GODFREY OKOYE UNIVERSITY
ENUGU, ENUGU STATE, NIGERIA
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B.S. ED BIOLOGY

The Core Curriculum Minimum Academic Standards (*CCMAS*)

September, 2023.

Overview

The B.Sc. Ed. Biology Education programme was designed with the major aim of increasing the biology content knowledge of pre-service biology teachers, their understanding of the Senior Secondary Biology Core Curriculum and skills to teach biology in the context of the students with adequate provision for acquiring 21st Century skills. All courses including 60 Units of core courses in biology and Science Education, General Studies and Education courses are core. The course content for all the courses as well as learning outcomes are clearly outlined as guide for content delivery. The minimum human and material requirements to produce the desired profile of pre-service biology graduates are clearly stated.

Philosophy

The B.Sc. Ed. Biology Education Programme should seek to train teachers who are competent in teaching biology and knowledgeable enough to make decisions related to life, including the unity of all life and willing to deploy their knowledge and skills to be self-reliant, solve societal problems and contribute to national and global development.

Objectives

The objectives of the B.Sc. Ed. Biology Education programme are to enable students:

1. acquire the various concepts, principles, theories, laws and conceptual schemes of biology appropriate to teach the lower, middle and upper basic education levels;
2. acquire necessary teaching and practical skills and other aspects of methodology of teaching biology at the lower, middle and upper basic education levels;
3. develop necessary laboratory skills and;
4. become effective classroom science teachers with competencies in classroom management and management of individual differences;
5. be abreast with the ethics of teaching as a profession;
6. gain enterprise skills as well as skills in industrial applications of biology in areas such as pest and pollution controls, management of public health, zoological gardens and wild life parks, fish and integrated farming, biotechnology centres and laboratories, water and sewage treatment plants;
7. take part in national decision and consensus making;
8. sharpen their digital skills and honed in dissemination of information about biology education to the society; and
10. develop scientific habits of mind, positive values and attitudes for efficient discharge of their duty as biology teachers.

Unique Features of the Programme

The unique features of the programme are:

1. higher biology content than the BMAS;
2. emphasis on understanding of the biology core curriculum, development of biology teaching methods and laboratory techniques;
3. development of skills and competencies to handle indigenous culture and ability to teach in the context of the learner;
4. development of digital skills that will enable teaching remotely when necessary;
5. development of entrepreneurial/employability skills; and

6. development of scientific literacy, that is, understanding the nature of science/biology, interaction of science, technology and society and ability to make decisions related to science.

Employability Skills

The graduate of B.Sc. Ed. Biology education should be equipped with the ability to:

1. become effective classroom biology teachers;
2. engage in science laboratory and school proprietorship;
3. Be gainfully employed in national and international intergovernmental and nongovernmental agro-related jobs, research institutions;
4. establish and run some agricultural business outfits such as aqua-culture, horticulture, bee farming, flouri-culture, eco-tourism, poultry, piggery, mushroom culture;
5. use skills relevant for the industry, such as wildlife parks, zoological gardens, afforestation fields/woodlot parks, reservoirs /dams, farms, environmental control establishments and sites;
6. develop digital teaching packages and media literacy skills; and
7. produce different biology teaching aids and models.

21st Century Skills

The B.Sc. Ed. Biology Education CCMAS has the capability of inculcating into the pre-service biology teachers, the following:

1. inclusive education and cultural sensitivity;
2. problem solving skills;
3. digital skills;
4. communication and advocacy skills;
5. initiative and enterprise skills,
6. self-management skills; and
7. flexibility skills, being able to source information, learn and adapt quickly.

Admission and Graduation Requirements

Admission Requirements

Four Year Programme

In addition to UTME requirements candidate shall have at least credit pass in five subjects including English Language, Mathematics, Biology and Chemistry, with credit in one other relevant science subject, preferably, Physics. Agricultural Science and Geography at the Senior Secondary School Certificate or its equivalent may be considered at the Senior Secondary School Certificate (SSC) or (equivalent) credit passes obtained at not more than two sittings.

Direct Entry Mode

For direct entry, candidates must have: At least five SSC-credit passes, two of which must be at the Advanced Level or A minimum of merit grade in University/ National Diploma, NCE in any field is required. Or

A pass at merit level in a relevant Diploma Programme (provided the O/L requirements are satisfied).

Passes in Biology and any of Chemistry, Agricultural Science or Physics at Advanced level.

Passes in Biology and any of Chemistry, Agricultural Science or Physics in the NCE.

Passes in Biology and any of Chemistry, Agricultural Science or Physics at the IJMB (Interim Joint Matriculation Board) examination or Cambridge Moderated Schools of Basic Studies Terminal Examinations or International Baccalaureate from a recognized institution.

Graduation Requirements

In addition to the general requirements for graduation at the University, students must offer and pass courses totalling 120 credit hours, 60 of which must come from the relevant option areas in Biology and Science Education for the four-year programme. They must also complete and receive a pass grade in teaching practice, and a research project report on a topic approved by the Department.

Global Course structure

100 LEVEL

Course Code	Course Title	Units	Status	LH	PH
GST 111	Communication in English	2	C	15	45
GST 112	Nigerian Peoples and Culture	2	C	30	-
EDU 101	Introduction to Teaching and Foundations of Education	2	C	30	-
BIO 101	General Biology I	2	C	30	-
BIO 102	General Biology II	2	C	30	-
BIO 107	General Biology Practical I	1	C	-	45
BIO 108	General Biology Practical II	1	C		45
CSC 101	Introduction to Computer Science	3	C	30	45
CHM 101	General Chemistry I (Inorganic)	2	C	30	-
CHM 102	General Chemistry II (Organic)	2	C	30	-
MTH 101	General Mathematics I	2	C	30	-
MTH 102	General Mathematics II	2	C	30	-
PHY 101	General Physics I	2	C	30	-
PHY 102	General Physics II	2	C	30	-
GOU-EDU 103	Sociology of education in South Eastern Nigeria	2	C	30	0
GOU -SED 112	Teaching Laboratory Organization and Management	2	C	15	45
GOU-SED 113	Learning Theories for Biology Teachers	2	C	30	15
	TOTAL	33			

C = Compulsory; LH = Lecture Hours; PH = Practical Hours;
1 Credit Unit = 1 hr of lecture or 3 hrs of practical work per week

200 LEVEL

Course Code	Course Title	Units	Status	LH	PH
GST 212	Philosophy, Logic and Human Existence	2	C	30	-
ENT 211	Entrepreneurship and Innovations	2	C	30	-
EDU 201	Curriculum, Curriculum Delivery and General Teaching Methods	2	C	30	-
BIO 201	Genetics I	2	C	30	-
BIO 202	Introductory Ecology	2	C	15	45
BIO 203	General Physiology	2	C	30	-
BIO 204	Biological Techniques	2	C	15	45
BIO 205	Introductory Developmental/Cell Biology	2	C	30	-
BIO 206	Hydrobiology	2	C	30	-
BIO 208	Biostatistics	2	C	30	-
GOU-EDU 202	Innovative Approaches to Micro-teaching in Enugu Socio-Cultural Milieu	2	C	15	45
GOU-EDU 211	Career Guidance in Job opportunities for Learners in Enugu Socio-Cultural Milieu	2	C	16	20
GOU-SED 213	Biology Education Organization and Projects	2	C	15	45
GOU-SED 214	Special Methods in Biology Education	2	C	15	45
	TOTAL	28			

300 LEVEL

Course Code	Course Title	Units	Status	LH	PH
GST 312	Peace and Conflict Resolution	2	C	30	-
ENT 312	Venture Creation	2	C	15	45
EDU 301	Teaching Practice I	3	C	-	135
EDU 302	Educational Measurements, Tests, Research Methods and Statistics	3	C	45	-
SED 302	General Biology Methods II	2	C	15	45
BIO 301	Genetics II	2	C	15	45
BIO 302	Population Biology and Evolution	2	C	30	-
BIO 303	Biogeography and Soil Biology	2	C	30	
BIO 304	Nigerian Flora and Fauna	2	C	30	-
BIO 306	Systematic Biology	2	C	15	45
BIO 307	Field Course	1	C	-	45

GOU-EDU 303	Psychology of Education in South East Nigeria	2	C	15	45
GOU-EDU 305	Indigenous Educational Resources for teaching and learning	2	C	26	10
GOU-SED 311	Indigenous Teaching Methods in Biology 1	2	C	15	45
GOU-SED 312	Indigenous Teaching Methods in Biology 11	2	C	15	45
GOU-SED 313	Issues, Approaches and Challenges in Biology Education in the South East Zone	2	C	15	45
	TOTAL	32			

400 LEVEL

Course Code	Course Title	Units	Status	LH	PH
EDU 400	Project	3	C	-	135
EDU 401	Teaching Practice II	3	C	-	135
SED 402	Science, Technology and Society	2	C	15	45
BIO 402	Principles of Plant and Animal Breeding	2	C	30	-
BIO 403	Wildlife Conservation and Management	2	C	30	-
BIO 404	Nigerian Plants and Animals in Prophylactics & Therapeutics	2	C	30	45
BIO 406	Principles of Pest Management	2	C	30	-
BIO 407	Field Course II	1	C	-	45
BIO 408	Applied Biotechnology	2	C	15	30
BIO 410	Bio-Entrepreneurship Options	2	C	30	
BIO 413	Bioinformatics	2	C	30	-
BIO 414	Molecular Biology	2	C	15	45

GOU-EDU 403	Ethno-Pedagogy and Curriculum of Non-School Environment 1	2	C	30	0
GOU-SED 410	Skills, Techniques and Strategies for Biology Instruction	2	C	15	45
GOU-SED 411	Evaluation in Biology Education	2	C	15	45
GOU-SED 412	Curriculum for Teaching and Maintenance of Ethno-Biological Garden	2	E	15	45
GOU-SED 413	Biology Education Curriculum	2	E	15	45
GOU-SED 414	Resources and Improvisation in Biology Instruction	2	C	45	15
	TOTAL	37			

Course Contents and Learning Outcomes

100 Level Courses

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. classify word formation processes;
4. construct simple and fairly complex sentences in English;
5. apply logical and critical reasoning skills for meaningful presentations;
6. demonstrate an appreciable level of the art of public speaking and listening; and
7. 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 and Note making. 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 selfreliance (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; Reorientation 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.

EDU 101: Introduction to Teaching and Foundations of Education (2 Units C: LH 30)

Learning Outcomes

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

1. discuss the characteristics and the importance of the teaching profession;
2. raise and judge some ethical issues in education;
3. list the intellectual and practical competencies required by the teacher;
4. justify the need for education in the development of a nation;
5. give an account of the history of education from ancient times to the present day modern education in Nigeria;
6. present an overview of the National Policy on Education;
7. identify the stages of child and adolescent development;
8. state the behaviourist, cognitive and socio-cultural perspectives of learning;
9. enumerate historical and current developments in sociology of education; and
10. highlight the historical and current developments in philosophy of education.

Course Contents

Teaching as a profession. Ethics of the teaching profession. Intellectual and practical competencies required by the teacher. Link between education and development. Educational development from ancient times to the present with particular reference to the evolution of modern education in Nigeria. The National Policy on Education. Brief treatment of learning theories from the behaviourist, cognitive and socio-cultural perspectives. Child

and adolescent development. Historical and current developments in philosophy of education. Historical and current developments in sociology of education.

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

Learning Outcomes

At the end of lectures in Plant Biology, 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 organization, 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 in Introductory Ecology, students should be able to:

1. state the unique characteristics of plant and animal kingdoms;
2. describe ecological adaptations in the plant and animal kingdoms;
3. give a summary of the physiology of plants and animals;
4. explain nutrition, respiration, excretion and reproduction in plants and animals; and
5. describe growth and development in plants and animals.

Course Contents

A generalized survey of the plant and animal kingdoms based mainly on study of similarities and differences in the external features, ecological adaptations of these forms. 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 the lectures in Introductory Ecology, students should be able to:

1. outline common laboratory hazards;
2. provide precautions 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 the lectures in Animal Biology, students should be able to:

1. describe the anatomy of flowering plants;
2. differentiate types of fruit 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 emphasize the practical aspects of topics in BIO 102.

CSC 101: Introduction to Computer Science (3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. trace historical development of computing to the current programmes in the discipline;
2. distinguish the salient characteristics of the different programmes of the computing discipline;
3. identify the roles and applications of computers and computing in different areas of human endeavor;
4. identify and explain the basic components of a computer system;
5. develop basic literacy on the use of computer systems;
6. develop competence on the use of common Office productivity applications; and
7. make purposeful use of the Internet for information gathering, learning and continuous professional development.

Course Contents

History of computing sciences leading to the different programmes in the discipline. Characteristics of each programme in computing sciences. Hardware, Software; and human resources; Integration and application in business and other segments of society. Information processing and its roles in society; Students will be required to complete lab assignments using the PC's operating system, and several commonly used applications, such as word processors, spreadsheets, presentations, graphics and other applications. Internet and on-line resources, browsers, and search engines.

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

Learning outcomes

At the end of this 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. rationalize 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. draw 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. Redox reactions and introduction to electrochemistry.

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

Learning Outcomes

At the end of this course, the student will be able to:

1. state the importance and development of organic chemistry;
2. define fullerenes and its applications;
3. discuss electronic theory;
4. determine the qualitative and quantitative of structures in organic chemistry;
5. state 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, 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.

MTH 101: Elementary Mathematic I (Algebra and Trigonometry) (2 Units C: LH 30)

Learning Outcomes

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

1. discuss basic definition of Set, Subset, Union, Intersection, Complements and use of Venn diagrams;
2. solve quadratic equations;
3. solve trigonometric functions;
4. explain 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: General Mathematics II (Calculus) (2 Units C: LH 30)

Learning Outcomes

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

1. explain types of rules in differentiation and integration;
2. discuss 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.

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

Learning Outcomes

On completion, the students 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). Coordinate systems. 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 of the course, students 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;

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.

GOU-EDU 103: Sociology of Education in South East Nigeria (2 Units; Compulsory; LH = 30; PH = 0)

Senate-Approved Relevance

The training of prospective teachers in Sociology of Education in a way that they will acquire the knowledge and skills that would enable them operate most effectively in the Enugu Nigerian cultural environment is a need. The course underscores the importance of determining how public and social institutions and the experience of people in South Eastern Nigeria affect education and its outcomes. This is in line with the mission and vision of Godfrey Okoye University Enugu that focuses on quality training of students in learning and character in order to be productive to their immediate environment. Therefore, graduates of this course will play a crucial role in helping the locals to achieve their economic, health, and political wellbeing.

Overview

This course applies the philosophy and theories of sociology of education to the study of how social and cultural institutions affect education in South Eastern Nigeria. This course on the Sociology of Education will help the students acquire knowledge and skills that will help them to tap the potentials of their natural/cultural environment for the benefit of education.

Furthermore, this course is designed to expose learners to some contemporary sociological thoughts and skills for dealing innovatively with situations in the area of their discipline of study. It is also designed to prepare prospective teachers for their future career in human and societal development. Most importantly, it is designed to instil in the student teachers the desired skills in human relationships.

Objectives

The objectives of this course are to:

1. Explain the concept of Sociology of Education.
2. Expose the philosophical root of sociology of education.
3. Discuss theories of Sociology of Education.
4. Expose the functions of Sociology of Education.

5. Discuss pertinent sociological topics in South-Eastern socio-cultural environment.
6. Evaluate the teaching of societal values in schools.
7. Discuss how South Eastern social institutions affect education and its outcome.
8. Examine the ways education can encourage social integration and cultural innovation.

Learning Outcomes

By the end of this course, the student should be able to:

1. Define Sociology of Education
2. Discuss the ideas of the Founders of Sociology of Education.
3. Discuss two theories of sociology of Education.
4. Explain the importance of Sociology of Education.
5. Discuss three functions of Sociology of Education.
6. Analyze the concept of Sociology of Education in relation to three social institutions in the South East.
7. Explain the importance of teaching societal values in schools.
8. Discuss five ways in which a selected social institution affect education in the South East.

Course Content

Concept of Contemporary Sociology of Education. Philosophical roots of Sociology of Education. The Founders of Sociology of Education. Theories of sociology of education. Importance of Sociology of Education. Functions of Sociology of Education. The Socio-Cultural environment in the South East. Social Institutions in South Eastern Nigeria. The Public School System. Adult and Continuing Education. The Igbo Apprenticeship system. Training in Special Education. Training in Geriatric and Child care. Gender Relations. Race and Ethnicity. Rural and Urban Residence in South-Eastern Nigeria. Teaching societal values in schools. Effect of social institutions on education.

Minimum Academic Standards

1. 3-D Technology
2. Computers (1:3 students)
3. Other NUC-MAS requirement facilities

GOU-SED 112: Teaching Laboratory Organization and Management (2 Units; Compulsory; LH = 15; PH = 45)

Senate – Approved Relevance

This course is intended for the training of high-quality graduates who are highly skilled and knowledgeable in Biology Laboratory resources, organization and management. This is in line with the vision of Godfrey Okoye University to be a centre of academic excellence by utilizing the available resources provided form the environment for teaching, research and knowledge of biology principles which will make them good Biology teachers.

Overview

Any science instruction without laboratory activities is no science at all. While biology education in Nigeria suffers many ills perhaps the most serious is the lack of biology laboratories and inadequacy of the laboratory apparatus and equipment in many schools. This brings to focus the need to relate biology to the culture of the environment, hence employing the cultural resources of the environment to teach this course. For this, creativity and innovation are involved, especially in improvising apparatus from locally available materials.

Improvisation of science apparatus for our laboratories should not be downplayed. The production of needed apparatus locally should be the evidence of the proper working of the "Biological Techniques", which is a core course in Biology Education. By careful planning and improving on some apparatus made by students in successive years, the production of standard apparatus would be achieved. This forms a ground for entrepreneurship and wealth creation for self-reliance of the students after university education.

Objectives

The objectives of this course are to:

1. Name and list the characteristics of a good biology laboratory.
2. List and explain the skills needed in a biology laboratory.
3. Describe vital areas of space in a biology laboratory.
4. List at least ten basic apparatus in a school biology laboratory.
5. Explain how the apparatus should be stored in the biology laboratory.
6. Describe different ways students should be arranged during practical sessions.
7. Describe how to keep inventory of apparatus in the laboratory.
8. Discuss the hazards in a biology laboratory.
9. Discuss relevant safety precautions to be taken in a biology laboratory.

Learning Outcomes

On completion of this course, students should be able to:

1. Identify a school biology laboratory among others.
2. List/name at least five characteristics of a good biology laboratory.
3. Name at least five skills to be acquired in a laboratory.
4. Name at least five vital areas of space in a biology laboratory.

5. List at least fifteen basic apparatus to be found in a university/school biology laboratory.
6. Explain how apparatus should be stored in a school biology laboratory.
7. Describe different ways students should be arranged during practical sessions.
8. Describe how to keep inventory of apparatus in the laboratory.
9. Name some hazards in the biology laboratory.
10. List at least three relevant safety precautions to be taken in a biology laboratory.

Course Content

Introducing a university/school biology laboratory. Characteristics of biology laboratory. Skills needed for a laboratory. Physical facility in a Biology Laboratory. Location, shape and design of the laboratory. Different Types of Specimen in the School Biology Laboratory. Laboratory Groups. Demonstrations. Experimentations, Sorting and Storage of Apparatus. Inventory of Laboratory Equipment. Biology Science laboratory records. Biology laboratory accidents. Types of laboratory accidents. Causes of biology laboratory accidents. Hazards in the Laboratory. Safety Precautions.

Minimum Academic Standard

Laboratory, Microteaching laboratory.

GOU-SED 113: Learning Theories for Biology Teachers (2 Units; Compulsory; LH = 15; PH = 45)

Senate-Approved Relevance

This course is intended for the training of high quality graduate who are highly skilled and knowledgeable in different learning theories and their application to biology instructions. This is in line with the vision of Godfrey Okoye University to be a centre of academic excellence by application of different learning theories to teaching and learning of biology. This will help student teachers and teachers of biology understand how learning occurs as well as its application to biology instructions.

Overview

There are set of principles that are systematically integrated to provide a means of explaining and predicting learning phenomena. These principles constitute learning theories developed over years through systematic studies that were supported by experimentation carried out by different psychologists.

Learning theories are very useful in biology education where learning is defined as the process that brings together cognitive, emotional and environmental influences that lead to acquisition of experiences that result to changes in a person's knowledge, skills, values and worldview. Learning theories direct attention to the variables that are crucial to finding solutions to teaching and learning of biology.

Objectives

The objectives of this course are to:

1) Identify different groups of learning theories.
2) Explain Piaget's theory of learning and apply it to biology instruction.
3) Discuss application of Piaget's learning theory to biology instructions.
4) Explain Robert Gagne's theory of learning and its application to teaching and learning biology.
5) Outline and explain modes of human activities for learning according to Jerome Brunner in his learning theory.
6) Explain the types of discovery processes in Jean Piaget's learning theory.
7) Explain constructivist view of learning.
8) Discuss three implications of Ausubel's theory of learning for biology instructions.

Course Content

Definition of learning theories. Groups of learning theories. Behaviorism. Cognitivism. Constructivism. Jean Piaget's theory of learning and biology instruction. Implication of Piaget's theory for biology instruction. Robert Gagne's theory of learning and biology instruction. Implications of Gagne's theory to biology instructions. Jerome Brunner's theory of learning and biology instruction. Assimilation and Accommodation. Implication of Brunner,s theory for biology instruction. David P. Ausubel's learning theory. Implications of Ausubel's theory for biology instruction. Connectivism. Piaget's Stages of Cognitive Development. Vygotsky's theory of learning and biology instruction.

Minimum Academic Standard

Laboratory, Microteaching laboratory.

200 Level Courses

GST 212: Philosophy, Logic and Human Existence (2 Units C: LH 30)

Learning Outcomes

A student who has successfully gone through this course should be able to:

1. explain the basic features of philosophy as an academic discipline;
2. identify the main branches of philosophy & the centrality of logic in philosophical discourse;
3. explain the elementary rules of reasoning;
4. distinguish between valid and invalid arguments;
5. think critically and assess arguments in texts, conversations and day-to-day discussions;
6. critically asses the rationality or otherwise of human conduct under different existential conditions;
7. develop the capacity to extrapolate and deploy expertise in logic to other areas of knowledge, and
8. guide his or her actions, using the knowledge and expertise acquired in philosophy and logic.

Course Contents

Scope of philosophy; notions, meanings, branches and problems of philosophy. Logic as an indispensable tool of philosophy. Elements of syllogism, symbolic logic— the first nine rules of inference. Informal fallacies, laws of thought, nature of arguments. Valid and invalid arguments, logic of form and logic of content — deduction, induction and inferences. Creative and critical thinking. Impact of philosophy on human existence. Philosophy and politics, philosophy and human conduct, philosophy and religion, philosophy and human values, philosophy and character molding.

ENT 211: Entrepreneurship and Innovations (2 Units C: LH 30)

Learning Outcomes

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

1. explain the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation, and risk taking;
2. state the characteristics of an entrepreneur;
3. analyze the importance of micro and small businesses in wealth creation, employment, and financial independence;
4. engage in entrepreneurial thinking;
5. identify key elements in innovation;

6. describe stages in enterprise formation, partnership and networking including business planning;
7. describe contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world; and
8. state the basic principles of e-commerce.

Course Contents

Concept of Entrepreneurship (Entrepreneurship, Intrapreneurship/Corporate Entrepreneurship,). Theories, Rationale and relevance of Entrepreneurship (Schumpeterian and other perspectives, Risk-Taking, Necessity and opportunity-based entrepreneurship and Creative destruction). Characteristics of Entrepreneurs (Opportunity seeker, Risk taker, Natural and Nurtured, Problem solver and change agent, Innovator and creative thinker). Entrepreneurial thinking (Critical thinking, Reflective thinking, and Creative thinking). Innovation (Concept of innovation, Dimensions of innovation, Change and innovation, Knowledge and innovation). Enterprise formation, partnership and networking (Basics of Business Plan, Forms of business ownership, Business registration and Forming alliances and join ventures). Contemporary Entrepreneurship Issues (Knowledge, Skills and Technology, Intellectual property, Virtual office, Networking). Entrepreneurship in Nigeria (Biography of inspirational Entrepreneurs, Youth and women entrepreneurship, Entrepreneurship support institutions, Youth enterprise networks and Environmental and cultural barriers to entrepreneurship). Basic principles of e-commerce.

EDU 201: Curriculum, Curriculum Delivery and Teaching Methods (2 Units C: LH 30)

Learning Outcomes

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

1. explain at an appropriate level of confidence the meaning and types of curriculum;
2. describe the process of curriculum development; analyze and critique the Nigerian Core curricula as guide to curricula delivery;
3. use different methods in the delivery of curriculum content;
4. identify local epistemologies and context and the use of CTCA in the Nigerian context;
5. plan and schedule lessons as well as monitor and evaluate the outcome of each lesson;
6. identify and use learning resources and media and improvise, whenever necessary;
7. manage classrooms under different conditions and address the needs of individual students, especially, those with special needs including the gifted; and
8. demonstrate skills in ICT, set up and manage online classes.

Course Contents

Definition and types of curriculum. The curriculum development process. The Nigerian core curricula. Curriculum delivery to include general teaching methods and strategies: lecture, class discussion, demonstration, problem-solving, cooperative learning and guided-discovery, concept mapping, metacognition, argumentation, project-based learning, competency-based learning, culturo-techno-contextual approach (CTCA). Developing the lesson plan/note. Assessment of learning. Resources for teaching, improvisation. General classroom management. Teaching in a 21st century classroom. Setting up and managing online classes. Attending to students with special needs.

SED 202: General Biology Methods I (2 Units C: LH 30)

Learning Outcomes

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

1. analyse and critique the biology core curriculum;
2. develop specific lesson notes from the biology core curriculum;
3. select appropriate objectives and learning experiences for different topics of the biology core curriculum;
4. assess different concepts through paper and pencil tests, observation and portfolios;
5. identify difficult concepts in biology with justification;
6. use appropriate methods in the teaching of difficult concepts in biology;
7. set up and manage zoom and google classroom platforms; and
8. identify misconceptions, alternative conceptions and indigenous biology knowledge and relate them to concepts in the biology core curriculum.

Course Contents

The biology core curriculum, developing lesson notes from the core curriculum, selection of appropriate general and specific objectives and learning experiences for individual topics. Assessment in biology, paper and pencil tests, assessment of practical/laboratory skills, observation and portfolios. Difficult concepts in biology, the use of role play, vignettes, problem-based approach and case studies to teach difficult concepts in biology. Use of elearning platforms, zoom, google scholar. Indigenous biology knowledge and the biology core curriculum, culturo-techno-contextual approach (CTCA). Misconceptions in biology, alternative conceptions and sources of alternative conceptions.

BIO 201: Genetics I (2 Units C: LH 30)

Learning Outcomes

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

1. distinguish between heritable and non-heritable characteristics;
2. explain the likelihood of genetic events (Probability) and how well those events (results) fit into a set of observation;
3. discuss polygenic variations; and
4. describe concepts in population genetics.

Course Contents

Hereditable and non-hereditable characteristics. Probability and tests of goodness of fit. Quantitative inheritance; variation in genome structure, introduction to population genetics.

BIO 202: Introductory Ecology (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. explain various concepts and terminologies associated with the ecosystem;

2. list and explain features of various habitat types;
3. explain natural destruction/disaster, community and natural cycles; and
4. explain and describe factors responsible for changes in population.

Course Contents

Concept and definition of ecosystem, ecology at community level, ecological classification of habitat types, terrestrial and aquatic biomass, specific features of each, biotic components of habitat. Natural destruction, factors of communities, success of community interaction, natural cycle, dynamics of population.

BIO 203: General Physiology (2 Units C: LH 30)

Learning Outcomes

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

1. describe the chemistry of organic compounds and their biological importance;
2. state the general characteristics of enzymes;
3. describe nutrition, digestion and absorption in plants and animals;
4. discuss the cell membrane structure and list its functions;
5. summarize osmoregulation, excretion and transport in animals;
6. enumerate growth hormones in plants and their functions;
7. explain the homeostasis, their coordination and functions in animals; and 8. explain the plant water relation, growth and growth regulation.

Course Contents

Chemicals of life: The chemistry of Carbohydrates, lipids, proteins and nucleic acids and their biological importance. General characteristics of enzymes; nutrition, digestion, and absorption in plants and animals. Biosynthesis: Photosynthesis and protein synthesis. Cell membrane structure and function. A general study of osmoregulation, excretion, transport, growth hormones and enzymology, homeostasis and their co-ordination in animals. Plant water relation, growth and growth regulation. Pre-requisite -BIO 101 and 103

BIO 204: Biological Techniques (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. list the different parts of a light microscope and state their functions;
2. state and explain the stages involved in preparation of slides;
3. describe the basic principles of spectrophotometry, colorimetry, photometry, polarimetry, chromatography, refractometry, melting points and colligative properties;
4. describe the basic collection and preservation processes of plant and animal materials and their preservation in Herbarium and Museum respectively; and
5. explain the need for experimental design, basis of report writing and presentations.

Course Contents

Microscopy: handling of microscopes, preparation of microscope slides (microtomy) for microscopic examinations, use of hand lens, biological drawings and diagrams.

Spectrophotometry, colorimetry, photometry, polarimetry, chromatography, refractometry, melting points and colligative properties Herbarium and Museum Techniques. Experimental designs, report writing and presentations.

BIO 205: Introductory Developmental / Cell Biology (2 Units C: LH 30)

Learning Outcomes

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

1. draw the detail structure of plant and animal cells and state the functions of the organelles;
2. summarize and state the differences and similarities between mitosis and meiosis;
3. describe cell differentiation and its growth; and
4. explain the molecular basis of cell structure and development.

Course Contents

History and present trends in cell biology. Ultra-structure of the plant and animal cells, Organelles and their basic structures and functions; mitosis and meiosis, cell differentiation and growth of cells. A brief study of the molecular basis of cell structure and development.

BIO 206: Hydrobiology (2 Units C: LH 30)

Learning Outcomes

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

1. discuss the physical properties of water;
2. explain the thermal stratification of lakes;
3. summarize the importance and interplay of oxygen, carbon-dioxide and pH in water,
4. describe fresh water communities;
5. list factors influencing the distribution and productivity of aquatic macrophytes, phytoplanktons, benthic algae and zooplanktons;
6. discuss the importance and adaptive features of Estuarine communities; and
7. explain colonisation and succession in aquatic ecosystem.

Course Contents

Principles of aquatic biology with particular reference to limnology. The physical properties of water and their biological significance. Thermal stratification of lakes; waves and currents and their effects on substratum; dissolved oxygen, carbon-dioxide and inorganic ions in freshwater; the carbonate-bicarbonate system and pH; Oligotrophic and Eutrophic lakes; the chemical composition of African lake waters; freshwater communities, factors influencing the distribution and productivity of aquatic macrophytes, phytoplanktons, benthic algae; Zooplanktons in freshwater; marine brackish water/estuarine communities and their chemical factors; colonisation and succession in aquatic ecosystems, adaptations and interrelationships.

BCH 201: General Biochemistry I (2 Units C: LH 30)

Learning outcomes

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

1 identify the chemical and molecular chemical and molecular components of the cell as the unit of life;
2 state and decipher the different nomenclature of the chemical and molecular components of the cell
3 discuss the interrelationship of the components of the cell with each other; and 4 isolate the components of the cell.

Course Contents

Introductory chemistry of amino acids; their properties, reactions and biological functions. Classification of amino acids: neutral, basic and acidic; polar and non-polar; essential and nonessential amino acids. Peptides. Introductory chemistry and classification of proteins. Biological functions of proteins. Methods of their isolation, purification and identification. Primary, secondary, tertiary and quaternary structures of proteins. Basic principles of tests for proteins and amino acids. Introductory chemistry of carbohydrates, lipids and nucleic acids.

Nomenclature of nucleosides, and nucleotides; effects of acid and alkali on hydrolysis of nucleic acids.

MCB 221: General Microbiology (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. explain basic concepts and scope of microbiology;
2. classify organisms into prokaryotes and eukaryotes;
3. culture and isolate micro-organisms;
4. identify selected microbial groups and their economic importance;
5. discuss the layout of a microbiology laboratory;
6. enumerate the different equipment and reagents in a microbiology laboratory; and
7. explain the theory behind basic protocols in a microbiology laboratory.

Course Contents

History of the Science of Microbiology. Classification of organisms into prokaryotes and eukaryotes; Classification of prokaryotes into archaea and eubacteria Anatomy and cytochemistry of bacteria and fungi. Shapes, groupings and colonial morphology of bacteria and fungi. Structure of viruses. Sterilization and disinfection; Structure, ecology and reproduction of representative microbial genera. Culture of micro-organisms. Isolation of micro-organisms; isolation of bacteria, viruses fungi (yeasts and moulds. Nutrition and biochemical activities of micro-organisms. Antigens and antibodies. Identification and economic importance of selected microbial groups. Microbial variation and heredity. Study of laboratory Equipment. Introduction to microbiology of air food, milk, dairy products, water and soil. Staining techniques, antibiotic sensitivity tests, serological tests, antimicrobial agents

GOU-EDU 202: Innovative Approaches to Micro-teaching in Enugu Socio-cultural Milieu (2 Units; Compulsory; LH = 15; PH = 45)

Senate-Approved Relevance
Proper preparation of professional teachers with adequate and useful knowledge, skills methods, values and initiative is important in Enugu socio-cultural environment. Godfrey Okoye University exists in this socio-cultural milieu to impart quality knowledge to the teeming youths in this part of the country who are desirous of education. This course is meant to help student teachers to acquire the right method, techniques and confidence which will enable them to teach their students effectively. This is in line with the epistemic dialogue that Godfrey Okoye University is anchored on. Therefore, student teachers who acquire skills, confidence and knowledge in this course can easily impact knowledge to secondary school students using various and relevant methods in teaching any topic and can easily give extra classes (that is as lesson teachers). This is also in line with the entrepreneurial mindset of Godfrey Okoye University, Enugu, Nigeria.

Overview
Poor performance of students in almost all standardized examinations in both primary and secondary schools call for the need for the development of the course. Recently there is an outcry from the public about this falling standard of education and it is believed that if student teachers acquire confidence and effective methods of teaching it will improve their efficiency in imparting knowledge. This creates the need for proper attention on the teaching methods acquired by student teachers.

The course includes topics such as innovative pedagogy, peer and microteaching. During the course, students will be guided on innovative ways of preparing lesson plan and lecture notes; to develop their educational potentials and desired learning outcomes. The course will expose the student teachers to peer teaching and self-appraisal that will lead them to become effective professional teachers.

Objectives
The objectives of this course are to:
1. Justify the relationship between innovative pedagogy, peer teaching and microteaching.
2. Discuss the concept of peer teaching.
3. Explain the concept of micro-teaching.
4. Describe the process of teaching in a micro-teaching laboratory.
5. Outline the role of instructional methods and instructional materials in micro-teaching.
6. Explain how to write a lesson plan/note.
7. Recognize the different skills in micro-teaching.
8. Analyze supervisory skills and their usefulness in teaching and learning.
9. Illustrate a micro-teaching practicum.
10. Apply pedagogy of peer and micro-teaching in extra classes.

Learning Outcomes
By the end of this course, the student should be able to:
1. Define innovative pedagogy.
2. Give the meaning of peer teaching.
3. Explain the concept of micro-teaching.
4. Discuss micro-teaching and its relevance to teacher education
5. Describe ten importance of peer teaching and micro-teaching.
6. Select five teaching skills involved in teaching objectives
7. Draw out micro-teaching practicum.

8. Describe five teaching methods.
9. Discuss the preparation of a lesson plan.
10. Describe micro-teaching supervisory skills.
11. Explain professionalism in relation to extra classes.

Course Content
Definition of innovative pedagogy. Meaning of peer teaching. Explanation of the concept of micro-teaching. Micro-teaching procedure. Explanation of micro-teaching. Relevance of micro teaching to teacher education. Importance of micro-teaching to student teacher education. Teaching skills involved in teaching objectives. Teaching methods relevant to teachers' education. Instructional materials. Lesson plan. Lesson note. Classroom control. Classroom management. Micro-teaching supervisory skills. Micro-teaching practicum. Laboratory activities. Teaching as a profession in Nigeria.

Minimum Academic Standards
1. Micro-teaching Laboratory.
2. Video tape.
3. Projectors.
4. Computers (1:1 student).
5. Other NUC-MAS requirement facilities.

GOU-EDU 211: Career Guidance for Learners in Enugu Socio- Cultural Environment (2 Units; Compulsory; LH = 15; PH = 45)

Senate -Approved Relevance
Sufficient training of professional career guidance teachers with deep knowledge, skills and positive attitudes is a need in this local environment; Enugu State, where Godfrey Okoye University is situated. This course is meant to help prospective teachers to reach out to those living on the margins, and help them attain their full career potentials or fulfilment in life. Therefore, apart from teaching in formal classroom setting, student teachers who acquire skills and knowledge in this course can easily become home career guidance and own their career guidance centres eventually. This is in consonant with the entrepreneurial mindset of Godfrey Okoye University.

Overview
The intellectual climate from which guidance emerged as an important activity in education is based on the continuous poor performance of students in examinations in both primary and secondary education, social ills, and lack of employment opportunities. More, so, the inability of the education sector to attain to the career guidance needs of those living on the margins in Enugu socio-cultural environment. This calls for the need of the design of this course. Many a time, parents have no time to oversee the academic assignments of their children. This creates the need for proper career guidance in the educational needs of their wards.

This course is designed to enable the prospective teachers to acquire the needed knowledge and skills that will help them to develop their educational potentials, and acquire the desired learning outcomes in guidance and counselling with special emphasis on career guidance to their students and to those living on the margins in Enugu socio-cultural environment. It will give the prospective teachers the opportunity to reach out to many young people on the margins who have no opportunity for proper career guidance. In addition, it will expose the student teachers on the need to own and manage their own guidance and counselling centres and become employers of labour.

Objectives

The objectives of this course are to:

1. Explain the concept of career guidance.
2. Discuss different careers in Enugu socio-cultural environment.
3. Justify different methods of counselling.
4. Outline the role of different methods of counselling.
6. Explain the concept "living on the margins."
5. Describe how counselling leads people to be self-reliant.
6. Identify the need for innovation in counselling that will lead to student teachers being self- reliant.

Learning Outcomes

By the end of this course, the student should be able to:

1. Define career guidance.
2. Identify at least four career opportunities in Enugu socio-cultural environment.
3. Discuss the relationship between guidance and counselling.
4. Justify the concept of counselling.
5. Discuss at least two methods of counselling
6. Draw out the relationship between marginalization and counselling.
7. State the need for career guidance and counselling in schools.
8. Organize group career guidance and counselling in at least five schools.

Course Content

Meaning and Definition of Guidance. Meaning and Definition of Counselling. Meaning of Guidance and Counselling. Relationship between Guidance and Counselling. History of the Introduction of Guidance and Counselling in Schools. Philosophical roots of Guidance and Counselling. Rational for counselling in schools. Careers in Enugu Socio- Cultural environment. Scope of counselling. Methods of Counselling. Various guidance services rendered in schools. . Various counselling services rendered in schools. Marginalization and counselling. Types of guidance. Types of counselling. Approaches to guidance. Approaches to counselling.

Minimum Academic Standards

1. Guidance and Counselling Laboratory.
2. Videos.
3. Other NUC – MAS requirement facilities.

GOU-SED 213: Biology Education Organization and Projects (2 Units; Compulsory; LH = 15; PH = 45)

Senate-Approved Relevance

This course is intended for the training of high-quality graduates who are highly skilled and knowledgeable in agencies and organizations that enhance teaching and learning of biology in Nigeria. This is in line with the vision of Godfrey Okoye University to be a center of academic excellence by getting agencies and organizations involved in biology instruction through Town and Gown Assembly, interdisciplinary and international collaborations This will contribute immensely to making our biology education students good biology teachers on graduation.

Overview

Some professional associations evolved to tackle some educational issues in Nigeria. Some of them came into being solely concerned with how to make science teaching and learning succeed in making the citizens scientifically literate and self-reliant. Some of these associations and agencies have initiated and completed different projects targeted at enhancing effective biology instruction. They work in tandem with similar associations in other countries in different parts of the world.

The main advantage of the link with international similar agencies is that it ensures uniformity of biology education process and production worldwide. The interaction of the biology students with the activities of these agencies as those from European park in Godfrey Okoye University, Enugu will surely prepare a ground for entrepreneurship and wealth creation for self-reliance of the biology education students after University education.

Objectives

The objectives of this course are to:

1. List some of the agencies that are concerned with enhancement of biology instruction.
2. Describe five of these agencies and their contribution to growth and development of biology education.
3. Explain how these agencies have in biology education curriculum review and revision.
4. Produce some biology education instructional media.
5. Disseminate information on innovations in the area of biology education.
6. List and explain the objectives of these agencies.
7. Describe the functions of these agencies.
8. Write both abbreviated and full names of the agencies.
9. List and explain some of the projects developed by these agencies.
10. Explain how to generate and moderate external examination questions.

Learning Outcomes

On completion of this course, students should be able to:

1. List five agencies that are concerned with the enhancement of Biology instruction.

2. Discuss three contributions of these agencies to the growth and development of Biology education.
3. Explain how STAN helped in Biology Education curriculum review and revision.
4. State five Biology instructional media produced by CECAC as an agency of Science Education in Nigeria.
5. Describe two innovative pedagogical strategies in Biology Education employed by these agencies.
6. List and explain aims and objectives of STAN and one of the agencies of innovation in Biology instruction.
7. Explain three functions of Nigeria Educational Research Council (NERC).
8. Write the full name of CESAC.
9. State five projects developed by the agencies.
10. Give three reasons why external examination questions in Biology must be moderated.

Course Contents

Concept of agencies. Different agencies and their functions. Science Teachers Association of Nigeria (STAN). Aims of STAN. Local and national linkages of STAN. International linkages of STAN. Contributions of STAN to growth and development of Biology Education. Innovative STAN projects that enhance effective teaching and learning of Biology. Nigerian Educational Research and Development Council (NERDC). Functions of NERDC. Contributions of NERDC to Biology instruction. Comparative education and adaptation centre (CESAC). Aims and functions of CESAC. Projects developed by CESAC. Nigerian Educational Research Council (NERC) and its projects. Areas of Biology Education at secondary school level influenced by WAEC. Development and revision of biology curriculum and books

Minimum Academic Standard

Biology laboratory
ICT
Micro teaching laboratory

GOU-SED 214: Special Methods in Biology Education (2 Units; Compulsory; LH = 15; PH = 45)

Senate Approval Relevance

This course is intended for the training of high-quality graduates who are highly skilled and knowledgeable in different innovative pedagogical strategies and teaching methods. This is in line with the vision of Godfrey Okoye University to be a center of academical excellence by employing different innovative teaching methods during Biology instructions. This enhances the knowledge and understanding of Biological concepts and principles which will make the students good biology teachers.

Overview

There are different methods that are used to achieve the predetermined objectives of every biology content each with its own advantages, disadvantages as well as measures to put in place to enhance the derivation of maximum benefits from its use.

No teaching method is bad. It is therefore expected of every biology student teacher to be knowledgeable enough about the different methods of biology instruction, their advantages, disadvantages and measures that enhance their maximum utilization to be able to make wise choice of innovative teaching methods for different situations.

Objectives

The objectives of this course are to:

1. Identify different methods of biology instruction.
2. Name and describe some teaching methods for biology instructions.
3. Explain teacher-centered teaching methods.
4. Explain learner centered teaching methods.
5. Describe advantages and disadvantages of different teaching methods.
6. Explain effective utilization measures for the different teaching methods.
7. Explain different criteria for making good choice of teaching methods.
8. Describe some innovative teaching methods for biology instruction.

Learning Outcomes

On completion of this course, students should be able to:

1. List seven different teaching methods.
2. Describe at least five teaching methods in Biology instruction.
3. Explain the teacher centered teaching methods in biology instruction.
4. Explain the learner centered teaching methods.
2. Describe five advantages of concept-mapping method of biology instruction.
3. Give five disadvantages of lecture method.
4. Explain three effective utilization measures for experimental method of biology instruction.
5. Discuss five criteria for making good choice of teaching method.

Course Content

Methods of science instruction. Groups of methods of biology instruction. Lecture method. Advantages and disadvantages of the Lecture method. Effective utilization measures of lecture method in biology instruction. Experimental method. Advantages and disadvantages of experimental method. Demonstration method. Advantages and disadvantages of Demonstration method. Filled trip. Advantages and disadvantages. SELF ORGANIZED LEARNING EXPERIENCE (SOLE). FLIP classroom model. Discovery method. Advantages and disadvantages of Discovery method. Discussion method. Advantages and disadvantages of Discussion method. Effective utilization measures to enhance biology instruction. Project method. Scaffolding Method and its advantages. Computer-Assisted learning. Meta-Cognition.

Minimum Academic Standard

Biology laboratory. Micro-teaching laboratory. ICT laboratory.

300 Level Courses

GST 312: Peace and Conflict Resolution (2 Units C: LH 30)

Learning Outcomes

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

1. analyse the concepts of peace, conflict and security;
2. list major forms, types and root causes of conflict and violence;
3. differentiate between conflict and terrorism;
4. enumerate security and peace building strategies; and
5. describe roles of international organisations, media and traditional institutions in peace building.

Course Contents

Concepts of Peace, Conflict and Security in a multi-ethnic nation. Types and Theories of Conflicts: Ethnic, Religious, Economic, Geo-political Conflicts; Structural Conflict Theory, Realist Theory of Conflict, Frustration-Aggression Conflict Theory. Root causes of Conflict and Violence in Africa: Indigene and settlers Phenomenon; Boundaries/boarder disputes; Political disputes; Ethnic disputes and rivalries; Economic Inequalities; Social disputes; Nationalist Movements and Agitations; Selected Conflict Case Studies – Tiv-Junkun; Zango Kartaf, Chieftaincy and Land disputes. Peace Building, Management of Conflicts and Security: Peace & Human Development. Approaches to Peace & Conflict Management --- (Religious, Government, Community Leaders and others). Elements of Peace Studies and Conflict Resolution: Conflict dynamics assessment Scales: Constructive & Destructive. Justice and Legal framework: Concepts of Social Justice; The Nigeria Legal System. Insurgency and Terrorism. Peace Mediation and Peace Keeping. Peace & Security Council (International, National and Local levels) Agents of Conflict resolution – Conventions, Treaties Community Policing: Evolution and Imperatives. Alternative Dispute Resolution, ADR. Dialogue b). Arbitration, c). Negotiation d). Collaboration. Roles of International Organizations in Conflict
Resolution. (a). The United Nations, UN and its Conflict Resolution Organs. (b). The African Union & Peace Security Council (c). ECOWAS in Peace Keeping. Media and Traditional Institutions in Peace Building. Managing Post-Conflict Situations/Crisis: Refugees. Internally Displaced Persons, IDPs. The role of NGOs in Post-Conflict Situations/Crisis

ENT 312: Venture Creation (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students, through case study and practical approaches, should be able to:

1. describe the key steps in venture creation;
2. spot opportunities in problems and in high potential sectors regardless of geographical location;
3. state how original products, ideas, and concepts are developed;
4. develop business concept for further incubation or pitching for funding;

5. identify key sources of entrepreneurial finance;
6. implement the requirements for establishing and managing micro and small enterprises;
7. conduct entrepreneurial marketing and e-commerce;
8. apply a wide variety of emerging technological solutions to entrepreneurship; and
9. appreciate why ventures fail due to lack of planning and poor implementation.

Course Contents

Opportunity Identification (Sources of business opportunities in Nigeria, Environmental scanning, Demand and supply gap/unmet needs/market gaps/Market Research, Unutilised resources, Social and climate conditions and Technology adoption gap). New business development (business planning, market research). Entrepreneurial Finance (Venture capital, Equity finance, Micro finance, Personal savings, Small business investment organizations and Business plan competition). Entrepreneurial marketing and e-commerce (Principles of marketing, Customer Acquisition & Retention, B2B, C2C and B2C models of e-commerce, First Mover Advantage, E-commerce business models and Successful E-Commerce Companies,). Small Business Management/Family Business: Leadership & Management, Basic book keeping, Nature of family business and Family Business Growth Model. Negotiation and Business communication (Strategy and tactics of negotiation/bargaining, Traditional and modern business communication methods). Opportunity Discovery Demonstrations (Business idea generation presentations, Business idea Contest, Brainstorming sessions, Idea pitching). Technological Solutions (The Concept of Market/Customer Solution, Customer Solution and Emerging Technologies, Business Applications of New Technologies - Artificial Intelligence (AI), Virtual/Mixed Reality (VR), Internet of Things (IoTs), Blockchain, Cloud Computing, Renewable Energy and others. Digital Business and E-Commerce Strategies).

EDU 301: Teaching Practice I (3 Units C: PH 135)

Learning Outcomes

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

1. knowledge of the subject matter;
2. the necessary Pedagogical skills;
3. acquired understanding of child psychology;
4. the needed attitude towards teaching;
5. proper use of instructional facilities;
6. apply knowledge of individual differences in actual classroom situations and use this knowledge to assist children in real time; and
7. effective classroom management skills.

Course Contents

Effective and responsive teaching practices and interactions are key for all learning in professional teacher preparation. The importance of teaching practice is to provide the students with an opportunity to apply their pedagogical knowledge and skills in practice. Therefore, the practical implementation of teaching and learning strategies in the classroom,

as applied to the subject area, should be taught through micro-teaching before students embark on the exercise.

EDU 302: Educational Measurements, Tests, Research Methods and Statistics (3 Units C: LH 45)

Learning Outcomes

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

1. measure and assess learning outcomes and use the results in decision making and judgments;
2. identify the different domains of learning; develop and use appropriate instruments for measuring each;
3. identify the different kinds of data that can be yielded in different contexts and the appropriate statistical tool for analyzing each type of data;
4. explain the meaning, aim, types, role and processes of research in educational settings;
   5. acquire communication skills and skills in reporting of research;
6. carry out hypothesis testing, and employ the knowledge of critical values and error in interpretation of results and making of inferences;
7. gain skills in the use of IBM-SPSS and other relevant packages in the analysis of data; and
8. judge and address ethical issues in research.

Course Contents

Types of educational measurements. Types of tests, development of tests, test blueprint, item analysis, reliability and validity of instruments. Domains of learning and taxonomy of cognitive outcomes. Meaning of research, types of research with focus on descriptive and experimental research. The research process. Writing a research proposal. Research designs. Theoretical/conceptual framework and review of literature. Sample and sampling techniques. Types of data, data gathering, data processing, data analysis and interpretation. Probability, critical values and error and their place in inferences. Ethical considerations (political, economic religious and cultural) in research. Data analysis using IBM-SPSS in educational data analysis. Reporting educational research.

BIO 301: Genetics II (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. summarize various aspects of human genetics and pedigree analysis;
2. discuss various aspects of gene interactions, biochemical mutants;
3. describe the types and functions of nucleic acids and nucleotides;
4. explain DNA replication and mutation;
5. discuss proteins and regulation of gene expression; and
6. describe the importance and processes involved in DNA technology and how it influences genetic engineering.

Course Contents

Aspects of human genetics; pedigree analysis. Further consideration of various deviations from basic principles. Gene interactions, including biochemical mutants, nucleic acids and nucleotides, DNA replication, mutation of DNA, proteins and regulation of gene expression. DNA technology and genetic engineering.
Pre- requisite -BIO 201.

BIO 302: Population Biology and Evolution (2 Units C: LH 30)

Learning Outcomes

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

1. explain the concept of natural selection;
2. summarize evolution of some organisms;
3. discuss how organisms adapt to their environment;
4. apply mathematical formulae and models to genetic variations and predictions in population; and
5. describe factors responsible for population changes.

Course Contents

Biological properties of species; Natural selection, variations, isolation mechanisms (including their breakdown resulting in hybridization, adaptation, origin of life, origin of species and adaptive radiation, Evolution of selected groups of plants and animals, including humans). Population dynamics, factors affecting population growth.

BIO 303: Biogeography and Soil Biology (2 Units C: LH 30)

Learning Outcomes

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

1. explain the theories related to Gondwanaland, continental drift and land bridges;
2. outline the world key flora and fauna groups and reasons for their distribution;
3. explain succession, colonisation and dispersal of plants and animals;
4. describe the concept of endemicity, refugia and Island biogeography;
5. discuss physical and chemical nature of soil;
6. summarise the cycling of minerals and nutrients;
7. explain soil and animal soil water relationship; and
8. outline the causes of soil erosion and alleviation methods.

Course Contents

Gondwanaland and theory of continental drift; theory of land bridges; distribution of world key floral and faunal groups including factors affecting distribution; phyto- and zoogeographyical regions of the world. Relationships between plants and animal distributions (emphasising local examples). Concept of successesion, colonisation and dispersal in terrestrial plants and animals. Concept of endemicity and refugia. Island biogeography. Physical and chemical nature of soil. Detritus organisms. Cycling of minerals and nutrient pools. Plant and animal soil water relationship, soil sampling techniques. Causes of soil erosion and alleviation methods/techniques.

BIO 304: Nigerian Fauna and Flora (2 Units C: LH 30)

Learning Outcomes

At the end of the lectures in Nigerian Fauna and Flora, students should be able to:

1. identify Nigerian plants and animals, and associate them with habitats;
2. confirm identified plants and animals with Herbarium and Museum specimens respectively; 3. describe the life histories strategies of selected plants and animals; and
4. discuss the prospects, problems and problem alleviation strategies of protected areas in Nigeria.

Course Contents

Field identification of Nigerian plants and animals; plant and animal indicators of Nigerian biomes (i.e. association of habitats with specific plants and animals);identification of plants through preserved herbarium specimens and keys, identification of animals through signs left by them such as footprints, trails, scats, runways and museum specimens; life history strategies of selected Nigerian plants and animals; Nigerian protected area system, their prospects, problems and problem alleviation strategies.

BIO 306: Systematic Biology (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the Pre-Linnaean, Linnaean and Darwinian taxonomic concepts of species;
2. explain the binomial system of nomenclature;
3. classify organisms based on the binomial system of nomenclature; and
4. explain the concept of keys and keying and their applications.

Historical background, pre-Linnaean, Linnaean and Darwinian, taxonomic hierarchies; species concept, categories below species and categories above species; biological nomenclature, new systematics; numerical and binomial taxonomy, keys and keying.

BIO 307: Field Course I (1 Unit C: PH 45)

Learning Outcomes

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

1. conduct basic field sampling techniques in terrestrial, aquatic and aerial environment;
2. collect plant and animal materials for identification, classification and preservation in the herbarium and museum respectively; and
3. explain the importance of the institutes and industries visited to Biology.

Course Contents

Sampling techniques in local habitats (i.e., not more than 20 km radius of the University). Also involve visits to research institutes, industries and other related institute. This should cover several areas of specialisation in Biology. Assessment by examination (objectives, short answer questions, fill in the gaps) in addition to group report.

GOU-EDU 303: Psychology of Education in South-East Nigeria (2 Units; Compulsory; LH = 15; PH = 45)

Senate-Approved Relevance
Adequate preparation of professional teachers with useful knowledge, skills, values, initiatives and understanding and application of human knowledge to the principles of teaching and learning is important in Enugu, Nigeria, where Godfrey Okoye University, is located. This course is meant to help student educators to acquire the right techniques which is important for understanding the learner, his/her socio-economic environment and which will enable the student educators to teach their students effectively. This is in line with the epistemic dialogue that Godfrey Okoye University is anchored on. Therefore, during the course of teaching and learning, the student educators who acquired skills and knowledge in this course can easily find out individual differences among the students and guide the students to put in their best thereby preventing students in their studies dropping out of school.

Overview
The concept of student dropout in educational system has aroused interest of many professional academics and the public in general. Students may drop out of schools with or without the consent of the school either to another school or to sit at home. Some of the reasons for dropout from school are poor academic performance, lack of sufficient individualized attention and conflict between school and household duties. If student educators acquire the psychological skills that will make them understand the individual differences and needs of their students' they will teach more effectively, and dropout from schools will reduce or curbed entirely. This creates the need for proper attention on the application of principles and techniques of psychology to the solution of problem in the classroom.

This course is designed to enable the student educators acquire skills to understand human behaviour in relation to teaching and learning and the environment in which education takes place. It will give the student teachers the opportunity to understand the learner, apply the learning theories of motivation and memory processing in effective teaching and learning. It will expose the student educators to the need for home teaching and manage their own learning centres and become employees of labour.

Objectives
The objectives of this course are to:
1. 2. Justify the need for psychology of teaching and learning.
3. Discuss various theories of learning and their implications for the classroom teacher.
4. Examine the concept of dropout.
5. Identify the development patterns that influences the learners' behaviour.
6. Describe the theories of motivation and their application to the classroom.
7. Explain memory processing, encoding and retrieval process.
8. Analyze forgetting and remembering
9. Discuss the transfer of learning and its implications for the classroom.
10. Apply psychology of teaching and learning to home studies.

Learning Outcomes
By the end of this course, the student should be able to:
1. Define psychology of teaching and learning.
2. Discuss theories of learning and their implications to the classroom teacher.
3. Describe the relevance of motivation to classroom learning.
4. Select at least five adequate learning experiences and materials for school and home learners.
5. Draw out the relationship between learning and individual differences and fashioning appropriate techniques for solving the problems resulting from such differences.
6. Demonstrate how learning process can be effectively guided and preserved.

7. Distinguish developmental characteristics of the learners and fashion a way of solving certain problems resulting from such characteristics.
8. Discuss professionalism in relation to the study.

Course Content

Meaning of psychology. Meaning of educational psychology. Critical analysis of developmental patterns. Characteristics of individuals. Theories of learning. Implication learning theories to the classroom teacher. Concept of dropout from school. Theories of motivation. Motivational problems encountered in the classroom. How to solve the motivational problems. Issues of dropout from school. Enugu experience. Memory processing. Forgetting. Remembering. Classroom management. Need for home study. Professionalism in home school teaching. Learning establishment of a study centre. Students' attitudes. Students' aptitudes. Students' interest.

Minimum Academic Standards

1. Projectors.
2. Other NUC-MAS requirement facilities.

GOU-EDU 305: Indigenous Educational Resources for Curriculum Implementation (2 Units; Compulsory; LH = 15; PH = 45)

Senate-Approved Relevance

This course is designed for the training of highly skilled and knowledgeable education graduate teacher on local educational resource for teaching and learning in Enugu, Nigeria which aligns properly with the mission and vision of Godfrey Okoye University, Enugu to produce graduate teachers that could contribute maximally to high quality education entrepreneurship, and sustainable socio-economic human development. This is also in agreement with Nigeria SDG for equitable, inclusive and sustainable education.

Overview

Presently students of education are not made to learn about skills for production of instructional materials from local resources like palm trees and other forest trees and soil for teaching and learning various school subjects. In terms of impacting the knowledge, these skills would enable graduate teachers to utilize the local environmental resources to produce instructional materials for schools here and outside Enugu.

The course therefore is designed to adequately expose graduate education teachers of Godfrey Okoye University to look inward in the production of various educational instructional materials from local resources for Enugu and Nigerian schools.

Objectives

The objectives of the course are to:

1. Define the concept curriculum.
2. Discuss problems encountered in defining curriculum.
3. Explain the aim and scope of curriculum.
4. Describe the different programs in education curriculum.
5. Define resources in education curriculum.
6. Outline the different types of resources in education curriculum.
7. Describe improvisation of instructional materials in education curriculum.
8. Describe the various local educational resources for teaching and learning in Enugu.
9. Discuss the merits and demerits of utilizing local educational resource in production of instructional materials.
10. Describe the main qualities of a good instructional material.

Learning Outcomes

By the end of this course, the student should be able to:

1. Define the concept curriculum in three different ways.
2. Explain at least five problems encountered in defining education curriculum.
3. Describe at least five aims and scope of education curriculum.
4. Describe the three main programs of education curriculum.
5. Explain at least five local educational resources in education curriculum.
6. Differentiate at least five local educational resources in education curriculum.
7. Describe the meaning of improvisation of instructional materials in teaching and learning.
8. Explain at least five local educational resources for producing teaching and learning materials.

9. Describe at least five merits and demerits of using local educational resource in production of instructional materials.
10. Describe at least five qualities of good instructional materials.

Course Content

Definition of terms. An overview of the course. Aim of the course. Objective and Contents. Learning experiences. Scope of the course. Education and curriculum. Curriculum programmes. Programme of studies. Program of guidance. Program of activity. Resources in education curriculum. Human and material resource from plant, soil etc. Meaning of instructional materials. Improvisation of instructional materials. Qualities of good instructional material: durable, clarity cost etc. Advantages of local educational resources.

Minimum Academic Standard

a) Micro teaching laboratory.
b) Computers (1:5 students).
c) Other NUC – MAS requirement facilities.

GOU–SED 311: Indigenous Teaching Methods in Biology I (2 Units; Compulsory; LH = 15; PH = 45)

Senate Approved Relevance

The senate of the Godfrey Okoye University, Enugu working with the National University Commission, Nigeria has considered students engagement and understanding of materials as primary goals in today's education over spoon- feeding the facts. Therefore, using black-boards or the typical lecture methods are not adequate to teach science and other related subjects. Many scholars and researchers have proposed advanced ideas and they claim that virtual teaching scenarios or simulations can help to build a better understanding of subjects among students. The course, innovative methods in science I will help students to explore the world of science, biology inclusive. These innovative teaching techniques in science can substitute the typical teaching techniques to achieve the 2063 sustainable development goals in pedagogy.

Overview

Students in Nigeria schools have reported low achievement in sciences including biology in school certificate examinations over the years. There is no gain saying the fact that inculcating innovative pedagogical skills in science educators will help to boost students' understanding of science and lead to improvement in students' achievement in school certificate examinations.

The course is designed to adequately equip our students with the needed pedagogical skills using hands-on learning, storytelling, role play, sports-based learning, visual cues, instructional conversation, science text cards, word games, social media, virtual science labs, word walls, thinking maps, mini anchor charts, crossover learning, context-based learning, computational thinking, remote labs, science kit and science stations.

Objectives

The objectives of the course are to:

1. Define innovative methods in science.
2. Explain hands-on learning and state its advantages.
3. Demonstrate story telling.
4. State the advantages of storytelling technique.
5. Demonstrate role play technique in teaching.
6. List the advantages of role play.
7. Explain sports-based learning and its advantages.
8. Define social media and state its advantage.
9. Explain crossover learning and state its advantages.
10. Describe computational thinking and state its advantages.
11. Describe context-based learning and list its advantages.

Learning Outcomes

On completion of the course, the students should be able to:

1. Define innovative method.

2. Explain hands-on learning and state five of its advantages.
3. Demonstrate storytelling.
4. Give four advantages of storytelling.
5. Demonstrate role play techniques in teaching.
6. List three advantages of role play techniques.
7. Explain sports-based learning and three of its advantages.
8. Explain social media, and give four of its advantages.
9. Explain crossover learning, and state four of its advantages.
10. Describe computational thinking, and state three of its advantages.
11. Explain context-based learning, and state four of its advantages.

Course Content

Concept of teaching. Concept of Learning. Innovative teaching methods. Hands-on learning. Storytelling. Role play. Sports-based learning. Social media. Cross-over learning. Computational thinking. Context-based learning. Visual cues. Instructional conversation. Science text cards. Word games. Thinking maps. Science kits. Science stations. Remote labs. Observation stations.

Minimum Academic Standard

Virtual Science labs, Remote labs, Science kit, Science stations, Observation stations and mini-labs.

GOU–SED 312: Indigenous Teaching Methods in Biology II (2 Units; Compulsory; LH = 15; PH = 45)

Senate Approved Relevance

The senate of the Godfrey Okoye University, Enugu working with the National University Commission, Nigeria has considered students engagement and understanding of materials as primary goals in today's education over spoon feeding the facts. Therefore, using black-boards or the typical lecture methods are not adequate to teach science and other related subjects. Many scholars and researchers have proposed advanced ideas and they claim that virtual teaching scenarios or simulations can help to build a better understanding of subjects among students. The course, innovative methods in science II will help students to explore the world of science biology inclusive. These innovative teaching techniques in science can substitute the typical teaching techniques to achieve Africa's sustainable development goals.

Overview

Nigeria students have recorded low achievements in science including biology in senior school certificate examinations over the years. There is no gain saying the fact that inculcating innovative pedagogical skills in science educators will go a long way in boosting students' understanding and consequently lead to improvement in students' achievement and retention in biology.

This course is the continuation of GOU-SED 311. It is designed to adequately equip our students with the needed pedagogical skills using embodied learning, science museums, projects, multimedia approach, ICT enabled learning, video clips, power points, science fair, Research books, mini-labs, Documented problem solving, Science kit, Science stations, Observation stations, peer-to-peer teaching, Science movies, Field trips, Reward discovery, Interactive science journals, Flipped classroom, Guided discovery problems, build your model.

Objectives

The objectives of the course are to:

1. Explain embodied learning and give its advantages.
2. Describe science museum.
3. List advantages of science museum to a science student.
4. Explain multimedia approach in teaching and state its advantages.
5. Describe ICT enabled learning and list its advantages.
6. Describe the use of video clips and power points in teaching.
7. State advantages of the use of video clips and power points.
8. Explain documented problem solving and give its advantages.
9. Explain peer-to-peer teaching.
10. State advantages of peer-to-peer teaching.
11. Explain field trips.
12. Explain guided discovery problems, list its advantages in teaching.

Learning Outcomes

On completion of the course, the students should be able to:

1. Explain embodied learning, state at least five of its advantages.
2. Describe a science museum.
3. List two advantages of science museum to a science student.
4. Explain multimedia approach, give at least its three advantages.
5. Describe ICT enabled learning, list at list four of its advantages.
6. Explain the use of video clips and power points in teaching.
7. Give two advantages each of video clips and power points in teaching.
8. Describe documented problem solving and list three advantages.
9. Explain peer-to-peer teaching.
10. Outline two advantages of peer-to-peer teaching.
11. Explain the use of field trips in teaching.
12. Give five characteristics of field trips.
13. Describe guided discovery problems, list four of its advantages in teaching.

Course Content

Embodied learning, Science museums, Projects, Multimedia approach, ICT enabled learning, Video clips, Power points, Science fair, Research books, Documented problem solving, Science kit, Science station, Observation station, Peer-to-peer teaching, Science movies, Field trips, Interactive science journals, Flipped classroom, guided discovery problems, build your model.

Minimum Academic Standard

Science kit, Science stations, Observation stations, mini-labs, Remote labs, Virtual science labs.

GOU–SED 313: Issues, Approaches and Challenges in Biology Education in the South-East Zone (2 Units; Compulsory; LH = 15; PH = 45)

Senate Approved Relevance

The senate of the Godfrey Okoye University, Enugu in line with the National University Commission, Nigeria sees science education as a much more than fact-based knowledge enterprise. Science education becomes meaningless and incomprehensible for learners if the learners are unable to relate it with their lives, hence the need to adopt Science Technology Society (STS) approach for the delivery of science education. The purpose of STS approach lies in developing scientifically literate citizens who can make conscious decisions about the socio-scientific issues that impact their lives. The challenges in adopting this approach here in Nigeria lie in four areas that will completely need to be revamped using the STS approach. These areas include examination system, science textbooks, science teacher education program, available resources and school activities. This explains the dire need for the inclusion of the course, Issues, Approaches and Challenges in Science Education in the curriculum for the attainment of Nigeria's sustainable development goals.

Overview

In Nigeria, science graduates are unable to relate their fact-based knowledge in science education with their lives. Given that science education becomes meaningless and incomprehensible if the

learners are unable to relate it with their lives, scholars and researchers are considering the use of Science Technology Society (STS) approach in order to help develop scientifically literate citizens who can make conscious decisions about socio-scientific issues that impact their lives.

This course – Issues, Approaches and Challenges in Science Education – is designed to adequately develop scientifically literate citizens who can make conscious decisions about socio-scientific issues that impact their lives. Hence the yearning need to revamp our examination system, science textbooks, science teacher education program, availability of resources and school activities using the science technology society approach cannot be over emphasized.

Objectives

The objectives of the course are to:

1. Explain the concept of science education.
2. Outline issues in science education and state approaches to resolve it.
3. Enumerate challenges to science education program.
4. Explain the concept of science, technology and society.
5. Evaluate the examination system in Nigeria.
6. Describe the features of suitable science textbooks in use in schools.
7. Explain science education program in Nigeria.
8. Enumerate available school science resources.
9. Describe different school science activities and state their merits.
10. State merits of school science resources.

Learning Outcomes

On completion of the course, the students should be able to:

1. Explain the concept of science education.
2. Outline at least ten (10) issues in science education and three approaches to resolving them.
3. Discuss the impediments of at least five (5) identified issues to science education.
4. Enumerate and discuss at least five challenges to science education.
5. Explain the concept of science, technology and society.
6. Describe examination system in Nigeria.
7. Describe at least two (2) science textbooks that are suitable for schools.
8. Explain science education program in Nigeria.
9. Enumerate ten (10) school science resources and state any five of their merits.
10. Describe at least four school science activities and their merits.
11. Explain how Science Technology and Society (STS) can be used to resolve science education encumbrances.

Course Content

Concept of science. Technology. Society. Education. Issues in science education. Impacts of the identified issues on science education. Approaches to resolving science education issues. Challenges to resolving the science education issues. Science Technology and Society (STS). Examination system in Nigeria. Science textbooks. Science education program. School science resources. School

science activities. Influence of technology on the society. Advantages of technology. Disadvantages of technology.

Minimum Academic Standard

Science textbooks, School science resources.

400 Level Courses

EDU 400: Project (3 Units C: PH 135)

Learning Outcomes

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

1. identify researchable project topics on contemporary problems in relevant subject specialization in education;
2. search and review literature pertinent to identified topical issues;
3. conceptualize and design a research study to address an identified problem'
4. develop valid and reliable tests, questionnaires and other relevant research instruments for research project;
5. plan and implement a scheme for selection of study sample;
6. determine statistical tools for analyzing data collected based on research objectives;
7. write a coherent report on research conducted;
8. cite and reference sources of information used in their research report; and
9. work independently to accomplish a research project with the guidance of the research supervisor.

Course Contents

Application of knowledge and skills acquired in research methods, statistics and evaluation in identifying and proffering solutions to educational problems. Working independently under the guidance of a Project Supervisor. Planning and execution of a well-conceptualized research and presenting a written report on the study conducted.

EDU 401: Teaching Practice II (3 Units C: PH 135)

Learning Outcomes

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

1. knowledge of the subject matter;
2. the necessary Pedagogical skills;
3. acquired understanding of child psychology;
4. the needed attitude towards teaching;
5. proper use of instructional facilities;
6. knowledge of individual differences in actual classroom situations and how to use this knowledge to assist children in real time; and
7. effective classroom management skills.

Course Contents

Effective and responsive teaching practices and interactions are key for all learning in professional teacher preparation. The importance of teaching practice is to provide the students with an opportunity to apply their pedagogical knowledge and skills in practice. Therefore, the practical implementation of teaching and learning strategies in the classroom, as applied to the subject, area should be taught through micro-teaching before students embark on the exercise.

BIO 402: Principles of Plants and Animal Breeding (2 Units C: LH 30)

Learning Outcomes

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

1. explain principles of plant and animal breeding;
2. enumerate the importance of heterosis, sterility and inbreeding consequences;
3. state management strategies for pests and diseases;
4. possess ability to conduct breeding exercises in plants and animals;
5. develop appropriate management practices required for plant and animal breeding; and
6. keep adequate farm records.

Course Contents

Importance of plant and animal breeding with examples. Cytogenetic principles of breeding, heterosis, inbreeding consequences, incompatibility mechanisms, sterility, breeding methods, disease and pest resistance and their management, major domestic plants and animals' breeding practices, and desired traits used to sustain their qualities. General management and farm record keeping.

BIO 403: Wildlife Conservation and Management (2 Units C: LH 30)

Learning Outcomes

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

1. state the principles/glossaries of wildlife management;
2. outline wildlife diseases;
3. identify problems and prospects in wildlife resources;
4. outline conservation policies related to wildlife; and
5. explain the impact of climate change on wildlife resources.

Course Contents

General principles/glossaries of ecosystem management. Biological gardens. Wildlife diseases. principles of wildlife management. Wildlife in Nigeria: conservation policies. problems and prospects. World wildlife resources and their protection. Conflicts related to wildlife resources. climate change and wildlife resources. International and national laws related to wildlife resources. Fire as tool in terrestrial wildlife management.

BIO 404: Nigerian Plants and Animals in Prophylactics and Therapeutics (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. explain the historical development of plants and animals in prophylatics and therapeutics (Phamacognosy);
2. define some terminologies used in pharmacognosy;
3. appreciate the classification and uses of plants and animals in prophylatics and therapeutics in Nigeria;
4. understand crude traditional methods of preparation and uses;
5. identify and describe modern methods of preparation and uses of plants and animals as prophylatics and therapeautics; and
6. account for the evaluation and adulteration of crude drugs, and the need for quality control

Course Contents

Historical development and scope of plants and animals in prophylatics and therapeutics (Phamacognosy). Some terminologies used in pharmacognosy. Classification and uses of plants and animals in prophylatics and therapeutics in Nigeria. Crude traditional methods of preparation and uses. Modern methods of preparation and uses of plants and animals as prophylatics and therapeautics. Evaluation and adulteration of crude drugs (extraction methods, identification of phytochemicals, proximate analysis, minerals, organoleptic, microscopic, physical, chemical and biological). Deterioration and adulteration of crude drugs. Quality control.

BIO 407: Field Course II (1 Unit C: PH 45)

Learning Outcomes

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

1. acquire knowledge on various field aspects of biology;
2. demonstrate ability to plan and conduct a series of simple field experiments and collection of data;
3. develop the ability, to record, summarize, classify, preserve specimens collected from the field;
4. develop thin working and individual skills, learn to manage time effectively; and 5. write biological and field reports with appropriate presentation.

Course Contents

Field trips should be conducted to meet the requirements of various aspects of Biology taught in the classroom. The field course should add to, and fulfil other practical aspects of ecology, hydrobiology, wildlife and forestry, taxonomy and systematics and others. Guided field visits by students to observe plants and animals, learn sampling techniques as related to plants and animals, collect samples, classify, preserve in herbarium and museum accordingly. Conduct field researches, collect data and analyse. Visit to industries, wildlife parks, zoological gardens, afforestation fields/woodlot parks, reservoirs /dams, farms, environmental control establishments and sites, and other areas of biological importance. Field projects (individual or grouped), report writing and examination.

BIO 408: Applied Biotechnology (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. conduct DNA extraction from different tissues;
2. quantify DNA and proteins;
3. outline the types of chromatography;
4. describe DNA amplification;
5. apply the knowledge of biotechnology to protein engineering, medicine, food and forensic science; and
6. incorporate the knowledge of biotechnology in the treatment of wastes.

Course Contents

Extraction of DNA and proteins from various tissues, quantification of DNA and proteins. Molecular biology techniques including chromatography (paper and thin layer). Electrophoresis. amplification of DNA using polymerase chain reaction. Identification and genomic sequencing. Introduction of DNA IUTA and cloning in cell. Application of biotechnology in protein engineering and production, medicine and forensic science, bioindustrial production of genetically engineered medicinal and food products using living factories. Environmental protection and cleansing through biotechnological treatment of solid, liquid, chemical and nuclear waste.

BIO 410: Bio-Entrepreneurial Options (2 Unit C: LH 30)

Learning Outcomes

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

1. acquire an understanding of the background, appropriate theory and methods relating to any of the chosen topics;
2. appraise and discuss how knowledge acquired can be used to become an independent entrepreneur;
3. discuss project cycle, financial sourcing and management; and
4. design and plan how any of the products can be produced on a large scale for national and international markets.

Course Contents

Students are required to take 2 Units of direct studies in any one of the areas listed below. Availability of each area depends on staff on the ground. Examples of these options include but not limited to 1. Mushroom farming.

2. Tissue culture.
3. Apiculture.
4. Weed management and control.
5. Introduction to ornithology/poultry production.
6. Environmental impact assessment.
7. Horticulture/Applied horticulture and landscape ecology.
8. Orchards / Production of vegetables.
9. Herpetology.
10. Introduction to Vaccine and anti-venom production.
11. Heliciculture.

12. Techniques in disease diagnosis.
13. Production of slides and Photomicrography.
14. Production and management of ruminants/monogastric animals.

BIO 413: Bioinformatics (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. explain the history of bioinformatics;
2. identify basic instruments required in bioinformatics; 3. Outline DNA and protein databases; and
4. describe genomics and proteomics.

Course Contents

Introduction to computer based analyses and management applications of molecular biological data. history of bioinformatics. Instrumentation: PC applications, resources, introduction to DNA and protein databases. data storage. file formats and information retrieval. genomics and proteomics.

BIO 414: Molecular Biology (2 Units C: LH 30; PH 45)

Learning Outcomes

At the end of the lectures in this course, students shall be able to:

1. describe the structure and roles of DNA and RNA;
2. discuss Gene regulation, DNA replication, genetic transformation and recombinant DNA technology;
3. summarize the roles of Nucleic acids and proteins in the cell division, growth and development; and
4. list the importance and application of Molecular Biology in food production, medicine and genetic engineering.

Course Contents

Structure and role of DNA. Structure and role of RNA.
Describe gene regulation, DNA replication, genetic transformation and recombinant DNA technology. Describe biological systems at the molecular level. Nucleic acids and proteins and how they interactively regulate cell division, growth and development. Evolution of genomes. Practical applications of the knowledge of molecular Biology (in alleviation of food shortages, plant breeding, disease resistant crops, animal breeding, marriage, medicine, genetic
engineering and others).

GOU-EDU 403: Ethno-Pedagogy and Curriculum of Non-School Environment (2 Units; Compulsory; LH = 30; PH = 0)

Senate-Approved Relevance

Adequate formation of professional teachers with sustainable knowledge, skills, values, and positive attitudes is a need in the local environment of Enugu where Godfrey Okoye University

is located. This course is meant to help student teachers to reach out to every learner in their homes and help them to achieve their educational needs. This is in line with the epistemic dialogue that Godfrey Okoye University is anchored on. Therefore, apart from teaching in the formal classroom setting, students who acquire skills and knowledge in this course can easily become home teachers and own their own study centres. This is also in line with the entrepreneurial mind-set of Godfrey Okoye University Enugu, Nigeria.

Overview

Continuous poor performance of students in formal school setting in almost every standardized examination in both primary and secondary education calls the need for the development of this course. In recent times, parents are always busy with work. Many a time, they find it difficult to look at the academic work of their wards. This creates the need for proper attention on the educational needs of their children.

This course is designed to enable the student teachers acquire the required knowledge and skills to help learners to develop their educational potentials and desired learning outcomes. It will give the student teachers the opportunity to manage home lessons. More so, it will expose the student learners on the need to own and manage their own learning centres and become employers of labour.

Objectives

The objectives of this course are to:

1. Justify the relationship between ethno-pedagogy and curriculum.
2. Explain the concept of non-school environment.
3. Discuss curriculum as a process for transferring knowledge into application.
4. Analyze the relevance of curriculum based on the national policy on education.
5. Explain selection of objectives and learning experiences in curriculum.
6. Outline the role of instructional methods and materials in curriculum.
7. Explain evaluation processes in curriculum.
8. Identify the need for curriculum innovation in Enugu.
9. Apply ethno-pedagogy at home schools.

Learning Outcomes

By the end of this course, the student should be able to:

1. Define ethno-pedagogy.
2. Give the meaning of curriculum.
3. Discuss the relevance of curriculum based on the national policy on education.
4. Draw out the relationship between curriculum and instruction based on the three domains of learning.
5. Select adequate learning experiences and materials for home school learners.
6. Identify at least five scaffolding activities for home school teaching and learning.

7. Explain curriculum innovation in the subject area.
8. Name three instruments used in evaluating learners' performance in home school teaching and learning.
9. Discuss professionalism in relation to home school teaching and learning.
10. Identify five ways of public relations regarding home school teaching and learning.
11. Suggest three methods of establishing study centres.

Course Content

Concept of ethno-pedagogy. Meaning of curriculum. Concept of non-school environment. Critical analysis of curriculum in terms of their relevance and national goals. Relationship between curriculum and instruction in terms of objectives specification. Selection of learning experiences. Learning materials. Methods and media of instruction. Scaffolding activities. Evaluation. Curriculum innovation in a subject matter area with particular reference to Enugu experience. Professionalism in home school teaching and learning. Public relations in home school teaching and learning. Establishment of study centres. Application of ethno-pedagogy at home schools.

Minimum Academic Standards

1. Microteaching Laboratory.
2. Computers (1 computer per student).
3. Other NUC-MAS requirement facilities.

GOUNI –SED 410: Skills, Techniques and Strategies for Biology Instruction (2 Units; Compulsory; LH = 15; PH = 45)

Senate – Approved Relevance

The Senate of the Godfrey Okoye University, Enugu in line with the National University Commission, Nigeria has considered the indispensable need to inculcate in her prospective teachers the skills, techniques and strategies for teaching and learning in schools. Incorporating indigenous course content into the curriculum of Nigeria Universities has become necessary given that a greater number of Nigerian youths today shy away from school for lack of interest. The course, SED 410 – skills, techniques and strategies – provides the needed skills (listening, communicating, organization, design, project management, problem solving and creativity. Hence, the incorporation of the skills, techniques and teaching of biology in our school curriculum will in no small measure speed up our attainment of Africa's 2063 sustainable development goals.

Overview

In Enugu, the skills, techniques and strategies for teaching will have far reaching instructional value yet most teachers hardly engage in these instructional approaches. There is no gain saying the fact that adopting the needed skills, techniques and strategies for teaching will go a long way in sustaining interest of students in classroom activities.

The course is designed to adequately equip our prospective teachers with the needed skills, techniques and strategies for teaching and learning.

Objectives

The objectives of the course are to:

1. Define education skill.
2. State types of education skills.
3. Give examples of skills in education.
4. Give examples of teaching skills.
5. Explain skill acquisition, skill transfer and skill development.
6. Define technique.
7. Give main types of teaching technique.
8. Differentiate between teaching technique and teaching method.
9. Outline basic teaching technique.
10. State qualities of a good teaching technique.

Learning outcomes

On completion of the course, the students should be able to:

1. Define Education Skill.

2. Give three types of education skill.
4. List ten (10) examples of skills in education.
5. State five (5) examples of teaching skills.
6. Explain (i) skill transfer, (ii) skill acquisition, (iii) skill development.
7. Define technique.
8. Give two main teaching techniques.
9. Differentiate between teaching technique and teaching method.
10. Outline six basic teaching techniques.
11. State five qualities of a good teaching technique.

Course content

Concept of skill. Types of Education skill. Examples of skill in Education. Examples of teaching skills. Differences between teaching technique and teaching method. Basic teaching techniques, Qualities of a good technique. Learning technique. Teaching strategy. Active learning strategy. Advantages of problem-based learning. Disadvantages of problem-based learning, Classroom technologies. Inquiry-based learning. Classroom management strategies.

Minimum Academic Standard

Science Kit, Science Stations, Observation stations.

GOU-SED 411: Evaluation in Biology Education (2 Units; Compulsory; LH = 15; PH = 45)

Senate Approval Relevance

This course is intended for the training of high-quality graduates who are highly skilled and knowledgeable in the concepts, correlates and methods of evaluation in biology instruction. This is in line with the vision of Godfrey Okoye University to be a center of academic excellence in making decisions based on opinion formed about the quality, value or worth of biology education students, products, processes or events. This will contribute immensely to making our students good biology students on graduation.

Overview

Evaluation is taking decision based on opinion formed about the quality, value or worth of persons. Evaluating Biology instruction therefore means testing, measuring, accessing and then passing value judgment on the methods, media, skills, techniques and their interaction with the learners at work and not at the objectives of the instruction stage only. It entails passing value judgement-based o the results of the preliminary processes as tests, measurement and assessment which are associated with evaluation.

The evaluation process enhances early detection and therefore remedy to problems and difficulties of the learners. With Evaluation, the strengths and weaknesses of individual learner are detected and addressed during biology instruction process leading to well-informed teachers after university education. This course is designed to equip graduates on this course to do proper grading of students' strength in order to ensure quality completion of the teaching and learning process.

Objectives

The objectives of this course are to:

1. Discuss the concept of evaluation.
2. Explain the common criteria on which evaluation is based.
3. Differentiate formative evaluation from summative evaluation.
4. Discuss the purposes of evaluation.
5. Outline and explain methods of evaluation of biology education.
6. Explain the major parts of biology instruction.
7. Explain scoring and grading of performance in Biology Education.
8. Determine methods and tools for biology instruction evaluation.

Learning Outcome

On completion of this course, students should be able to:

1. Define Evaluation.
2. List and explain three common criteria on which evaluation is based.

3. Explain formative evaluation
4. Discuss three purposes of evaluation
5. Explain one method of evaluation.
6. Discuss two major parts of biology instruction.
7. Explain grading of performance.
8. Describe three tools used for biology instruction evaluation.

Course Content

Concept of Evaluation. Types of evaluation. Formative evaluation. Summative evaluation. Purpose of evaluation. Diagnostic evaluation. Placement evaluation. Appraisal evaluation. Method of evaluation. Subjective evaluation. Objective evaluation. Science instruction evaluation. Scoring and grading of performance in biology instruction. Tools for biology instruction evaluation. Methods of biology instruction evaluation. Assessment. Science instruction. Assessment of students' performance.

Minimum Academic Standard

Micro-teaching laboratories, assessment tools.

GOUNI-SED 412: Curriculum for Teaching and Maintenance of Ethno-Biological Garden (2 Units; Elective; LH = 15; PH = 45)

Senate – Approved Relevance

Godfrey Okoye University considers students' engagement and understanding the practical aspects of a course as of primary importance in today's education over the theoretical aspect of teaching. Therefore, outdoor learning involving excursion and field trips are considered veritable teaching strategies for impacting learning on students. Many scholars have proposed that engaging students in practical activities will go a long way in developing students' cognitive, psychomotor and affective attributes. The course, Curriculum for teaching and maintenance of Ethno-biological garden, will help our would-be teachers to explore the world of plants and animals in their natural environment. This innovative teaching technique in science will blend with the typical theoretical teaching technique to achieve the 2063 sustainable goals in pedagogy.

Overview

Students in Nigeria schools have reported low achievement in Science Practical in School Certificate Examinations over the years. There is no gain saying the fact that exposing students to practical activities will help to boost their understanding of science and lead to improvement in students' achievement in School Certificate Examinations.

The course is designed to adequately equip our students with the needed cognitive, psychomotor and affective skills using hands-on learning, storytelling, role play, visual cues, word walls, thinking maps, science kit, science stations, field trips and excursions.

Objectives

The objectives of the course are to:

1. Define curriculum.
2. Explain the nature of Biology Education Curriculum in General.
3. State the scope of the curriculum for Ethno-biological garden.
4. Outline the importance of the curriculum.
5. Define ethno-plant.
6. Define Ethno-biological garden.
7. Give the characteristics of an ethno-plant.
8. Discuss the structures and characteristics of an ethno-biological garden.
9. Discuss the importance of cultivating medicinal plants.

Learning outcomes

On completion of the course, the students should be able to:

1. Explain the meaning of curriculum.
2. State four principles of curriculum development.
3. Define Biological garden.
4. Explain the meaning of Biological Garden.
2. Explain the nature and scope of the curriculum of ethno-biological garden.
3. Outline the importance of the curriculum of ethno-biological garden.
4. Explain the importance of teaching this course at Godfrey Okoye University.
5. Discuss four steps to setting up a biological garden.
6. Discuss the parts of a botanical garden.
7. List seven (7) medicinal plants and their importance.

Course content

Concept of curriculum. Nature of curriculum. Scope of curriculum. Need and importance of curriculum development. Principles of curriculum development. Concepts of teaching. Characteristics of teaching. Steps in teaching. Ethno-biological garden. Components of biological garden Elements of nature garden. Role of botanical garden in scientific research. Setting up a biological garden. Parts of a botanical garden. Functions of ethno-biological garden and Disadvantages of cultivation of medicinal plants.

Minimum Academic Standard

Biological garden, Zoological garden, Staff, collecting museum, Scientific Institute,
Library, Conservation organization, Educational academy, theme pack, shop, café.

GOU-SED 413: Curriculum Development in Biology Education (2 Units; Elective; LH = 30; PH = 0)

Senate Approval Relevance

This course is intended for the training of high-quality graduates who are highly skilled and knowledgeable in the curriculum organization and development in the area of Biology Education. This is in line with the vision of Godfrey Okoye University to be a center of academic excellence in policy making, development, design and implementation of biology education curriculum. This will contribute greatly towards making our students good and well-informed biology teachers who are equipped with skills to develop, evaluate and implement curriculum.

Overview

Biology Education curriculum development can involve changes in what is taught which is the content and its related applications to whom (which is the target audience namely the learners), and how (which refers to ways of teaching and learning as well as instructional interventions). It aims to help biology students to develop basic scientific ideas and understanding about the biological and physical aspects of the world, and the processes through which they develop this knowledge and understanding. An effective biology education curriculum should include a robust approach to health and safety and not just proper risk assessment but also supporting students so that in the future, as they enter the world of work, they are better positioned to look after themselves and others around them.

Biology Education curriculum development as planned, purposeful, progressive and systematic processes which create positive improvement in the education system in general and biology education student in particular leading to effective teachers on graduation.

Objectives

The objectives of this course are to:

1. Critique some definitions of Biology education Curriculum.
2. Draw the wheelers model of curriculum development.
3. Evaluate presently used curriculum materials for deficiencies.
4. Lists some the problems involved in curriculum implementation.
5. Summarize some of the philosophers' contributions to philosophical foundations of science
6. List some of the psychological factors affecting the biology education curriculum.
8. Justify why the biology education curriculum should be integrated.
9. List various types of curriculum evaluation.

Learning Outcome

On completion of this course, students should be able to:

1. Give two definitions of biology education curriculum.
2. Draw the wheelers model of curriculum development.
3. Write out two deficiencies inherent in the presently used biology education curriculum materials.
4. List five problems involved in biology education curriculum development and implementation.
5. Explain three purposes of biology education curriculum development.
6. Give a summary of one philosopher's contribution with Philosophical foundation of biology as a science subject.
7. List five psychological factors affecting biology education curriculum development.
8. Describe two types of curriculum evaluation.

Course Content

Definition of curriculum. The emerging concept of curriculum development. Purpose of biology education curriculum development. National policy on education. Need for national policy on education. Educational objectives. Behavioural objectives. Curriculum development and design. Stages of curriculum development. Curriculum processes. Philosophical foundations of biology education curriculum. Psychological foundation biology education curriculum. Curriculum integration. Levels of integration. Problems of integration. Justification of integration. Biology education curriculum evaluation. Types of curriculum evaluation.

Minimum Academic Standard

Micro-teaching laboratories, resource materials, models.

GOU-SED 414: Resources and Improvisation in Biology Instruction (2 Units; Compulsory; LH = 30; PH = 0)

Senate Approval Relevance

This course is intended for the training of high-quality graduates who are highly skilled and knowledgeable in development and utilization of resources and improvisation in biology instructions. This is in line with the vision of Godfrey Okoye University to be a center of excellence by identifying and utilizing different types of resources and improvisation in biology teaching and learning. This enhances the knowledge and understanding of biological concepts and principles which will make the students good biology teachers.

Overview

There are different types of resources and improvisation that are utilized to achieve the predetermined objectives of every biology content. Biology education requires effective instruction which involves conscious and appropriate selection and utilization by integration of relevant resources into teaching-learning processes to make scientific knowledge and skills accessible to learners.

Resources arouse the sense organs in the process of learning and predisposes biology teaching to be activity-based, thereby helping to concretize abstract concepts in biology. They could be regarded as the nervous system of teaching-learning process and cannot be separated from biology instruction, if objectives would be achieved.

Objectives

The Objectives of this course are to:

1. Identify different types of resources.
2. Name and describe some resources of Biology instruction.
3. Explain different functions of resources in biology teaching.
4. Identify some facilities for resources storage and preservation.
5. Describe the Nature (Science) Corner and how it can be provided within the teaching-learning environment.
6. List different items that should be in the nature corner.
7. Describe the resource room.
9. Explain some measures to be taken in the establishment of resource centers.

Learning Outcome

On completion of this course, students should be able to:

1. Outline different types of resources for biology instruction.
2. Give a reasoned classification of resources for biology teaching and learning.
3. Explain five functions of resources in teaching and learning biology.
4. Describe resource room as a facility for resource storage and preservation.

5. Create Nature Corner using locally made items.
6. List five items that should be in the Nature Corner.
7. Describe the resource room.
8. Differentiate resource center from resource room.

Course Content

Meaning and concept of resources in biology instruction. Types of resources. Classification of resources. Human and non-human resources. Importance and function of resources in Biology instruction. Facilities for resources storage and preservation. Nature (Science Corner). Nature corner items. Resources room. Recording items in the resources room. Resource centers. Establishment of resource center. Improvisation. Measure fir generating resources for biology resources. Management of resources. Best resources for biology teaching. Biology Podcast for teachers and students.

Minimum Academic Standard

Resource center, biology laboratory, ICT laboratory, local materials.

Minimum Academic Standards Segment

List of minimum equipment/Facilities

Facilities

1. A Demonstration Laboratory in the Biology Education Department
2. An Educational Technology Laboratory
3. A Micro-teaching Unit
4. A Biological Garden
5. Other Laboratories in the cognate Department of Biology in the Faculty of Sciences

Equipment

1. Microscope (Binocular)
2. Incubator/Sterrilizer
3. Water Filter
4. Hydrometer
5. Drying Oven (30^0 -120^0)
6. Microtome/Stage Micrometer
7. Herbarium
8. Photometer/Light Meter
9. Barometer Fortins
10. Insect Light Traps
11. Steel Aquaria
12. Plant Press

13. Wooden Quadrats
14. Sechi Disc
15. Bunsen Burners
16. Test Tubes
17. Test Tube Racks Plastic
18. Fire Extinguisher Big
19. Sand Buckets
20. Preserved Plant And Animal Specimens (Assorted) Plant Cell, Animal Cell, Onion, Tissue.
21. Water Bath
22. Skeletal System Chart
23. Skeletal System Model
24. Muscular System Chart
25. Brian And Nervous System Chart
26. Digestive System Chart
27. Eye Model
28. Ear Model
29. Nose Model
30. Skin Model
31. Excretory/Diagram Of Kidney
32. Male And Female Reproductive System Chart
33. Respiratory System 34. Ph Meter
35. Autoclave Partable
36. Air Pumps (Hand Operated)
37. Insect Storage Boxes (Wooden)
38. Hand Lens
39. Table Sinks
40. White Board
41. Gas Fiting Big
42. First Aid Kit (Big)
43. Retort Stands Complete
44. Beakers
45. Petri Dishes
46. Flat/Round Bottom Flask 500ml
47. Spatula Stainless 150mm
48. Preserving Bottles
49. Chromatography Apparatus
50. Nets, I.E, Sweeping, Butterfly Nets
51. Rain Gauge On Stand
52. Anemometer
53 Wind Vane
54. Wet And Dry Bulb Thermometer
55. Measuring Cylinder, Funnels

56. Bench Centrifuge
57. Shelves For Reagents
58. Laboratory Tables
59. Hot Plate
60. Biology Kits
61. Dissecting
62. Micrometer Screw Guage
63. Vernier 0-18cm
64. Measuring Tape
65. Hacksaw Blades
66. Plain Goggles
67. Engraver
68. Gas Cylinder
69. Biological Miscrocope Model 107
70. Disecting Boards
71. Dissolved Oxygen Meter
72. Leaf Area Meter
73. Filter Photocotori Meter
74. Muffler Furnace (Model 5xl)
75. Heating Mantle (5lflask)
76. Heating Mantle (2l Flask)
77. Heating Mantle (1l Flask)
79. Water Bath (Dk-8a)
80. Homogenizer
81. Dessicator
82. Refrigerator
83. Stabilizer (2000va)
84. Manesty (Distillatory)
85. Chromatography Tank With Accessories
86. Column Chromatography
87. Binocular Microscope
88. Centrifuge
89. Insect Box/Insectory
90. Insect Scope Net Scoop
91. Dissecting Kits
92. First Aid Box
93. Quadrat
94. Tape Meter (100ft)
95. Meter Rule
96. Adaptor (15amp)
97. Electrophoresis Paper(Germany)
98. Petri Dishes
99. Washing Brush

100. Air Sampler
101. Tissue Processor (3 Part Differential)

Lab. Chemicals

S/N	Item
1	Stains
2	Iodine Solution
3	Millions Reagent 500 Ml
4	Sudan Iii Solution 500ml
5	Copper Sulphate Solution 500ml
6	Benedict's Solution 500ml
7	Hydrochloric Acid (Dilute) 500ml
8	Eosin Solution 250ml
9	Chloroform 2.51
10	Formaline/Formaldehyde 2.51
11	Sodium Hydroxide 500g
12	Fehling Solution 500ml
13	Petroleum Ether (2.5l)
14	Ethanol (Absolute 2.5l)
15	Ethanol (901.-2.5l)
16	N- Hexane (2.5l)
17	Methanol (Absolute, 2.5l)
18	Iodine Crystals (500g)
19	Zinc Sulphate (500g)
20	Potassium Iodide
21	Saboraude Dextrose Agar
22	Peptone Powder
23	Formaldehyde (40%, 2.5l)
24	Chlorofoam (2.5l)
25	Selerite Broth Selenite
44	Leishman Stain
45	Giemsa Stain
46	Sefranin
47	Crystal Violet
48	Acetone (2.5l)
49	Methyl Red
50	Canada

Staffing

Academic Staff

The NUC guidelines on staff/student ratio of 1:30 for Education departments shall apply. It is expected that all academic staff should possess Ph.D degree. However, the proportion of academic staff with PhD degree should not be less than 70%, with a minimum of 6 full-time equivalent of staff (including full time staff from Faculty of Science), staff should have a maximum of 15 contact hours per week for lectures, tutorials, practicals and supervision of projects. The staff mix by rank should be in the ratio of 20:35:45 for Professors and Readers:Senior Lecturers:Others. However, where the ratios are distorted by virtue of a high percentage of Professors, that can be accepted.

In employing/promoting staff, the following criteria are suggested:

Administrative Support Staff

The services of the administrative support staff are indispensable in the proper administration of the departments and faculty offices. It is important to recruit very competent senior staff that are computer literate. The ratios are as given below:
Senior non-teaching (administrative and secretarial) staff should constitute 3.4% of the total student population.
senior secretarial staff should constitute not more than 40% of the total senior administrative staff junior staff should constitute 20% of the total student population

Technical Support Personnel

The services of technical support staff, which are indispensable in the proper running of laboratories and workshop/studios are required. It is important to recruit very competent senior technical staff to maintain teaching and research equipment. They are also to undergo regular training to keep them abreast of developments in equipment operation and maintenance. The ratio of academic staff to technical staff should be 20:1.

Library

Universities should leverage on available technology to put in place rich databases and other electronic/digital library and information resources. In addition well stocked and current hardcopies of reference and other textual materials should be provided centrally at the level of the University library, Faculty library and/or Departmental library. A well networked digital library should serve the entire university community. Availability of wireless facilities (Wifi) with adequate bandwidth should enhance access to these electronic resources.

In any case, there should be internet ready workstations available in the library for at least 25% of the total student enrolled in the programme.

Classroom, Laboratories, Workshops and Offices a) **Spaces**

The NUC recommends the following physical space requirement:

		m^2
Professor's Office	-	18.50
Head of Department's Office	-	18.50
Senior Lecturer's Office	-	15.50
Other Teaching Staff Space	-	13.50
Tutorial Teaching Staff's Office	-	7.00
Technical Staff Space	-	7.00
Secretarial Space	-	7.00
Science Staff Research Laboratory	-	16.50
Education Staff Research Laboratory	-	14.50
Seminar Space per student	-	1.85
Laboratory Space per student	-	7.50