UNIVERSITY OF IBADAN, IBADAN
DEPARTMENT OF BOTANY

NUC CCMAS
(100 LEVEL)

Programmes in Faculty of Science
Department of Botany
University of Ibadan

B.Sc. Botany

Overview

Botany is the scientific study of plants and these ranges in the broadest sense, from the microscopic bacteria and diatoms to large forest trees. Man has always depended on plants for food, fibre, drugs, etc., and with the growing shift of emphasis to renewable resources in the face of diminishing world supplies of fossil fuels and other exhaustible materials the need for better understanding of plants, including present-day under-utilized or non-economic species, has come sharply into focus.

Philosophy

The programme has been designed to provide a sound knowledge of the concepts and methodologies of botany in key areas that meet the needs of society.

Objectives

The main objectives of the programme are to

1. enable students acquire knowledge in the skills of the discipline;
2. train and equip students in contemporary Botany procedures for better career performance;
3. broadly educate students for positions in the conservation and bio-diversity sectors;
4. produce highly qualified personnel to take up employment in plant products based industries and institutions; and
5. prepare students for graduate and professional studies in the plant sciences at the molecular level.

Unique Features of the Programme

The unique features of the programme include:

1. Creating a wide range of interest areas that now exists in botany, allowing persons with different backgrounds, attitude and temperament to select satisfactory plant-science-based careers;
2. Introducing Bioinformatics to enhance students understating plant at molecular level;
3. Producing students with bio-entrepreneurship skills; and
4. Infusion of basic skills and competencies to contribute to health and plant disease control.

Employability Skills

1. A graduate of Botany is equipped with requisite skills and understanding that would successfully launch the individual into employment in plant base Industries and Research Institutes.

2. Botany graduates are expected to develop skill that may bring gainful employment in such government agencies and allied bodies as the Federal Quarantine Service, Geological Survey, Oil Exploration Department, germplasm collection and herbaria, museums and archaeology institutes and botanical gardens, parks and reserves.

3. The cognitive skills of botanists will be applied in pharmaceutical industry, petrochemical industry, lumber industry, seed companies, food companies, fermentation industry (including breweries), and biological supply houses are pertinent example

4. Botany graduates with research, IT and technology, monitoring and other skills may be self-employed in floriculture, mushroom production and consultancy service to agriculture, forestry, fisheries, paper mills and other users of wood and plant products.

21st Century Skills

1. Collaboration
2. Critical thinking
3. Creativity
4. Flexibility
5. Technology literacy
6. Innovation
7. teamwork
8. good problem-solving skills
9. Information and Communication Literacy

Admission and Graduation Requirements

Admission Requirements

4-year degree programme

The entry requirements shall be at least credit level passes in five subjects including English Language, Mathematics, Biology, Chemistry and Physics at the Senior Secondary Certificate (SSC) or its equivalent. In addition, an acceptable pass in the Unified Tertiary Matriculation Examination (UTME), with relevant subject combination is required for admission into 100-level.

Candidates with five SSCE (or equivalent) credit passes with at least two passes in Biology, Chemistry, Mathematics or Physics at the GCE Advanced Level or IJMB or JUPEB may be considered for admission into 200 Level.

Graduation Requirements

To earn a degree in Botany, UTME Students must obtain a minimum of 120 credits while Direct entry students must obtain and pass a minimum of 90 credits units.

2024/2025 ACADEMIC SESSION
100L COURSES (under the CCMAS)

Course Code	Course Title	Unit(s)	Status	LH	PH	S
GST 111	Communication in English	2	C	30	-	1st
GST 112	Nigerian Peoples and Culture	2	C	30		2nd
MTH 101	Elementary Mathematics I	2	C	30		1st
MTH 102	Elementary Mathematics II	2		30	-	2nd
COS 101	Introduction to Computing Sciences	3	C	30	45	1st
BIO 101	General Biology I	2	C	30	-	1st
BIO 102	General Biology II	2	C	30	-	2nd
BIO 107	General Biology Practical I	1	C	-	45	1st
BIO 108	General Biology Practical II	1	C	-	45	2nd
CHM 101	General Chemistry I	2	C	30	-	1st
CHM 102	General Chemistry II	2	C	30	-	2nd
CHM 107	General Chemistry Practical I	1	C	-	45	2nd
BOT 102	Introductory Botany	2	C	15	45	1st
PHY 101	General Physics	2	C	30	-	1st
PHY 102	General Physics II	2	C	30	-	2nd
UI-BOT 111	Cryptogamic Botany	2	R	30	30	1st
U-IBOT 141	Basic principles in Botany	2	R	30	30	2nd
	TOTAL	**32**				

100 LEVEL

Legends: Course Codes, Contents, Status, Units, LH-Lecture Hours, PH-Practical Hours and S-Semesters in which the Courses are offered

Course Contents and Learning Outcomes

100 Level

GST 111: Communication in English (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to

1. identify possible sound patterns in English Language;
2. list notable Language skills;
3. demonstrate an appreciable level of the art of public speaking and listening; and
4. write simple and technical reports.

Course Contents

Sound patterns in English Language (vowels and consonants, phonetics and phonology). English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations). Sentence in English (types: structural and functional, simple and complex). Grammar and Usage (tense, mood, modality and concord, aspects of language use in everyday life). Logical and Critical Thinking and Reasoning Methods (Logic and Syllogism, Inductive and Deductive Argument and Reasoning Methods, Analogy, Generalisation and Explanations). Ethical considerations, Copyright Rules and Infringements. Writing Activities: (Pre-writing , Writing, Post writing, Editing and Proofreading; Brainstorming, outlining, Paragraphing, Types of writing, Summary, Essays, Letter, Curriculum Vitae, Report writing, Note making and Mechanics of writing). Comprehension Strategies: (Reading and types of Reading, Comprehension Skills, 3RsQ). Information and Communication Technology in modern Language Learning. Language skills for effective communication. Major word formation processes. Writing and reading comprehension strategies. Logical and critical reasoning for meaningful presentations. Art of public speaking and listening. Report writing.

GST 112- Nigerian Peoples and Culture (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. analyse the historical foundation of the Nigerian culture and arts in pre-colonial times;
2. list and identify the major linguistic groups in Nigeria;
3. explain the gradual evolution of Nigeria as a political unit;
4. analyse the concepts of Trade, Economic and Self-reliance status of the Nigerian peoples towards national development;
5. enumerate the challenges of the Nigerian State towards Nation building
6. analyse the role of the Judiciary in upholding people's fundamental rights
7. identify acceptable norms and values of the major ethnic groups in Nigeria; and
8. list and suggest possible solutions to identifiable Nigerian environmental, moral and value problems.

Course Contents

Nigerian history, culture and art up to 1800 (Yoruba, Hausa and Igbo peoples and culture; peoples and culture of the ethnic minority groups). Nigeria under colonial rule (advent of colonial rule in Nigeria; Colonial administration of Nigeria). Evolution of Nigeria as a political unit (amalgamation of Nigeria in 1914; formation of political parties in Nigeria; Nationalist movement and struggle for independence). Nigeria and challenges of nation building (military intervention in Nigerian politics; Nigerian Civil War). Concept of trade and economics of self-reliance (indigenous trade and market system; indigenous apprenticeship system among Nigeria people; trade, skill acquisition and self-reliance). Social justices and national development (law definition and classification. Judiciary and fundamental rights. Individual, norms and values (basic Nigeria norms and values, patterns of citizenship acquisition; citizenship and civic responsibilities; indigenous languages, usage and development; negative attitudes and conducts. Cultism, kidnapping and other related social vices). Re-orientation, moral and national values (The 3R's – Reconstruction, Rehabilitation and Re-orientation; Re-orientation Strategies: Operation Feed the Nation (OFN), Green Revolution, Austerity Measures, War Against Indiscipline (WAI), War Against Indiscipline and Corruption(WAIC), Mass Mobilization for Self-Reliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

MTH 101: Elementary Mathematics I (Algebra and Trigonometry)

(2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. explain basic definition of set, subsets, union, intersection, complements and use of Venn diagrams;
2. solve quadratic equations;
3. solve trigonometric functions;
4. identify the various types of numbers; and
5. solve some problems using binomial theorem.

Course Contents

Elementary set theory, subsets, union, intersection, complements, Venn diagrams. Real numbers, integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers, algebra of complex numbers, the Argand diagram. De-Moivre's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formulae.

MTH 102: Elementary Mathematics II (Calculus) (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. identify the types of rules in differentiation and integration;
2. describe the meaning of function of a real variable, graphs, limits and continuity; and
3. solve some applications of definite integrals in areas and volumes.

Course Contents

Function of a real variable, graphs, limits and idea of continuity. The derivative as limit of rate of change. Techniques of differentiation. Extreme curve sketching. Integration as an inverse of differentiation. Methods of integration. Definite integrals. Application to areas, volumes.

COS 101: Introduction to Computing Sciences (3 Units C: LH 30; PH 45)

Learning Outcomes

At the end of the course, students should be able to:

1. explain basic components of computers and other computing devices;
2. describe the various applications of computers;
3. explain information processing and its roles in the society;
4. describe the Internet, its various applications and its impact;
5. explain the different areas of the computing discipline and its specializations; and
6. demonstrate practical skills on using computers and the internet.

Course Contents

Brief history of computing. Description of the basic components of a computer/computing device. Input/Output devices and peripherals. Hardware, software and human ware. Diverse and growing computer/digital applications. Information processing and its roles in society. The Internet, its applications and its impact on the world today. The different areas/programs of the computing discipline. The job specializations for computing professionals. The future of computing.

Lab Work: Practical demonstration of the basic parts of a computer. Illustration of different operating systems of different computing devices including desktops, laptops, tablets, smart boards and smart phones. Demonstration of commonly used applications such as word processors, spreadsheets, presentation software and graphics. Illustration of input and output devices including printers, scanners, projectors and smartboards. Practical demonstration of the Internet and its various applications. Illustration of browsers and search engines. How to access online resources.

BIO 101: General Biology I (2 Units C: LH 30)

Learning Outcomes

At the end of lectures, students should be able to:

1. explain cells structure and organizations;
2. summarize functions of cellular organelles;
3. characterize living organisms and state their general reproduction;
4. describe the interrelationship that exists between organisms;
5. discuss the concept of heredity and evolution; and

6. enumerate habitat types and their characteristics.

Course Contents

Cell structure and organisation, functions of cellular organelles. Characteristics and classification of living things. Chromosomes, genes; their relationships and importance. General reproduction. interrelationships of organisms (competitions, parasitism, predation, symbiosis, commensalisms, mutualism, saprophytism). Heredity and evolution (introduction to Darwinism and Lamarkism, Mendelian laws, explanation of key genetic terms). Elements of ecology and types of habitat.

BIO 102: General Biology II (2 Units C: LH 30)

Learning Outcomes

At the end of the lectures, students should be able to:

1. list the characteristics, methods of identification and classification of viruses, bacteria and fungi;
2. state the unique characteristics of plant and animal kingdoms;
3. describe ecological adaptations in the plant and animal kingdoms;
4. explain nutrition, respiration, excretion and reproduction in plants and animals; and
5. describe growth and development in plants and animals.

Course Contents

Basic characteristics, identification and classification of viruses, bacteria and fungi.

A generalized survey of the plant and animal kingdoms based mainly on the study of similarities and differences in the external features. Ecological adaptations. Briefs on physiology to include nutrition, respiration, circulatory systems, excretion, reproduction, growth and development.

BIO 107: General Biology Practical I (1 Unit C: PH 45)

Learning Outcome

At the end of this course students should be able to:

1. outline common laboratory hazards;
2. provide precaution on laboratory hazards;
3. state the functions of the different parts of microscope;
4. use the microscope and describe its maintenance;
5. draw biological diagrams and illustrations; and
6. apply scaling and proportion to biological diagrams.

Course Contents

Common laboratory hazards. prevention and first aid. measurements in biology. uses and care of microscope. compound and dissecting microscope. Biological drawings and illustration, scaling, accuracy and proportion. use of common laboratory apparatus and laboratory experiments designed to illustrate the topics covered in **BIO 101.**

BIO 108: General Biology Practical II (1 Unit C: PH 45)

Learning Outcomes

At the end of this course, students should be able to:
1. describe the anatomy of flowering plants;
2. differentiate types of fruits and seeds;
3. state ways of handling and caring for biological wares;
4. describe the basic histology of animal tissues; and
5. identify various groups in the animal kingdom.

Course Contents

Anatomy of flowering plants, primary vegetative body. stem, leaf and root to show the mature tissues namely parenchyma, collenchyma, sclerenchyma, xylem and phloem. Types of fruits and seeds. Care and use of dissecting kits and other biological wares. Dissection and general histology of animal tissues based on vertebrate forms. Morphology and functions of epithelial, muscular, nervous and connective tissues. Examination of various groups of lower invertebrates under microscopes, identification of various groups of organisms in Animal Kingdom and any experiment designed to emphasise the practical aspects of topics in BIO 102.

CHM 101: General Chemistry I (2 Units C: LH 30)

Learning Outcomes

After studying all materials and resources presented in the course, the student will be able to:

1. define atom, molecules and chemical reactions;
2. discuss the modern electronic theory of atoms;
3. write electronic configurations of elements on the periodic table;
4. justify the trends of atomic radii, ionization energies, electronegativity of the elements based on their position in the periodic table;
5. identify and balance oxidation – reduction equation and solve redox titration problems;
6. illustrate shapes of simple molecules and hybridized orbitals;
7. identify the characteristics of acids, bases and salts, and solve problems based on their quantitative relationship;
8. apply the principles of equilibrium to aqueous systems using Lechatelier's principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;
9. analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
10. determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents

Atoms, molecules, elements and compounds and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridization and shapes of simple molecules. Valence Forces; Structure of solids. Chemical equations and stoichiometry; Chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry; rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102: General Chemistry II (2 Units C: LH 30)

Learning Outcomes:

At the end of this course, the students should be able to:

1. state the importance and development of organic chemistry;
2. define fullerenes and their applications;
3. discuss electronic theory;
4. determine the qualitative and quantitative of structures in organic chemistry;
5. describe rules guiding nomenclature and functional group classes of organic chemistry;
6. determine rate of reaction to predict mechanisms of reaction;
7. identify classes of organic functional group with brief description of their chemistry;
8. discuss comparative chemistry of group 1A, IIA and IVA elements; and
9. describe basic properties of Transition metals.

Course Contents

Historical survey of the development and importance of organic chemistry, fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures and nanochemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The Chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

CHM 107: General Chemistry Practical I (1 Unit C: PH 45)

Learning Outcomes

1. describe the general laboratory rules and safety procedures;
2. collect scientific data and correctly carrying out chemical experiments;
3. identify the basic glassware and equipment in the laboratory;
4. identify the differences between primary and secondary standards;
5. perform redox titration;
6. record observations and measurements in the laboratory notebooks; and
7. analyse the data to arrive at scientific conclusions.

Course Contents

Laboratory experiments designed to reflect topics presented in courses CHM 101 and CHM 102. These include acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

PHY 101: General Physics I (Mechanics) (2 Units C: LH 30)

Learning Outcomes

On Completion, the Student should be able to;

1. identify and deduce the physical quantities and their units;
2. differentiate between vectors and scalars;
3. describe and evaluate motion of systems on the basis of the fundamental laws of mechanics;
4. apply Newton's laws to describe and solve simple problems of motion;
5. evaluate work, energy, velocity, momentum, acceleration, and torque of moving or rotating objects;
6. explain and apply the principles of conservation of energy, linear and angular momentum;
7. describe the laws governing motion under gravity; and
8. explain motion under gravity and quantitatively determine behaviour of objects moving under gravity.

Course Contents

space and time. units and dimension. vectors and scalars. differentiation of vectors: displacement, velocity and acceleration. Kinematics. Newton laws of motion (Inertial frames, Impulse, force and action at a distance, momentum conservation). relative motion. Application of Newtonian mechanics. equations of motion. conservation principles in physics, conservative forces, conservation of linear momentum, Kinetic energy and work, Potential energy, System of particles, Centre of mass. Rotational motion. torque, vector product, moment, rotation of coordinate axes and angular momentum, polar coordinates. conservation of angular momentum; Circular motion.

Moments of inertia, gyroscopes and precession. gravitation: Newton's Law of Gravitation, Kepler's Laws of Planetary Motion, Gravitational Potential Energy, Escape velocity, Satellites motion and orbits.

PHY 102: General Physics II (Electricity & Magnetism) (2 Units C: LH 30)

Learning Outcomes

On completion, the student should be able to;

1. describe the electric field and potential, and related concepts, for stationary charges;
2. calculate electrostatic properties of simple charge distributions using Coulomb's law, Gauss's law and electric potential;
3. describe and determine the magnetic field for steady and moving charges;
4. determine the magnetic properties of simple current distributions using Biot-Savart and Ampere's law;
5. describe electromagnetic induction and related concepts, and make calculations using Faraday and Lenz's laws;
6. explain the basic physical of Maxwell's equations in integral form;
7. evaluate DC circuits to determine the electrical parameters; and
8. determine the characteristics of AC voltages and currents in resistors, capacitors, and Inductors.

Course Contents

Forces in nature. Electrostatics (electric charge and its properties, methods of charging). Coulomb's law and superposition. Electric field and potential. Gauss's law. Capacitance. Electric dipoles. Energy in electric fields. Conductors and insulators. DC circuits (current, voltage and resistance. Ohm's law. Resistor combinations. Analysis of DC circuits. Magnetic fields. Lorentz force. Biot-Savart and Ampère's laws. Magnetic dipoles. Dielectrics. Energy in magnetic fields. Electromotive force. Electromagnetic induction. Self and mutual inductances. Faraday and Lenz's laws. Step up and step down transformers. Maxwell's equations. Electromagnetic oscillations and waves. AC voltages and currents applied to inductors, capacitors, and resistance.

BOT 102: Introductory Botany (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of the course, the students should be able to:

1. identify different classes of plants;
2. describe the vascular plants;
3. locate nonvascular plants;
4. list growth forms of plants;
5. differentiate the cell structure of monocotyledonous and dicotyledonous plants;
6. explain distinguishing features of monocot and dicot;
7. identify types of fruits and seeds;
8. illustrate botanical drawings; and
9. sketch parenchyma, collenchyma, sclerenchyma, xylem and phloem.

Course Contents

General classification of plants. Distinguishing features of Monocotyledons and Dicotyledons. Features of vascular plant, Morphology of non-vascular plants. Duration of life of plants. Plants life cycles. Growth forms of plants. Cell structure and functions. Morphology of flowering plants, primary vegetative body: stem, leaf and root to show the mature tissues of parenchyma, collenchyma, sclerenchyma, xylem and phloem. Types of fruits and seeds. Botanical drawings and use of microscope.

CHM 101: General Chemistry I (2 Units C: LH 30)

Learning Outcomes

At the end of this course, the students should be able to:

1. define atom, molecules and chemical reactions;
2. discuss the Modern electronic theory of atoms;

3. write electronic configurations of elements on the periodic table;
4. justify the trends of atomic radii, ionization energies, electronegativity of the elements based on their position in the periodic table;
5. identify and balance oxidation – reduction equation and solve redox titration problems;
6. illustrate shapes of simple molecules and hybridized orbitals;

7. identify the characteristics of acids, bases and salts, and solve problems based on their quantitative relationship;
8. apply the principles of equilibrium to aqueous systems using LeChatelier's principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;
9. analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
10. determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents

Atoms, molecules, elements and compounds and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridization and shapes of simple molecules. Valence Forces. Structure of solids. Chemical equations and stoichiometry; Chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry. Rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102: General Chemistry II (2 Units C: LH 30)

Learning Outcomes

At the end of this course, the students should be able to:
1. state the importance and development of organic chemistry;
2. define fullerenes and their applications;
3. discuss electronic theory;
4. determine the qualitative and quantitative of structures in organic chemistry;
5. describe rules guiding nomenclature and functional group classes of organic chemistry;
6. determine rate of reaction to predict mechanisms of reactions;
7. identify classes of organic functional group with brief description of their chemistry;
8. discuss comparative chemistry of group 1A, IIA and IVA elements; and
9. describe basic properties of Transition metals.

Course Contents

Historical survey of the development and importance of Organic Chemistry. Fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures, nanochemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The Chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

UI-BOT 111: Cryptogamic Botany (2 Units R: LH 30 PH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. Know the distinguishing characteristics of these organism.
2. Know the habitats where they are found
3. Know the diseases of plants and animals
4. Interaction of the organisms with the environment.
5. Know the poisonous and the safe ones.
6. The benefits of these organisms to life.

Course Contents

The courses explore the Introduction to the biology of Bacteria, Fungi, Algae, Bryophytes & Pteridophytes, Introduction to plant diseases caused by Bacteria & Fungi, Fungi & Bacteria diversity, Viral replication, Bacteriophage, Secondary metabolites of Fungi, Allelopathy, Plant classification and diversity

UI-BOT 141: **(2 Units R: LH 30 PH 30)**

Learning Outcomes

At the end of the course, students should be able to describe:

1. The plant cell structure
2. The sources of energy to cells

3. Cell growth and cell reproduction
4. Food procurement by plants
5. Types of cell division
6. Test for foods in plants

Course Contents

The course explores the basic principles of plant physiology, cytology, genetics and ecology, Seed dormancy, phytohormones, cellular respiration, mycorrhiza application, carbohydrate, protein, lipids and vitamins, photosynthesis and translocation, major metabolic pathways, cell cycle, mitosis and meiosis.