus
lxvi	Standard Lab Safety Installations (fire, acid spill first aid box etc.)
lxvii	Miscellaneous Glassware / Ceramic ware and General Equipment
lxviii	Bomb Calorimeter
lxix	Whatman Filter Papers (different types and sizes)
lxx	Buchner Funnels and Flasks
lxxi	Mechanical Shakers and Screen Filters
lxxii	Freeze Dryer (Lyophilizer)
lxxiii	Pipettes Fillers

B. Food Microbiology Laboratory

1	Cooled incubators
2	Analytical Balances
3	Refrigerators
4	Deep freezers
5	Blast freezer
6	Bunsen Burners
7	Tripod Stands
8	Retort Stands
9	Lyophilizer
10	Oven (Sterilizing)
11	Autoclaves
12	Incubator
13	Distilled water unit
14	Centrifuges (small and medium)
15	Microscopes (Compound and Light)
16	Hot Plates
17	Water Baths (thermostatically controlled)
18	Colony counter
19	Deionizer
20	Table Lamps
21	Inoculation Chambers
22	pH meters
23	Micro Slides Cabinet
24	Boxes of slides and cover slides
25	pH papers
26	Full range of glass wares
27	Porcelain Tiles
28	Spatula (Stainless Steel, Various sizes)
29	Clamps
30	Moisture meters

31	Voltage Stabilizers
32	Inoculation Room
33	Bench Top Stirred Fermenter with Support Units
34	Fermentation Locks
35	Vacuum Pump
36	Magnetic Stirrer
37	Shaking reaction incubators
38	Range of Filter Papers (Different pore sizes)
39	Fume Chambers
40	Standard Lab Safety Installations (fire, acid spill first aid box etc.)
41	Stomacher
42	Pipettes Fillers

C. Food Processing Pilot Plant

1	Cooled incubators
2	Smoking kiln
3	Central Boiler (steam or hot water) Supply
4	Central Compressed Air Supply
5	Refrigerators
6	Pilot Baking oven
7	Deep freezers
8	Can steamers
9	Pilot Autoclave
10	Pilot Spray Dryer
11	Pilot Cabinet Dryer
12	Pilot Fluidized Bed Dryer
13	Solar Dryer
14	Pilot Attrition mill
15	Pilot Hammer mill
16	Pilot Scaling Up Fermenter
17	Wet corm mill
18	Cassava Grater
19	Stainless Steel Cooking Utensils
20	Hydraulic Cassava Press
21	Community Garri Fryer
22	Pressed Cassava Cake Sifter
23	Garri sieve
24	Industrial Gas Cooker with Oven
25	Plastic Bag Packaging Sealer
26	Unused Plastic Packaging Bags of Different Sizes (with only one open side)
27	Pilot Juice Extractor
28	Pilot Meat Mincer
29	Dough Multiple Speed Mixer/kneader
30	Bread and Cake Pans of Different Sizes
31	Refrigerated Beverage Dispenser
32	Ice Cream Machine
33	Empty Beverage Glass Bottles
34	Virgin Crown Corks
35	Empty Unused Food Cans and Covers
36	Manual Crown Corker
37	Glass bottle Batch Pasteurizer
38	Pilot Deep Fryers
39	Pilot slicing / Chip Making Machine
40	Manual Chemical Balance
41	Sieve shaker
42	Warring Blender or Vitamix Blender (1200W Capacity)
43	Processing vessel complete with mixer min 250L
44	Liquid filling machines (Volumetric and Vacuum)
45	Filter Press 8 frames
46	Deionizer 100L/Hour minimum
47	Stainless Steel Transfer Pumps
48	Stainless Steam jacketed vessels
49	Stainless Steel Holding/Processing/Storage vessels
50	Stainless Steel Work Tables
51	Standard Lab Safety Installations (fire, acid spill first aid box etc.)
52	Blast Freezer
53	Retort Cookers for pouches and cans

D. Instrument /Analytical Lab

1	Analytical Balances
2	Refrigerators
3	Deep freezers
4	Voltage Stabilizer
5	High Performance Liquid Chromatograph
6	UV Spectrophotometer
7	I.R. Spectrophotometer
8	Amino Acid Analyzer
9	UV / Visible Spectrophotometer
10	Flame Photometer with accessories
11	Electrophoresis
12	Sets of Glassware
13	Hot Air Ovens
14	Fume Chambers
15	Standard Lab Safety Installations (fire, acid spill first aid box etc.)
16	GLC-MS
17	Atomic Absorption Spectrophotometer

E. Special Purpose Lab for special studies in particular of interest to the institution e.g. dairy lab, milling lab, beverage lab, meat lab/mini abattoir etc.

F. Sensory Evaluation Laboratory

1	Special purpose-built housing or section with 'out of bounds' to people not involved in the studies and good noise control.
2	Partitioned cubicles with window ports for service
3	Bar stool for each cubicle
4	Room lighting of different colours (Red, Blue and regular white)
5	Sample Cups of different sizes
6	White Serving Plates of different sizes (Chinaware, paper, plastic)
7	Cutleries of plastic and stainless steel (table & kitchen knives, spoon, fork etc.
8	Central Public address system

G. Animal Testing and Nutrition House Equipment

1	Matrolon cage types i
2	Matrolon cage type ii
3	Matrolon cage type iii
4	Matrolon cage type iv
5	Wire cage type ii
6	Wire cage type iii
7	Wire cage type iv
8	Rack for cage type i
9	Rack for cage type ii
10	Rack for cage type iii
11	Rack for cage type iv
12	Racks for wire cage type ii
13	Racks for wire cage type iii
14	Mobile batteries for Guinea/pig
15	Drinking bottles
16	Feeding containers for Rats
17	Feeding containers for Mice
18	Feeding containers for Guinea/pig
19	Feeding Holder
20	Drinking valve for mice and rats
21	Experimental Dropping tray
22	Bottle washing and transport basket
23	Identification plates
24	Food transport trolley
25	Cages for collecting faeces and urine
26	Cat cage
27	Upright cage washer
28	Partitioned cabinets for staff clothing
29	Polythene dust bins
30	Record cabinets
31	Sterilizing machine
32	Incinerator
33	Drawer Cabinet
34	Other animal house miscellaneous equipment

H. Engineering Workshop (Machine, Welding and Woodwork) Practice Equipment

1	Power saw
2	Lathe machine
3	Milling machine
4	Drilling machine
5	Portable grinding machine
6	Portable hand electric drill
7	Set of lathe tools
8	Set of milling cutters
9	Set drills (Imperial and metric)
10	Set of flat spanners (metric)
11	Sets of ring spanners (metric)
12	Sets of flat spanners (A.F.)
13	Set of ring spanners (A.F.)
14	Adjustable spanners small
15	Adjustable Spanners medium
16	Pairs of pliers different sizes
17	Screw drivers different sizes
18	Steel rulers
19	Sets of taps (metric, BST, UNIT)
20	Sets of stock and dyes (metric, BST, UNF)
21	Sets of BA Taps
22	Sets of BA stock and dyes
23	Half pound and one pound hammers
24	Copper Hammers
25	Scribers
26	Drifts
27	Engineer Square
28	Inside and outside Calipers
29	Micrometer Screw Gauge
30	Pipe Wrenches 14" & 18" & 24"
31	Hack Saws
32	Bench Vice
33	Blow master Pipe
34	Clamp
35	Furnace
36	Arc Welding Unit
37	Gas Welding Unit

I. Department / Faculty / (Audiovisual Equipment)

1	Slide Projector
2	Video Camera
3	Overhead Projector
4	Projector screens
5	Audiotape Recorders
6	Computer facilities with internet access at one computer system to five students
7	Public Address System
8	Scanner
9	Video Recorders/Player